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 JAWAHARLAL NEHRU UNIVERSITY

ICT AND KERALA'S DEVELOPMENT

AN ANALYSIS OF 'AKSHAYA' EXPERIMENT

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*Dissertation submitted in partial fulfilment of the requirements for the Degree of
Master of Philosophy in Applied Economics of the Jawaharlal Nehru University*

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M.Phil. Programme in Applied Economics

2006-08

CENTRE FOR DEVELOPMENT STUDIES

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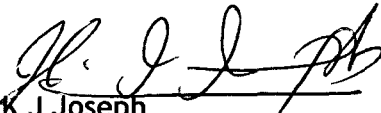
I hereby affirm that the work for the dissertation, **ICT and Kerala's Development: An Analysis of 'Akshaya' Experiment**, being submitted as part of the requirements of the MPhil Programme in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself and has not formed part of any other Programme and not submitted to any other Institution/University for the award of any Degree or Programme of Study

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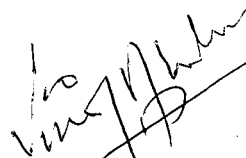


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Certified that this study is the bona fide work of Rajesh M, carried out under our supervision at the Centre for Development Studies.



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**“I dedicate this research work to a real human being,
Prof. K. Pushpangadan, who discovered me in this world”**

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Rajesh M

ABSTRACT

ICT and Kerala's Development: An Analysis of Akshaya Experiment

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This study mainly undertakes research on Kerala's performance in emerging knowledge intensive sector ICT. It attempts to answer the question whether 'Akshaya' model of ICT based intervention is capable to address Kerala's development issues, and to explore the opportunities that arise from knowledge intensive new economy.

It is a well known fact that over the past few decades Kerala 'model' development has received much attention in development studies. Kerala's remarkable achievements in Physical Quality of Life Index (PQLI) with low level of economic growth led it to become a 'model' for other states and even some other developed regions in the world. However, this paradox of high human development with low per capita income has generated a major debate on the state's ability to sustain its achievements within the social sphere without making similar progress in the productive sectors of the economy. The present globalization regime, however, has been associated with major technological change that took place in the form of information and communication technologies (ICT). It has been shown that ICT could be instrumental in enhancing competitiveness, productivity, employment generation and economic growth in developing regions.

This research evolves in the above-mentioned context and develops under the conceptual framework - ICT diffusion and development of an economy. In general, the contribution of ICT can be viewed at two different but interrelated levels - ICT production and diffusion. The former refers to the contribution to output, employment, export earning, etc. resulting from the production of ICT goods and services. ICT diffusion refers to information technology induced development through enhanced productivity, competitiveness, growth and human welfare resulting from the use of this technology in different sectors of the economy and society. As compared to other states in India, Kerala's ICT based development strategy has given emphasis to the diffusion of ICT. As part of this strategy, the State has initiated the experimental public intervention 'Akshaya' to reap the advantages of ICT based development. This study has taken Malappuram district for intensive field survey and analyzes how Akshaya addresses the development issues of Kerala and where it stands in terms of performance.

The study reveals that even though the knowledge intensity is less in the activities of present Akshaya units, it has been creating an economic vibrancy in the region to cope with emerging technology as well as to keep abreast with technological change. Moreover, the Akshaya experiment in Malappuram gives the lesson that ICT based diffusion strategy is good up to the extent of making people vigilant about changing technology. ICT is not the panacea for agricultural or industrial crisis if there are persistent fundamental factors contributing to the crisis. Rather, it can only complement various measures which target prices and productivity by mitigating information asymmetry. Further, Malappuram region is mainly dependent on remittances from Gulf countries so that there is not much room to accommodate ICT as a development tool in agriculture. I feel that Akshaya would have been more effective in Malappuram if it had given more emphasis to capacity building of potential migrants through ICT. The high intensity of e-payment activity in Akshaya reduces the relevance of the programme as it was envisaged because there is already an e-governance system to address those issues. This makes Akshaya less development oriented and reduces its scope to a mere administrative exercise. Instead of giving preference to e-payment, a programme like Akshaya should try to tap the comparative advantage of the region where it is implemented.

In essence, the much acclaimed ICT experiment Akshaya was successful in generating an information society through diffusion of ICT. However, the sustainability of the experiment depends a lot on developing production linkages with the rest of the economy.

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Chapter 1

Introduction

Information and Communication Technologies (ICT) and its linkages with economic development and social transformation have invited significant academic attention and debates in recent years, particularly in the emergence of new studies on 'new economy' or 'knowledge based economy'. As compared to any other conventional productive sectors in the economy, the ICT sector is considered as more knowledge intensive and 'knowledge' is the key factor of production "sidelining both capital and labor" (Drucker, 1993). The production, diffusion and consumption of ICT goods and services will induce the productivity and growth process of an economy (OECD, 2003; Gordon, 2000; Bailey, 2002; Basant et al, 2007).

This study mainly takes up the research on an ICT based policy initiative that was undertaken by the state of Kerala, India; and its impact on Kerala economy. It attempts to answer the question whether the policy intervention named 'Akshaya', an ICT diffusion model of development strategy, is capable to address Kerala's long prevailing development imbalance between social and economic development and to explore the opportunities that arise from knowledge intensive new economy. This chapter tries to give an overview the scope of the thesis. It explains the research background, problem statement, research questions, research objectives, analytical framework, and research methods of the present study.

1.1 Research Background

such as? As compared to any other regions in India, the state of Kerala has gone through various phases of development initiatives through a network of interaction among various actors and institutions. Public action had an important role in shaping these interactions among various agents (Sen, 1999) and in configuring the system of economy in Kerala. The uniqueness of Kerala's development experience is that the spread effect of human development was high and was not polarized in any specific location. This spread effect is quite visible in various human development indicators like education, health and other social development gauges (Human Development Report, 2005). The interesting fact is that this social development was achieved in spite of the low level of economic growth.

e.g.? ← Kerala's remarkable achievements in Physical Quality of Life Index (PQLI) with low level of economic growth led it to become a 'model' for other states and even some other developed regions in the world. However, this paradox of high human development with low per capita income has generated a major debate on the state's ability to sustain its achievements within the social sphere without making similar progress in the productive sectors of the economy. The present globalization regime, however, has been associated with major technological change that took place in the form of information and communication technologies (ICT). It has been shown that ICT could be instrumental in enhancing competitiveness, productivity, employment generation and economic growth in developing regions. This research evolves in this background and analyzes various policies Kerala has initiated to benefit from ICT and its outcome as compared to other states in India.

specifics?

1.2 Research problem statement

As part of emerging technological change in terms of ICT and its economic growth linkages, India and many other developing countries have adopted policy initiatives and institutional interventions to enhance their ICT capabilities (Joseph, 2006; Krishnan, 2004). India's strategy, however, has been to profit

mainly from the production and export of IT software and services as her performance in terms of the diffusion of ICT has been less remarkable. But if the available evidence is any indication, at least in the recent years Kerala has been adopting a strategy of “walking on two legs” - promoting both production and diffusion of ICT. The ICT projects like FRIENDS and Akshaya have already attracted world attention. ‘Akshaya’ project is a community based ICT experiment aiming at and development of the core sectors like agriculture, industry and social sectors like health and education. Initially, the programme started with the aim of providing ICT access to all sections of the society, bridging the divide between ‘information poor’ and ‘information rich’, developing locally relevant content, establishing rural connectivity, skill-set up gradation of common people, ensuring content to be generated in local language, and cost effective and efficient delivery of government services to the grassroots are the objectives of the project. This project is envisaged as an enabler in generating economic growth, creation of direct employment opportunities in the State by developing a unique entrepreneurial model for setting up of the centres. It is expected that the project would have a long-standing impact on the socio-economic scenario of the state.

Studies have highlighted the effectiveness of Akshaya in promoting Information Technology (IT) literacy (Pal, 2006; Jose, 2006). However, there is no study to understand, in particular, whether the Akshaya model ICT initiative is capable to address the Kerala’s long prevailing economic development issues like low growth in productive sectors and its capability to benefit from the emerging knowledge based economy etc. To fill this research gap this study concentrates on these problems and analysis the impact of Akshaya experimentation on Kerala economy.

1.3 Research questions

As mentioned in the problem statement, this study focuses on ICT based policy intervention of the State of Kerala and its impact on Kerala economy in the context of its past development experience. Therefore, this study is concerned

with the following research questions: What are the social and economic changes that have characterized Kerala's development? What are the initiatives which the State has taken over the time period to balance its growth process? How does the State act towards major technological change that took place in the form ICT? How does Kerala's policy intervention in terms of ICT differ from national policies and those of its neighboring states? What is the rationale behind the Akshaya experimentation? What is the institutional framework in which Akshaya works? What are the linkages between global and local institutional interventions? Is the Akshaya experimentation capable of addressing the various issues of its economy?

1.4 Research objectives

The primary objective of this study is to learn about Kerala's ICT based strategy and its likely outcome in Kerala economy. The study looks at 'Akshaya' as a public policy initiative and examines how does it go with in Kerala's development discourse and analyze whether it has any development impact in the economy. While we consider neighboring states' policy initiatives regarding ICT, Kerala's initiatives seem to be somewhat different and objectives are framed in an ambitious manner with the aim of making growth inclusive. To identify this policy implementation and outcome, following specific objectives are traced out from the research questions mentioned in Section 1.3. The specific objectives of the study are;

To highlight the developmental imbalance of Kerala and to explore the various policy initiatives under taken by the state to harness ICT, in comparison with that of neighboring states.

To have a detailed examination of the 'Akshaya' experiment to understand its effectiveness in generating local ICT capabilities on the one hand and addressing issues in productive sectors of the economy on the other.

1.5 Analytical Framework

This research evolves under the conceptual framework of ICT diffusion and development of an economy. In general, the contribution of ICT can be viewed at two different but interrelated levels - ICT production and diffusion. The ICT production refers to the contribution to output, employment, export earning, etc. resulting from the production of ICT goods and services. This is limited to just one segment of the economy and not related to the spread of ICT among the mass (Kraemer and Dedrick 2001). ICT diffusion refers to information technology induced development through enhanced productivity, competitiveness, growth and human welfare resulting from the use and spread of this technology in different sectors of the economy and society. Many of the studies in these areas are anecdotal citing and are not based on analysis of hard data. India has attempted to profit from ICT growth through a series of institutional innovations and export oriented policy measures, based on the implicit assumption that a market-oriented ICT production strategy will also result in the diffusion of new technology and ICT-induced development.

The statistical evidence and literature show that the production of ICT and its exports have increased (Arora et al 2001, Joseph, 2002, 2006, Kumar 2001, Parthasarathi et al 2004, D'Costa 2004). The literature on diffusion based development of ICT which looks beyond the firm level adoption of ICT and productivity growth, however, is scanty¹. Though there is some literature on diffusion based ICT strategy and its economic impact in OECD countries, they have not gone beyond a case study methodology lacking a theoretical framework (Gust and Marquez, 2002; Van Ark et al., 2002; Pilat et al., 2002; OECD 2003).

This study has attempted to contribute to this research area and has adopted the above mentioned analytical framework in terms of production and diffusion (consumption) of ICT. The experimental programme Akshaya advocates the diffusion of ICT among the masses giving access to the technology. Therefore,

¹ See in this context Joseph and Abraham (2007) Basant et al (2007) Lal (2001)

present study looks at Akshaya from the perspective of ICT diffusion and development of an economy.

1.6 Research methods

This study uses both qualitative and quantitative data. For analyzing Akshaya's role in development context of Kerala, a questionnaire is selected as a tool to collect data from Akshaya centres at Malappuram district in Kerala. Malappuram is the location where the Akshaya programme was initially experimented in 2002. The project was extended to seven districts of Kerala once the Government of Kerala (GoK) had realized that the pilot programme was successful. This has ensured almost 5 years of time lag to study the programme. We have randomly chosen sixty units to study out of the three hundred and forty four functional Akshaya units. The questionnaire was developed after a pilot visit in some of the units and Akshaya officials at Malappuram. I have drawn thirty samples each from urban (municipalities) and rural (primarily agriculture dependent population) clusters for detailed investigation.

1.7 Structure of the thesis

This thesis develops through five chapters. Chapter 1 presents an overview of this research. It addresses the research background, the research problem statement, research questions, research objectives, analytical framework and research methods.

Chapter 2 tries to describe Kerala's different phases of development experiences and the emergence of a unique development model. It addresses issues related to the imbalance between social and economic development, various crisis elements emerged out of this imbalance, the social chaos and educated unemployment, the recovery factors behind the non-collapse of the economy, and 'collective interventions' that were initiated by Government of Kerala to bridge the gap between social and economic development by inducing the growth process of productive sectors. This chapter places in context the recent ICT based initiative Akshaya and establishes its similarity with previous initiatives.

Chapter 3 focuses mainly on the emergence of major technological change in the form of ICT and its impact on Indian economy. It analyses various policies that were envisaged at national and state level to benefit from ICT production and its overall outcome. This chapter examines how Kerala's ICT strategy evolved over the time period in terms of ICT production and diffusion, and what was the outcome. It makes a comparative investigation of Kerala's ICT strategy with that of neighboring states Tamil Nadu, Karnataka and Andhra Pradesh. This chapter attempts to address the first specific objective of this research.

Chapter 4 presents the analysis and discussion of Akshaya experiments in terms of their contribution towards local ICT capability building, viability of the Akshaya units and some reflections on the effectiveness of this initiative in help addressing the developmental imbalance of the economy. It also tries to find out the factors that affect the performance of ICT and capability to address the development issues of the economy. This chapter deals with core objective of this study.

The last Chapter 5 summarizes research findings related to the research questions and specific objectives. The chapter then discusses the research contribution made by this study and presents recommendations for further research and practice.

Chapter 2

Balancing the Imbalance?

Kerala's Development Initiatives

The state of Kerala, located in the south-western part of India, is well known for its achievements in the physical quality of life of its people as is evident from higher human development index compared to other states in India and even comparable to some of the developed countries. Its development experience is a widely debated research topic among researchers and policy makers in terms of its high level social achievement in spite of the low level of economic growth. Researchers were also concerned with the limited influence higher human development on productivity, competitiveness and growth of the economy in general and productive sectors in particular (Ramachandran, 1997). Over the past few decades, Kerala's development experience has gone through various phases of 'collective intervention' and learning process through a network of interaction among various actors and institutions. Public action had an important role in shaping these interactions among various agents (Sen, 1999) and in configuring the social system in Kerala. Kerala's development discourse is mainly concerned with the potential of the economy and the State to sustain high level of social development without increasing commodity production and employment potential. This chapter focuses mainly on Kerala's development concerns over

time and State's various initiatives to balance its imbalance between social and economic growth.

2.1 The configuration of Kerala economy - historical base

The region's development story starts even much before the constitutional functioning of the state in 1956. Historically, the region of Kerala was enriched with its ecological equal regional distribution of resources in terms of rural urban distinction. It had well established international trade and communication with ancient Babylonia, Egyptians, Greeks, Romans, Jews, Christians and Muslims in terms trade of cash crops like cardamom, cinnamon, ginger, turmeric and black pepper. In late-nineteenth century British investors had shown good interest in Western Ghats of the region for establishing tea and rubber plantations. As a continuation to British trade relation with the region they have established various factories to process and manufacture coir, cashew nut, tobacco, tiles and wood products in the lowland coastal areas. The major incentive behind this trade function is Kerala's extensive infrastructure support in terms of roads, railways, water drainage systems, and ports (Franke et.al, 1994). More than the physical factors human factor played a major role in configuring Kerala's development process. The radical reforms in improving the lives of the poorest farmers and workers took place in the form of social networking of labor unions, caste and peasant organizations.

It is a well accepted fact that as part of British colonization and influence of Christian missionaries, the region underwent educational capability building process at various levels. As an outcome of this educational training, people achieved good literacy status. It is evident that in 1901 the region had achieved 11 percent general literacy rate as compared to the all India average of 5 percent. In 1971, it has grown up to 60 percent which was double the literacy rate of the country.

By 1956, when the constitutional integration of the region as state of Kerala had occurred, it had undergone tremendous radical reforms for bringing up freedom and social equality. Public interventions which were undertaken by the State

through various policy reforms led the State to climb the initial ladder of development of society. In this series of public interventions, Land Reform Act in 1969 and Kerala Agricultural Workers Act 1974 had played crucial role in making Kerala a developed society. The land reform in Kerala was the first attempt in South Asian countries to re-distribute the agricultural land among poor farmers and to abolish the tenancy system. According to government statistics during 1971, large portion of workers were engaged with plantation sectors and traditional industrial sectors like coir and tile manufacturing. This sector contributed 45 percent of employment to rural workforce and ranked Kerala first among all Indian states. Only 34 percent of rural workforce was engaged in major labor absorbing sector agriculture. The Kerala Agricultural Workers Act was enacted in this context to induce the work participation in agriculture through protecting the interest of agricultural laborers.

By late 1970s and 1980s, Kerala evolved as a premier state in social sphere of India with high standard of quality of life indicators. As compared to low income countries, Kerala was ahead in literacy rate, life expectancy, infant mortality rate and birth rate. In terms of primary and secondary schools, higher education facilities, post offices, roads, public distribution system, and hospitals Kerala was placed in the first position. However, the notable contradiction of this achievement is that it was attained with low per capita income and high unemployment. Table 2.1 gives an idea about the beginning of Kerala's unique development process. Except the per capita GNP, Kerala is ahead in all other quality of life indicators as compared to the rest of India and other low income countries.

defn?

Table 1: Comparison of Quality of Life Indicators, 1986

Indicator	Kerala	India	Low income Countries	United States
Per capita GNP (\$)	182	290	200	17480
Adult literacy rate (%)	78	43	Na	96
Life expectancy (in years)	68	57	52	75
Infant mortality (per 1000)	27	86	106	10
Birth rate (per 1000)	22	32	43	16

Source: Franke et. al, 1994

The radical reforms and high level of achievement in physical quality of life has not equipped the region to stimulate its economic growth as well as employment generation. In contrast to the impressive programs to benefit workers, Kerala's economy suffers from serious problem of high unemployment. In 1971, Kerala's unemployment was 26 percent while all India was 8 percent. The work participation rate also has shown a downward trend since 1901 from 45 percent to 29 in 1971.

2.2 The emergence of a development 'model'

As mentioned in the Section 2.1, Kerala's high level of performance in social sectors with low level of growth in productive sectors has invited wide development debates among academicians and policy makers, and become a region of research interest. The study conducted by CDS-UN (1975) initiated the academic debates on Kerala's unique development experience, and its various initiatives on high levels of human development even with very little economic development. The following sections look over how the State's economy has been evolving since 1970s and the initiatives taken by State to reduce the gap between social and economic development.

Kerala's population as per Census 2001 was 318.41 lakh consisting of 154.69 lakh males and 163.72 lakh females. Kerala's share in the population of India is 3.1 percent. Even if there is not much difference between rural and urban areas, 74 percent of the population still lives in rural areas as per Census definition. The average annual growth in population of Kerala during 1991-2001 was 0.91 percent as against the average annual growth rate of 1.93 percent in India. In addition to achievements such as low infant mortality rate and high life expectancy, the population growth rate in the state remains the lowest in the country. Between 1991 and 2001, population in the 15-19 age group increased by 12.91 percent. The proportion of people in the working age group is 63 percent in Kerala as against 55.6 percent in India. This indicates Kerala's high potential for economic growth.

As compared to other states in India, Kerala's achievements in basic human development are remarkable. Kerala is placed top in terms of human development index (HDI) with score of 0.638 in 2001. Since 1981 Kerala ranks top in HDI. Latest estimates for Kerala reveal a further enhancement in the HDI to 0.773 (HDR, Kerala, 2005).

Table 2.2 State-wise Human Development Index

States	1981		1991		2001	
	Value	Rank	Value	Rank	Value	Rank
Andhra Pradesh	0.298	9	0.377	9	0.416	10
Assam	0.272	10	0.348	10	0.386	14
Bihar	0.237	15	0.308	15	0.367	15
Gujarat	0.360	4	0.431	6	0.479	6
Haryana	0.360	5	0.443	5	0.509	5
Karnataka	0.346	6	0.412	7	0.478	7
Kerala	0.500	1	0.591	1	0.638	1
Madhya Pradesh	0.245	14	0.328	13	0.394	12
Maharashtra	0.363	3	0.452	4	0.523	4
Orissa	0.267	11	0.345	12	0.404	11
Punjab	0.411	2	0.475	2	0.537	2
Rajasthan	0.256	12	0.347	11	0.424	9
Tamil Nadu	0.343	7	0.466	3	0.531	3
Uttar Pradesh	0.255	13	0.314	14	0.388	13
West Bengal	0.305	8	0.404	8	0.472	8
India	0.302		0.381		0.472	

Source: Indiatat.com, 2008

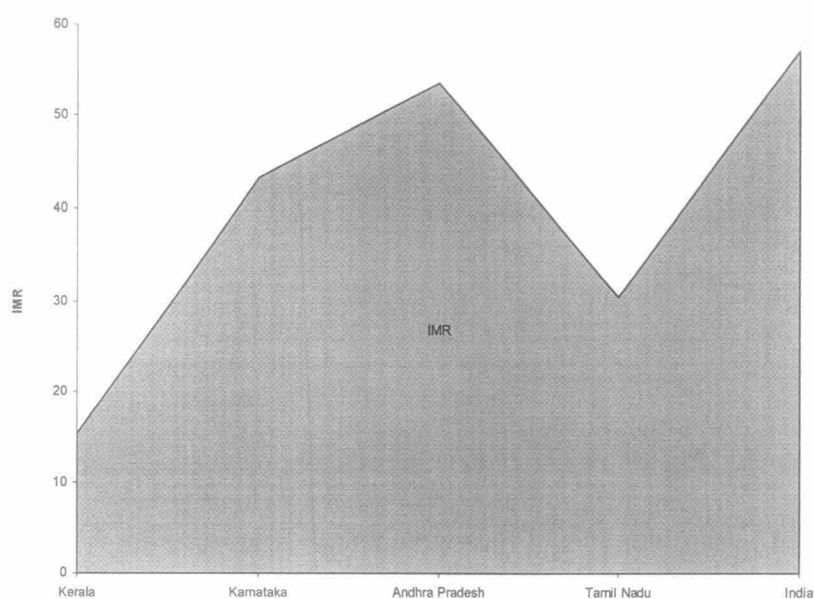
Life expectancy at birth and infant and child mortality rates is considered as one of the aspects of human development and it reflects a country's level of socio-economic development and quality of life. In Kerala during 2007 the life expectancy at birth was 73.45 years against the national average of 62.70 years. In this period, life expectancy of males was 70.90 years and of females were 76 against the national average of 61.80 and 63.50 years. During 2007, the IMR of Kerala was 14 and the national average was 58. All other states in India have infant mortality rates that are double that of Kerala (see Figure 2.1). It is important to note that IMR is one of the major parameter to monitor and evaluate health programme and policies of a region.

Table 2.3 Select health indicators of Kerala and India, 2007

Health Indicator	Kerala	India
Birth rate (per 1000 population)	15.00	23.80
Death rate (per 1000 population)	6.00	7.60
Infant mortality rate (per 1000 population)	14.00	58.00
Child mortality rate (per 1000 population)	3.40	17.30
Total fertility rate	1.70	2.90
Life at birth	73.45	62.70
Male	70.90	61.80
Female	76.00	63.50

Source: Economic Review 2007

Figure 2.1: Infant mortality rate compared to neighboring states, 2005-06

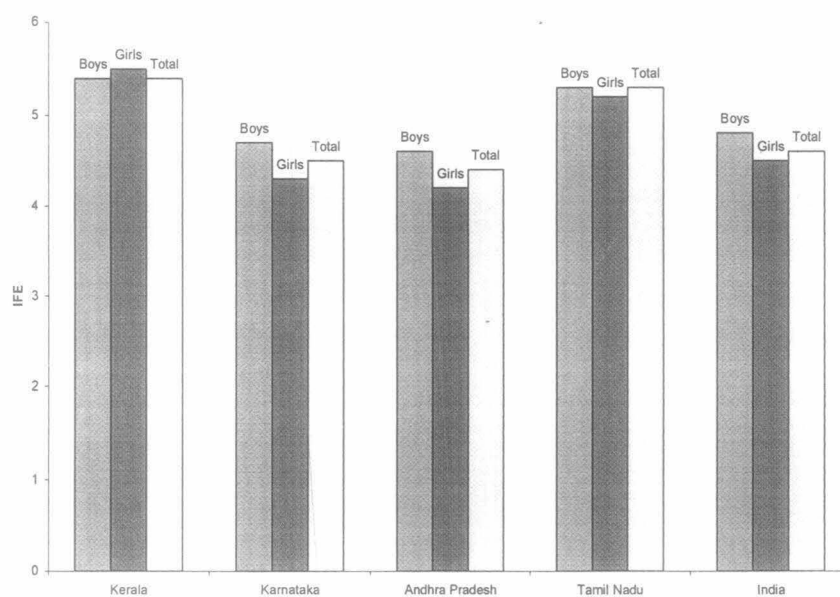


Source: National Family Health Survey, 2006

Kerala's literacy rates was 47.18 percent in 1951 and it has grown to 90.86 percent in 2001. Kerala's literacy rate has been consistently higher than the all India rate in all census years. Gender wise literacy also places Kerala in the prime position, male literacy 94.20 percent and female literacy 87.86 percent. By 1980s, enrolment at the primary level was near universal with no significant gender variation. In Kerala society, parents are not biased in investing in education of girls and boys.

A variety of initiatives, including social reforms, missionary works and state interventions in the early part of the last century, laid the ground for gender equality in education (HDR, 2005). In terms of gender equality index (GDI) Kerala was ranked first even in 1981 with an index of 0.750 as against India 0.620 in India. The intensity of formal education is highest in Kerala followed by Tamil Nadu.¹ Kerala's intensity of formal education is 5.4 in 1993 against of 4.6 years at national level. Compared to boys, intensity of formal education of girls is higher in Kerala, whereas in all other states the trend is the reverse (Figure 2.2)

Figure 2.2 Intensity of Formal Education Kerala with neighboring states, 1993



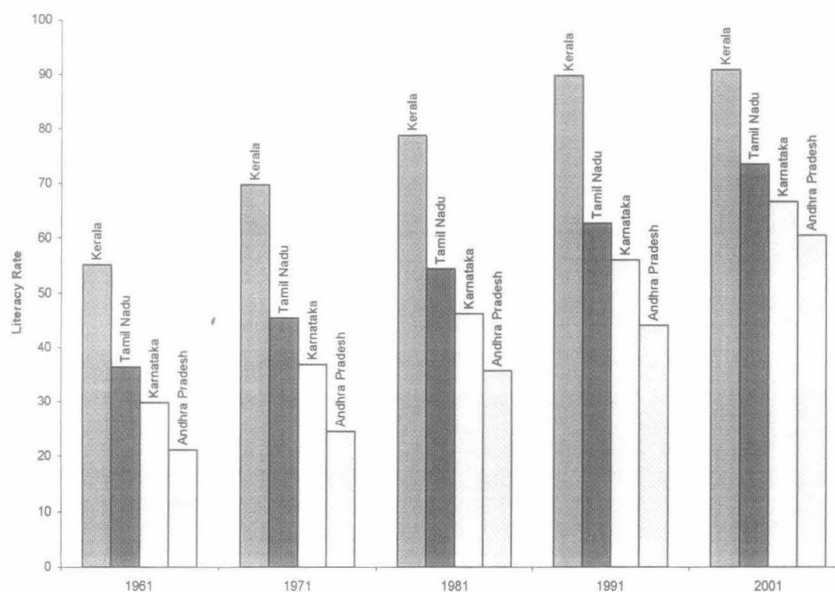
Source: National Human Development Report 2001

Public spending on education in Kerala has been among the highest in the country, both as a share in the total budgeted expenditure and as a percentage of NSDP. More than 80 percent of this expenditure goes to school education. However, the state is increasingly finding it difficult to sustain this level of expenditure, because of fiscal crisis. The share of education expenditure in NSDP

¹ The intensity of formal education is estimated as weighted average of the enrolled students from classes I-XII. It implicitly takes care of the drop-out rates across all classes.

has come down from above 6 percent in the 1980s to around 4.5 percent in the 1990s.

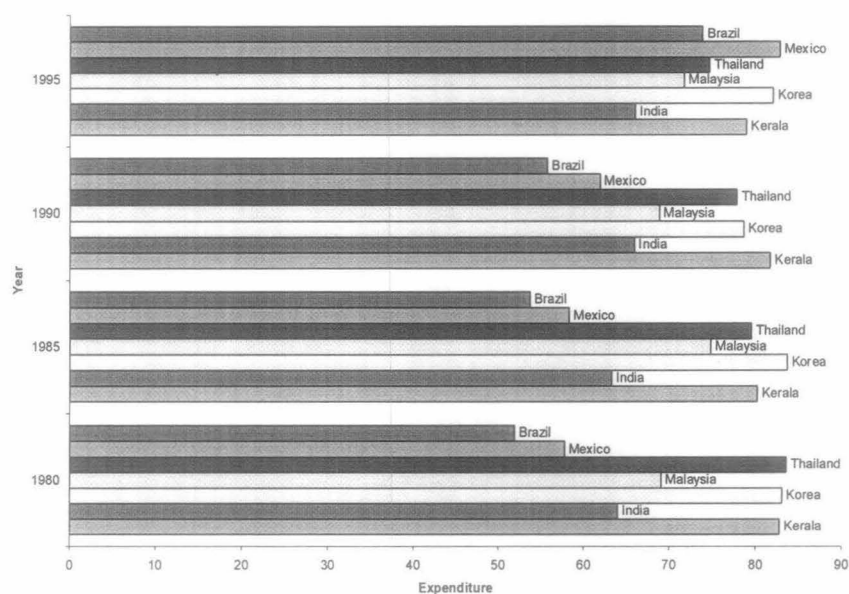
Figure 2.3: Literacy rate trend in Kerala and its neighboring states



Source: Economic Review, 2007

Kerala's pattern of allocation of public expenditure on education is very similar to that of the East Asian countries, particularly South Korea (Figure 2.4). There is a criticism that Kerala's education policy has given emphasis on school education compared to higher education. Over-spending on primary education than higher education is the reason for low economic growth in Kerala (Tilak, 2001). In contrast to this observation Chandrasekhar et al, 2001 argues that the major reason behind the East Asia's extraordinary economic performance is the quantity of basic education provided by governments.

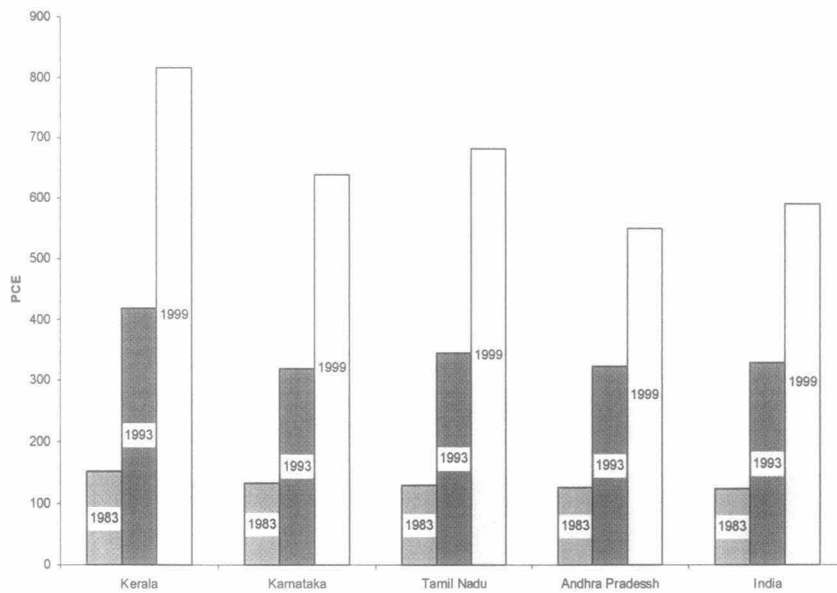
Figure 2.4 Share of expenditure on school education in total education expenditure



Source: Chandrasekhar et al (2001), HDR, 2005

According to Planning Commission, in the case of human poverty and deprivation, Kerala is in a secure position as compared to other regions in India. The human poverty index (HPI) calculated by NHRD, 2001 shows that Kerala is far ahead of even the economically better off states. The per capita consumption expenditure, which indicates the economic well being of a region, is also high in Kerala as compared to other states. 1983 onwards Kerala's per capita consumption expenditure stands above all India average, and the rural urban variation is only Rs. 166.9, which was much lower than the corresponding figures of neighboring states Tamil Nadu, Karnataka, and Andhra Pradesh.

Figure 2.5 Per capita consumption expenditure Kerala vs. neighboring states
(Rs. Per month)



Source: Planning Commission, 2001

Infrastructure parameters like road density, tele-density, and social and economic infrastructure index² etc show favorable condition for development in Kerala. In road density, in terms of both area and population, Kerala was the highest among all states. Tele-density recorded an upward trend in all states 1987-88 onwards. Tele density in 2000 was the highest in Kerala (5.56), which is almost double that of all India. After 2000 it was taken over by Punjab. In 2005-06 Kerala's tele-density was 25.54 as against of Punjab 27.61. In the case of social and economic infrastructure index Punjab has the highest index. Kerala stood next to Punjab.

² This index is calculated by Eleventh Finance Commission of India in 2000, which brings out a composite comparative profile of the availability of physical, social and institutional infrastructure in a state.

Figure 2.6 Infrastructure indicators Kerala vs. neighboring States

Figure 2.6.1 Road density in km

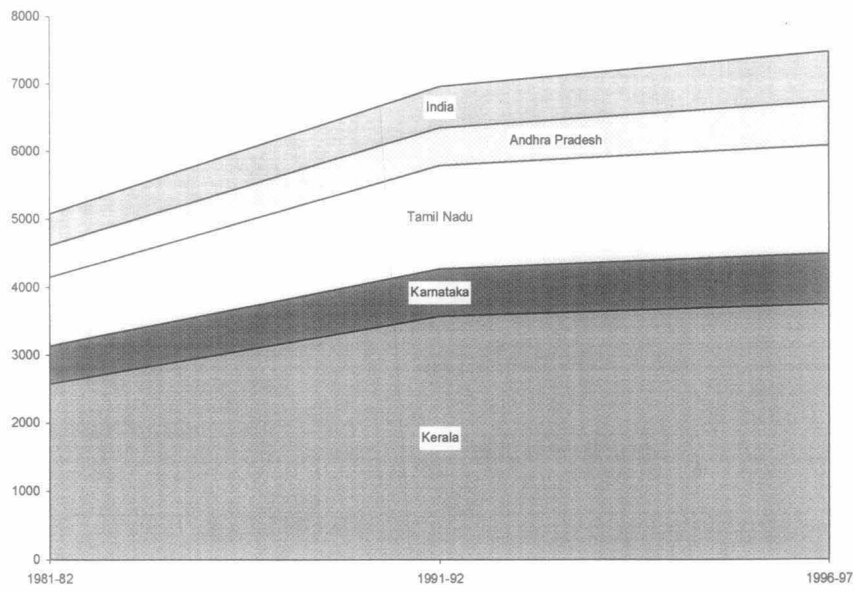


Figure 2.6.2 Tele density per 100 persons

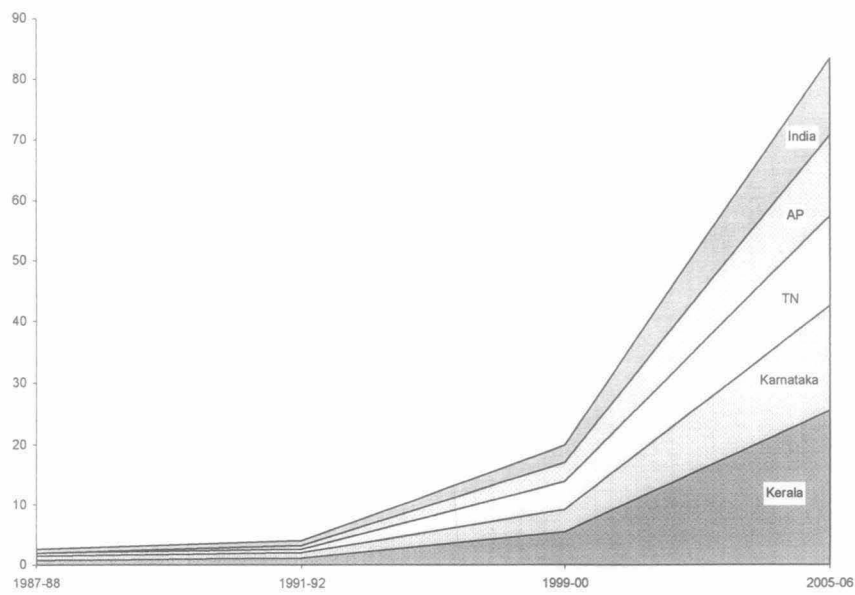
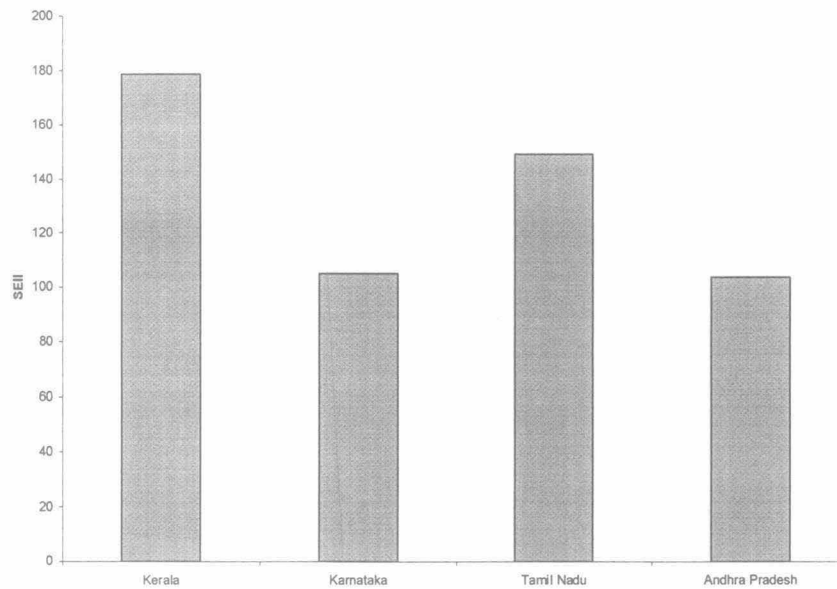


Figure 2.6.3 Social and Economic Infrastructure Index, 1999



Sources: Basic Road Statistics, Infrastructure in India, 1996; Eleventh Finance Commission Report, 2000; Indiatat.com

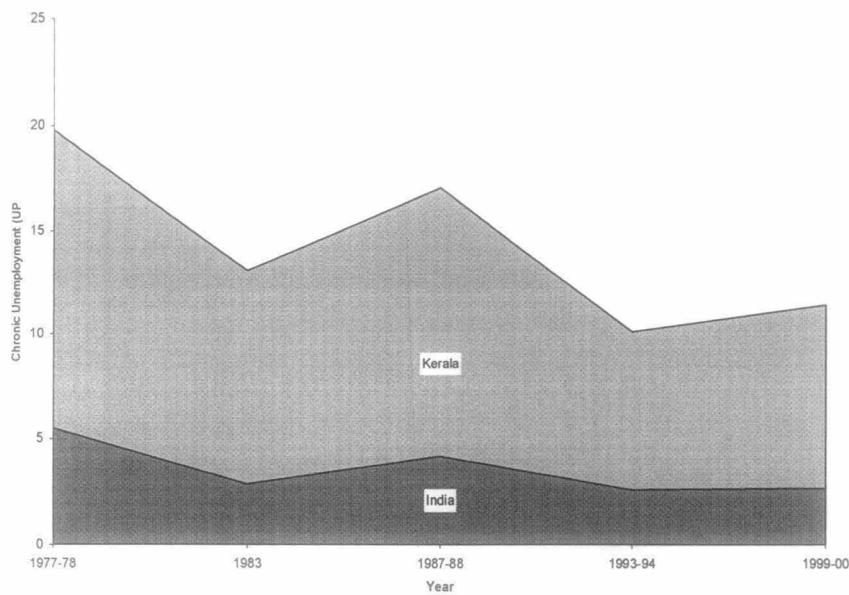
Even though the State is characterized by fairly high levels of physical quality of life indicators like birth rate, death rate, infant mortality rate, life expectancy, basic literacy, primary and secondary school enrolment, and fairly high levels of infrastructure development which are favourable preconditions for industrialisation and employment generation these factors did not result in the growth of the productive sectors of the economy or employment generation (Kannan, 1990; Kannan, 2001; Ramachandran, 2004, Harilal and Joseph, 2003). As an outcome of this situation Kerala has undergone the problem of educated unemployment and the phenomenon called 'jobless growth'. In Kerala, from the decade of 1970s onwards there has been rapid rise in the labour supply because the number of women seeking wage employment has been increasing. Until the early 1970s, Kerala's population grew at a higher rate than at the all India rate. However, the work participation rate was recorded low. In 1987 Kerala's work participation rate was 38 percent against all India was 41.1 percent. This trend continued until 1990s. According to NSSO survey, the incidence of overall unemployment in Kerala

where is the growth?

has been over four times the national average for the last 25 years (Figure 2.7)³. Kerala has the highest incidence of unemployment among the major states. Incidence of unemployment among females greatly exceeds that of among males in Kerala. When the incidence of unemployment among males in Kerala decreased gradually, that of females increased at a faster rate touching 1.5 percent in 1990-2000. Incidence of unemployment among females in Tamil Nadu witnessed downward trend since 1983, in contrast to Kerala (Table 2.4).

Figure 2.7 Incidence of various measures of unemployment

Figure 2.7.1 Incidence of chronic unemployment (UPS)



³ The National Sample Survey reports mainly three measures of unemployment. According to the Usual Principal Status (UPS), the reference period is 365 days preceding the date of survey. If a person is unemployed for a major period, he/she is unemployed by UPS. Another measure is based on Current Weekly Status (CWS). As per this measure, if a person did not find work even for one hour in any day previous to the seven day period, he/she is unemployed. The third measure is based on Current Daily Status (CDS) wherein each day of the previous seven days is classified as working or not working based on one to four hours as half day and more than four hours as full day.

Figure 2.7.2 Incidence of seasonal unemployment (CWS)

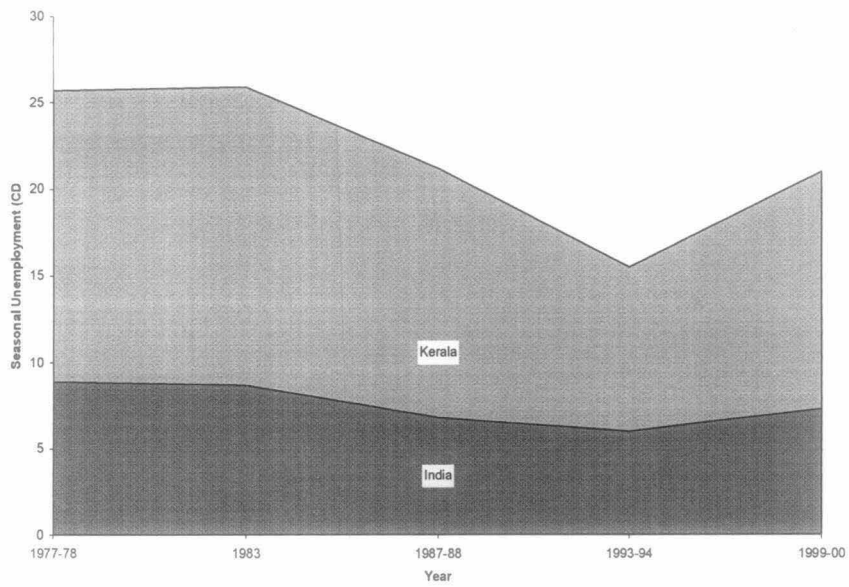
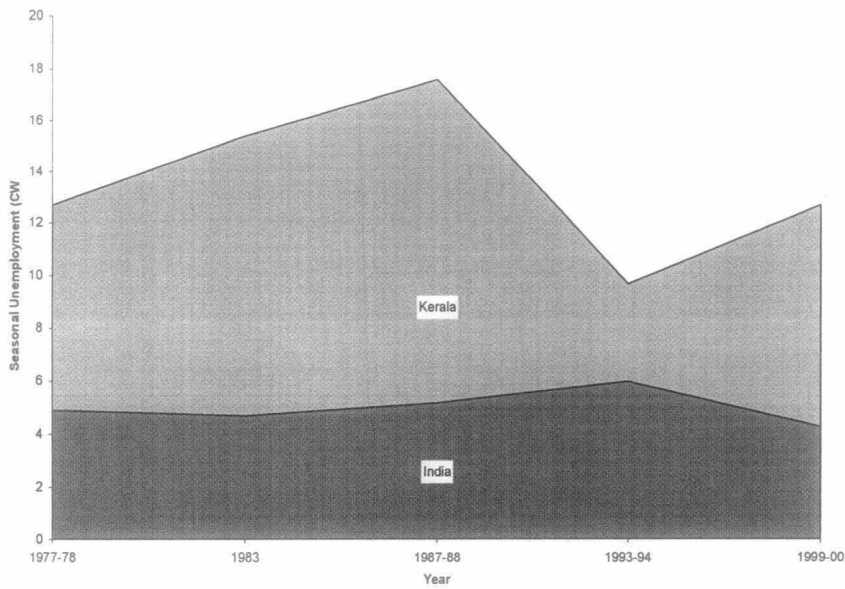


Figure 2.7.3 Incidence of seasonal unemployment (CDS)



Source: HDR, 2005

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Table 2.4 Incidence of unemployment Kerala vs. neighboring states

State	1983			1993-94			1999-2000		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Andhra Pradesh	1.8	0.5	1.3	1.3	0.6	1.1	1.8	0.9	1.4
Karnataka	1.8	1.2	1.6	1.5	1.3	1.4	1.5	1.2	1.4
Kerala	7.5	8.6	7.9	5.8	12.1	7.7	5.6	15.1	8.6
Tamil Nadu	3.7	2.1	3.1	2.6	2.0	2.4	2.9	1.9	2.6
All India	2.3	1.3	2.0	2.1	1.7	2.0	2.5	1.8	2.3

Source: NHRD 2001

In general, trend in sector wise growth of employment was more or less same in all the states. Employment under primary sector has been on the decline and that under tertiary sector on the increase. Employment under secondary sector is either almost stagnant or fluctuating within a very narrow range. In Kerala, when the employment under primary sector declined from 47.9 percent in 1987-88 to 45.4 percent in 1993-94 and further to 34.7 percent in 1999-2000, that under tertiary sector moved up from 36.2 percent in 1987-88 to 39.7 percent in 1993-94 and further to 49.7 percent 1999-2000. While in several better off states, the major share of employment is under primary sector, in Kerala it is under tertiary sector (Table 2.5).

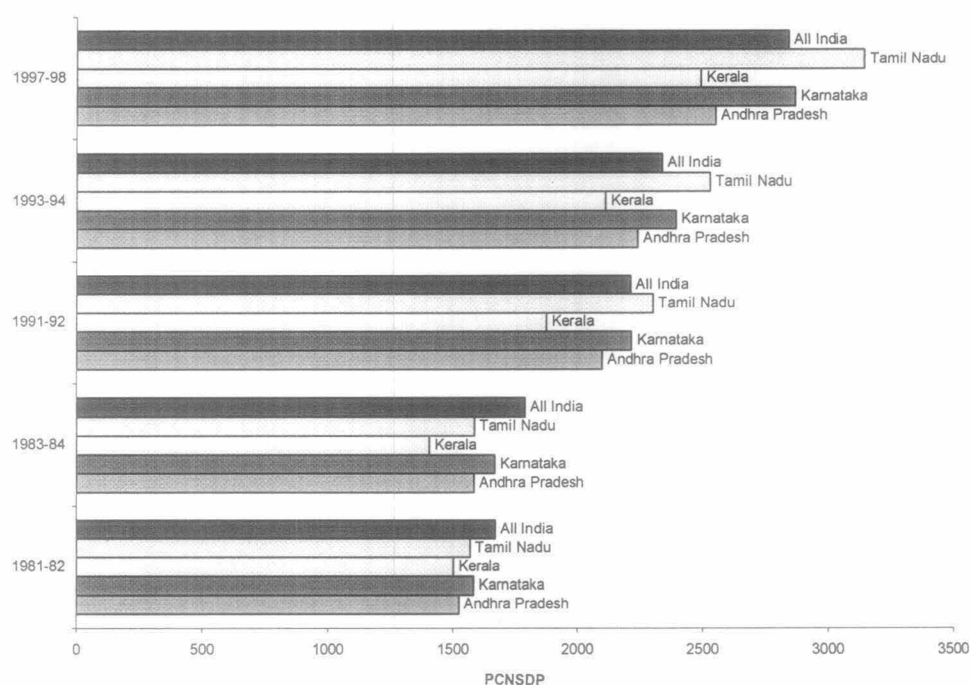
Moreover, in terms of economic growth performance its sectors have not shown an optimistic trend of late. The State domestic product as an indicator of economic growth, Kerala's position was lower than the all India till 1997. Per capita Net State Domestic Product (NSDP) wise also Kerala holds the least position as compared to its neighboring states (Figure 2.8). In the 1970s Kerala's economy grew at 2.27 percent, which further slipped to a low 1.16 percent in the 1980s. However, it picked up significantly in the post reform period, and in the last decade and a half it has grown at an average of around 5.8 percent which is very close to that of the growth of national economy. The structural transformation of the Kerala economy is heavily service sector biased and still continues.

Table 2.5 Employment by industrial sector Kerala vs. neighboring states

State	1987-88			1993-94			1999-2000		
	Prim ary	Second ary	Terti ary	Prim ar y	Second ary	Terti ary	Prim ary	Second ary	Terti ary
Andhra Pradesh	67.4	10.3	22.3	68.0	9.1	22.9	60.6	9.3	30.2
Karnataka	66.8	12.0	21.2	66.4	10.6	23.0	58.4	11.5	30.1
Kerala	47.9	15.9	36.2	45.4	14.9	39.7	34.7	15.6	49.7
Tamil Nadu	51.2	19.9	28.9	52.4	18.1	29.5	41.9	20.1	38.0
All India	58.8	10.6	30.3	58.4	10.1	31.5	52.4	10.9	36.7

Source: Planning Commission

Figure 2.8 Per capita NSDP at 1980-81 prices – Kerala vs. neighboring states

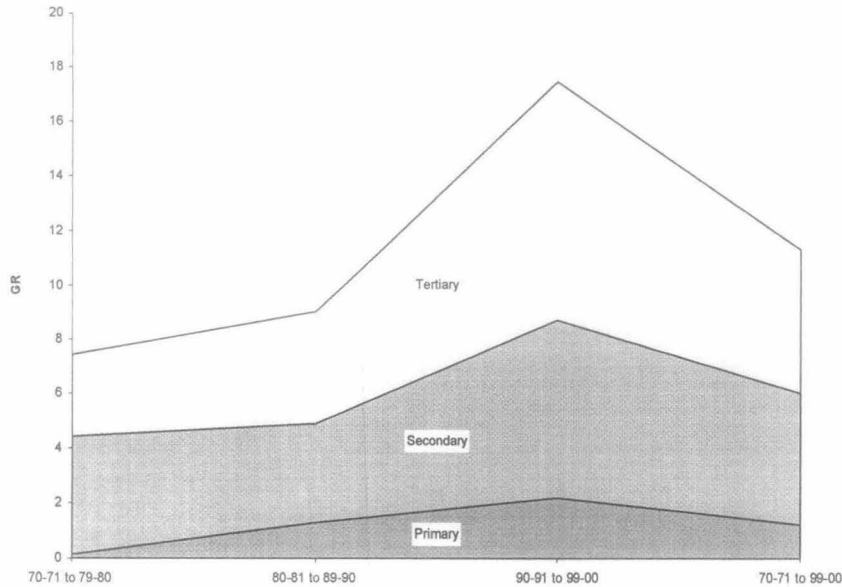


Source: National Human Development Report 2001

According to a study conducted by Mohanan Pillai and Shanta (2005) on Kerala's decadal sectoral growth experience, the long-term trend in NSDP of Kerala shows that in the seventies and the eighties the rate of growth of NSDP was very low. In contrast to this, the nineties witnessed a sharp increase in the growth rate of the economy. That is the growth rate, which was 1.97 percent during 1970-71 to 1979-80 increased to 2.87 percent during the period 1980-81 – 1989-90 but rose

to 6.12 percent during the period 1990-91 - 1999-2000. For the period as a whole the growth rate was only 3.65 period.

Figure 2.9 Average sectoral growth rates in NSDP in Kerala (1980-81 prices)



Source: Mohananan Pillai and Shanta, 2005

The primary sector registered a low growth rate during 1970s and it recovered during the second period (1980s) and third period (1990s), the growth rates moving from 0.14 to 1.28 and 2.17 percent respectively. For the period as a whole, the growth rate was a low of 1.20 percent pinpointing that the primary sector has not been showing a promising trend. As for the secondary sector growth rates have been fluctuating, the first phase recording 4.28 percent followed by a decline in the second period to 3.62 percent and a good recovery to 6.53 percent during the third period. On an average over the whole period the sector recorded only a growth rate of 4.81 percent. Thus the two commodity producing sectors do not seem to have been doing on an average well although in the nineties they show some recovery. In contrast to these two sectors, the tertiary sector growth rates steadily increased from 3 percent during the 1970's to 4.11 percent in the 1980's and to 8.75 percent in the 1990's with an average growth rate of 5.29 percent for the period as a whole, recording the highest average

growth among the three sectors, during the eighties, nineties and for the period as a whole. Thus as against the commodity producing sectors it is the tertiary sector which has been the high growth sector of Kerala's economy since the eighties.

To conclude this section we could infer that the traditionally enhanced human capability has not been reflected in Kerala economy in terms of employment generation and balanced sectoral economic growth. In this scenario, there is much debate among researchers and policy makers on the sustainability of Kerala's development 'model' in the context of high level of growth in social sector with low level of growth in productive sector.

2.3 The sustainability question of Kerala 'Model'

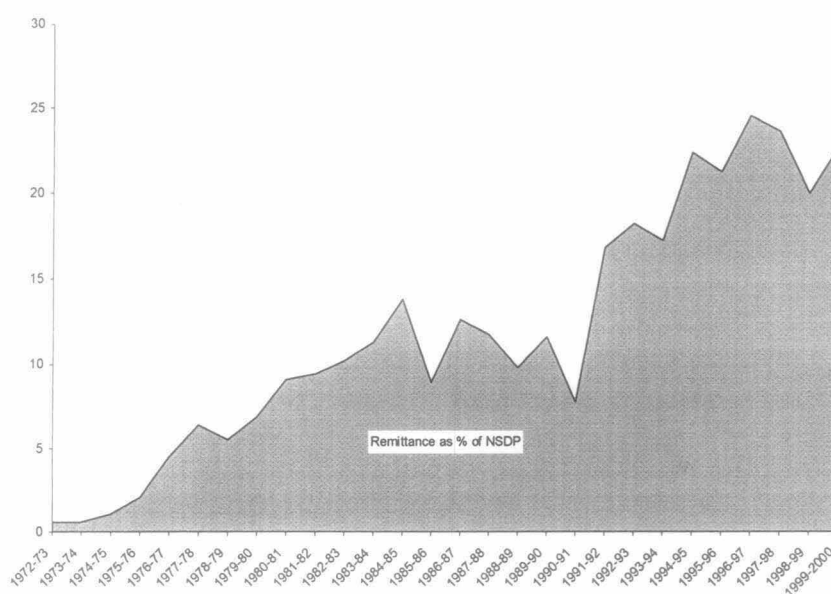
A set of studies in the late 1980s and in 1990s cautioned about the element of crisis in Kerala's unique development experience (George, 1993, 1998; Oommen, 1999). Two factors contributed to the crisis: the rate of growth of State Domestic Product (SDP) has stagnated and the growth rate of the productive sectors has drastically come down (Subrahmanian, et.al 2000; Kannan 1990). The State's inability to continue its huge expenditure in welfare policies due to the poor performance in the commodity producing sectors predicted the collapse of the Kerala model. The 'jobless' growth phenomenon and diminishing significance of primary and secondary sector growth in the economy further increased the fear of collapse of the 'model'.

2.3.1 A remittance driven solution

Fortunately, the predicted collapse of 'model' was muted by the international emigration to Gulf nations and remittances. This remittance driven economic growth helped Kerala to retain its achieved human development, even when there was a low growth in productive sectors (Pushpangadan, 2003). According to two extensive studies, Kerala Migration Study (KMS) and South Asia Migration Study (SMS) (K. C. Zachariah and S. Irudaya Rajan) conducted in 1998 and 2003 respectively, during the five-year period 1999-04, the number of

emigrants increased from 13.6 lakh to 18.4 lakh, and the number of Non-Resident Keralites (NRKs) increased from 21.0 lakh to 27.3 lakh. Remittances to Kerala from abroad increased from Rs 13.65 thousand crore in 1999 to Rs 18.46 thousand crore in 2004. As a result of remittances, the per capita state income in Kerala has increased by Rs 5,678. Remittances as percentage of NSDP also increased from around 0.57 percent in 1972-73 to 22.63 percent in 1999-2000 (Figure 2.10)

Figure 2.10 Foreign remittances and State income (NSDP)



Source: Kannan and Hari, 2002

The importance of remittances in Kerala's economy becomes more evident from a few comparisons. The remittances were 1.74 times the revenue receipts of the state, 1.8 times the annual expenditure of the Kerala Government, and 7 times of what the state received from the Central Government. Remittances were sufficient to wipe out 60 percent the state's debt in 2003 (Zhachariah and Rajan 2004). Export of cashew kernels and marine products are two important earners of foreign exchange in Kerala. The remittance in 2003 was 15 times the export earnings from cashew and 18 times that from marine products.

Some of the recent studies observe that Kerala may no longer be considered as 'relatively poor state', and its per capita net domestic product has come above the all India average since 1994-95 (Subramanian and Azeez, 2000; Pushpangadan, 2003; Kannan, 2005). The pattern of sectoral composition of output too has changed in the 1990s with the tertiary sector accounting for over half of the state gross domestic product. Since 1970s, the tertiary sector has maintained growth rates consistently higher than the state domestic product and higher than the other sectors (Mohan Pillai and Shanta, 2005). This implies the relevance of the service sector in Kerala's economic growth. However, in 1970s, the secondary sector dominated Kerala economy but in the 1980s it was pulled down by tertiary sector. This trend continued in the nineties despite a good recovery of the secondary sector in this period.

Aforementioned development process of Kerala economy reveals that the high level of social development led to an accumulation of enhanced human capability. This enhanced human capability responded to the employment opportunities emerging in the wider world and relocated itself, generating substantial linkage effects of the 'Gulf boom' raising per capita consumption expenditure in the state much ahead of the per capita state domestic product. As a result, this expanded economic capability by enhanced human capability maintained the already achieved human development. However, the tradeoff between human development and productive sectors has not changed from its earlier status.

One debilitating feature of the studies discussed above on the development dynamics of Kerala economy is the undue emphasis on endogenous factors. The making of the 'Kerala model' as well as its crisis are sought to be understood in a closed economy framework. While the emphasis on endogenous factors, particularly on the redistributive policies, is eminently justifiable, what is conspicuously missing in the literature is an effort to unravel the mystery of the general backwardness of the goods producing sectors. This is particularly true of the studies on the crisis of the regional economy since the mid seventies. Given

the closed economy perspective the mainstream approach has been one of treating the boom in remittance as a boon, with no bearing on the crisis except that it helped moderate the adverse impact of the same. Given the extreme dependence of the regional economy on rest of the world, Harilal and Joseph (2003) approached the problem in an open economy perspective. Drawing insights from the Dutch disease economics, it was argued that the crisis of the commodity producing sectors witnessed during the period since mid seventies could be attributed to the resource movement and spending effect associated with remittance boom. The study also highlighted a revival in the growth of the regional economy since the mid eighties and makes an attempt to account for the same in terms of different factors including the adaptation of the regional economy to the Dutch disease environment. It was argued that there is the need to promote production of such tradables that are immune to the Dutch disease environment- industries, which can sustain their competitiveness in spite of the higher wages and relatively higher cost of non-tradables. The study further argued that the lower wages in traditional industries and lower cost of non-tradables cannot any more be the source of comparative advantage on which the state can hope to develop its domestic production sectors.

2.4 Initiatives to correct the imbalance

As we understood, the enhanced human capability or expanded economic capability never contributed to the balanced sectoral growth in the economy. This invited social chaos like high youth unemployment, educated unemployment, and increased social inequality etc. In this social context, during the decade of 1990s, the State has initiated some public interventions like social security schemes for workers and other disadvantaged groups, and the decentralization of governance to balance the economy and retain its past achievements .

The decentralization of governance and its core component, the People's Campaign, was one of the bold initiatives that was implemented in 1996 to overcome the long period of stagnation in economic growth and the continuing

problem of unemployment in Kerala. The idea behind decentralized governance was bringing government closer to the people, and mobilization of resources at local level, and its effective use. The basic assumption behind this attempt was that the participatory planning process and approach will induce productivity in primary sector as well as informal industrial sector. The People's Campaign can also be seen as an outcome of the long prevailing development crisis by the Kerala Model of Development, especially regarding severe economic problems like stagnation in agricultural and industrial production, widespread reduction in productivity levels, acute power shortages, out-migration of industries and skilled labour, extremely high unemployment rates, rampant reduction in the quality of services, and the deepening fiscal crisis of the State (Isaac and Harilal 1997). Along with People's Campaign, the State has introduced another innovative initiative 'Kudmbashree', a unique welfare programme for eradicating women-centred poverty. It turned out to be a successful programme to eradicate poverty among rural and urban women, and enhanced the entrepreneurship capability of poor women groups (reference).

2.5 Overcoming the fear of technology

We have to note that all these democratized development initiatives in Kerala were held during the period of economic reforms in India. During this decade, most of the regions in India and the world framed its policies to cope with global change in terms of trade liberalization and technological change. The major technological change took place in the form of ICT. In this context, most of the Indian states framed their policies to attract global finance in ICT production and export. The States competed to form various policies in infrastructure building and incentive mechanism for attracting global capital in ICT.

The post-independence era in Kerala witnessed the growing strength of trade unions and fear of labour saving technology. Given the pressure of demand for employment, Kerala's political society turned its back on technological change for quite some time, considering that all such changes resulted in job loss. In Kerala, there is also a long history of opposition to technological change in

industries such as coir processing and manufacturing (HDR, 2005). In effect, opposing technological change has not resulted in job protection because industries and activities move away from the state. In agriculture, the result has been to move towards low labour absorbing cash crops. Thus, opposing technological change has neither served the immediate purpose of job protection nor the long term objective of development. However, the educated unemployed and younger generation desired to work with technology than without it. Young people embraced technology, especially ICT. The approach of Malayalees to technological change is a possible area of future research as literature on perception on technology with an intergenerational perspective is scanty.

Kerala's achievement in human development particularly attainments in education is viewed as a crucial enabling factor in its entry into the knowledge intensive economic activities like ICT. But, the absence of analysis and evaluation of Kerala's capabilities to enter and deal with the challenges posed by technological change leaves these claims and prescriptions unrealistic. To correct this negative impact on economy, recently, the state has taken certain initiatives and measures to benefit from new economy by inducing the technological capability building process of the region. The ICT based experiment Akshaya can be seen as a recent public intervention that comes in this series of development initiatives.

2.6 Summary of Chapter

This chapter focused mainly on Kerala's development concerns over the time period and State's initiatives to balance the imbalance between social and economic growth. Kerala's high level of performance in social sectors with low level of growth in productive sectors led Kerala to become a 'model' for other Indian States and region of considerable research interest. A set of studies in late 1980s and in 1990s cautioned about the element of crisis in Kerala's unique development experience. The State's inability to continue its huge expenditure in welfare policies due to the poor performance in the commodity producing sectors predicted the collapse of the Kerala model. While studies have shown the

positive contribution of massive remittance to economic growth, there are also studies attributing stagnation in the productive sectors to the spending and resource movement associated with remittances. These studies have called for restructuring of the economy with emphasis on skill intensive sectors like ICT. In this social context, during the decade of 1990s, the State has initiated some public interventions like social security schemes for workers and other disadvantaged groups, and the decentralization of governance to balance the economy and retain its past achievements. The decentralization of governance and its core component the People's Campaign was one of the bold initiatives that was implemented to overcome the long period of stagnation in economic growth and the continuing problem of unemployment in Kerala. All these democratized development initiatives in Kerala coincided with economic reforms in India, and then most of the regions in India and the world, framed its policies to cope with global change in terms of trade liberalization and technological change. The major technological change took place in the form of ICT known to be capable of making the productive sectors of the economy efficient and competitive through its use while having the potential to contribute towards employment and exports through production. No wonder, almost all the states in the country responded to the new opportunity by a series of policy initiatives and institutional interventions. How has the state of Kerala responded to these opportunities and what were the outcomes? It is to this issue that we turn now.

Chapter 3

The Emergence of ICT based Development Strategy

In tune with the policy reforms initiated in India since 1980s, various economic reform measures were undertaken to integrate Indian economy with the rest of the world. As part of this reform agenda, the economy has undergone a major change in its development strategy from import substitution to export orientation. Opening up of the economy further initiated various policy changes in the different sectors of the economy. The effect of this policy change was reflected in removing rigid international trade barriers such as tariffs and quotas and in removing the entry barriers to domestic and foreign private investors.

During this decade, all over the world, there took place a major technological change in the form of Information and Communication Technology (ICT) production and diffusion. The development literature observe that production and diffusion of ICT will induce the competitiveness, economic growth and development in a region. Production of ICT is more knowledge and skill intensive than any other conventional productive sectors. In this context, India and most of the developing countries adopted their policy initiatives accordingly to enter into ICT production. The ICT induced economic development in developing countries like India mainly depends on production of ICT goods and services and its global trade. The production of ICT goods include production of hardware and software goods, and of ICT enabled services (ITES). There is a further distinction in terms

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of knowledge intensity and skill intensity in ICT production. Production of hardware and software goods is more knowledge intensive and helps to transform the economy as knowledge based. On the other hand, production of ICT enabled services is more skill intensive but limited in terms of knowledge intensity.

India's comparative advantage in low wage but skilled human resource persuaded the nation to rework its policies to attract global finance in the sector ICT. As a result, at the national level, government has initiated some reforms to attract Foreign Direct Investment (FDI) in Indian economy. Reforms in banking and financial sector, reforms in telecommunication and ICT infrastructure further induced the growth in Indian ICT sector. In addition, the central government has directed the states to make its own separate Information Technology (IT) policies to reap the advantages of emerging ICT revolution.

Pandey et al (2004) points out that in the 1970s, 1980s and 1990s unintentional outcomes of restrictive governmental policies and pure accidents contributed in shaping India's ICT future. For example, in the 1970s Government of India brought in a policy change that required all foreign companies to lower their equity share to 50 per cent while operating in India. This forced IBM to close down business in India making Indian companies less reliant on mainframe computers produced by IBM. The Indian Diaspora in US also contributed to the growth of the software industry in India. Indian software professionals in US were mentors of early Indian software companies and trained and hired software professionals from India to work in US. The difference in wage rate between India and US was the reason for this. While hiring software professionals to work in US was more expensive than letting them work in India, it was much cheaper than employing US professionals. What emerged finally was a mixed business model of offshore outsourcing whereby some of the software professionals work in the client's premises in US, while others work in the companies' back office in India. Finally, in the 1990s, the Y2K problem proved to be the ultimate jackpot for Indian firms. The programme which was required to tackle the Y2K problem was COBOL. COBOL was no longer taught in US universities as it had turned obsolete in the

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1990s, but was still taught in India. This proved to be a significant advantage for Indian IT vendors as Y2K contracts helped them to enter US market and build networks and trust. It was, paradoxically, not cutting edge technology which came to the help of Indian software companies and workers, but obsolete but useful technology! Pandey et al (2004) shows that while governmental policy helps industry, it need not be the end of the story; accidents and technological backwardness do matter. The policy analysis that follows should be read by keeping this caveat in mind.

This chapter examines various policies that were envisaged at national and state level to benefit from ICT production and its overall outcome. The chapter is organized in two sections. Section 1 highlights various policies that were formulated in the country over the time period for facilitating ICT industry. Section 2 talks about some empirical evidences on the policy impact at national and regional levels. In addition, specifically, it examines how Kerala's ICT strategy evolved over the time period in terms of ICT production and diffusion, and what the outcome was. It makes a comparative investigation of Kerala's ICT strategy with that of neighboring states Tamil Nadu, Karnataka and Andhra Pradesh. Moreover, this chapter attempts to address the first objective of this research.

3.1 The policy analysis framework

This policy analysis has adopted two dimensions of ICT based benefits and regional development: direct benefits and indirect benefits. The direct benefits include production of ICT industry, employment generation and export earnings. ICT includes IT and Telecommunications. ICT industry includes IT hardware and software industries; IT software industry includes IT software, IT service and IT enabled service. However, it excludes IT training institutions that provide training to the public at large and other public interventions taken up by government for diffusing ICT among the masses. The diffusion component or usage is mainly coming under indirect benefits. Indirect benefits include the economic and social benefits accrued through the diffusion of ICT that include but not limited to

increase in efficiency, productivity, competitiveness and growth of the using sectors. Therefore, the policy initiatives are analyzed with reference to the above mentioned dimensions.

3.2 Reform led ICT strategy at national level

This section of my enquiry mainly explains how the government's economic reform intervention laid the founding stone to ICT development in India. The policy frame that affected the IT Industry can be broadly divided into two, one set of policies dealt specifically with the IT industry, while another set of general policies of liberalization that induced the IT industry to grow. India's quest to explore the emerging opportunities in the sector ICT persuaded the country to exploit the reform situation timely and efficiently in favor of ICT.

3.2.1 The evolution of the ICT industry policy

The post independence era of India was focused on the search for self reliance. However the electronics industry was inconsequential, with no domestic production. Computer Industry was synonymous to computer hardware and Software was custom made by trained professionals. International Business Machines (IBM) and International Computers Limited (ICL), two foreign multinationals importing outdated computing machineries to the country had complete monopoly over the industry. The Indo-china war and the Indo- Pakistan war during the 1960s brought out the strategic importance of the electronics industry in India. Acting on the Dr. Homi Bhabha Committee in 1965 the government directed the foreign companies to initiate indigenouse development. Since IBM was not ready to relent from its position. In 1977-78 IBM was forced out of operation. ICL reduced its proportion of equity participation and reorganized itself into a new firm, International Computers Indian Manufacture (ICIM). Following the recommendations of Bhabha Committee the strategic importance of electronics industry was recognized, Electronics Corporation of Indian Limited, (ECIL) was established for the production of small and medium computers in 1971.

Ref ?

Is this a correct representation?

The ECIL was build into a government monopoly by effectively creating institutional barriers to entry for both private domestic and foreign producers. In 1975 the public sector monopoly enterprise Computer Maintenance Corporation (CMC) was established to service all foreign systems installed in the country. ECIL became the dominant player in the Indian market, accounting for 40 percent of the systems (Joseph, 1997). The restrictive policies insulated the industry from interacting with newer technology in the world market resulting in widening technology gap with the rest of the world (Brunner, 1991). Moreover the domestic demand for minicomputers could not be met by the state monopoly. Agency operation of the foreign firms increased. Private domestic firms were to work as agents to foreign MNCs thus restricting the growth of domestic private sector.

However, the importance of computer software development, was recognized by the erstwhile Department of Electronics as early as in 1972 (Parthasarathy and Joseph, 2002). For the purpose of software exports, duty free import of computers was permitted during the period. Tata Consultancy Services (TCS) reached at an agreement in 1974 wherein it was allowed to import hardware in return for the export of software. Foreign owned software export operations were permitted from Santacruz Export Processing Zone from 1982. The Computer Policy of 1984 initiated the establishment of Software Development Promotion Agency and software export related imports were further liberalized. The 1984 computer policy removed most of the institutional barriers including barriers to entry on MRTP firms and FERA firms. MNCs sought India as a software development source as well as a market for software products.

Evidence?

With the liberalization of the economy in 1991 entry barriers to foreign participation was removed completely, technology transfer was made open, private participation was encouraged in policy making and risk capital was allowed in the sector. In order to streamline the functioning of venture capital, Securities and Exchange Board of India (SEBI) issued guidelines to which a venture capital fund has to adhere in order to carry out its activities in India.

Relevance?

In 1990's, at national level, the government of India has initiated various liberalized policy measures to attract global capital investment, which also had an impact on the ICT industry. The policies were mainly formulated under the dimensions of covering major factors like framing an advanced investment incentive mechanism in ICT industry, infrastructure development in ICT industry, strengthening of foreign investment practices, strengthening technology transfer properties and e-governance for efficient functioning of government. The Department of Information Technology (DIT) has worked out different investment incentive mechanisms to attract global finance and domestic private investors to make India a front-runner in the age of Information revolution. Government of India's (GoI) early policies like National Telecom Policy 1994 and 1999, Internet Service Providers Policy 1998; and India's entry into WTO in 1995 etc further energized the sector. Subsequently, GoI directed Indian states to formulate a policy framework for promoting ICT industry in its own regional development perspective.

Is this true?

A new dedicated ministry was formed for the encouragement of electronics and Information technology production and use within the economy. A national task force on IT was formed to ensure strategic approach to promotion and growth of the IT industry. The national task force on Human Resource Development for IT was formed to promote the generation of IT related skills within the economy.

To promote export activities in this sector, the government has taken various measures to provide adequate infrastructure facilities for such industries. As part of this objective, Software Technology Parks of India (STPI) was established and registered as an autonomous society under the Societies Registration Act 1860, under the Department of Information Technology, Ministry of Communications and Information Technology in 1991. STPIs eased the implementation of the STP scheme for the promotion and development of software industry and enhancement of software exports by providing infrastructure facilities including High Speed Data Communication (HSDC) links. It enables export oriented software firms to conduct exports operation at a pace commensurate with global

standards. Companies in these parks can import goods duty free and for the first five years without corporate taxes. The parks have centralized computing facilities and members get complete access to high speed data communication links and the internet. The leaders of the park provide the single governmental contact for all procedures such as licenses, import certificates, etc. allowing Indian firms to avoid the bureaucracy of the central government. STPI, as of now has over 40 centers spread across the country and helping about 6500 software exporting companies.

During the year 2005-06, 1052 new units were registered under STP Scheme. There has been an impressive 36.40 percent increase in software exports through STPI units, from Rs. 74, 019 crore in 2004-05 to Rs 100, 965 crore during 2005-06. At the national level, STPI units account for around 97% percent of software exports – out of the total national figure of Rs 104540 crore, STPI units exports accounted for Rs. 100,965 crore to the overall export revenue from software operations in the country. In addition to STPI, the government has established Special Economic Zone (SEZ) and Electronic Hardware Technology Parks (EHTP) to boost the industry.

Technology parks that provided basic infrastructure and helped in taking advantage of agglomeration economies were envisaged through the Software Technology Parks of India (STPI). STPs are allowed duty free imports of capital goods, raw materials, components software, hardware and other related inputs. STPI centers act as 'single-window' in providing services to the software exporters. Some of the STP centers provide incubation infrastructure to Small & Medium Enterprises (SMEs), enabling them to commence operations without any delay.

The Information Technology Act (2000) was enacted with an aim to provide legal framework to facilitate electronics commerce and electronics transaction and aims to recognize electronic contracts, prevention of computer crimes, electronic filing/ documentation, digital signature, etc. The IT Act gives the legal framework for these technologies and raises electronic records to the level of conventional paper-based physical ones as primary evidence for all Legal requirements.

*Role of the state
has a large and
conflicting literature.
NOT reflected
here*

The role of the state at the policy level as well as in actual production had been substantial in developing this sector. The fruitful state participation in production in the formative stages of the industry and later enhancing private domestic participation through successful policy options has been pivotal in creating this dynamism within the sector.

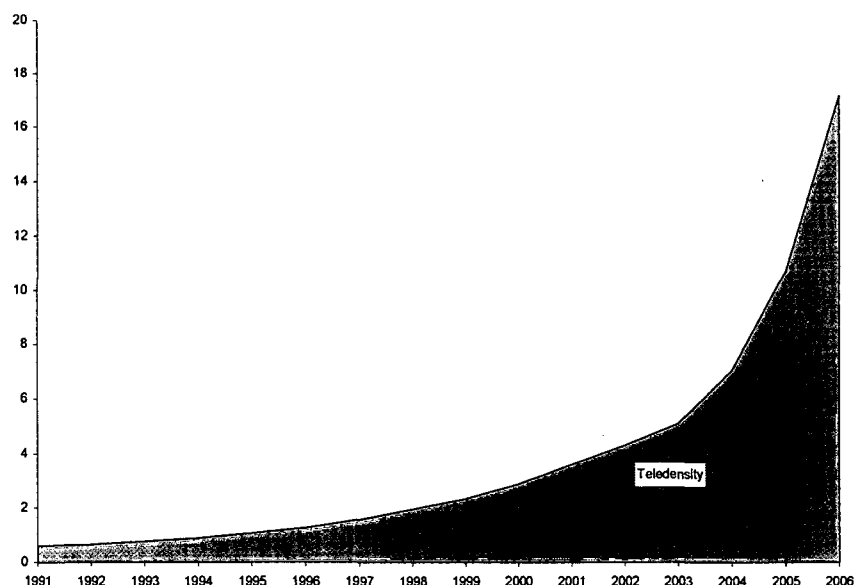
3.2.2 The General Policies that had impacted on ICT industry

The policy of reforms followed by Government of India in the post 1991 period recognizes the important role of foreign capital in the industrial and economic development of the country. Foreign capital inflow is encouraged not only as source of financial capital but also as a facilitator of knowledge and technology transfer. Over the past 15 years, the GoI has undertaken several initiatives and measures to encourage foreign investment inflows, particularly the flow of Foreign Direct Investment (FDI) into the country. The deregulation in the banking and financial sector opened up the investment opportunities for private capital and facilitated entry into the Indian banking market for foreign banks. As a result, there is increased competition in the banking sector and new financial institutions. The deregulation of the interest rates allowed banks to determine deposits and lending rates. The prior approval of the Reserve Bank of India for large loans was eliminated, and the sector became more market oriented. This deregulation increased access to financial capital for emerging ICT based companies and expanded their market opportunities. The reform that took place in Indian stock market in 1992 further encouraged global finance to invest in the booming ICT sector in India. The capital market reforms in 1993 permitted Indian firms to list in foreign stock exchanges and helped them to move globally for capital accumulation. This expanded worldwide opportunity for Indian ICT firms tremendously. This initiatives helped first generation Indian IT companies like TCS, Wipro, Infosys, and HCL to spread their roots all over the world and transform as Indian multinational companies.

To attract FDI in software sector, the government has permitted up to 100 percent foreign investments in the sector, through the automatic route. A foreign investor is not required to seek active support of joint venture partnership for investing in a new IT-ITES venture in India like some other sectors. Moreover, the FDI policy has been favorably drafted to promote outbound investments to facilitate global acquisition by Indian companies. Investment limit for overseas acquisitions has been increased to 200 percent of net worth of the Indian company as on the date of last audited balance sheet without prior approval from RBI. Furthermore, to promote growth of the IT sector, the GoI has introduced various relaxation of policies relating to inbound and outbound investments, exchange control relaxations, incentives for units located in a Domestic Tariff Area (DTA) or under Export Oriented Units (EOU), Software Technology Parks (STP), Special Economic Zones (SEZ) and Electronic Hardware Technology Park (EHTP) schemes.

The development of an efficient and reliable telecom infrastructure is necessary to sustain the growth of the ICT and ITES (Information Technology Enabled Services) industry in India. Moreover, tele-density and internet penetration are key growth factors for the domestic software and service industry. Growth of telecommunication infrastructure is one of the major prerequisites to develop ICT based production and diffusion in the country. In this regard, India's performance was remarkable. The restructuring of the telecommunication sector started in the early 1980s, but most of the liberalization took place after 1994, with the new telecom policy. The Indian telecom sector has witnessed rapid transformation since it was deregulated to allow private participation. Over the past decade alone, carefully crafted policy has helped drive a balanced agenda for the sector by influencing a decline in pricing and increased affordability on one hand and increasing access penetration and usage on the other, resulting in strong growth. Annual growth rates in tele-density over the past 2 years have been higher than those observed over the 50 years from 1948 to 1998. Tele-density in India has grown from 0.6 percent per 100 people in 1991 to 17.16 percent in 2006.

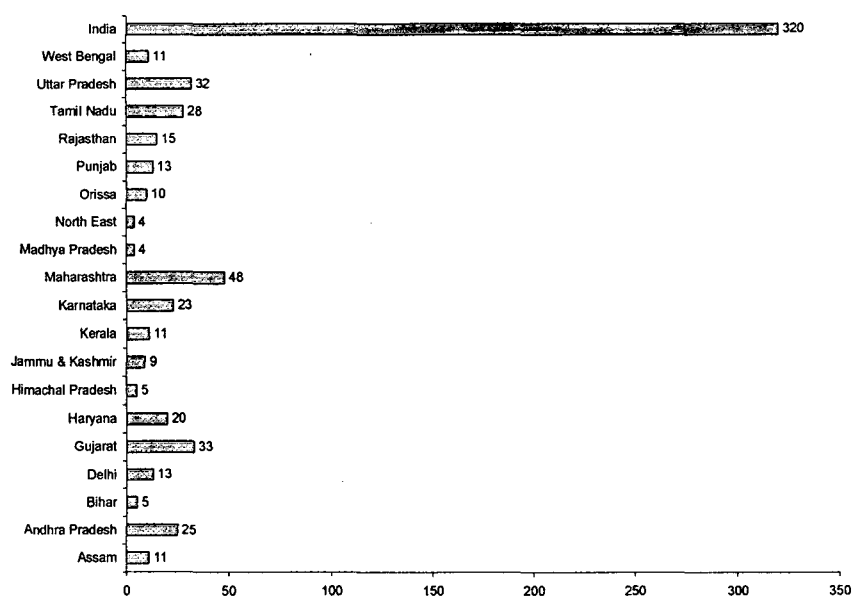
Figure 3.1 Trends in tele-density, 1991-2006



Source: Indiatat.com, 2007

The Government announced the National Telecom Policy 1999 (NTP), with the objective of setting guidelines for the development of a reliable and robust telecom infrastructure in India. In NTP 1999, government took initiatives to strengthen the role of the telecom regulator and separate its police and licensing functions from its role as a service provider. As part of this policy initiative, it reassigned the service provision from license fee based models to revenue sharing models and opened the Domestic Long Distance (DLD) market to private competition. Further, the GoI liberalized the Internet Service Providing (ISP) sector in 1998. Since then, the number of ISPs has increased to about 190, as of March 2003. ISPs in India provide a range of services such as dial-up connections, broadband services, Internet telephony, leased line circuits and Internet Private Leased-line Circuits (IPLC). The prominent ISP in India was the public sector company VSNL. Further, the Government granted licenses to Internet Service Providers (ISPs) to set up international gateways in 2000. This ended VSNL monopoly of being the sole provider of international bandwidth to India.

Figure 3.2 Circle-wise Number of Internet Service Providers (as on 07.03.2007)

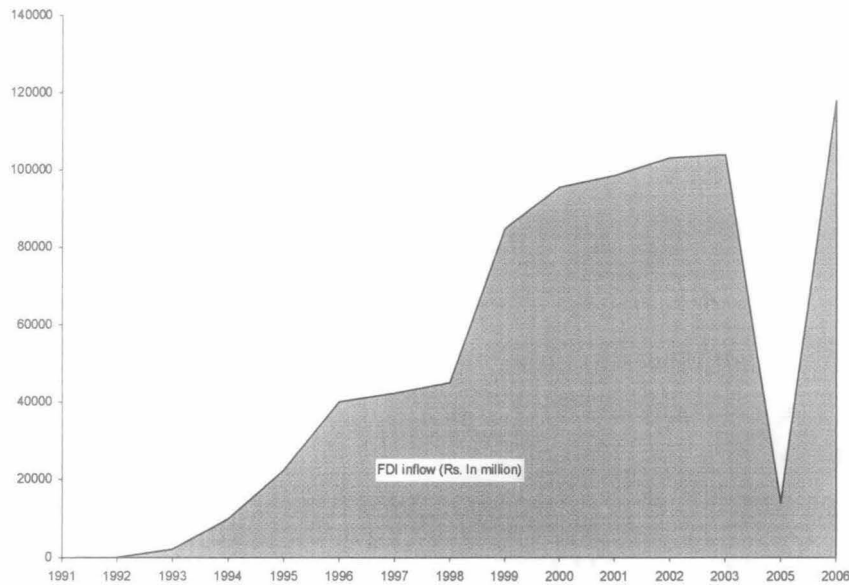


Source: Indiatat.com, 2007

The Government liberalized the International Long Distance (ILD) sector in 2002. This was two years ahead of the government's commitment to the WTO to liberalize the telecommunications sector and remove trade barriers for foreign investors. The government allowed Internet telephony in 2002. This has given consumers a cheaper option for making international calls.

The Telecom Regulatory Authority of India (TRAI) introduced a unified licensing regime from November 2002 which enabled service providers to offer fixed and mobile services under one license. This increased competition in the Indian cellular market. The government has commissioned a National Internet Backbone (NIB), covering all the states. The NIB is intended to provide a high bandwidth domestic backbone infrastructure in India. These initiatives have given a boost to the sector. Since its liberalization in 1991, the telecom sector in India has received a total FDI of Rs. 780556 million until 2006. In 2006, FDI in telecom sector contributed 0.03 per cent to total FDI.

Table 3.3: Foreign Direct Investment Inflow in India's Telecoms Industry



Source: Mani, 2007¹

The Indian telecom sector is dominated by wireless technologies, which include cellular mobile and fixed wireless technologies. In fact, almost the entire increases in the availability of telephones have been contributed by wireless technologies. India has one of the highest ratios of wireless to wireline technologies, which is now almost 5 (Mani, 2007). The wireless segment consists of two kinds of technologies GSM² and CDMA³. The liberalization has proceeded and today 76 percent of the mobile (GSM) market share in India is private owned compared to the 9 per cent of private ownership of fixed lines. In CDMA wireless service 99 percent is owned by private sector.

Indian customers are taking up wireless technology in a big way. They prefer wireless services compared to wire-line services, which is evident from the fact that while the wireless subscriber base has increased at 75 percent from 2001 to 2006, the wire-line subscriber base growth rate is negligible during the same

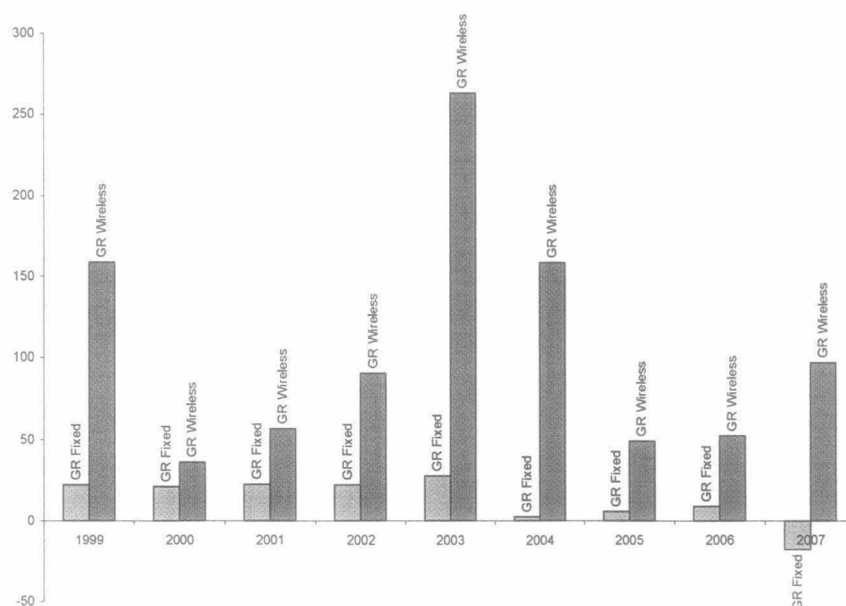
¹ Data for Year 2004 is not available according to the source.

² Global System for Mobile Communications

³ Code Division Multiple Access

period. In fact, many customers are returning their wire-line phones to their service providers as mobile provides a more attractive and competitive solution. The main drivers for this trend are quick service delivery for mobile connections, affordable pricing plans in the form of pre-paid cards and increased purchasing power among the 18 to 40 years age group as well as sizeable middle class.

Figure 3.4 Average annual growth rate of fixed and wireless connections, 1998-2007



Source: Mani, 2007

India's telecommunications sector is now among the most deregulated in the world and presents potentially lucrative opportunities for service providers and equipment vendors alike. Currently, the Indian telecommunications network with 110.01 million connections is the fifth largest in the world and the second largest among the emerging economies of Asia (Goyal & Suman, 2006). In the last 3 years, two out of every three new telephone subscribers were wireless subscribers. Consequently, wireless now accounts for 54.6% of the total telephone

subscriber base. There are primarily 9 GSM and 6 CDMA operators providing mobile services in 20 telecom circles and 4 metro cities, covering 2000 towns across the country.

As part of this phenomenal growth in wireless market, there is an increase in FDI in this sector. If this trend continues India can rejuvenate her present telecom equipment manufacturing industry, and compete with 'Asian Dragon' China for good market share in global telecom hardware production. This enlarged and highly networked telecom infrastructure primarily enabled India to reap the emerging advantages of ICT and help to transform as a manufacturing hub for mobile telecom equipments.

*Purpose of
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3.3 Policy impact on ICT production and diffusion in India

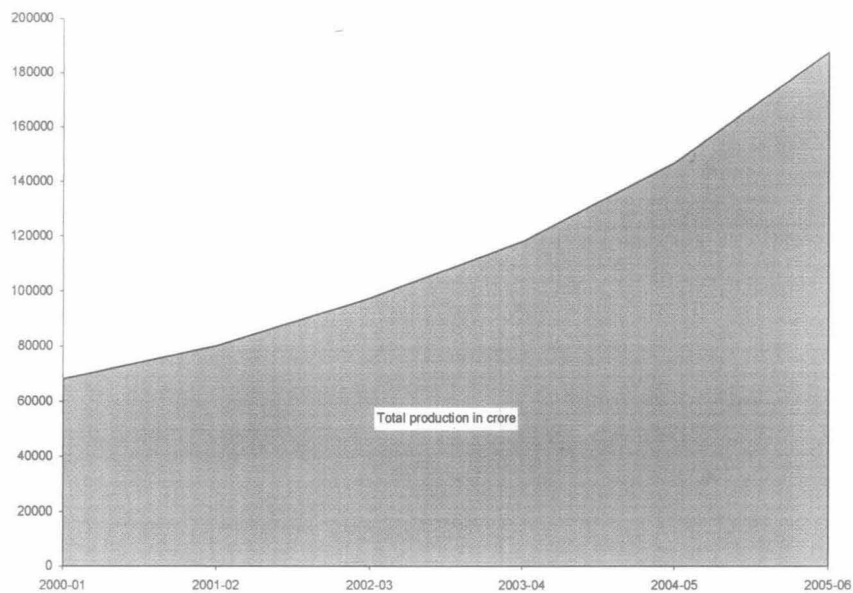
The general climate of ICT as an Industry has undergone vast changes under the proactive modes of state interventions in terms of creating a conducive policy frame for building an infant industry, and then withdrawing from the scene after the industry gained competitive strength. However, the ICT as a technology for development and growth had limited success in India, though of late some changes are visible. To begin with the success story of ICT production is documented below. This is followed by a discussion on the performance of ICT as a technology in India's growth and development.

ICT production in India consists of electronic hardware, software and ITES (IT Enabled Services). For this analysis, I have taken components like computer software and hardware, ITES / BPO (Business Process Outsourcing), and electronic instruments like industrial equipments, medical equipments, office equipments, consumer electronics and telecommunication hardware and related services. All these segments are interdependent and complement each other.

Over the last decade, exports of various ICT components like electronic hardware, computer software and IT enabled services have become a large component of the exports of the country. Production of electronic hardware accounts for 42.6 percent of total ICT production and software and ITES accounts for 57.4 percent in 2005-06,

and registered a growth of 27.80 percent over the year 2004-05. The sector has been maintaining an outstanding annual average growth rate of 28.83 percent during the period 2001-02 to 2005-06. India's electronic hardware and computer software/ITES accounts for a share of 14.33 percent in India's over all export during the year 2005-06.

Figure 3.5 ICT productions in India, 2000-01 to 2005-06 (in crores)

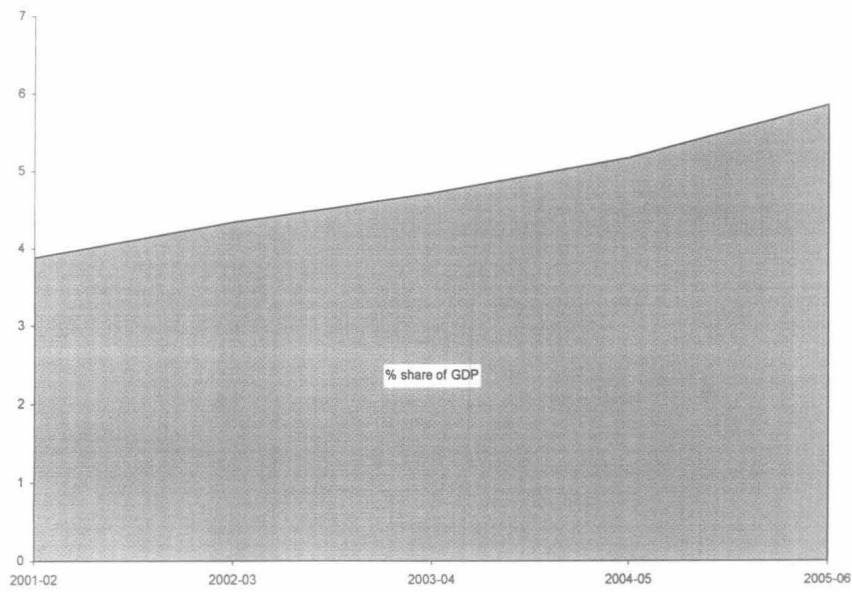


Source: Electronics and Computer Software Export Promotion Council, 2007

The production of ICT estimated at Rs. 187460 crore accounts for a share of 5.84 percent in India's GDP at current prices during 2005-06. This is slightly higher than the share of this sector in India's GDP in 2004-05 estimated at 5.20 percent. It marked a continuous growth in India's GDP. India's total production of ICT estimated at US\$ 42.34 billion accounts for a share of 2.08 percent in the world production of ICT (Figure 2.6).

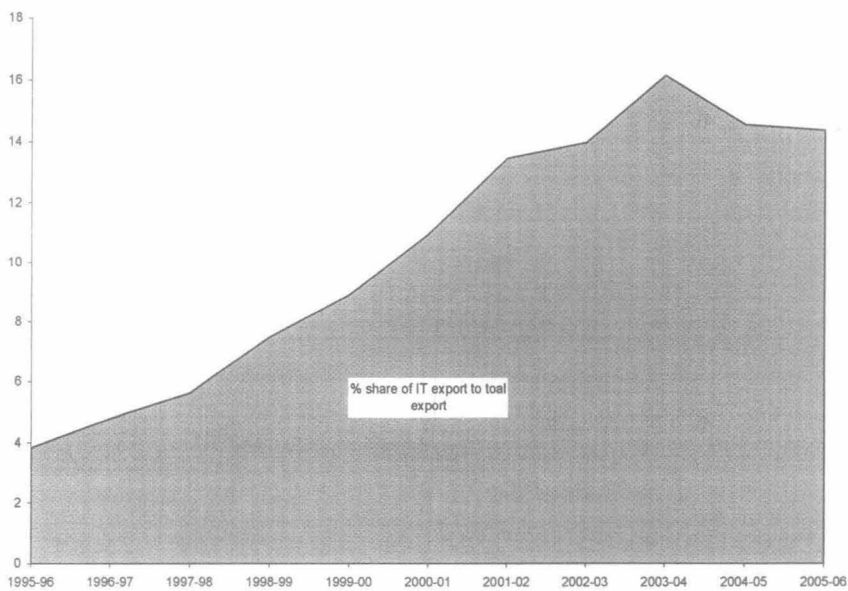
The percentage share of India's ICT export to total export has increased since post reform period. During 1995-96 period the share of India's IT export to total export was 3.84 percent. In 2005-06 it has grown to 14.33 percent. It shows an increasing trend over the time period (Figure 3.7).

Figure 3.6 Share of ICT productions in India's GDP



Source: Electronics and Computer Software Export Promotion Council, 2007

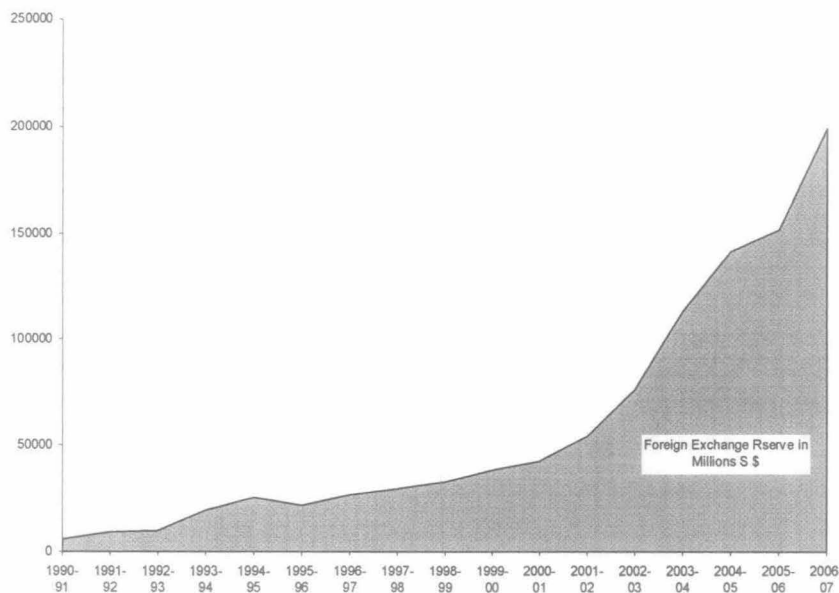
Figure 3.7 Share of ICT export in India's Total Export 1995-96 to 2005-06



Source: Electronics and Computer Software Export Promotion Council, 2007

Production in Indian ICT industry is mainly dependent on external market than domestic market. Since India's focus was on earning foreign exchange, its policy was biased in favor of export of ICT goods and services. The initial reason behind it was low ICT market expansion in India. This is evident in its foreign exchange reserve and exported oriented production of ICT. India's foreign exchange reserve shows a rapid increasing trend since 1991 (Figure 3.8). During the year 2005-06, out of the total production 61.15 percent was exported to various countries of the world. The share of export content in India's ICT production has also been continuously rising since last several years.

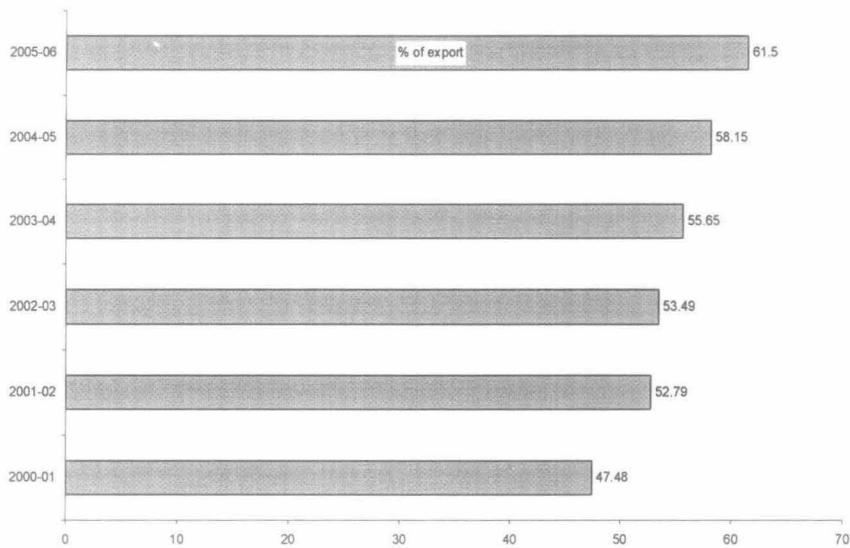
Figure 3.8 India's Foreign Exchange Reserve since 1991



Source: Reserve Bank of India, 2007

During the year 2005-06, India exported its various ICT commodities to 274 countries of the world. This is an increase of 50 countries when compared to 2000-01. North America maintains the top position for India's Export. It accounts for 59.22 percent of the total ICT exports from India. Export to North

Figure 3.9 Percentage share of export to total ICT production in India

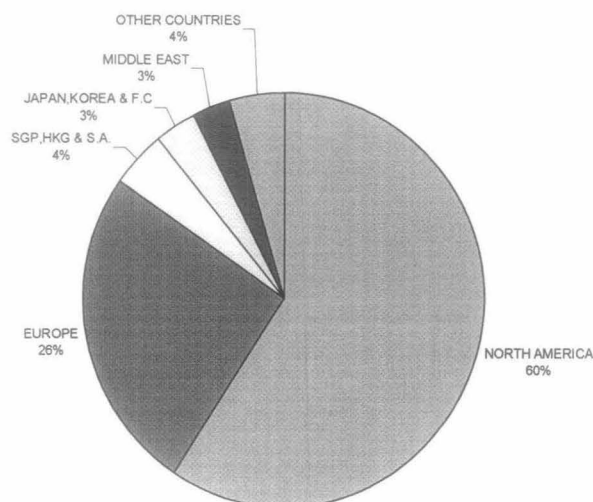


Source: Electronics and Computer Software Export Promotion Council, 2007

America during 2005-06 is registered a growth of 31 percent. Export to EU countries registered a growth of 40 percent during the year 2005-06 over the year 2004-05. Singapore, Hong Kong and other South Asian countries, remains at the 3rd position for India's export. Export to Japan, Korea & other Far East countries and Middle East countries also registered good growth during 2000s (Figure 3.10).

UK and USA remain the top two countries for export of software goods and services from India, and contribute 75 percent of India's total software export. Netherlands with an over all share of 2.51 percent emerged as the third top destination for export in this sector during 2005-06. Japan remains at the fourth position during 2005-06. The other major destinations for India's ICT are Singapore, UAE, Germany, Canada, Switzerland and Hong Kong.

Figure 3.10 Region wise export of Indian ICT industry during 2005-06



Source: Electronics and Computer Software Export Promotion Council, 2007

The export oriented ICT strategies in the last few decades have thus rewarded the sector with high growth. However, the almost complete export oriented growth, catering to the global value chain, on the other hand kept IT as a technology away from fostering the growth and development processes within India.

Even when India occupies an enviable position among IT producing Countries its position in terms of the diffusion of the technology had been very poor. The Personal Computer penetration was only 0.89 per 100 inhabitants, compared to 50.8 per 100 inhabitants in Netherlands. The level of penetration was lower than low income countries like Sri Lanka and China or Middle Income countries such as Mexico. The performance of internet diffusion was also very similar to that of PCs. Only 0.7 percent of the Indian population used internet, while it was much higher at more than 6 percent in China. The gap between developed economies and India in each of these indicators was even more conspicuous.

Table 3.1 International comparison of ICT diffusion

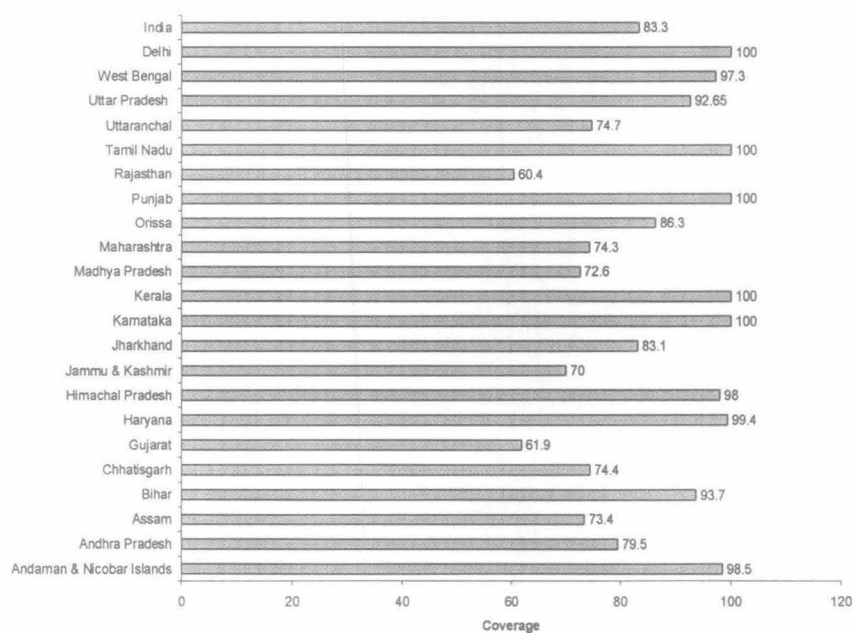
Country	% of households with a telephone			Internet users per 100 inhabitants			PC per 100 inhabitants		
	2001	2002	2003	2001	2002	2003	2001	2002	2003
India	9.14	NA	NA	0.7	1.6	1.7	0.58	0.72	0.89
China	41.70	48.50	57.80	2.6	4.6	6.2	1.90	2.76	3.90
Bangladesh	1.19	2.30	2.80	0.1	0.2	0.2	0.19	0.34	0.77
Sri Lanka	NA	22.90	NA	0.801	1.056	1.454	0.93	1.32	1.69
Japan	NA	NA	NA	38.4	46.5	48.3	35.82	38.22	40.75
Mexico	40.10	45.30	53.00	7.5	10.7	12.0	6.96	8.30	9.79
Netherlands	94.00	NA	NA	49.1	50.6	52.2	42.84	46.66	50.83
United Kingdom	93.00	92.00	93.00	33.0	42.3	43.7	36.62	40.57	43.90
United States	94.90	95.30	94.70	50.1	55.2	55.6	62.44

Source: ITU World Communication Indicators 2006

However, the state had been taking an active role in diffusion of the Information Technology in the economy in the recent years. The important contribution of the Government strategy in the growth of ICT is telecom policies which enabled low cost computer networking in the country. The digital divide has come down and accesses to telephone and internet has drastically increased. During the period 2003, 83.3 percent villages in India have achieved direct access with telecom facilities, and internet subscribers are grown from 476680 in 2000 to 4549618 in 2004 (Figure 3.11).

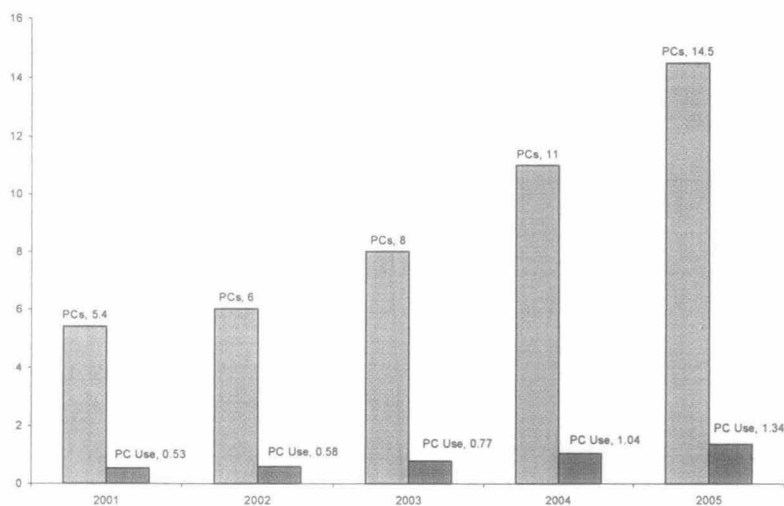
The personal computers increased from 5.4 million in 2001 to 14.5 million in 2005. Use of the computer also witnessed a tremendous progress. The use of ICT has been encouraged by the state not only through policy measures but also through direct intervention in various developmental initiatives such as achieving the goals of the decentralized planning through e-governance, achieving the millennium development goals with the assistance of IT, rural development and catalyzing the rural economy through IT interventions. Some of the successful government schemes are mentioned below.

Figure.3.11 Villages in each state with direct access to telecom facilities in India, 2003 (percentage)



Source: Indiatat.com, 2007

Figure 3.12 Personal Computers (PC) (in million) and use per 100 population in India



Source: Indiatat.com, 2007

Railway Reservation.

The establishment of the National Informatics Centre and its efforts of connect all district headquarters was one of the earliest initiatives towards digitally interconnecting the whole of India.

The National E-Governance Action Plan for 2003-2007 was initiated in 2003. The Plan seeks to build the legal, policy related and infrastructure requirements for long term growth of e-governance in the country. It has also mooted a number of Mission Mode Projects at the centre, state and integrated service levels to create a citizen-centric and business-centric environment for governance.

The Bhoomi e-governance project is another landmark initiative to digitize the land records of Karnataka, jointly funded by the Government of India and the state government of Karnataka. Under this project more than 20 million land records of 6.7 million landowners in 176 taluks of Karnataka have been computerized⁴. AP Online is an e-governance gateway for the Government of Andhra Pradesh to offer multiple services, through a single window, to its citizens in partnership with TCS. Similarly, AP Online is comprehensive in scope and over 200 informative, interactive and payment services to citizens are under development across the state. AP Online is easily accessible through multiple delivery channels, homes and offices, anytime, anywhere. The gateway provides Information Services regarding the Andhra Pradesh Government Departments such as, Functions of the Department, Acts & Rules, services offered, budget documents, forms and procedures, organizational performance, government orders etc.

A backward district of Madhya Pradesh, one of the poorest states of the country, called Dhar has been in news since the implementation of the Gyandoot project. The Gyandoot project, launched in 2000, connects the rural district by Internet and provides vital information for the agrarian sector. The project covers over 600 villages in the entire district.

More details would have been expected.

⁴ <http://www.revdept-01.kar.nic.in/Bhoomi/Home.htm>

Chapter 4

Experiment of 'Akshaya' An Infinite Source of Innovation?

As discussed in the previous chapter, several initiatives, both within India and abroad have helped to demonstrate the potential to harness ICT in help achieving various developmental goals such as poverty alleviation, access to education and health services, and reduce gender inequalities. Poverty alleviation programs have leveraged ICT to increase opportunities for wage employment and micro entrepreneurship. Use of technology has also helped raise the magnitude and reduce the vulnerability of returns earned by small producers from their economic activities by providing timely access to relevant information regarding details about the best prevailing prices for farmers, weather reports, etc. Further, direct effects of ICT on poverty reduction may also be achieved through a reorganization of economic activity that allows producers to increase their returns.

Besides the direct contribution that ICT can make towards alleviating poverty, it can also contribute indirectly by facilitating and reducing the costs of delivery of services that either promote wage and self employment or help overcome structural constraints to poverty alleviation, and by improving the quality of delivery of employment generating and poverty alleviating projects being implemented by the government. ICT can play a role in bridging gender disparities by directly benefiting the women who use technology as well as by improving the delivery of services to women. This is also reflected in the relatively higher proportion of women employees in the IT-ITES sector as compared to other

Numbers?

sectors of the economy. The influence on gender equality is not restricted to cities alone. There are also examples where ICT is being used to strengthen earning opportunities for women and to build productive skills among disadvantaged women as well as offer knowledge-based services that help improve the productivity of women's enterprises in smaller towns and cities. Technology may also be applied towards building an equitable knowledge based society by facilitating better access to education for people in remote locations or from underprivileged sections of the society in an economical manner. Potential gains from ICT in health have been highlighted through some grass-roots usage experiments in which ICT has been applied to increase the efficacy of social service delivery.

*much
or ?*

'Akshaya', an ICT diffusion programme experimented in Kerala state, during 2002, incorporated the aforementioned social perspective. This chapter is trying to understand the evolution of the Akshaya experiment since its inception and evaluates how it addresses Kerala's developmental issues. This chapter deals with the core objective of this study.

4.1 Introduction to Akshaya

As part of Kerala's various initiatives to link its unique achievements in human development with economic growth, the State has introduced an innovative concept 'Aksahya', a community based ICT diffusion centre. The essence of the Akshaya project was creating an information society to engage in emerging knowledge intensive development process. According to government documents, Akshaya is envisaged as a one stop information hub for knowledge production and diffusion. It claims that it has already generated contents in five core areas including, health, agriculture, career, education and laws and regulations. The government also delivered its public services through Akshaya network. Moreover, Akshaya is a social and economic catalyst focusing on the various facets of e-learning, e-transaction, e-governance, information and communication.

The first phase of Akshaya, from October 2002 until January 2004, was mainly engaged in promoting IT literacy amongst villagers. The logic behind this phase

*What actually
happened during
this phase?*

was preparing people to participate in the emerging knowledge revolution in the form of ICT. The programme was funded by the Gram Panchayat and enabled the entrepreneurs to recover 30 percent of their initial investment within the first three months of the project. Once the government found that the experiment was successful in making people aware about the technology and its utility, it decided to implement the second phase of the programme with development oriented activities.

In the second phase of Akshaya, high-speed internet connectivity for all centers was established by early 2004 and there was more emphasis on providing advanced computer training to induce the mobility of people in ICT based job market. It started to engage with capability building process of people providing advanced training in communication and personality development to survive in competitive job sectors on a payment basis. Moreover, it has started various developmental activities to complement Kerala's development process, especially in agriculture, service industries and employment generation.

Such
as?

The major objectives behind the Akshaya project are:

To bridge the gap between the 'Information Poor and the Information Rich';

To empower individuals and communities through enhanced access to information, education and communication facilities;

To integrate communities through creation of e-networks and development of the core sectors like agriculture, health, education, industry and resources;

To integrate local governing bodies through the network and integrate government service through the model;

To create a society that is ready for capitalizing on knowledge for economic and social development; and

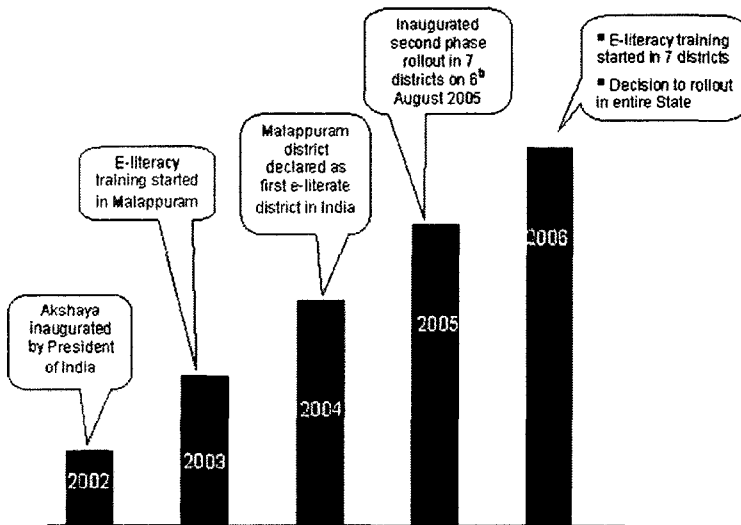
Transform Akshaya centers to work as social and economic catalysts for the overall development of the society.

The uniqueness of the project has been the clubbing of entrepreneurship development with the creation of ICT Access Points. Entrepreneurs with a social attitude are promoted to start small ICT enterprises at the grassroots level. The concept of social entrepreneurship is envisaged in the project, which is unique, because of two reasons: i) ICT for development in the rural areas is a new concept and ii) people have not yet started using ICT in their lives. To prompt the people to use Internet instead of telephone calls or online payment system to pay their bills is not an easy job, because of the entrenched negative mindset of the people to adopt new technology. A social entrepreneur, who is a native to that place, commands some social esteem, badly in need of a job, ready to experiment and well versed in social activities, would be able to define the information, communication, and education needs of the common people around him.

What does the entrepreneur do?

According to government's claim, the successful pilot project implemented in Malappuram district could gather overwhelming local support and enthusiasm. Therefore, there has been a conscious effort by government for Statewide roll out, based on the initial successful experiment in Malappuram. The programme is, now extended in seven more districts namely Kasargod, Kannur, Kozhikode, Thrissur, Ernakulam, Pathanamthitta and Kollam.

Figure 4.1 Milestones of Akshaya



Source: Official documents of Akshaya, 2007

Over the years, Akshaya, the prestigious ICT diffusion project of Kerala is recognized by several national and international organizations for its excellence in programme conceptualization and implementation. In 2006 UNESCO has come forward to support it in the field of women empowerment component. It has won the 'Golden Nica' award of Prix Ars Electronica in the Digital Community category for the year 2005. It won the 'India Tech Foundation Telecom India 2005, Excellence Award 2005. Further, it won 'Silver Icon' award in innovative operations and best practice-new entrants for exemplary implementation of e-Governance initiatives for the year 2004.

4.2 Study Area

Akshaya was implemented in Malappuram, a district in North Kerala sandwiched between the Arabian Sea on the west and Western Ghats in the east. While the district shares some of the high human development indicators with the rest of the state, it fares poorly in terms of per capita income. According to the 2001 census, Malappuram has a literacy rate of 89.61 as against 90.86 for the rest of the state. Female literacy rate is also close to the state average at 86.26. Sex ratio is 1066 against the state average of 1058. However, Malappuram has the lowest rank among the 14 districts in Kerala in terms of human development index (HDI) and gender related development index (GDI). The percentage of urban population in Malappuram is low at 9.8% while the state average is 26%. Muslims constitute the majority of the population in Malappuram unlike in other districts of Kerala where Hindus are the majority. The lowest per capita income in the state was recorded in Malappuram District (Rs.18960) in 2005-06 (Economic Review, 2007). It is one of the industrially backward districts in Kerala with only 5% of the total number of working factories in the state. However, there are reasons to believe that the economy of the district is remittance driven. Rajan & Zachariah (2004) observes that Malappuram sends out the largest number of people to the Gulf and remittances were the second highest in Malappuram after Thrissur with Rs 2892 crore. Remittances formed about 46 percent of the district domestic income.

4.3 Sample Area

In the first phase of Akshaya experiment, around 610 units are established in the entire district of Malappuram. Once the preliminary phase of e-literacy training was over, it has come down to 344 units in the second phase. According to the official statistics provided by Akshaya district officials on 4th June, 2008, out of 344 units only 28 units are working efficiently (A+ grade) and 110 units are moderately efficient (A grade). We are not convinced enough about their grading system and we could not collect any methodology of the grading from the office. We have randomly chosen 60 functioning units from rural, semi urban and urban areas in Malappuram district. We have drawn samples from 8 blocks Areacode, Malappuram Municipality, Mankada, Nilambur, Perinthalmanna, Thirurangadi, Vengara and Wandoor and covered 32 panchayats in Malappuram district. In fact, during the field visit at least 3 per 10 units were closed and we could not interview entrepreneurs due to various reasons. Hence, we have substituted those units with nearby units.

4.4 Profile of samples

In our sample survey, 90 percent of the unit owners are men and remaining 10 percent are run by women. According to official documents of Akshaya, 33 percent are female and 67 percent are male entrepreneurs. We could observe from our sample survey that the ownership of the units changed several times from its inception in the case of many units, even if the legal agreement between Akshaya entrepreneur and implementing government agency Kerala State IT mission (KSITM) prohibit the transfer of the ownership. The Letter of Undertaking of Akshaya clearly specifies in the clause numbered C that 'the change of location of ICTs and transfer of ownership is prohibited'. Our discussion with present entrepreneurs reveals that majority of initial entrepreneurs left the units due to the low profitability than what they have expected and went to Gulf to work. Moreover, currently, in some Panchayats, a single entrepreneur owns more than one unit and is not directly managing the units.

The official documents maintain that 58 percent of the entrepreneurs fall between 26 and 35 year age group and 78 percent are below 35 years. Our sample also shows almost the same pattern (Table 4.1)

Table 4.1 Age group of Akshaya entrepreneurs

Age Group	No. of Units	Percent	Cumulative Percent
Below 25	6	10.0	10.0
Between 26 & 35	32	53.3	63.3
Between 36 & 55	18	30.0	93.3
Greater than 55	4	6.7	100.0
Total	60	100.0	

Source: Primary Survey, 2008

Among all the entrepreneurs in sample 30 percent have some kind of technical education. But majority of entrepreneurs are graduates while 13 percent are post graduates. Around 18 percent have completed secondary schooling. The educational level of the sample is almost similar to the official claims regarding the educational level of entrepreneurs.

Table 4.2 Educational level of Akshaya entrepreneurs

Education	No. of entrepreneurs	Percent	Cumulative Percent
Secondary Education	11	18.3	18.3
Graduation	23	38.3	56.7
Post Graduation	8	13.3	70.0
Technical Education	18	30.0	100.0
Total	60	100.0	

Source: Primary Survey, 2008

In the initial phase, there was a problem regarding over crowding of units because too many units sprang up in each panchayat. The logic behind this over crowding

of units was to diffuse the e-literacy among people simultaneously and to ensure coverage and easy accessibility. However, the outcome was declining profitability of units leading to closure of some units. Thus in the second phase, there was a reduction in the number of working units. Yet, the problem of 'over crowding' persists leading to low profits. This is one of the major reasons of entrepreneurs turning back from the ventures. The sample statistics shows that around 43 percent of units are located within one kilometer from the nearest unit. 68 percent of units are within two kilometers from the nearest unit. This actually indicates the 'over crowding' mentioned above.

Table 4.3 Distances between Akshaya Units (Km)

Distance	Frequency	Percent	Cumulative Percent
Below 1 km	26	43.3	43.3
1-2 km	15	25.0	68.3
2-3 km	9	15.0	83.3
3-4 km	5	8.3	91.7
4-5 km	2	3.3	95.0
Above 5 km	3	5.0	100.0
Total	60	100.0	

Source: Primary Survey, 2008

On an average in each unit there were employees. The gender ratio was such that for every male employed, there were two women employees. The frequency of employment per unit shows that 42 percent of the units have two employees, 20 percents have 3 employees and 30 percent have more than 3 employees. In the case of male-female proportion, 28 percent units have two male employees while 33 percent units have two women employees. We could understand from our field visit that majority of units are managed by women employees. It is interesting to note here that while only 10 percent of entrepreneurs were women in our sample, among the workers 55 percent were women. Our enquiries suggest that this is due to the low wage-low profitability nexus. Majority of the female managed units have absentee owners who are engaged in some other occupation.

Table 4.4 No of employees per unit

No. of Employees	No. of Units	Percent	Cumulative Percent
1.00	5	8.3	8.3
2.00	25	41.7	50.0
3.00	12	20.0	70.0
4.00	6	10.0	80.0
5.00	6	10.0	90.0
6.00	5	8.3	98.3
8.00	1	1.7	100.0
Total	60	100.0	

Source: Primary Survey, 2008

Table 4.5 No of male employees per unit

No. of Male Employees	Frequency	Percent	Cumulative Percent
0	13	21.7	21.7
1	23	38.3	60.0
2	17	28.3	88.3
3	3	5.0	93.3
4	4	6.7	100.0
Total	60	100.0	

Source: Primary Survey, 2008

Table 4.6 No of Female employees per unit

No. of Female Employees	No. of Units	Percent	Cumulative Percent
0	9	15.0	15.0
1	18	30.0	45.0
2	20	33.3	78.3
3	9	15.0	93.3
4	4	6.7	100.0
Total	60	100.0	

Source: Primary Survey, 2008

As per the opinion of the owners of the units, 35 percent of units are best performing while 65 percent are moderate performing. According to the opinion of

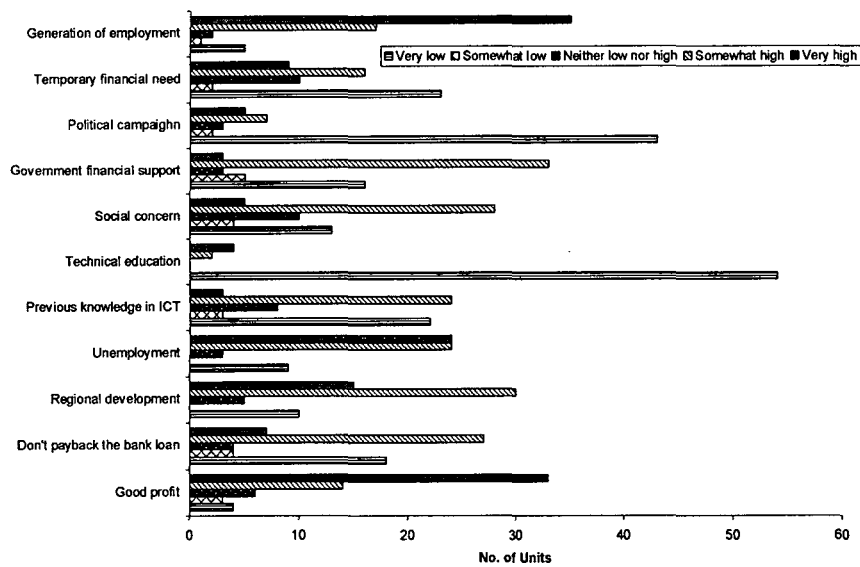
the owners, we cannot attribute this better performance measure to Akshaya because these firms were already working before Akshaya integrated them into the programme and have other sources of income like insurance agency, mobile recharge facilities and DTP and Photostat work.

4.5 Reasons of entrepreneurs to start an Akshaya unit

Our specific question regarding the major factors that prompted entrepreneurs to start Akshaya units give a good picture of the mindset of entrepreneurs. We have asked several questions on financial aspects and welfare aspects. 78 percent entrepreneurs mention that earning good profits out of Akshaya units is one of the main motivations. In the pilot experiment of Akshaya in Malappuram, the government has facilitated loan availability to entrepreneurs. On our question regarding this issue 57 percent responded saying that the loan facility motivated them to start the firm and that they thought they do not need to pay back the loan amount. Now they realize that it will be difficult to pay back the loan. Also, 60 percent of people believed the government would extend its support continuously in the future to run the units in a subsidized mode. 80 percent of respondents started Akshaya due to the unemployment crisis and 42 percent to meet their immediate financial need.

The question regarding development of the region indicates that 75 percent of respondents thought that the project would induce the development of the region. Only 20 percent believed that political campaign prompted them to start the Akshaya unit.

Figure 4.2 Reasons of entrepreneurs to start an Akshaya unit



4.6 Infrastructure of Akshaya units

According to the official instruction, each unit should have 5 computers, a server computer, a CD writer, a printer, a web camera or a digital camera, UPS and an internal network of computers. We had asked the respondents to compare the status of the unit in terms of infrastructure when the programme started and the current status of the unit. We did this to get a comparative perspective over time and to get an understanding about the evolution of the programme and the unit.

Our sample enquiry regarding infrastructural facility in two time points, the initial and current periods, revealed that, 18 percent of units have begun without 5 computers as required by the government condition. Even now, 5 percent of units do not have 5 computers. Majority of the Akshaya units now have more than 5 computers. The paired-samples¹ T statistic shows that there is a significant improvement in infrastructural components like computers, printer, multimedia equipments and CD writer.

¹ The paired-sample T test procedure compares the means of two variables that represent the same group at different times or related groups. The low significance value for the T test (typically less than 0.05) indicates that there is a significant difference between the two variables.

Table 4.7 Hardware infrastructure available in Akshaya units

Descriptive Statistics	Initial Period			At Present		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Computers	2	15	6	4	40	8
Printer	0	3	1	0	8	2
Scanner	0	4	1	0	2	1
Multimedia Equipments	0	10	3	0	17	5
CD Writer	0	6	1	0	9	2
Webcam	0	3	1	0	7	2
UPS	0	6	1	0	7	2
Trainees	0	15	3	0	21	4
Male Trainees	0	10	1	0	11	1
Female Trainees	0	5	1	0	10	1

Note: Mean value shows the rounded value

Source: Primary Survey, 2008

Table 4.8 The paired-sample t test

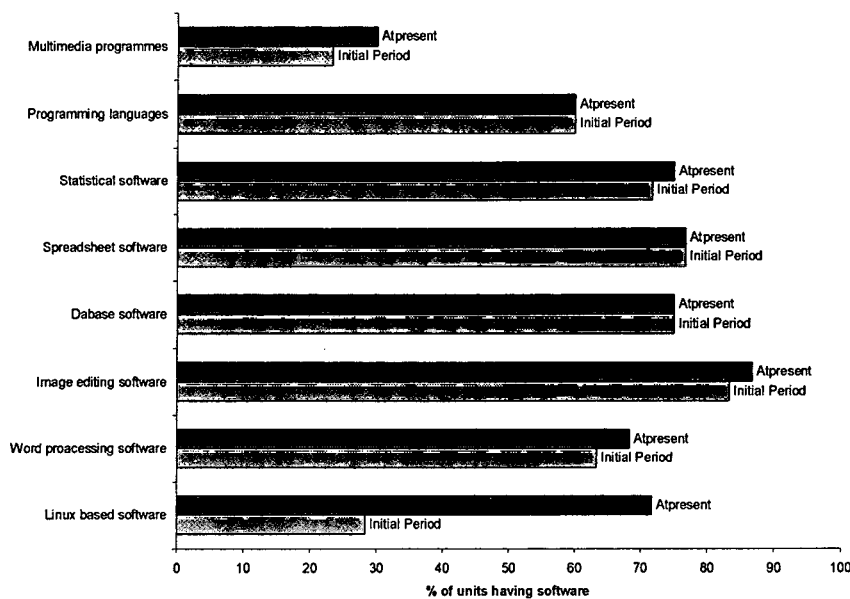
Hardware	Mean value		T value	P value (Sig. 2-tailed)
	Initial Period	At present		
Computers	5.6	8.25	-4.11	0.000
Printer	1.12	1.88	-5.502	0.000
Scanner	0.78	0.95	-2.098	0.040
Multimedia Equipments	3.08	4.9	-3.987	0.000
CD writer	1.43	2.4	-4.465	0.000
Webcam	0.92	1.63	-4.026	0.000
UPS	1.18	1.65	-2.445	0.017

Source: Primary Survey, 2008

Even though the official document is strict on hardware component of infrastructure, we could not observe any mandatory clauses in terms of software which mainly determines the knowledge intensity of ICT diffusion. Also, there is no specification with respect to training. In the initial phase of Akshaya programme around 73 percent of units had less than two trainers. In the second phase there is not much difference in terms of trainers. Moreover, there is no specification in official documents about the qualification and eligibility criteria of trainers. There are more women trainers than men. 72 percent of units have internal computer network in the initial period as against 77 percent currently. 58

percent units had women trainers compared to 57 percent currently. It is interesting to observe that the use of free software operating system, Linux, has tremendously increased from an initial 28 percent to 71 percent at present. It shows Kerala's commitment to promoting free software movement. However, only 33 percent of the respondents were aware of the free software movement and its significance and economic relevance. Currently, 68 percent of the units

Figure 4.3 Software infrastructures available in Akshaya units (percent)



Source: Primary Survey, 2008

4.7 The major services provided through Akshaya units

Mainly nine kinds of services are delivered through Akshaya units.

Basic e-literacy training, a short term e-awareness programme

E-payment, an extension of FRIENDS, a single window utility bill payment system of BSNL, Kerala State Electricity Board (KSEB) and Kerala Water Authority (KWA) etc. Presently, e-payment service enabled 165 centers in Malappuram out of 300 functioning units.

Advanced computer training in different specialized software packages

E-krishi, a networked community of farmers in Kerala. This programme is supported by UNDP. Akshaya centres were positioned as interlinking agencies of buyers and sellers in the rural agricultural sector and also as the information kiosks in connection with agriculture. Farmer's clubs called 'Bhoomi' clubs were formed in 63 panchayats in Malappuram.

DIC web portal service. Akshaya centers are authorized to help the small-scale firms and customers to upload and download the information and advertisement to the web portal created by District Industries Centre, Malappuram

PMRY online registration. It is mainly meant for the easy registration by the self-employment seekers under the Prime Minister's Rosgar Yojana programme in association with District Industries Centre.

Content generation. This service relates with land record digitization, service records digitization of the government servants, and digitization of traditional knowledge and local innovations of the state

Dissemination of contents in education, career, health and agriculture

Other services like data entry, internet browsing, insurance agency, and mobile phone re-charging service

For this study, we have included the above services in the following broad categories based on the sectoral contribution of each service. i) E-krishi contributes to the development of the primary sector. ii) DIC web portal is connected to the small scale industry development oriented programme and it contributes to the secondary sector. iii) advanced computer training, PMRY online registration contribute to employment generation in various sectors iv) content digitization, dissemination of contents, e-payment, basic e literacy training and other services like internet, insurance agency etc either come directly under e-governance or contribute to the service sector. It should be noted that these activities complement each other. / How?

47 percent are providing basic e-literacy training and 90 percent units are providing advanced computer training in various job oriented software. In the

case of e-payment 80 percent of the sample has e-payment services and 72 percent have e-krishi. Only 10 percent of the sample provides DIC web portal service and 38 percent gives the service of PMRY on line registration service. 25 percent gives content digitization as against 30 percent dissemination of various contents. 78 percent of units are providing other services than Akshaya envisaged like insurance agency, internet browsing, travel ticket booking, mobile servicing, online match making etc.

Table 4.9 Services provided through Akshaya units

Services	% of units providing service
Basic e-literacy training	46.70
E-payment (BSNL, KSEP, KWA etc)	80.00
Advanced computer Training	90.00
E-krishi	71.70
DIC web portal service	10.00
PMRY online registration service	38.30
Content digitization (land records, traditional knowledge etc)	25.00
Dissemination contents (education, career, health etc)	30.00
Others (DTP, Internet browsing, mobile phone service etc)	78.30

Source: Primary Survey, 2008

4.8 Intensity of Activities

We have measured the intensity of activities that take place in Akshaya in the initial and present periods. We had asked the respondents to compare the intensity of an activity when that activity started and the current status of the activity. 38 percent of respondents mention that initially the participation in the e literacy training was very low. However, at present, participation has further declined. Our discussions with respondents reveal that the responsibility of finding trainees was with the entrepreneurs. Initially, the response was good among stakeholders due to the initial hype and enthusiasm. Hence, 45 percent of the sample reveals that there was some what high participation in the e-literacy programme in the initial period. Now it has come down to 12 percent. In the case of e-payment, 37

percent of the respondents said that participation was high which increased to 75 percent when asked about participation in the current period. In the content digitization and dissemination services, 98 percent respondents declared that the activity was low in the initial period and the same trend has continued till now. Other value added services like web page development, software development, training of disabled persons also remained low through out the period. However, free software training shows increased trend from initial period to current. It has gone up from 20 percent to 38. This can be attributed to the patronage given to free software by the left democratic front led government in the current period. The left campaigned vigorously for the free software movement since its origin and spread in the world. In its IT policy, it has given special preference to it. Training for disabled persons also is a priority of the Akshaya's on going activity and it has gone up from 38 percent to 45 percent in activity intensity. Moreover, training for school children, training for government employees also show an upward trend from initial period to now.

How are these related?

33 percent of the respondents said that employment generation programmes like PMRY registration had high participation which came down to 9 percent in the current period. 67 percent of respondents said that advanced computer training in specialized software packages had high participation initially and which became 80 when asked about the current period.

67 percent of the respondents said that the participation in secondary sector oriented programme DIC web portal service was low in the initial period which remained low throughout. 85 percent of the respondents said that participation was low in the E-krishi designed to rejuvenate the primary sector. Now it has shown improvement as 33 percent of the respondents, said that activity has improved.

Table 4.10 Intensity of various activities in Akshaya unit

Activities	Mean Value	
	Initial Period	At Present
Internet browsing	3.52	4.25
Advanced computer training*	3.55	4.18
Training for school children	3.53	4.03
E-payment*	2.43	3.98
Training for government employees	3.08	3.67
Training for disabled community	2.85	3.07
E-krishi*	1.52	2.45
Basic e-literacy training	2.68	2.30
Free software training	1.67	2.13
Webpage development *	1.70	2.07
Software development*	1.72	2.03
DIC webportal service	1.77	1.87
PMRY online Registration service	1.82	1.87
Content digitization service	1.77	1.83
Dissemination of contents	1.65	1.68

* Paired-sample t test statistic shows significant value

Source: Primary Survey, 2008

The paired-sample t test statistics also shows that there is a significant change in initial and current period in the case of e-payment, advanced computer training, e-krishi, free software training, training for school children, training for government employees, using e-mail, accessing information via internet, internet telephone, participation of school children , male and female.

It should be noted that the respondents were asked to rate the intensity of the activity as low, somewhat low, neither low nor high, somewhat high, very high. We have combined somewhat high and very high into a category 'high' and similarly very low and somewhat low were combined as 'low' in the description.

4.9 Participation rate

According to the respondents' opinion, the sample statistics shows that on an average, 133 visitors are using the services of Akshaya units per week. Majority of the units have a visitor rate of above 80 per week.

Table 4.11 Average visitors per week

Average Visitors per Week	Frequency	Percent	Cumulative Percent
Below 10	2	3.3	3.3
10-20	3	5.0	8.3
20-40	4	6.7	15.0
40-60	17	28.3	43.3
60-80	3	5.0	48.3
80-100	13	21.7	70.0
Above 100	18	30.0	100.0
Total	60	100.0	

Source: Primary Survey, 2008

52 percent visitors of Akshaya units fall in the age group of 20-30 years, the second largest group is 10-20 years which constitutes of 40 percent of the visitors. The frequency of the visit by the same visitor is at least once a day. 67 percent of the respondents said that most of the visitors come at least once a day. 30 percent of the respondents said that the same visitor visits at least once a week.

According to 79 percent of the respondents, participation of school children (male) was high in the initial period and remained high. 82 percent of the respondents said that participation by female school children improved in the current period. In the case of government employees (male and female), unemployed youth, general women population, traders and farmers participation is moderately good and there is not much improvement over time.

4.10 Revenue

According to the respondents in the sample, the average income per unit is Rs. 1538 per week. The average income received per week is below Rs.1000 for 53 percent of units. Average income of 93 per cent of units is below Rs.3000 per week. This shows that many of the Akshaya units run on a low profitability mode. Therefore, we could understand from our field visit that majority of units are seeking additional revenue to survive.

*What are the costs?
Is this net?*

Table 4.12 Average income received per week

Average Income Group	No. of Units	Percent	Cumulative Percent
Below 1000	32	53.3	53.3
1000-2000	17	28.3	81.7
2000-3000	7	11.7	93.3
3000-4000	1	1.7	95.0
4000-5000	2	3.3	98.3
Above 5000	1	1.7	100.0
Total	60	100.0	

Source: Primary Survey, 2008

The question regarding income difference between before and after setting up the units shows a significant association. There is an increase in the income of Akshaya entrepreneurs after setting up the units. The likelihood ratio obtained after a chi-square² test shows p-value of .001 at 0.05 percent level of significance.

Table 4.13 Monthly earnings before and after setting up the Akshaya units

		Monthly earnings after setting up the unit				Total
		1000-2000	2000-3000	3000-4000	more than 5000	
Monthly earnings before setting up the unit	less than 1000	3	3	1	0	7
		8.6%	8.6%	2.9%	.0%	20.0%
	1000-2000	0	6	2	0	8
		.0%	17.1%	5.7%	.0%	22.9%
	2000-3000	0	1	4	1	6
	.0%	2.9%	11.4%	2.9%	17.1%	
	3000-4000	0	1	4	3	8
		.0%	2.9%	11.4%	8.6%	22.9%
	more than 5000	0	0	1	5	6
		.0%	.0%	2.9%	14.3%	17.1%
Total		3	11	12	9	35
		8.6%	31.4%	34.3%	25.7%	100.0%

Primary Survey, 2008

² The Chi square measures test the hypothesis that the row and column variable in a cross tabulation are independent. A low significance value (typically below 0.05) indicates that there may be some relationship between the two variables. Here we have taken the likelihood ratio of the chi square because the expected count in row and column is less than 5.

Chi-Square Tests

Statistics	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.536 ^a	12	.000
Likelihood Ratio	35.878	12	.000
Linear-by-Linear Association	20.971	1	.000
N of Valid Cases	35		

a. 20 cells (100.0%) have expected count less than 5. The minimum expected count is .51.

Out of the nine services which Akshaya provides currently, the major source of revenue is other services like browsing, DTP, railway ticket booking, mobile servicing and recharging, online job searching and online match making. These services are not directly part of Akshaya programme. 38 percent of the total respondents said that these services are the main source of revenue. The second largest revenue source is advanced computer training. 35 percent of the respondents ranked this to be the largest revenue source. 13 percent of the respondents ranked e-payment the largest revenue source. E-literacy programme also share the third position as another 13 percent of the respondents found it to be the largest revenue source. Most of the e-literacy and advanced computer courses are financially supported by the government through local bodies and ITMK. ?

Table 4.14 Major revenue source of the units

Services	No. of Units		
	1st Revenue source	2nd Revenue source	3rd Revenue source
Basic e-literacy training	8	4	4
E-payment (BSNL, KSEP, KWA etc)	8	18	19
Advanced computer Training	21	21	9
E-krishi	0	1	9
DIC web portal service	0	1	1
PMRY online registration service	0	0	3
Content digitization (land records, traditional knowledge etc)	0	0	0
Dissemination contents (education, career, health etc)	0	1	0
Others (DTP, Internet browsing, mobile phones service etc)	23	14	15

Note: Each cell denote the no. of units who ranked each service as the major revenue source
Source: Primary Survey, 2008

In the case of e-krisi , the DIC web portal service, PMRY registration and content digitization and dissemination services are not generating as much revenue as expected. Hence, the entrepreneurs are giving more emphasis to government sponsored computer training courses, e-payment activity and other additional services. In our question regarding how future of their unit they said that they are looking forward to finding additional revenue sources other than Akshaya activities. They are not sure that Akshaya would make them survive in future.

4.11 Capability building for entrepreneurs

The response to the question, regarding training entrepreneurs has received from government, local bodies and private institutions, is summarized below. 73 percent of respondents mentioned that initially they got good training in hardware and software. But only 67 percent thought that they got good training in the recent period in hardware. Even though the free software is popular in Akshaya units, 90 percent of entrepreneurs believe that they are not getting proper training in free software. 82 percent of the entrepreneurs currently think that they are not getting proper training in advanced software and 93 percent feel that training on latest ICT technologies and opportunities should be provided. Government support regarding financing and subsidy, formulating new information society strategy, providing broadband internet accessibility, providing training for trainers, increasing the quality of courses and certification, developing an information system on agriculture and health is very low throughout the period according to the respondents. Moreover, the entrepreneurs feel that the introduction of Akshaya project in Malappuram district has tremendously reduced the digital divide.

Evidence?

4.12 Outcome

Our question to Akshaya entrepreneurs about the outcome of Akshaya project implementation shows that the major outcome of the Akshaya experiment in the region reflects building up of the skills needed for the people to enable the people engage themselves with ICT. However, till date there is not much impact in terms of Kerala's development objectives. The ambitious programmes like e-krisi,

Is this enough to establish outcomes?

employment generation etc are not reflected properly in Akshaya's activity. It works as a general internet kiosk rather than as a driver of local economy. Table 4.15 provides a picture on Akshaya's outcomes as perceived by the entrepreneurs. The higher mean value indicates higher level of outcome in that activity.

Table 4.15 Outcomes of Akshaya project according to entrepreneurs

Outcomes	No. of Respondents	Mean value of opinion
Using emails	60	4.80
Improved language skills	60	4.63
Using operating systems	60	4.63
Development at Panchayat level	60	4.52
Digital divide	60	4.45
Typing MS word	60	4.45
Searching information on internet	59	4.32
Career & education	59	4.31
Spreadsheet with excel	60	4.20
Cultural knowledge	58	4.17
PowerPoint presentation	60	4.17
Online course training	60	4.15
Internet browsing	57	4.09
E-literacy training	57	3.58
Political knowledge	57	3.44
International knowledge	57	2.67
Finding jobs	54	2.31
PMRY online registration service	57	2.14
Providing free software training	58	2.14
Scientific knowledge	56	2.13
Selling agricultural products	55	2.09
Content dissemination	55	2.04
E-krisi	60	2.00
Content digitization	54	1.87
DIC web portal service	57	1.65
Webpage design and software development	53	1.49

Source: Primary Survey, 2008

4.13 Reasons for success

Our analysis shows that the success of Akshaya units is led by factors which are not necessarily influenced by Akshaya or the government. The factor analysis reveals that in the initial period, reasons behind success of Akshaya units are associated with factor components other activities like insurance agency, DTP

works, mobile service etc. rather than Akshaya services. Other important factor components were qualified trainers, self marketing strategy, adoption of new ICT technology, investment in infrastructure, locational advantages, support of local bodies, collaboration with private firms, volume of e-payment and e-literacy training.

In the initial period, the factor analysis yielded following component matrix (Table 4.16) containing factor loadings. The sample adequacy was tested using Kaiser-Meyer-Olkin Measure and Bartlett's Test of Sphericity. We found that the data is appropriate for analysis.

Table 4.16 Factors determined by success of Akshaya

Variables	Component Matrix ^a				
	Component				
	1	2	3	4	5
Locational advantage	-.233	.783	-.119	-.166	.282
Supportof local bodies	.154	.808	.192	.029	-.270
Self marketing strategy	.687	.294	-.219	.020	.290
Investment in infrastructure	.379	.503	.328	-.041	-.365
Qualified trainers - initial period	.872	.161	-.089	.152	-.319
Adopting new technologies	.492	.147	.554	-.294	.343
Collaboration with private firms	.220	-.100	.568	.426	.545
Volume of e-payment	.347	.146	-.603	-.440	.329
Volume of e-literacy training	.317	.032	-.330	.786	.056
Volume of content dissemination	-.452	.558	-.348	.311	.151
Others Activities	-.731	.456	.265	.108	.038

Extraction Method: Principal Component Analysis.

a. 5 components extracted.

The Table 4.17 provides the factor components for the current reasons for success. They are volume of content dissemination, other activities than Akshaya activities,

volume of e payment, qualified trainers, support of local bodies, investment in infrastructure and adoption of new technology.

Table 4.17 Factors determined by success of Akshaya

Variables	Component Matrix ^a			
	1	2	3	4
Location advantage	.137	.327	-.029	.457
Support of local bodies	.094	.675	-.026	-.563
Self marketing strategy	.134	.499	.543	.159
Investment in infrastructure	.000	.649	.275	-.056
Qualified trainees	-.488	.662	.195	-.274
Adopting new technologies	-.207	.601	-.246	.382
Collaboration with private firms	-.006	.536	-.426	.388
Volume of e-payment	-.604	-.161	.473	-.061
Volume of e-literacy training	.370	.199	-.648	-.402
Volume of content dissemination	.929	.056	.270	.015
Others activities	.929	.056	.270	.015

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

4.14 Summary

The ambitious ICT based experiment, Akshaya, implemented in Malappuram district of Kerala shows that the project has had certain degree of success with respect to generating the capacity building in the form of e-literacy and other indicators and thus laying the foundation for facilitating ICT diffusion. The study finds that the infrastructure and ICT diffusion capability recorded a significant improvement ever since the project was implemented. More over, the goal set in the initial phase of Akshaya regarding reducing the digital divide was also achieved. However, in the perception of most of the entrepreneurs, it is not a profitable venture. This has led to a significant reduction in the number of working units while those survived resorted to diversification of "Akshaya activities" into more revenue generating areas. In the second phase of the programme, there were

Evidence?

various developmental objectives concerning economic backwardness in primary and secondary sector growth. Our enquiry tends to suggest that achievement with respect to addressing the developmental imbalance is yet to be achieved. Nonetheless, it is to be noted that it is too early to expect such outcomes and that given the success in setting the initial conditions, the developmental outcomes by harnessing ICT are bound to follow in the near future.

Chapter 5

Innovation and inclusive Growth

Development is, ultimately, a matter of wellbeing. As theorized by Sen (1999), it is the right and freedom of people. Kerala had a unique development trajectory wherein it made substantial progress in human development indicators even when the income growth had been stagnant. However, the sustainability of a lop-sided development strategy was suspect with the rise of second generation problems of severe unemployment, low levels of per capita income, poor economic growth along with looming social unrest and social problems. It is in this larger milieu that economy wise changes were unleashed through liberalization, privatization, and globalization. Along with these policy shifts came the great possibility of acquiring new technologies to revitalize the economy through the production and use of such technologies.

Information and Communication Technology (ICT) poses such an opportunity for the developing economies. In the production of ICT, especially software and IT enabled services; the role of human capital is much larger than physical capital. Moreover, the production of such services does not require large sunk in capital, unlike production of most other goods. Also, the lower ends of the value chains of the IT industry and ITES make them suitable for production in developing economies given their relatively lower level of skill requirement. In the diffusion of ICT also, the developing economies are faced with a great opportunity as never

before to catch up with the developed world. Studies show that the use of ICT has substantial positive effect on productivity, growth and development through a variety of roles such as being a more efficient capital input in the production process, being an efficient assistant to coordination and management, providing network effects, and most importantly filling vital information gaps. The above described properties of ICT make it an ideal choice for enhancing the growth and development problems in Kerala. The focus of this study is to assess the development impact of such an ICT initiative in Kerala

The strategies adopted by the Indian economy, and its regional constituents had been at variance with the strategies adopted by the regional economy of Kerala. India in general, and most of the states in India focused on the ICT production as a strategy for supporting economic growth, while Kerala focused on ICT diffusion and its use at the grass root level as a developmental strategy. Since India has a knowledgeable human resource and low wages, the expanded ICT market driven economies like USA and UK outsourced heavily its ICT based production of goods and services to India during the post reform regime. This has expanded the economy of India in terms of production of ICT goods and services. With intention to explore this wind fall gain, most of the States in India adopted policies at par with national level to equip themselves to accommodate global capital and their production needs. In this stream, southern part of India was an early starter and benefited a lot. They contribute the major chunk of production, export, employment, and foreign exchange earnings.

Kerala on the other hand, though has comparative advantage in human resources, infrastructure and technological background, its initial fear of global capital slowed down the growth of its share in ICT production and export. But at the same time, Kerala as compared to IT producing neighboring states Tamil Nadu, Karnataka and Andhra Pradesh, has adopted an ICT strategy giving more priority to consumption and spread of ICT among the masses and an inclusive growth process prior to create an efficient and conducive environment for production based ICT industry. In other words, it followed a strategy on the basis of 'indirect

Can this
be
backed
up?

How do
you
conclude
this?

benefit' dimension of ICT. It has adopted this strategy because it thought that its past achievements in human development will help the region to transform as knowledge based economy, if it gives more emphasis on consumption of the technology through ICT based capability building process. This imbalance between ICT production and consumption reflected in Kerala's economy in terms of direct employment generation and export earnings. In the process of ICT capability building and increasing the consumption of technology, it has attained its goal. It is evident in that its high telephone density, internet coverage, and 100 percent digital telephone exchanges linked with OFC to National Internet Backbone (NIB), highly developed e-governance practice, top position in e-readiness index etc. Moreover, some studies shows that the capability of ICT adoption in Kerala is higher than its neighboring states, who are much above Kerala in terms of production of ICT. As a sequel to this ICT based capability building and diffusion of technology, Kerala has experimented various e-governance activities and programmes since 1990s.

Ref?

'Akshaya' project is one such development project taken up by the government of Kerala, a community based ICT experiment aiming at development of the core sectors like agriculture, industry and social sectors like health and education. For this study, a survey of the Akshaya units were conducted in Malappuram district of Kerala,

The primary field study and analysis conducted in Malappuram districts of Kerala where Akshaya was initially experimented gives great insights on Kerala's ICT strategy and its impact on Kerala economy. Initially, the programme started with the aim of providing ICT access to all sections of the society and bridging the divide between 'information poor' and 'information rich'. Once the government found that the initial objective was attained, it has extended the programme to address the former issues, which are being faced by the State for a long time. Akshaya programme is supposed to grow from initial e-literacy training which enables people to become aware about emerging technology and decrease the gap between those who know technology and those who do not know technology to

the application of ICT in different sectors of the economy - primary, secondary and services.

But the analysis in this study shows that this gradual up gradation has not evolved properly as the government expected or the process is too slow. Initially, the entrepreneurs engaged with the units with the expectation that it will generate sufficient economic advantage for them. However, low participation by various stake holders created barriers to fulfill this optimism. This was reflected in the decrease of number of units working and low level engagement in Akshaya related activities. At present, the major source of income generation of units is from activities which were not the priority services envisaged by Akshaya except e-payment of utility bills. The interesting thing to observe is that the e-payment activity is a continuation of earlier programme for e-governance like FRIENDS rather than an immediate or direct result of Akshaya. The core programmes like E-krishi (to give a boost to the lagging agricultural sector), advanced computer training (to address educated unemployment) have not been functioning intensively or as desired. As a result, majority of units are under performing and still starving for public participation. They mainly depend on government support for providing e-literacy training for different sections like school teachers, government employees and school children. These are subsidized and government initiated programmes for capability building. This is nothing but a continuation of state's earlier policy of sustaining the social development through increased public spending.

Even though the knowledge intensity is less in the activities of present Akshaya units, it has been creating an economic vibrancy in the region to co-travel with emerging technology as well as to keep abreast with technological change. Also Akshaya units work as major promoter of non-proprietary software which has the potential to reap the advantages of IT in the coming future. To conclude, the much acclaimed ICT experiment Akshaya was successful in generating an information society through diffusion of ICT. However, the sustainability of the experiment depends a lot on developing production linkages with the rest of the economy.

The Akshaya experiment in Malappuram gives the lesson that ICT based diffusion strategy is good up to the extent of making people vigilant about changing technology. ICT is not the panacea for agricultural or industrial crisis if there are persistent fundamental factors contributing to the crisis. Rather, it can only complement various measures which target prices and productivity by mitigating information asymmetry. For instance, e-krishi was one of the ambitious projects of Akshaya in its second phase, but its progress was not as much as expected due to various reasons like low participation rate in agriculture as the primary source of livelihood, fragmented land ownership and low productivity. Further, Malappuram region is mainly dependent on remittances from Gulf countries so that there is not much room to accommodate ICT as a development tool in agriculture. It should be noted that in the state level also, agriculture has suffered setbacks over the same period. Akshaya would have been more effective in Malappuram if it had given more emphasis to capacity building of potential migrants through ICT. It is also highly probable that the high intensity of e-payment activity in Akshaya will reduce the relevance of the programme as it was envisaged because there is already an e-governance system to address those issues. This makes Akshaya less development oriented and reduces its scope to a mere administrative exercise. Instead of giving preference to e-payment, a programme like Akshaya should try to tap the comparative advantage of the region where it is implemented. These observations and suggestions may be considered while planning further extension of Akshaya to the entire state.

As a policy suggestion, focusing on any one of the aspects of production or diffusion may in the long run raise further developmental concerns. Diffusion of ICT in a region makes technology accessible to all unlike a production of ICT which might polarize society further in terms of technology. Production based strategy will, thus, exacerbate, the concentration of wealth in a specific segment and location, especially in the urban areas. The Indian experience exemplifies this. Even the major ICT producing states in India could not transfer the benefits of the technology to other economic sectors. The trickle down effect and knowledge spill over effect is not widely reflected. The high rate of farmers' suicide and economic

chaos in these states dampened the glitter of ICT based development. Production based strategy which is overtly dependent on foreign markets is not sustainable in the long run. The recent IT slow down and its repercussions in the Indian market due to its dependence on UK and US market stand in testimony to this. Only by combining the diffusion based strategy with production can any region develop the domestic economy in a sustainable manner leading to inclusive growth.

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Appendix A: Questionnaire Used for Primary Survey

A. Identification

A1	No. & Name of the Unit	
A2	Name of Entrepreneur	A3 Gender Male Female
A4	Age	Block Name
A5	Panchayat Name	
A6	Year of setting up	
A7	Education Highest Obtained (Owner of the unit)	
A8	Distance from nearest unit (KM)	
A9	Average visitors per week	
A10	Average income received per week	
A11	What are the services providing through the unit?	1 basic e-literacy training
		2 e-payment (BSNL, KSEB, KWA etc.)
		3 advanced computer training
		4 e-krisi
		5 DIC web portal service
		6 PMRY online registration service
		7 Content digitization (<i>Land records, traditional knowledge (KIF), SPARK ect.</i>)
		8 Dissemination of contents (education, career, health & Agriculture)
		9 Others (specify)
A12	What's your major revenue source? (<i>Rank it</i>)	Rank
		basic e-literacy training
		e-payment (BSNL, KSEB, KWA etc.)
		advanced computer training
		e-krisi
		DIC web portal service
		PMRY online registration service
		Content digitization (<i>Land records, traditional knowledge (KIF), SPARK ect.</i>)
		Dissemination of contents (education, career, health & Agriculture)
Others (specify)		

A13	Before setting up the Unit, average monthly earnings	1	Less than 1000		
		2	1000-2000		
		3	2000-3000		
		4	30000-4000		
		5	More than 5000		
A14	After setting up the Unit, average monthly earnings	1	Less than 1000		
		2	1000-2000		
		3	2000-3000		
		4	30000-4000		
		5	More than 5000		
A15	Mark the performance of your unit currently	Best performing	Moderate Performing	No performing	Under winding up process
A16	No. of employees in your Unit	A16.1 Male		A16.2 Female	

B. IT Infrastructure - Hardware

Code	Hardware	Numbers			
		Initial Period		At present	
B1	Computers				
B2	Printer (specify inkjet & laser)				
B3	Scanner				
B4	Photostat Machine				
B5	Multimedia equipments (headphones, speaker etc.)				
B6	CD writer				
B7	Webcam				
B8	UPS				
B9	Lamination Equipment				
B10	AC				
B11	Trainees				
B11.1	Male				
B11.2	Female				
B12	Do you have an internal computer network?	1. Yes	2. No	1. Yes	2. No
B13	Do you have any female trainer	1. Yes	2. No	1. Yes	2. No
B14	Do you have a computer server?	1. Yes	2. No	1. Yes	2. No
B15	Do you use Linux based software?	1. Yes	2. No	1. Yes	2. No
B16	Are you aware of free software movements?	1. Yes	2. No	1. Yes	2. No
B17	Do you know how to operate Linux?	1. Yes	2. No	1. Yes	2. No
B18	Do you have word processing software?	1. Yes	2. No	1. Yes	2. No
B19	Do you have image editing software?	1. Yes	2. No	1. Yes	2. No
B20	Do you have any database software?	1. Yes	2. No	1. Yes	2. No
B21	Do you have any spreadsheet software?	1. Yes	2. No	1. Yes	2. No
B22	Do you have any statistical software?	1. Yes	2. No	1. Yes	2. No

B23	Do you have any programming languages?	1. Yes	2. No	1. Yes	2. No
B24	Do you have any multimedia programmes?	1. Yes	2. No	1. Yes	2. No
B25	Which operating system you use?	1.Windows		2. Linux	
B26	Please point out a Linux based software				
B27	Please point out word processing software				
B28	Please point out an image editing software				
B29	Please point out a database system				
B30	Please point out a spreadsheet software				
B31	Please point out a statistical software				
B32	Please point out a programming language				
B33	Please point out a multimedia programme				

C. Initiative

To what extent do you believe that the following statements are true?

I have started the Akshaya Unit because...		1-5 Or X
C1	I thought I can earn good profit out of Akshaya initiative	
C2	I thought I don't need to payback the bank loan	
C3	I thought it will induce the regional development	
C4	I have started Akshaya due to my unemployment crisis	
C5	My previous knowledge in ICT have facilitated me to start the unit	
C6	My technical education has prompted me to start the unit (specify below)	
C6.1		
C6.2		
C6.3		
C7	My social concern tempted me to start the unit	
C8	I thought Government will extent its support regularly and provide financial perks to conduct the programme	
C9	Political campaign encouraged me to start the unit	
C10	My temporary financial need motivated me to start the programme	
C11	I thought it will generate employment opportunities	
C12	Comments:	

Codes: 1. Very low, 2. Some what low, 3. neither low nor high, 4. somewhat high, 5. very high, X. not applicable/cannot answer this

D. Training - Training you have received from government/local bodies/private institutions/NGOs

Code	Training	Use code	
		Initial Period	At present
D1	Hardware		
D2	Software		
D3	Entrepreneurship skill development		
D4	Free software		
D5	Advanced level software		
D6	Upcoming ICT technologies and opportunities		

Codes: 1. Never, 2. Rarely/perhaps once or twice, 3. occasionally, 4. Quite often, 5. Very often, X. Not applicable/cannot answer this

E. ICT information Sources

Sources/medium that you use to learn about latest ICT tools that you are expected to use in your unit

Code	Source of information	Helpfulness (Use code)	
		Initial Period	At present
E1	Newspaper or magazine articles		
E2	Television/Radio/CDs		
E3	Exhibitions/Fairs/Shows		
E4	Internally organized workshops or conferences		
E5	Externally organized workshops or conferences		
E6	Short courses organized through your neighboring units		
E7	Short courses organized by universities or NGOs		
E8	Short courses organized by Government agencies		
E9	Informal discussion groups with colleagues/workmates		
E10	Informal through friends and relatives		
E11	Informal through surfing the internet		
E12	Comments		

Codes: 1. No help, 2. Rarely helpful, 3. Occasionally helpful, 4. Very helpful, 5 Highly helpful

Codes

1 is for 25% dependence
 2 is for 50% dependence
 3 is for 75% dependence
 4 is for 100% dependence

F. Financial Dependence (use codes)

<i>Initial Cost</i>		Initial Period	At present
F1	Own Finance		
F2	Bank Loan		
F3	Government Subsidy		
F4	Local Bodies		
F5	Friends and Relatives		
<i>Operational Cost</i>		Initial Period	At present
F6	Revenue from basic e-literacy training		
F7	Revenue from e-payment (BSNL, KSEB, KWA etc.)		
F8	Revenue from advanced computer training		
F9	Revenue from e-krisi services		
F10	Revenue from DIC web portal service		
F11	Revenue from PMRY online registration service		
F12	Revenue from Content digitization (<i>Land records, traditional knowledge (KIF), SPARK ect.</i>)		
F13	Revenue from Dissemination of contents (education, career, health & Agriculture)		
F4	Others (specify)		

G. Government Support (use codes)

<i>Support activities</i>		Initial Period	At present
G1	Financing & Subsidy		
G2	Formulating the Information Society Strategy		
G3	Investigating measures for widespread diffusion of Internet infrastructure and usage -including broadband access- all around the region		
G4	Training of trainers for developing innovative and practical teaching applications, organizing internal training programs for increasing their skills in using new technology		

G5	Increasing the quality of Course and Certification education, provision of equivalence of certificates and diplomas to university Standards		
G6	Preparing a strategy for the provision of public services through portal and improving the services		
G7	Spreading best practices of e-Government services		
G8	Developing an Agricultural Information System		
G9	Informing and increasing the awareness of public and private institutions and citizens about the benefit of ICT diffusion		
G10	Shaping Health Information Management system for citizens and service provider institutions		
G11	Informing and increasing the awareness of SMEs about e-commerce and e-business		
F12	Others (specify)		

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. very high, X. not applicable/cannot answer this

H. Activities (use codes)

<i>Intensity of activities</i>		Initial Period	At present
H1	basic e-literacy training		
H2	e-payment (BSNL, KSEB, KWA etc.)		
H3	advanced computer training		
H4	e-krisi content service		
H5	DIC web portal service		
H6	PMRY online registration service		
H7	Content digitization (Land records, traditional knowledge (KIF), SPARK ect.)		
H8	Dissemination of contents (education, career, health & Agriculture)		
H9	Webpage Development		
F10	Software Development		
H11	Free software training		
H12	Training for disabled community		
H13	Training for school children		
H14	Training for government employees		
H15	Internet Surfing		

For what purpose visitors use internet		
H16	Using e-mail	
H17	Searching information	
H18	Video conferencing	
H19	Internet Telephone	
H20	Entertainment	
Participation		
H21	School Children (Male)	
H22	School Children (Female)	
H23	Government employees (Male)	
H24	Government employees (Female)	
H25	Unemployed youths	
H26	Women	
H27	Traders	
H28	Farmers	
H29	Others (specify)	

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. very high, X. not applicable/cannot answer this

		Rank
H30	Age group of visitors (Rank it)	Below 10 years
		10-20 years
		20-30 years
		30-40 years
		40-50 years
		Above 50 years
H31	Frequency of visits by same visitor	At least once a day
		At least once a week (but not every day)
		Less than once a month
		At least once in 3 months
		Never comes again

I Outcome (use codes)

How do you feel about the outcome of Akshaya project implementation, and to what extent do you believe that the following statements are true:		At present
General Statement		
I1	The gap between the 'information rich and the information poor drastically come down	
I2	Still lot of common people are coming for e-literacy training	
I3	e-krishi content service	
I4	DIC web portal service	
I5	PMRY online registration service	
I6	We are executing lot of Content digitization (Land records, traditional knowledge (KIF), SPARK ect.) work for government and other public institutions	
I7	Our main income source is Dissemination of contents (education, career, health & Agriculture)	
I8	We are doing work of webpage design and software development	
I9	We are providing free software training for public	
I10	Every day people are coming for internet surfing	
I11	Due to high public participation we are making good profit through akshaya centres	
I12	Akshaya project induced the development of our panchayat.	
I13	Almost all households in our panchayat have benefited from Akshaya	
Specific question to entrepreneur		
I14	After establishment of Akshaya center, have your language skills improved?	
I16	After establishment of Akshaya center, have you used online course trainings?	
I17 After establishment of ICT centre, status of your computer skills in following areas?		
I17.1	Using Operating Systems	
I17.2	Using e-mail	
I17.3	Spread sheets with Excel	
I17.4	Typing by Ms Word	
I17.5	Presentation by PowerPoint	
I17.6	Searching information	

I18 After establishment of ICT center, your knowledge about following subjects has increased?		
I18.1	Political	
I18.2	Economic	
I18.3	International	
I18.4	Scientific	
I18.5	Cultural	
I18.6	Career & Education	
I19	Does ICT center have positive impacts on producing and selling your agricultural products?	
I20	Does ICT center have positive impact on finding jobs for you?	

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. Very high, X. not applicable/cannot answer this

J. Problems Faced (use codes)

	<i>Intensity of problems</i>	Initial Period	At present
J1	Lack of public participation		
J2	Improper monitoring mechanism by Government agencies		
J3	Lack of financial support		
J4	Lack of infrastructure availability		
J5	Lack of proper trainers		
J6	Competition among units		
J7	Competition from private instructors		
J8	Lack of public campaign and motivation among stakeholders		
J9	Low bandwidth (internet speed)		
J10	Have access to Internet elsewhere		
J11	Don't want Internet (because content, harmful, not useful etc.)		
J12	Equipment costs		
J13	Access costs		
J14	Lack of skills		
J15	Language barriers		
J16	Physical disability		
J17	Privacy or security concerns		
J18	Political bias and corruption		

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. Very high, X. not applicable/cannot answer this

K. Success Reasons (use codes)

	<i>Intensity of reasons</i>	Initial Period	At present
K1	Locational Advantage (Urban)		
K 2	Support of local bodies and institutions		
K 3	Self marketing strategies and public campaign		
K 4	Investment in infrastructure		
K 5	Qualified trainers		
K 6	Adopting changing technologies		
K 7	Collaborative work with private firms		
K 8	Low competition from nearby units		
K 9	Reputation and goodwill		
K 10	Volume of e-payment		
K 11	Volume of e-literacy training		
K 12	Volume of content dissemination		
K 13	Others (specify)		

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. very high, X. not applicable/cannot answer this

L.Failure Reasons (use codes)

	<i>Intensity of reasons</i>	Initial Period	At present
L1	Locational disadvantage (Rural)		
L2	Lack of Support by local bodies and institutions		
L3	Infrastructure inadequacy		
L4	Lack of financial support		
L5	No Qualified trainers		
L6	No competency in new technologies		
L7	No takers for e-literacy training		
L8	No takers for e-krisi content service		
L9	No takers for e-payment service		
L10	No takers for content dissemination service		
L11	Have access to Internet elsewhere		
L12	Don't want Internet (because content, harmful, not useful etc.)		
L13	Equipment costs too high		
L14	Access costs too high		



L15	Lack of skills		
L16	Language barriers		
L17	Physical disability		
L18	Privacy or security concerns		
L19	Others (specify)		

Codes: 1. Very low, 2. somewhat low, 3. neither low nor high, 4. somewhat high, 5. very high, X. not applicable/cannot answer this

M. Suggestions

M1	
M2	
M3	
M4	
M5	
Interview time (in minutes)	
Name and Signature of Interviewee	