Faculté Jean Monnet
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"ICTs & Inequalities : the digital divides"
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Digital Divide : Realities in the Indian Context

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(ABSTRACT)

The information and communication technology is pervading all areas of economic activities and human life. There is also an ongoing debate about the contribution of ICT in economic development and human welfare in both developed and developing countries. Several cross country studies has indicated the positive impact of ICT in terms of productivity and growth but this trend is mostly visible in developed countries and developing countries are yet to reap such benefits fully. This lead to the concept of digital divides. It is a complex problem and their manifestation is different in different countries, but it is clear that there are disparities between 'haves' and have-nots'. This divide pose both practical and policy challenges. The paper discusses the conceptual side of ICT growth and ICT diffusion and taking the example of India, it is pointed out that in India, ICT-Growth to a great extent is successful and is in the process of enlargement but ICT diffusion has not gained much attention where lies the great opportunity. The paper discusses several case studies with focus on ICT-Diffusion by different stakeholders like community participation, NGOs, Private sectors, and Government etc. These successful cases are in isolation and to spread out the benefits of ICTs, ICT-diffusion is a must. This is only possible through the involvement of the society and with supportive policies of the government.

Keywords: Digital divide, ICT-Growth, ICT-Diffusion, Case studies, Policy.

Introduction

In the present era of communication revolution, the information and communication technology is pervading all areas of economic activities and human life. There is also an ongoing debate about the contribution of ICT in economic development and human welfare in both developed and developing countries. It is indicated in several studies that the returns to investments in information and communication technology are substantial in terms of productivity and growth (Kraemer and Derick,2001; Pohjola,2001). Some country specific studies also indicated similar results (for Singapore, Wong, 2001). But these studies highlighted the fact that IT induced growth is more pronounced in developed countries and the developing countries are yet to achieve such result. This situation brings in the concept of digital divide. There is the considered opinion that new technologies reinforce disparities between developed and developing societies. OECD (2000) stated that affluent states at a greater height of technological advantage have taken the lead in knowledge economy, but so far have not trickled down to poor countries in the Sub-Saharan Africa, Latin America or South East Asia. UNDP (1999) also in the same vein argued that productivity gain from ICT might widen the gap between the developed economies and developing economies because of lack of skills, resources and infrastructure to invest in ICT.

ICT development can impact the development process of a country broadly in two ways: direct and indirect. Directly, it may include growth of IT related industries and services

and their effect on employment, income etc. Indirectly, it may induce development thereby increasing productivity, economic growth and human welfare. The first one we may call ICT-growth and the second one ICT-diffusion. India has benefited much from ICT growth and especially from software related exports of goods and services due to several institutional innovations and policy measures (Joseph, 2002) and as the country has the comparative advantage in these areas (Heeks, 1999). Commensurate with this, ICT diffusion has not occurred and often discussed and cited IT success story has not been achieved by harnessing and utilizing the new technology to increase efficiency, productivity of the domestic real sectors but by export oriented ICT growth (Borbora, 2004). But it needs to be mentioned here that ICT diffusion is recognized as a tool for economic development and the software policy of 1986 also gave importance of balanced development of software industry for both domestic and international use.

The paper will mainly focus on ICT diffusion in India and highlight some private sector, NGO and even Government initiate to reach the larger sections of the society in India, majority of whom reside in rural areas. It is true that role of ICT in economic development have not received due attention and there is a need to shift focus to ICT induced development.

The Concept of Digital Divide

Digital divide is a complex problem and there may not be a single acceptable definition but surely it indicates disparities between 'haves' and 'have-nots' which is growing over the years with advances in technology and innovations. This divide refers to the gap between those who can effectively benefit from information and communication technologies (ICTs) and those who cannot. Prof. R. Kling (1998) observed this divide from two aspect, technical access and social access. Technical access refers to the availability of the infrastructure, hardware and software for ICTs and Social access refers

to the skills required to use the technical resources. Norris (2001) describes (a) global divide manifested by different capabilities between the developed and developing nations; (b) social divide due to inequalities within a given population; and (c) democratic divide allowing for different levels of civic participation. Kenniston (2002) offered four social divisions: (a) those who are rich and powerful and those who are not; (b) those who speak English and those who do not; (c) those who have access to technically advanced regions and those who do not; and (d) those who are technically savvy and those who are not.

In a larger canvas, we see two divides: International and Domestic Digital Divides. Real disparities exist in access to and use of ICT between countries i.e. "international digital divide" and between groups within countries i.e. "domestic digital divide". This view is supported by several studies (OECD, UNDP). "In the entire continent of Africa, there are mere 14 million phone lines – fewer than in either Manhattan or Tokyo. Wealthy nations comprise some 16 percent of the world's population, but command 90 percent of internet host computers. Of all the internet users worldwide, 60 percent reside in North America, where mere 5 percent of the world's population reside."(Nkrumah). "One in two Americans is online, compared with only one in 250 Africans"(The Economists). Such data and studies reinforce the trend of growing ICT disparities between and within countries and we see the following patterns:

a) All countries are increasing their access to and use of ICT. But "information have" countries are increasing their access and use in an exponential rate that tell us that the divide between countries are growing.
b) Within countries, all groups are increasing access and use of ICT. But "information haves" are increasing access and use in an exponential rate that tells us that divisions within countries are actually growing.

The Concept of ICT Diffusion

ICT diffusion refers to levels of ICT access, basic ICT usage and patterns of ICT application among countries and peoples. In this era of globalization and liberalization, leapfrogging of stages of development is possible because of some unique characteristics of the new technology to be supplemented by the supportive government policies. Actually, developing countries like India are in an advantageous position as late entrant as they do not face the problem of obsolescence in IT infrastructure. New technologies have multiple uses also such as telephones, satellites etc. Again technologies like the "wireless in local loop"(WILL) can significantly reduce the connectivity cost and useful for a vast country like India in order to connect remote villages (Planning Commission, 2001). These opportunities are challenges for developing countries to promote ICT diffusion. Thus despite the efforts needed to attract new investment in ICT infrastructure and to encourage ICT usage in ways appropriate in the developing country context, real opportunities exit for promoting ICT diffusion through the involvement of public and private organizations, NGOs and other stakeholders (Mansell, 1999).

The new technologies being mostly supply driven has a greater scope for the diffusion agents to influence the diffusion process. Therefore, even with low connectivity, innovations like kiosks, community centers focusing on internet can greatly offset the limits imposed by lower connectivity and poor information infrastructure. Today, there are number of stakeholders that are involved in one or more aspect of ICT development and use. Increasing participation of non- governmental organizations (NGO) and private sector is important for bridging the digital divide. Efforts are already on to achieve this objective by involving private sectors in many parts of the country. However, infrastructural bottlenecks in the backward regions of the country are found to be a major obstacle in effective participation of the private sector in providing benefits of ICT diffusion to different sections of the society. Hence, the government sector has a crucial role to play in this area. In India a number of diffusion initiatives are taking place

undertaken by government, private sector and NGOs for economic development and to provide services to citizens. Some of these are in initial stages but acceptance by the local communities may transform rural areas economically.

ICT Growth in India

As noted earlier, India has achieved to a great extent ICT growth but lagging behind in ICT diffusion. Some initiatives are taking place for ICT diffusion from different stake-holders but comparing the vastness of the economy; these are isolated cases and mostly concentrated in urban areas and organized sectors only (Borbora, 2004). Rural initiatives of ICT diffusions are discussed in the next section. Actually, the globalization process and the internalization of the service sector provided an opportunity to ICT for export of services as India has a comparative advantage in terms of labour cost. IT sector is highly labour intensive and it employs skilled labour, although the employability varies with the firm's nature of activity. That India is positioned in an advantageous situation can be seen from the Table 1 below.

Table 1: IT labour costs across different countries in 1995

	Switzerland	USA	Canada	UK	Ireland	Greece	India
	(US$ per annum)						
Project leader	74,000	54,000	39,000	39,000	43,000	24,000	23,000
Business analyst	74,000	38,000	36,000	37,000	36,000	28,000	21,000
System analyst	74,000	48,000	32,000	34,000	36,000	15,000	14,000
System designer	67,000	55,000	36,000	34,000	31,000	15,000	11,000
Development programmer	56,000	41,000	29,000	29,000	21,000	13,000	8,000
Support programmer	56,000	37,000	26,000	25,000	21,000	15,000	8,000
Network analyst/designer	67,000	49,000	32,000	31,000	26,000	15,000	14,000
Quality assurance specialist	71,000	50,000	28,000	33,000	29,000	15,000	14,000
Database data analyst	67,000	50,000	32,000	22,000	29,000	24,000	17,000
Metrics/process analyst	74,000	48,000	29,000	31,000	-	15,000	17,000
Documentation/Training staff	59,000	36,000	26,000	21,000	-	15,000	8,000
Test Engineer	59,000	47,000	25,000	24,000	-	13,000	8,000

Note: Figures are averages for 1995 and were likely to rise 5-10 % approx. *per annum*, with rates being slightly higher in lower-income countries.

Source: Heeks(1999), adapted from Rubin 1996.

Table 1 depicts India's cost advantage in relation to skilled employable labour in IT sector. Besides, it is also a reality that off-shore IT work is cheaper for MNCs than employing Indian labour onsite (Heeks, 1999).

ICT growth in India is mainly because of IT exports over the last decade, which is getting worldwide attention. As the data available from National Association of Software and Service Companies (NASSCOM), it is observed that the Indian IT market has grown from US $1.73 billion in 1994-95 to US$ 16.5 billion in 2002-03. It has also created employment opportunities for over 700,000 professionals in India in 2002-03. This growth is mainly export driven. The software and services growth registered a growth of 18.4 percent with a revenue of US$ 7.2 billion in 2002-03 and ITES-BPO segment witnessed a growth of 59 percent with revenue of US$ 2.3 billion in 2002-03. The total software and services exports (including ITES-BPO) increased from US$ 7.6 billion in 2001-02 to US$ 9.5 billion during 2002-03. The USA continues to be the primary market with 71 percent exports of total software exports, followed by UK with 14 percent , Europe (excluding UK) with 9 percent and rest of the world with 6 percent as of Mrch 2002-03. (Table 1, Table 2 and Table 3 in the Annexure provide data on growth of Indian software and Services Industry, India's software export destination for the year 2000-01 and Profile of Indian IT sector respectively)

It is observed from the data and the tables that Indian software and Service Industry has the following trends-

➔That there is shift in the Onsite: Offshore ratio. Offshore revenues are higher than onsite revenues.

➔Increased diversification of Indian IT companies in non-US markets such as Europe and Asia Pacific.

➔Increased focus on new verticals such as Healthcare, Utilities and Retailing etc.

➔A focus on moving up the IT value chain, by large Indian Companies, by offering services such as package implementation, IT outsourcing and IT consulting.

Some Initiatives of ICT diffusion in Indian States

This section will provide some initiatives of ICT diffusion in Indian states making connectivity in rural areas as urban areas are mostly connected although there are regional disparities among the states (Prabhakaran, 2003). These examples will be able to bring out the development plans taking place in rural areas thereby providing some idea about ICT diffusion and IT induced development.

1) Case study of Drishtee

Drishtee is an organizational platform in the private sector for developing IT enabled services to rural masses through intranet and a kiosk based revenue model. Through a franchise and partnership model, Drishtee facilitates the creation of a rural networking infrastructure. With nodes at the village, district, state and national level, Drishtee enables access to worldwide information as well as local services using its proprietary state-of-the-art software. Drishtee services not only provide financial benefits in terms of reduced costs and increased incomes, but also other social benefits like access to education and health information, government to citizen services, on-line grievance posting etc. Drishtee kiosks provide viable employment opportunities for unemployed rural youths as an entrepreneur and help stem rural-urban migration

Drishtee's software platform enables e-governance and provides information about and access to education and health services, market-related information, and private information exchanges and transactions. Drishtee offers its network platform to any service provider who wishes to market its range of services to rural India by plugging their application in with Drishtee's. Drishtee's business model is driven by a village entrepreneur, who acts as the gateway to valuable information and services for villagers. Drishtee enables this entrepreneur to operate a self-sustaining, profitable kiosk that provides various services at nominal costs. In less than four years, Drishtee has successfully demonstrated its concept in over 300 kiosks across six Indian states.

Drishtee's target customers live in rural India, a market of 700 million people, with aggregate discretionary purchasing power of $2 billion. An average villager spends about 80% on sustenance, with a large portion of the rest spent on accessing products/services available in cities. Drishtee enables access to these services.

A few frontal outfits of big corporations have been reasonably successful with this concept in localized regions, focusing primarily on backward or forward integration, without exposure to broader viability issues for the rural market. The recent upswing in overall IT awareness however could lead these players to enter this broader market. In view of this, Drishtee's management has forged key alliances for value-addition and effective delivery with strategic channel partners - something that should lend them competitive advantage moving forward. An advisory board, with diversified experience in strategic areas, is supporting this team. Also, by being the first to establish a network of proprietary technology-based kiosks around the country, Drishtee would be able to create a barrier to entry for any new competitor.

Due to its entrepreneurial model, Drishtee is not only self-sufficient but ensures increasing profits from the 6th year of its operations even at most conservative estimates.

However, Drishtee's main impact is social in nature where the Social Returns on Investment analysis shows that for each $1 of cost incurred, the social returns equal $20. Drishtee's current kiosks are financially self-sufficient.

2) Case study of Gyandoot

It is a community owned rural intranet project in the Dhar district of Madhya Pradesh initiated by the State. Started in January 1, 2000. Presently 31 centres are connected through intranet network. Local rural youths act as an entrepreneur for running the centers on commercial lines. These centers are called Soochanalayas (Information Kiosks) which provide user-charged-based services to rural people. The local community selects the centers. Even the selection of services provided by these center are made by the villagers on the basis of discussion amongst themselves and the felt needs. Some of the services offered are: agriculture produce rates, on-line public grievance redressal, Govt to citizen services like information of government programmes, application and issue of different certificates etc. A total of 18 services are provided through Gyandoot. Each of these centers has a potential clientele of around half a million inhabitants. The success has emphasized the social and economic benefits as well as mass empowerment. The potential of this project has been recognized internationally for introducing a new beginning in the use of ICT in bringing about social transformation.

3) Case of Community Information Centres in N E Region of India

The Community Information Centres (CIC) Project was conceived and implemented by the Ministry of Communications and Information Technology, Government of India in the North Eastern Region of the country. For the region in terms of providing benefits of ICT, CICs is the first initiative by the Government to provide IT access to the people living in remote areas, which may have an impact on socio-economic development of the region and bring the region closer to the national mainstream.

North Eastern Region of India consists of eight states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura with a total population of 3,91,25,582 in 2001 (Government of India, 2002). The CIC project was launched with a pilot project covering 30 blocks in the region including 15 in Assam and was inaugurated in August 2000. By August 2002, CICs were established in all the blocks in the region, which include 219 CICs in Assam covering 23 districts. These CICs were expected to help the region avail the benefits of global connectivity through internet besides other benefits.

Each CIC is made well equipped with infrastructure including one server machine, five client systems, VSAT, Laser Printer, Dot Matrix Printer, Modem, LAN, TV, Web cam, UPS, generator, Telephone, Air conditioner etc. The project is jointly implemented by Department of Information Technology under the Ministry of Communications and Information Technology, National Informatics Centre (NIC) and State Governments

Establishment of CICs is an innovative step by the Government of India to minimize the digital divide. It is found that CICs in Assam are providing various services to rural people in a limited way both in terms of providing relevant information and G2C services. The CICs have been able to achieve some of its stated objectives like providing ICT infrastructure at the block level, providing e-mail and internet services and conducting computer based training programmes. But they have been successful in a limited way in facilitating distance education and G2C services. The objective of using CICs as a tool for sustainable regional development has not been achieved satisfactorily as yet. To achieve some of the stated objectives of the CICs, a stronger coordination between the state government and the CICs is a must. Involvement of private sectors for sustainability of the CICs in future may also be a necessity. Besides, with wider coverage in terms of G2C services, a better awareness campaign and region specific innovative

services, CICs in the state may go a long way in bridging the digital divide and also in achieving regional economic development.

4) Case of Village Knowledge Centres of MSSRF

Village Knowledge centers of M S Swaminathan Research Foundation is an example of knowledge management at grassroots. Its main focus on community ownership and directed at access for the poorest. It started in rural Pondicherry in South India. These centers are user owned and controlled. It provides demand driven information. The centers are connected with wire and wireless system of communication. Supply of electricity is through integrated thermal and solar system. The main driver for its success is the horizontal flow of knowledge. The community has created a strong network, mainly through self-help groups. It is quite effective in empowering rural communities with information in the fields of environment, health, sustainable agriculture and aquaculture, meteorology, market prices etc. Generic information is converted into location-specific information, so as to enhance its practical relevance. For example, in a coastal village inhabited by fisher families, the women operators download from internet each evening information on the likely wave heights in the sea adjoining their village at various distance from the shore line. This information is broadcast throughout the village through loudspeakers. The fisherman thus will have access to accurate information on sea conditions before they set out for fishing. The ability to provide this kind of live-saving information at the right time and place generated among the rural poor a hunger for knowledge through technology (ICT).

This model is based on participatory approaches to social development. The fundamental philosophy of the foundation is reflected on its focus on community participation, inclusion of women, people's livelihood and indigenous knowledge. Women from disadvantaged social backgrounds have given considerable leadership in this IT

experiment. Although all knowledge centers perform the same function, satisfying the information needs of the local community, they are not managed in the same way. Different villages have evolved their own ways of managing the center. It shows the success of the initiative in empowering people through access to timely and relevant information and demonstrated that ICTs can play a crucial role in making a difference in the life of rural people.

5) Case of ITC's E-choupal

ITC is one of the India's leading private company in the corporate sector with diversified interest including agri-based products. As agriculture play an important role in the rural economy and because of market imperfections, farmers are exploited in terms of price for their output and there is system-wide inefficiencies. ITC started agricultural trading in 1990. The company initiated an e-choupal effort that placed computers with internet access in rural farming villages for exchange of information and an e-commerce hub. This web based procurement tool for the farmers in rural India has also created a highly profitable distribution and product design channel for the company. The company made significant investment to create and maintain its own network in rural areas and trained a local farmer to manage each e-choupal. The computer is linked to internet and serves an average of 600 farmers in 10 surrounding villages within about a five kilometer radius. The use of the system is free but for all e-choupal transactions, a commission is to be paid to the sanchalal (operator) to meet the operating expenses. The farmers get global price trend as well as in local market yard prices. They also get information on new farming techniques. They also use the e-choupal to order seed, fertilizer and other consunmer products from ITC or its partners at prices lower than those available from village traders. At harvest time, ITC offers to buy the crop directly from farmers. Farmers benefit from accurate weighing, faster processing time and prompt payment. As there is transparency in pricing, farmers can decide on the basis of market trends. The total benefit to farmers includes lower prices for inputs and other goods, higher yields and empowerment. At the

same time ITC also benefited from lower procurement cost as they do not need to employ buying agents on commission. The company reports that it recovers its equipment costs from e-choupals in the first year of operation and the venture is profitable.

The e-choupal is already empowering over 2.4 million farmers through 4,100 installations covering 21,000 villages across six states of India and the company has plans to cover 1/6th of India's villages to create more than 10 million e-farmers over the next decade. (The Hindu, June 8, 2004). This business driven initiative by ITC makes a difference to society at large by helping reduce poverty and creating sustainable livelihood opportunities. This also demonstrate that large corporation can combine social mission and commercial venture and can make significant difference in increasing efficiency in agricultural system which benefits both farmers and their share holders. Here, ICT play an important role in bringing transparency, increased access of information and helping in rural transformation.

Above selected cases highlight some successful initiatives taken by different stakeholders and lot more is to be done to penetrate the Indian villages to make ICT diffusion a reality. For these some supportive policy initiative may go a long way.

Policy measures needed for ICT Diffusion

A country's chosen legal and regulatory framework define the ICT policy framework and determine whether the benefits of technology can be fully harnessed to address the social and economic considerations of the developing world. The success of such policies will show a positive developmental change in the lives of the people in a real way. But there is a need of two-way communication between policy-makers and people. More often, policies are formed without taking into account the particular context and grassroots

realities of the country, resulting in formulation of policies without any impact on ground realities.

Information and communication technology (ICT) diffusion in India is devoid of any explicit policy on ICT for development taking into account national and regional requirements. The Indian IT Policy mainly focuses on ICT growth rather than diffusion. The national strategy should delineate role of different stakeholders, government, private and corporate sector, NGOs and others so that there may not be any duplication in a capital poor developing country. The strategy should provide a road map for harnessing the ICT for addressing development problems faced by the country. There is a need to have the policy based on the realistic assessment of ICTs role in a given socio-economic environment. Broad policy interventions may be necessary in the issues such as:

- Policy reform for development of modern information infrastructure;
- Adoption of non-discriminatory taxation policies;
- Well-defined content policies;
- Adoption of effective privacy and consumer protection policies;
- Technology diffusion policies;
- Etc.

It is fact that there is a disparity in the potential of ICT and actual level of ICT use in developing countries like India. Although technology is increasingly available, its affordability and accessibility put serious hindrance, which calls for policy intervention. Technology must be integrated into society and government can play an important role by creating an environment for technology use and encourage ICT investment to promote development. To spread out the benefits of ICT throughout society, government action is important. In a vast country like India where there are lot of diversity, policies and practical implementation is not easy task, which need public participation in a large scale.

There cannot be a single model for all countries. An effective ICT policy-making process is unique for each country, and it must be based on local culture, economics and politics and such policies need to be implemented with contribution of different stakeholders. In case of India, because of economic, cultural, religious diversities within the country, each region may require specific policies so as to have the optimal benefit from the use of ICT, especially in the rural areas.

Conclusion:

There is an increasing realization about the benefits offered by ICT for improvement in human life, economic productivity and development. ICT can play an important role in fighting poverty and misery even in the rural hinterland of a vast country like India as seen in the selected case studies. ICT growth strategy is quite successful in the country but proper attention towards ICT diffusion is lagging. This is at a time when a study by the IMF (2001) has reported that IT using countries tend to benefit more than IT producing countries which would suggest that ICT diffusion should be given priority for economic development. Today, technology is increasingly available, but people do not use it as they do not understand it, are uncomfortable using it, cannot afford it or cannot see its utility. For them, it is a lost opportunity. Digital divide is not only lack of computers and connections but also not using the information technologies for their benefits in terms of better information access, better education, heath-care and so on.
Although in India, several localized initiatives have started successfully for ICT diffusion, a holistic approach to provide real access is needed and the roadmap to narrow the divide is to integrate technology into society in an effective, sustainable way so that people can use it to better their lives.

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ANNEXURE:

Table 1. Growth of Indian Software and Services Industry

Year	IT Industry Size (US$ mn.)	Of which: Domestic Market (US$ mn.)
1995-96	1,124	490
1996-97	1,755	670
1997-98	2,670	920
1998-99	3,900	1,250
1999-00	5,700	1,700
2000-01	8,260	2,060
2001-02	11,200	2,700

Note: Figures for 2001-02 are provisional

Source: Statistical Outline of India, 2002-2003, Department of Economics and Statistics, Tata Services Limited, Mumbai.

Table 2. India's Software Export Destination , 2000-2001.

Countries	Export Revenue (Rs. Crore)	% to total
USA	17,336	61.2
UK	3,355	11.8
Japan	1,021	3.6
Germany	900	3.2
Singapore	540	1.9
Canada	425	1.5
Belgium	400	1.4
Netherlands	360	1.3
Switzerland	340	1.2
Australia	295	1.1
France	195	0.7
Ireland	170	0.6
Hong kong	142	0.5
UAE	120	0.4
Malaysia	70	0.3
Denmark	60	0.2
South Korea	50	0.2
Total Revenue	**28,350**	**100.0**

Note : Percentage figure do not add up to total

Source: Statistical Outline of India, 2002-2003, Department of Economics and Statistics, Tata Services Limited, Mumbai

Table 3. Profile of Indian IT Sector

Year	Onsite Services	Offshore Services	Products & Packages
	Rs. Crores		
1993-94	633	307	81
1994-95	935	454	146
1995-96	1,520	797	203
1996-97	2,289	1,178	433
1997-98	3,853	2,103	575
1998-99	6,365	3,710	865
1999-00	9,850	5,950	1,350
2000-0	15,900	10,950	1,500
2001-02*	17,500	18,000	1,500

*Estimated

Source: Statistical Outline of India, 2002-2003, Department of Economics and Statistics, Tata Services Limited, Mumbai