Future Technocrats Perception on Dissemination of Technology

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ABSTRACT

Technology is paving the way for us, but who is paving the way for the technology - future technocrats. The initiation into the scientific arena was a small step for man but a giant leap for mankind. The arrival of science has altered the life of man and also enriched him with the knowledge that technology can empower man but he must learn to use it for the good of humanity. With the advent of technology that world has shrunk and come closer. The myriad forms of the technology, which are evidently adopted by the individuals in their day-to-day lives, express the need for its further development and dissemination. Mobile technology, internet technology and DTH have become a way of our lives and future technocrats quintessentially need to come up with ways to develop it for the overall growth of our country. The future technocrat is synonymous with the future of technology and hence their role cannot be doubted in this scenario. The objective of this study was to identify and assess the perception of young technocrats on technology use and its dissemination. It is expected that the findings will throw light on the roles of technocrats for designing and developing technologies which are aimed at larger societal welfare. The study will also help in improvising the present curriculum of technical colleges by bridging the gap between humanity and technology dissemination. Our study may also impact the current and future government policies related to the above mentioned issues.

Keywords: Technology management, technology and assesment, technology policy studies

INTRODUCTION

India is a land of dichotomies. Teeming with a population of over a billion, it has a diverse blend of people inhabiting urban parts and rural parts - literate and illiterate - speaking a wide assortment of languages belonging to varying age-groups.

However, what has coalesced everyone and penetrated even to the grass root level besides spreading in the metropolitans are the technologies like Internet Technology, Direct to home service (DTH), Mobile technology, to name a few. With the advent of new technologies, the world is becoming a better place to live in. With each passing day new technology is being introduced by the researchers, which in one way or the other improves our day to day lives. It remains to be seen how, the demarcations in the society at large, rural or urban has led to spreading of technologies. The government policies, the company strategies and the need for development demands that the technological use infiltrates to the rural areas as much as it persists in the urban settings. Particularly, so as divide exists in the Indian society such as literacy divide and prominent digital divide. However, while one-third of the population of the country stands illiterate, not something to boast about, but still this has not encumbered the people from adopting technologies in their lives. The urge to advance to certain extent overpowered all shortcomings.

An integrated approach is therefore required to design, develop and disseminate technologies irrespective of age groups, income level or geographical areas. The onus of this falls on the government via policies and programmes; private sector to develop and design low cost and easily adapted technologies; academic bodies to provide education and environment conducive for the same. However without a doubt, the primary drivers to usher this

phenomenon would be the youth who are the primary users and have a greater role to disseminate these technologies.

Considering the present scenario, where India's population comprises 70% of people below the age-group of 40. The young blood presence and their urgent need to progress evidently need to be well-versed with use of modern technologies. Incorporation of various forms of technologies will eventually make their lives convenient and ensure the fast pace of their lives as desired.

The objective of this research is to make an empirical examination of the perception of future technocrats in the dissemination of the present day technologies. Future technocrats constitute students studying in engineering colleges or the freshly employed technocrats. The following sectors present the theoretical framework, and the methodology, followed with the findings and conclusions.

PRESENT DAY TECHNOLOGIES AND THEIR DISSEMINATION

Direct to Home (DTH)

DTH stands for Direct-To-Home television; it provides the television viewers the opportunities to access and view plethora of channels without any hassle and also connect the viewers directly with the broadcasting source through the individual dish. Students throughout the country can benefit from the educational programmes, thus, providing quality access to education by every student.

It was in 1996 that the DTH services were first proposed in India; however, on

the grounds of national security issues, the service had failed to get the approval. It was in year 2000 that DTH was allowed to enter the Indian market. Today, India is poised to become the world's largest DTH satellite pay TV market (Screen Digest). Growing popularity of the DTH services is an interesting development in the Indian television industry. In addition, the government's slack in the laws has resulted in a plethora of DTH service providers flooding the markets and wooing the customers with attractive schemes. Apart from Reliance Big TV, Tata Sky, Airtel and Dish TV that enjoy a major share of the market, there are a wide variety of other providers as well. The number of DTH subscribers across India is reported to be over 21 million, as of March 2010. The growth in terms of the number of subscribers continues to be significant and is expected to be of the order of 21% on Compounded Annual Growth Rate (CAGR) basis for the period 2009-2014. Thus, DTH services

assume the status of one of the preferred distribution platform for TV channels, along with the cable TV distribution services (Sarma, 2010).

Beside Doordarshan, the market includes other DTH operators like Bharti Airtel, Dish TV, Reliance Communications, Sun Direct, Tata Sky, and the latest entrant, Videocon.

The rising level of foreign investments in India, as well the investments by the private sector, has given an impetus to the DTH industry. A revelation in the industry is the far reaching access of DTH across various cities and towns. For example, rural DTH penetration is three times higher than in urban areas, with digital TV penetration rate of 34% in the rural areas as compared to 12% in the urban areas (Ernst & Young, 2009).

At present, hundreds of options are available in DTH. The number of companies providing these services has exploded in the recent past and people are getting

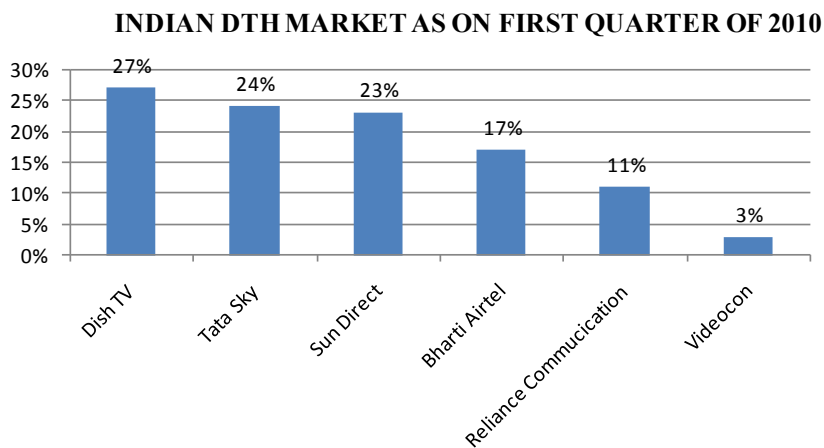**INDIAN DTH MARKET AS ON FIRST QUARTER OF 2010**

Fig. 1: Dataxis Intelligence (2010)

accustomed to the services. The antenna required is much smaller, the city will have fewer wires from one building to another and one has the flexibility of moving without changing or searching for new cable operators.

INTERNET TECHNOLOGY

Internet is a repository of invaluable information, housing it from all over the world. Its discovery has paved the way to a lot of major developments in our country such as spreading of education to the remote areas, job opportunities, health awareness, etc. The capabilities brought forth by it seem endless and are consistently increasing in a developing country like ours. In the year 1995, VSNL (Videsh Sanchar Nigam Limited) was launched. The growth in the industry has been stupendous and the leap

from 1G to 3G services has benefitted the masses.

For the first four years of the launch of internet in India, VSNL was the sole provider of the Internet Services in the Country. The broadband usage in India in the first year grew at a rate of 20% per month (ISPAI, Internet Service Providers Association of India). Most users were able to access high speed internet because of the policies of ICT, especially when the Broadband policy was announced in 1995.

Private operators were allowed to enter Indian markets when the Government of India ended the monopoly of VSNL in the month of November 1998 (Internet World Stats). The policies of ISP (Internet Service provider), like no license fee and freedom to set own tariffs and international gateways, encouraged many companies to

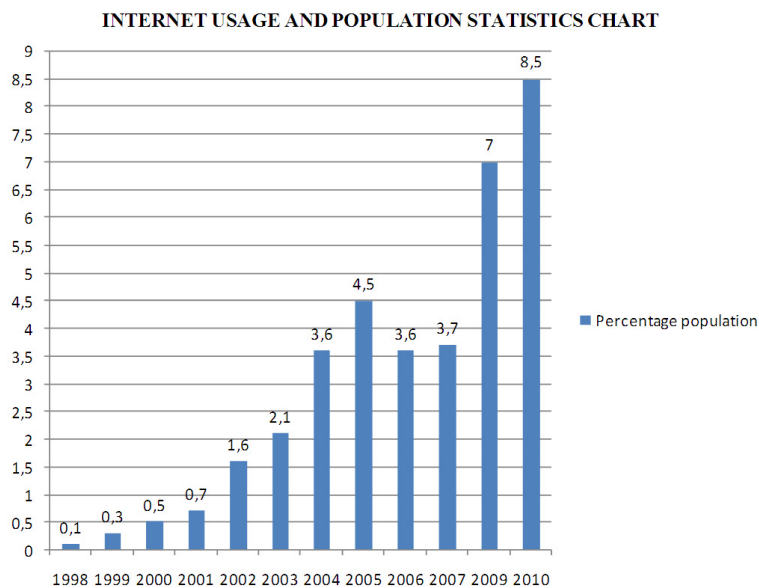**INTERNET USAGE AND POPULATION STATISTICS CHART**

Fig.2: International Telecommunication Union, ITU (1998-03), Internet Mobile Association of India, IAMAI (2006), Internet World Stats, IWS (2007, 2010), Computer Industry Almanac Inc., CI Almanac (2004-05)

invest in the venture. This also means that the monopoly of the government is over now and the services provided by the ISP's have improved.

The total number of internet users is expected to a whopping 2.2 billion worldwide by the year 2013 and at the same time, India is expected to have the third largest online population, with China and the US taking the first two spots, respectively (PTI, 2009).

In the rural India, however, only three per cent of all Indians will be active Internet users by the end of this year (IAMAI, 2009). The low figure came despite an expected doubling in the number of rural users, i.e. from 12.1 million in December 2010 to 24 million in December 2011.

MOBILE TECHNOLOGY

The mobile industry is the world's fastest growing industry. The pace at which it has grown in the past few years is commendable. The population of the country has provided the industry a unique platform for its accretion. The government has a substantial role to play in the development. The reforms have drastically changed the scenario of telecom in the country. While GSM (Global System for Mobile) technology rules the roost, CDMA (Code Division Multiple Access) has also claimed a fair share of the market.

The mobile technology has acted as a tool to educate and gain knowledge, as well as spreading viewpoints and communicate with the rest of the world. In a country like India, which is home to many religions and cultures, mobile technology has successfully ameliorated the task of maintaining the task of unity among our diversified population.

In the 1970s, the first generation of mobile networks (i.e. 1G) was introduced. 1G device was comparatively less heavy and expensive as compared to other devices that came prior to it. In the early 1990s, the 2G phones deploying GSM technology were introduced. GSM uses digital modulation to improve voice quality but the network offered limited data service. As demand drove uptake of cell phones, 2G carriers continued to improve transmission quality and coverage. The 2G carriers also started offering additional services, such as paging, faxes, text messages and voicemail. The 3G revolution allows mobile telephone customers to use audio, graphics and video applications. Over 3G, it is now possible to watch streaming video and to engage in video telephony, although such activities are severely constrained by network bottlenecks and over-usage. The 4G services were developed with the aim to provide transmission rates up to 20 Mbps while simultaneously accommodating Quality of Service (QoS) features. QoS will allow you and your telephone carrier to prioritize traffic according to the type of application using your bandwidth and adjust between your different telephones needs at a moment's notice. Hence, because of such developments in this field, the mobile technology has become such a voracious growing technology.

The mobile technology is growing all over the world; however, the rate at which

it is growing in the developing economies is very high as compared to that of the developed ones (World Resources Institute). It has been found that as incomes across the developing-world rise, household spending on mobile phones also grows faster than the spending on anything else like energy (World Resources Institute). The reason why the mobile technology has become valuable to the people in the developing or under-developed world is that they are providing access to telecommunications for the very first time, rather than just being portable adjuncts to existing fixed-line phones, as in the rich world (The Economist, 2009). In 2000, the developing countries accounted for about 25% of the world's 700 million mobile users. In 2009, this share rose to over 4 billion (World Bank, ITU). With saturation reaching in the developed world, the developing world would account for most of the growth in the coming years. The

total is poised to reach 6 billion by 2013, with about half of these new users in China and India alone (GSMA, 2009).

The success story of mobile technology in India is no different. In fact, India has now become the second largest telecom market in the world, with 706.4 million subscribers as of August 31, 2010, and these are estimated to reach approximately 1 billion by 2014 (IBEF, 2011). For more than a decade, the sector has witnessed a steady addition in wireless subscribers. India's subscribers grow around 15-20 million every month, making it the world's fastest growing wireless market. The key trends in the wireless segment are shown in Fig.4.

As is the case in the developed countries, the urban market of our country has however started coming to a saturation level. Hence, the growth prospects have now shifted from the urban to the rural areas (see Fig.3). The subscriber base in the rural market improved
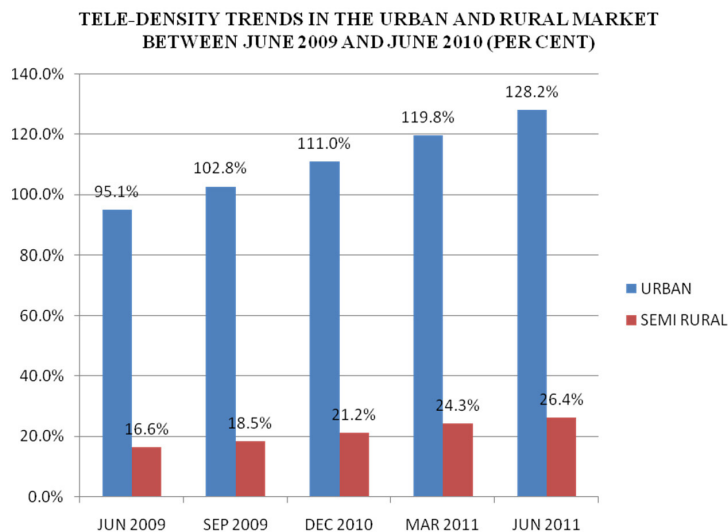

Fig.3: Telecom Regulatory Authority of India, TRAI (2010); Ernst & Young (2008)

significantly in 2009–2010, with the rural tele-density at 26.4 percent as of June 2010, and is going to account to nearly half of the total subscriber base, thereby, fuelling the sector growth.

METHODICAL FRAMEWORK

The primary objective of the study was to explore the perception of the young technocrats on the dissemination of the present day popular technologies – DTH, internet Technology, Mobile Technology. It also endeavoured to evaluate the differences in the perception on the bases of gender, native place (i.e., urban vs. semi rural) and occupation (i.e., future technocrats vs. current professionals). Based on the framework, the following hypotheses were postulated.

RESEARCH HYPOTHESES

H1: The perception on technology dissemination differs between the three technologies viz. DTH, Internet and Mobile technology.

H2: The perception on technology dissemination differs between the male and female technocrats.

H3: The perception on technology dissemination differ between:
a. natives of urban and rural areas.
b. professionals and students (would-be technocrats).

For the purpose of this study, a structured questionnaire was used via web based survey. The questionnaire consisted of items related to the *perception* on technology dissemination on a 5 point Likert scale, with (5) indicating strongly agree and

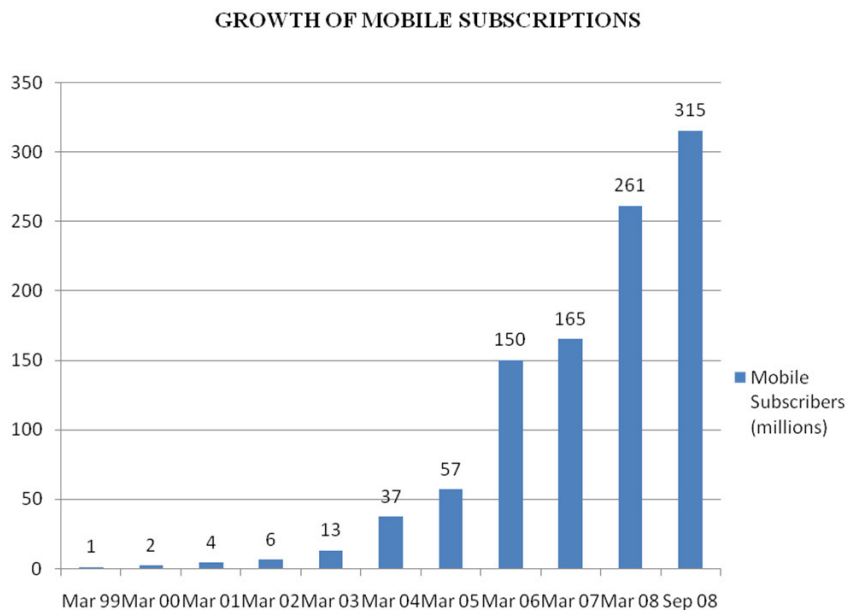**GROWTH OF MOBILE SUBSCRIPTIONS**

Fig.4: Vodafone policy paper (2009)

(1) indicating strongly disagree. The questionnaire also measured descriptive data such as age, gender, native place and occupation.

SAMPLE

The data for the study were gathered from a web survey using the snowball sampling technique. The resultant sample consisted of the profile as listed in Table 1.

TABLE 1
Sample Profile

Sample Size	102
Male	63 (61.2 %)
Female	39 (37.9%)
Urban	55.3 %
Rural	42.7%
Professional	35%
Student	64 %

MEASURES

Literature survey revealed a non–existence of scale that specifically measures the perception towards technology dissemination. Therefore in this study, multi-item scale was designed to measure: a) perception on dissemination of DTH; b) perception on dissemination of internet; and c) perception on dissemination of mobile technology.

The scale items included statements such as technology reaching the masses, impact of technology and behaviour, exposure to opportunities, compatibility with the current infrastructure, etc.

In order to assess the reliability of the scale, co–efficient alpha values were computed for the three scales. The Cronbach alpha values were 0.78, 0.91, 0.67 for DTH, Internet and Mobile technology respectively which deemed the scale as reliable (Nunnaly, 1978).

FINDINGS

The data analysis of the representation sample suggests that the youth perceives the mobile technology as the most avidly disseminated technology (Mean = 4.81; Standard deviation = 0.51), followed by internet technology (Mean = 3.91; standard deviation = 0.86), and the DTH technology (Mean=3.44; Standard Deviation=0.69).

A repeated measure i.e. one–way ANOVA was also employed to examine H1. The test revealed that there were statistically significant differences in the perception on the technology dissemination for the different technologies, with $F(1,101) = 35.62$; $p = .000$. Meanwhile, a moderate effect was repeated (partial eta – squared = 0.261), and LSD comparisons revealed that all four means were significantly different from each other (see Fig.5).

MANOVA was used to compare the mean scores of the male and female respondents for their perceptions on the technology dissemination for the three technologies. However, H2 did not find support in this examination. The Pillai's trace = 0.987 F $(1,101)$ =0.704, p=0.552. This implies that the perception on technology

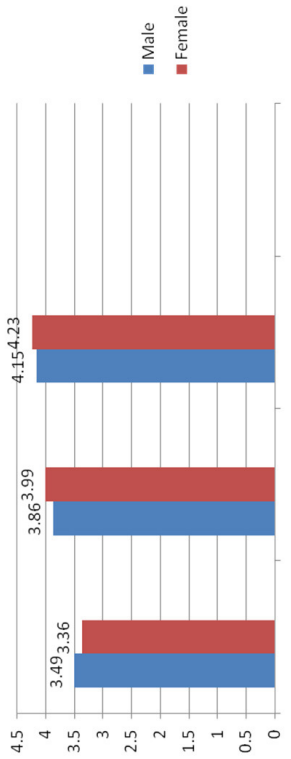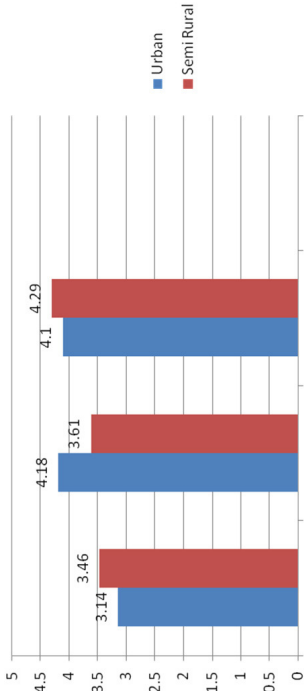**NATIVE PLACEWISE DATA ANALYSIS ON THE DISSEMINATION OF TECHNOLOGY**

Fig. 6: Native Placewise Data Analysis on the Dissemination of Technology

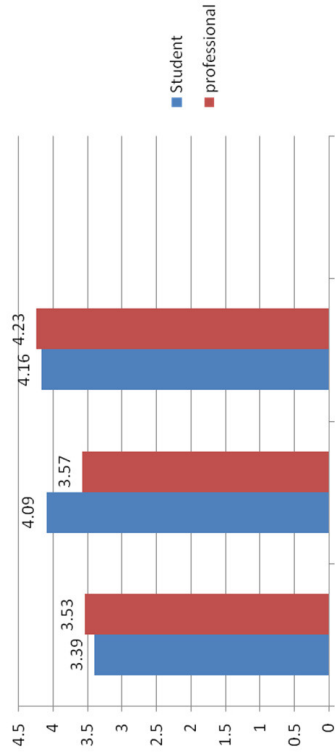**GENDER WISE DATA ANALYSIS ON THE DISSEMINATION OF TECHNOLOGY**

Fig. 5: Gender Wise Data Analysis on the Dissemination of Technology

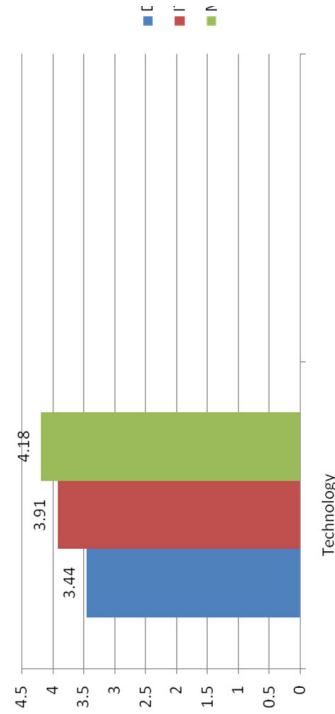**OVERALL PERCEPTION ON THE DISSEMINATION OF THE TECHNOLOGY**

Fig. 8: Overall Perception on the Dissemination of the Technology

OCCUPATION WISE DATA ANALYSIS ON THE DISSEMINATION OF TECHNOLOGY

Fig. 7: Occupation Wise Data Analysis on the Dissemination of Technology

dissemination is similar for the male and female respondents.

In order to test the hypotheses – H3 (a) and H3 (b), the two ways ANOVA were carried with demographic variables – occupation and native place as independent variable and the perceptions on technology dissemination as dependent variable. The results can be seen in Table 2.

The results suggest that the urban and semi-rural respondents had different perceptions on the proliferation of internet technologies, whereby the urban respondents felt a higher degree of proliferation than the semi rural respondents, thus, supporting H3(a). Meanwhile, H1, H2, and H3(b) do not find any statistical support in this investigation.

CONCLUSION

Technology can be a great leveller to bridge socio-economic gaps in the society, particularly in low income cost areas. Easily adaptable technologies can bring changes in the progress and prosperity of the nation at large. Therefore, design, development, and dissemination of technology need careful consideration.

This study focused on the perceptions of the future technocrats, vis–a–vis dissemination of three present day technologies–internet technology, mobile technology and DTH. Given the fact that growth is the primary driver to usher changes, it was pertinent to study their perceptions on the same. The findings from the study suggest that future technocrats perceived the 3 technologies to be fairly

disseminated; particularly so for the mobile technologies, followed by the internet technologies and DTH. These perceptions however seemed to be farfetched and away from the reality. As had been discovered in the earlier sections, these technologies need a faster acceleration and proliferation across various segments in the society. Further examination of gender related differences on perceptions found that young male and female technocrats have a similar perception on dissemination of these technologies. This uniformity in the perception across males and females eliminates the need to sensitize on the issues related to technologies dissemination.

It was a particular area of enquiry to examine the role of demographic variables such as occupation and native place on the perception for technology. The findings indicate no significant gaps in the perception between the technical students and technical professionals across the three technologies. On contrary to the expectation, urban and semi-rural respondents too had a similar perception, except for internet technologies. In this case, the urban respondents perceived a higher level of dissemination than their rural counterparts.

The findings are consistent with the earlier preposition suggested earlier which envisaged a greater role for government agencies, private sector participants and academic institutions, to holistically educate and train them and put greater emphasis to sensitize them on proactively designing and developing technologies for society's welfare. Given the fact that India is

developing and the economy is growing, this growth can be accelerated with the constant use and dissemination of the existing technology and the ushering in newer forms.

The government of India, with a vision of dissemination of Internet, Mobile technology and DTH, has framed policies for the population that have no access to technologies. CAPART (council for advancement of people's action and rural technology) was founded in the year 1986, with the aim to promote innovative rural technologies, especially for the disadvantaged sections of the society. CAPART supports projects under the Advancement of Rural Technologies (ARTS) scheme. The government is assisting NGOs (non-governmental organizations) to set up demonstration and training centres and upgrade the skills of village youths, artisans, women and other target groups for their effective participations in dissemination programmes. Most of the NGOs need technical assistance and guidance in terms of the choice of suitable technologies, adaptation to field conditions, and appropriate methodologies for transfer, including training and involvement of beneficiaries. This need is envisaged to be met by the Technology Resource Centres (TRCs). TRCs are designed to test technologies suitable for the specific geographical area, make modifications wherever necessary, and initiate the process of transfer of viable technologies through demonstration, training and manufacture (CAPART, 2012).

Apart from the policies, which are already being implemented, the government can frame policies for inter–firm cooperation, Standardization of technologies, personnel exchange and the support of R&D personnel, as well as technical assistance and consultancy (Shapira & Rosenfeld, 1996).

In the light of the findings from the study, policy makers such as state agencies should particularly focus on the internet, mobile technology and DTH. To a certain extent, these technologies can accelerate its dissemination.

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