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## A Structural Compendium on Perceptual Displays of Rural India towards the Role and Impact of ICT\*

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### Abstract

The core purpose of the paper is to explore perceptual displays of rural India towards the role and impact of ICT in transforming the lives through education and telecommunications. After meticulous review of pertinent literature on ICT, and its policy framework, the researcher administers both quantitative and qualitative field data collected from the villages of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu with a sample of 250 from each state. More than 90 percent of respondents from the four southern states in India clearly thought that the role and impact of ICT is very momentous. Predominantly, cent percent respondents from Kerala evinced that ICT is the major reason for achieving the tag of "100% Literacy State". And also in the remaining three states viz., Andhra Pradesh, Karnataka, and Tamil Nadu, the literacy rate has crossed mind-boggling figures only because of ICT's reinforcement. Even in the arena of telecommunications, these four states average telecom density is more than the country's average. The paper concentrated only on how ICT function empirically to build human capacity in rural south-India through the sectors of only education and telecom. This study is first of its kind and precious to all stakeholders of the ICT sector like educational institutional, telecom firms, customers, employees, and governments, etc.

**Keywords:** Education, Telecommunications, Consumers, Information, Institutions, India.

**JEL Classification Codes:** I21, L96, M15, N35.

### 1. Introduction

Information and Communication Technology popularly called as ICT is part and parcel in modern day's human life. It acts as a catalyst in every facet of individual's existence for the most part culturally, socially, economically, and politically which swiftly transforming lives of people in every

part of the globe in general and Africa and Asia-Pacific in particular. It fuels the economies of emerging countries, meticulously molding the approach they take up dealing, contact, and share information, communication with the remaining part of the world. As stated by Grace, Kenny, and Qiang (2003) in their World Bank working paper, swift dissemination of ICT in African countries along with other developing countries has been a common phenomenon in modern years. A competent education system, exceedingly adept and committed personnel, and the progress of information and communications technology are extensively commended as the key aspects motivating the knowledge economy like India.

In the last twenty five years of dot com boom spread in the country has confidently propelled the economy into novel strides. It also relates to human capacity development in the course of flawless garnering, application, and using of information through ICT assertively proliferate all kinds of dexterities of people who in turn boost-up their confidence in

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searching for their livelihood. In his oft-repeated adage Father of the Nation, Mahatma Gandhi (1931) said "India lives in villages" based on where the researcher selected rural India for the study on the role and impact of ICT. The world's largest democratic country India with more than 1200 million populations has acknowledged phenomenal economic growth in the last two to three decades. Whatever the growth identified by the country particularly rural India only with the snowballing trend of application of ICT predominantly in education and telecom sectors. The former Prime Minister of India, Mr. Rajiv Gandhi in early 1990s had taken an initiation to introduce most vibrant economic policies viz., liberalization, privatization, and globalization. This led to the massive introduction of ICT in all the sectors which are confidently changed the tag line of the nation as a knowledge hub.

In process of transforming India as a knowledge center with the application and implementation of ICT in fields like edification in addition to telecommunications, these economic policies envisaged and revolutionize the country in general and rural India in particular since 1990. All the stakeholders like governments, corporate sector, non-governmental organizations, educational institutions, and even public at large has noticed radical changes because of ICT sector through which the rural development has taken place by introducing computer based libraries, electronic business, learning and governance etc. Information and communication technology (ICT) one side has led to enhance the adroit levels of country's population and another side acts as a great impetus for economic growth. Any country in any part of the globe can facilitate and enhance its trade and industry which is sheer competitive advantage to a country in producing magnitude of goods and services. This is possible with the commendable application of information and communication technology with more efficient and competent manner which raises new questions particularly to both central and state governments regarding the growth of rural India. As said by the Lam and Shiu (2010), the introduction of ICT infrastructure facilitates to produce required quantity of output with additional professionalism and pace. This trend entails further and persistent information base for the framework and to adopt notable changes in existing ICT policies of the respective governments.

The paper therefore considers the last twenty five years of growth trends in ICT particularly in rural India based on where lucrative information base has to be provided which is

imperatively required for all the stakeholders of the sector for further action. The rationale behind this research is to be acquainted with the perceptions of rural India populace towards the role and impact of ICT in changing their lifestyle through education and telecommunications.

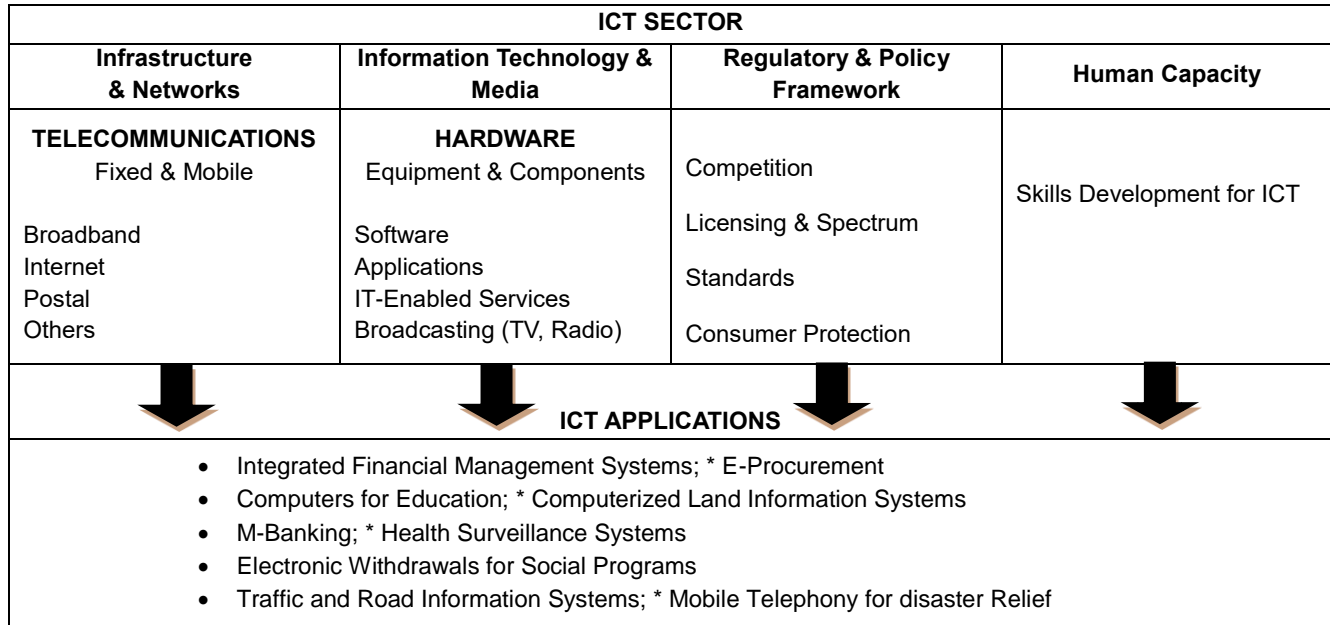
## **2. Literature Review**

### **2.1. ICT and Its Significance**

Many definitions of Information and Communication Technology (ICT) have given with diverse interests. UNESCO has core interest i.e. quality education for everyone. Along with this thrust area, UNESCO is also concerned with the increasing ken of ICT to all. UNESCO comprehensively defined the term ICT as types of technology that are applied to spread, progression, accumulate, generate, exhibit, distribute, or swap information by electronic means by using radio, TV, video, DVD, telecom. Satellite systems, and computer software and hardware along with the apparatus and services linked with the above technologies viz., video conferencing, emails and blogs etc. (UNESCO, 2007). The definition given by the Organization for Economic Co-operation and Development (OECD) is handy which clearly differentiated the views of manufacturing and service facets towards ICT in 1998 which is a blend of both manufacture and service sectors that hold, spread, and present data and information by electronic means.

Once again in the year 2002, the OECD redefined the term ICT by including the financial sector as electronic demonstrations, different kinds of cable, apparatus for find the way and plentiful further form of electronic and wireless connectivity related devices (OECD, 2002). ICT, as defined in the Information & Communication Technology Sector Strategy Paper of the World Bank Group consists of hardware, software, networks, and media for collection, storage, processing, transmission, and presentation of information (voice, data, text, images) (World Bank, 2003). In a nutshell, ICT means "dispensation and passing of information in a scientific manner" which covers lengthy above mentioned activities (World Bank, 2011).

Hence, the below Figure 1 proffers a comprehensive thought about both the ICT sector and ICT applications:



Source: World Bank ICT Strategy (World Bank 2002), IEG

<Figure 1> A comprehensive framework the ICT sector and ICT applications

As revealed by Tcheng, Huet, Viennois, and Romdhane (2007) the evolution of ICT subsumed as a crucial factor for economic growth instead of treating as an outcome of it. The following core features of ICT expounded this view: a) ICT is omnipresent in every business; b) ICT improves persistently the way of doing business by tremendously minimizing the costs for the users, and c) ICT uniquely sheds light on novelty or modernization and to the progress of innovative goods, services, and procedures. Studies by Daveri and Silva (2004), Lipsey and Carlaw (2004), Laursen (2004) and Plepys et al. (2002) stated that the ICT, the core facet for healthier economic prosperity, substantiate growth, and privileged yield.

Thomson and Garbacz (2007) acknowledged that evolution of ICT must have a noteworthy optimistic influence with remarkable intensification on any country in the globe by humanizing all sorts of competence. The commendable implementation of ICT leads to competent merchandizing through which an opportunity to create novel opportunities and employment (Arvanitis & Loukis, 2009; Carayanis & Popescu, 2005). ICT not only enhances competition in the market but also attracted foreign investments into the country and propelled the economy towards a rapid growth and also to face global competition (Al-mutawkkil, Heshmati, & Hwang, 2009; Meng & Li, 2002; Van Ark et al. 2002). The information and communication technology acts as a king-pin to the economic development of developed countries like United States (Cronin, Parker, Colleran, & Gold, 1991; Wolde-Rufael, 2007) and South Korea (Yoo & Kwak, 2004).

In India, a novel path with technology orientation identified by Mr. Rajiv Gandhi led Congress Government in the year 1984. This novel path with ICT association brought enormous changes with substantial program of computerization in all the sectors including public sectors, commercial undertakings, and admin departments (Bajwa, 2003). Every stakeholder of the ICT sector in India has clearly recognized the significance and strongly believed that ICT will propel the country into the league of developed nations. Cohen, Garibaldi and Scarpetta, (2004) stated that ICT know how to theoretically increase output escalation in ICT divisions, augment sum funds spent in ICT, and/or recognize competence expands by ICT espousal. Along with the above, Zhang, Aikman and Sun (2008) also defined ICT as technical expertise exercised by public and organizations for their information processing and communication purposes.

## 2.2. ICT: Education and Telecommunication

In the last two and half decades, India has witnessed astonishing modernization in the transformation of knowledge through education to all strata of the society. Education is imperative to the evolution of quality human resource that is proficient in accessing and integrating ken into societal and financial actions and participates in today's global economy. Both service and manufacturing sectors in every part of the globe has identified severe scarcity of quality work force because of the introduction of new technologies and a growing service sector particularly in developing world. Nowadays, stern inequalities everyone

can recognize in access to education in different parts of the world are substantial.

Out of 680 million children in developing world, only 565 million are accessible to primary education and in the remaining 115 million children, 60 percent are girls and 74 percent exist in south Asia and Sub-Saharan Africa (UNDP, 2003). Right to education is the buzz word among government circles in India which exorcises lethargy in the administration and at the same time heavy budget allocations has given this kind of impetus to the country in human capacity development. Even though many would argue that these are not up to the expectations of the public and at the same time the penetration level into the vast and densely populated rural India. As stated by Starr (2001) factors like lack of financial support to garner technology, technical and conceptual training for teaching community; improper and insufficient motivation; and lack of quality teachers to adopt ICT as teaching tools obstruct the introduction of ICT in education. No exception to the developing country like India.

With the escalating trend of demand for quality human resource in all the sectors of the economy, the present education system which has myriad problems comprehensively failed to supply required personnel with expected level of conceptual and technical knowledge. In this situation, introduction of ICT brought back new energy and competence to the economy by delivering goods to the country with commendable manner. Some cynics said that a few nations in different parts of the world invested in technology for education with a "glitz factor" which is nothing but stylish to pick the most sophisticated with superior quality. Majority of the nations invested in ICT exclusively for education with a positive frame of mind to candidly improve the efficiency of their education system for the purpose of enhancing knacks of the country's populace, maintaining databases and computerized records (Wright, 2000).

Bill Gates expressed different view of the use of ICT: "Students can come across their evaluations; smoothly complete their groundwork over the Internet; send emails to their kith and kin which competently meant to transform them as comprehensive knowledgeable human resources. Teaching staff also can have interactive sessions with the academia of remaining world." Amid these optimistic and pessimistic approaches, governments has to take decisions with indomitable commitment to introduce ICT based learning in all learning institutions up to higher grade to increase cognitive wisdom and to prepare young generation with ICT skills needs to work in the new millennium (DOEE, 1998) and the government of India did the same since early nineties. Through ICT, both central and state governments are responsible to bring in seamless developments in education by establishing a knowledge network for sharing of ken; enhancing access through distance learning; proffer

persistent training for teachers on conceptual developments, psychology of students.

Along with the above, governments also keep an eye on the introduction of technology based latest teaching methods; augmenting the availability of quality educational materials in institutions; close monitoring of the usage of available educational aids and equipment. And finally, government has to take precautionary measures to enhance the efficacy and effectiveness of educational administration and policy. The persistent and proliferating application of ICT in the above areas of education in the last two decades, particularly proffers significant breakthrough to the country which changes the face of India as an information technology based knowledge hub in the world.

These days' telecommunications is subsumed as snowballing sector in developing countries. The constructive impact of ICT can be huge in every part of the globe in general and third world countries in particular as ICT contrast to other services in the market. Waverman, Meloria, and Melvyn (2005) expounded along with health services, education, and roads, telecommunication arrangements are expenditure incurred areas and treated as social overhead capital items. The benefits incurred with telecom are both direct and indirect to any country. Datta and Agarwal (2004) stressed that ICT has confidently provided the direct effects like creation of employment and contribution of domestic output; enhance government revenues, and affect balance of payments and can also proffer indirect benefits like stimulate capital buildup, develop firms' productivity, increase the potentiality of the markets, intensify financial inclusion and moreover significantly contribute to rural development.

At the same time, Lewin and Sweet (2005) emphasized the significance of telecommunications and its benefits to different strata of the society, particularly business people, manufacturers, managerial community, software engineers and middlemen, etc. Based on these umpteen both direct and indirect benefits, telecommunications in recent years is considered as an essential infrastructure to any country's economic development and competitiveness. At the same time to be in the competitive arena in every sector, ICTs support is an imperative to every country as well to their people. In 2009, the World Bank report highlighted just ten percent growth in internet connections proliferate an alluring 1.3 percent boost-up in economy (<http://www.adb.org/sectors/ict-in-key-sectors/telecommunications>). An ideal application of telecommunications with great competence and efficacy delivers innovative and cost-efficient services in basic sectors like education, health, and agriculture, travel and tourism, banking, insurance, and many more. Based on these myriad advantages of ICT, every country has to build a mounting ICT-savvy nation to meet the challenges in this highly competitive new millennium.

### 3. Research Methodology

The prudence behind this research is to garner invaluable first-hand information and make it available to all the stakeholders of the education and telecom sectors. The requisite information about the role and impact of ICT on rural India has collected with the support of both quantitative and qualitative methods. The researchers administered a well-structured questionnaire to recognize the impact of ICT on receiving education and telecom services and the questionnaire was initially developed in English and then translated into four local vernacular languages viz, Telugu, Kannada, Malayalam and Tamil. This study was conducted in the Indian states like Andhra Pradesh, Karnataka, Kerala and Tamil Nadu in first quarter of this year. Both stratified and convenience sampling techniques were used to make the data more manageable with a total sample of 1000 equally chosen from the rural areas of four states.

The researchers also used structured personal interviews with predetermined, open ended questions to get additional information related to demographics, personal opinion on impact of ICT on their family, education, and communication. The study was supplemented by secondary data obtained from books, journals, magazines, the internet, and other documents from policy documents of IMF, Government of India, etc. The unique feature of this research is a well-trained under-graduate students of computer science involved in garnering the full-fledged data from the targeted states under the close supervision of my co-author. As the cohesiveness of rural is different, the researchers used the common words like computers, mobiles and phones instead of ICT while expounding about questionnaire which consists of three parts.

The first part consists of information related to demographics, second part related to education and the third consists of information related to telecom. Just to get some first-hand practical ken related to research, army of under-graduate students dedicatedly involved in this data collection and garnered the information with great dedication. The same had given comprehensive information about the research objective, along with additional clarifications required by the respondents and collected all the questionnaires then and there itself by taking an uncompromising stance. Even though the sample is minimal, this research is first of its kind in the country particularly to grab the perceptions of rural people in an extensive manner about ICT.

The collected data was reviewed, coded, manipulated, and analyzed by using SPSS 21.0 and also with the support of Microsoft Excel along with statistical tools such as percentages, mean, and to test the chosen hypotheses researchers applied Chi-square test. Major limitations of the

research are: a) stratified and convenience sampling technique used in the research which is not at all a fully representative profile of the entire rural India and due to lack of time and resources; b) the research confined to only rural areas which are mostly surrounding areas to the major towns and cities of the four states in south India; c) the third limitation is the study concentrated only on role impact of ICT related to education and telecom sectors and not involved in any other sectors of the economy and the researchers also considered the indirect usage of ICT by the respondents also considered. The following hypotheses were selected based on the literature review:

- H<sub>01</sub>:** People's awareness of ICT is uniform across all the four states.
- H<sub>02</sub>:** People's perception regarding the impact of ICT is uniform across the four selected states.
- H<sub>03</sub>:** Education has no association with awareness of ICT.
- H<sub>04</sub>:** There is no association between profession and ICT impact perception.

### 4. Analysis and Discussion

The perusal of this section of the research highlights about state-wise demographic features like age, gender, education, and profession of the respondents and then explained comprehensively about the role and impact of ICT in selected regions for study (see <Table 1>).

**<Table 1>** State-Wise Demographic Profile of the Respondents (In Percentage)

Demographical Feature	Andhra Pradesh	Karnataka	Kerala	Tamilnadu
1. Age				
18-28	22	18	24	23
29-38	32	28	33	36
39-48	38	41	36	32
49 & Above	08	13	07	09
2. Gender				
Male	54	61	48	59
Female	46	39	52	41
3. Education				
Below 10 <sup>th</sup>	16	18	04	17
Undergraduates	38	42	29	33
Graduates	36	33	41	39
Postgraduates	10	07	26	11
4. Profession				
Agriculture	59	64	54	61
Small Business	16	13	19	19
Artisans	12	16	17	12
Employees	13	07	10	08

The researchers uniquely raised two questions about awareness and impact of ICT in the initial part of the questionnaire to collect the information related to the core purpose of the study. Astonishingly, entire rural India has confidently aware about computers and mobile phones but not the term ICT. The God's own country Kerala with a tag line of 100% literate state leading with a percentage of 98 and followed by Tamil Nadu with 94, Andhra Pradesh with 86, and startlingly the IT hub of India Karnataka with a least percentage of 84 related to awareness levels on ICT. Related to the perception of rural India on the impact of ICT, the entire country out rightly accepted that the impact is very severe and everything in both urban and rural areas has depended on computerization of respective business activity. The state-wise information about the perception of rural has given in the below <Table 2>.

Related to role and impact of ICT on education, the researchers forwarded the questions like what and how is learned? When & where learning takes place? Who is learning and teaching? What it costs per month? The researchers offered clear options related to above questions to proffer greater clarity and cohesiveness to the

respondents' community. The application of ICT in rural India is very significant and also meant for multiple purposes mostly for study purpose, to procure a candid information about latest practices and methods related to agriculture and artisans, finance related schemes introduced by banks and governments, applying for government schemes including ration, and other information related to personal activities, interests, and opinions.

Associated with the specific usage of ICT for different purposes has given in Table 2 with clear percentages. Either directly or indirectly, more than 90 percent of the respondents used either computers or mobile phones to maintain a rapport with particularly governments. On an average around 70 percent of rural has involved in learning about agriculture and artisans and surprisingly, the same percentage of people also busy with learning to enhance their academic qualifications. In association with information procurement related to personal activities, interests and opinions, meager 36 percent respondents from Andhra Pradesh attempts where as it crossed above 70 percent in the states of Kerala and Tamil Nadu.

<Table 2> Role and Impact of ICT on Education (In Percentage)

Activity / State	Andhra Pradesh	Karnataka	Kerala	Tamilnadu
1. Are you aware about ICT? (Yes %)	86	84	98	94
2. Perception of Rural Indian about Impact of ICT (Yes %)	91	94	99	98
3. Education				
(A) What is learned?				
• About Studies (Courses)	62	56	79	79
• Agriculture	74	66	89	81
• Finance	62	56	79	79
• Novel Methods for Artisans	78	62	84	83
• Government Schemes	94	90	94	91
• Other Information related to Personal Activities, Interests, & Opinions	36	41	78	71
(B) How it is learned?				
• Through Internet	98	96	99	97
• Mobile Phones	03	04	68	32
(C) Where learning takes place?				
• Net Centers in the Village	22	19	39	36
• Net Centers in Nearest Towns	61	69	49	48
• Residence	15	09	10	12
• Personal Mobile	02	03	02	04
(D) When learning takes place?				
• During Day-time	34	31	21	39
• In the Evenings	36	40	39	25
• Weekends	18	22	28	22
• Holidays	12	07	12	14

Activity / State	Andhra Pradesh	Karnataka	Kerala	Tamilnadu
(E) Who is learning?				
• Youngsters Below 25	46	41	36	45
• People Below 35	38	39	31	38
• Below 45	12	14	24	13
• Above 45	04	06	09	04
(F) Who is teaching?				
• Net Centers	12	14	11	22
• Specially Appointed Tutors	26	34	48	36
• Educated Unemployed	46	27	21	25
• Retired Teachers/Employees	16	25	20	17
(G) What it costs per month?				
• \$ 10-15	64	59	49	54
• \$ 16-20	29	32	36	39
• \$ 21-25	04	07	11	05
• \$ 26-30	03	02	04	02

Because of the dot com boom even in the rural India, Internet usage is increasing with a snow-balling trend and more than 95 percent of respondents are learning diverse issues only through the websites. Based on their convenience and urgency, rural people are involved in learning either of their choice on time and place. Mostly they are using net centers in nearest towns to use Internet by hiring the services of educated unemployed who are working in these centers. Regarding people involved in learning as well teaching, generally around 80 percent of learners are in the age group of below 30 years as against a somber below ten percent in the above 40 years and majority of the instructors are local unemployed youth who are working in computer institutes, and net centers.

For learning ICT oriented education, around 55 percent of rural people are spending below 15 USD per month as against around 30 percent are spending between 16 to 20 USD. Even in the odd conditions like poor agricultural seasons, failure in getting support prices for their productivity, most of the farmers pushed their children towards ICT based education and received an alluring income from the IT and IT enabled services sector of the country. Undoubtedly, ICT has proffered marvelous breakthrough to the rural India which has revolutionize the life-styles by confidently proliferating their knacks in all the facets particularly through education and telecommunications (see <Table 3>).

<Table 3> Role and Impact of ICT on Telecommunications (In Percentage)

Feature/Activity	Andhra Pradesh	Karnataka	Kerala	Tamilnadu
1. Are you using mobile?	86	84	98	94
2. Are you using Internet?	69	64	89	78
3. Is it useful to your day-to-day life?	97	96	99	98
4. For what purpose:				
• For personal communication	84	82	94	89
• Agriculture/occupation related Information	59	62	79	72
• Marketing assistance	29	32	54	52
• E-commerce	12	10	36	29
• Banking services	03	07	88	74
• Education	57	54	91	65
• Others if any.....	16	19	45	36

Concerning with the role and impact of telecommunications, the third part of the questionnaire has four closed-end straight questions related to the usage of mobiles and internet, usefulness of those services, and the purpose behind the usage. More than 90 percent of rural populace in India are using mobile phones as against 75 are using Internet either directly or indirectly for diverse purposes. Approximately 98 percent of respondents enthusiastically said that ICT is playing pivotal role in their day-to-day life and some respondents expressed the opinion of it is part and parcel in their life. Extensively, just about 90 percent rural people are using for the purpose of personal communication with their kith and kin as against around 68 percent for agriculture and occupation.

Surprisingly, even rural India also involves in e-purchasing and placed an order for different products particularly dress material, utensils, kitchen items, furniture etc. More than 90 percent of Kerala rural is depended on ICT based learning particularly through Internet as against just around 60 in the remaining states selected for the study. Undisputedly, telecom sector in India has extended its maximum cooperation by establishing required infrastructure in offering both mobile and Internet services even to the rural. In the process of enhancing telecom density to the mindboggling figures, telecom industry rigorously investing all its resources and efforts which in turn lead to enhances the capacities of the rural people.

#### 4.1. Testing of Hypotheses:

**H01:** People's awareness of ICT is uniform across all the four states.

To test the above hypothesis, Chi-Square test for multiple proportions was used. The contingency table and calculated value of Chi-Square is shown below <Table 4>. Here the p – value > 0.05 and therefore we cannot reject the null hypothesis and thus we may conclude that there is uniformity in awareness on ICT across the four southern states of India.

<Table 4> Contingency Table for H01

Opinion State	Yes (%)	No (%)	Total	Chi -Square Test
AP	86	14	100	$\chi^2 = 5.23$ df = 3 Asymp. Sig ( 5%) = 0.1557
Karnataka	84	16	100	
Kerala	98	2	100	
Tamilnadu	94	6	100	
Total	362	38	400	

**H02:** People's perception regarding the impact of ICT is uniform across the four selected states

To test the above hypothesis, Chi-Square test for multiple proportions was used. The contingency table and calculated value of Chi-Square is shown below in H5: Here the p – value > 0.05 and therefore we cannot reject the null hypothesis and thus we may conclude that there is uniformity in impact perception of ICT across the four southern states of India (see <Table 5>).

<Table 5> Contingency Table for H02

Opinion State	Yes (%)	No (%)	Total	Chi-Square Test
AP	91	9	100	$\chi^2 = 6.09$ df = 3 Asymp. Sig ( 5%) = 0.1073
Karnataka	94	6	100	
Kerala	99	1	100	
Tamilnadu	98	2	100	
Total	382	18	400	

**H03:** Education has no association with awareness of ICT.

**H04:** There is no association between profession and ICT impact perception

To test the above hypotheses, Chi-Square test for association is being resorted. The calculations for the above test are shown in H6 and H7 given below (see <Table 6> and < Table 7>): Here the p – value < 0.05 and therefore we can reject the null hypothesis and there is no association between awareness on ICT and education levels. We may say that education is associated with awareness on ICT.

Here the p – value < 0.05 and therefore we can reject the null hypothesis and there is no association between awareness on ICT and Profession. We may say that profession is associated with awareness on ICT.

<Table 6> Contingency Table for H03

Awareness Education	Yes	No	Total	Chi-Square Test
≤ 10 <sup>th</sup> Standard	38	17	55	$\chi^2 = 12.42$ df = 3 Asymp. Sig (5%) = 0.00607
Under Graduates	128	14	142	
Graduates	144	5	149	
Post Graduates	52	2	54	
Total	362	38	400	

<Table 7> Contingency Table for H04

Impact perception Profession	Yes	No	Total	Chi-Square Test
Agriculture	231	7	238	$\chi^2 = 9.56$ df = 3 Asymp. Sig (5%) = 0.02270
Small Business	62	5	67	
Artisans	53	4	57	
Salaried	36	2	38	
Total	382	18	400	



### Broad Conclusions of the Study:

Based on the testing of the maintained hypotheses of the present study we may tentatively conclude that:

- The awareness and Impact of ICT across all the four sampled states is uniformly high.
- The demographic features of education and profession seem to be associated with the awareness levels of ICT among the sampled population.

## 5. Practical Implication

The world's largest democratic country India had passed the sorry state of affairs existed particularly in seventies and eighties successfully overcome in nineties only because of the comprehensive and competent introduction of ICT both in education and telecom sectors. The present study which concentrated on the perceptual displays of rural India on ICT oriented education and telecom fields in the development of human capacities proffers invaluable information particularly to both state and central governments by demanding wide and quality adoption of ICT. Based on the study, governments can swiftly review their existing IT policies and identify loopholes in penetrating to rural to properly organize those deficiencies for the quality delivery of services like education and telecom.

At the time of personal interviews, respondents expressed their discontentment and grievances over the transformation of ICT based ken as well as telecom services. Both educational institutions and telecom firms has to once again check their existing service delivery process and plan for quality and candid service which can be confidently in the up-beat mood of the market. Most of the parents expressed their dissatisfaction in quality deliverables of ICT based education because of the fat fee structure for inferior quality service which in turn fails to get a job which angers the parents' community. Even with the lowest telecom prices in

the world, Indian telecom firms not properly penetrated into the nook and corner of the country only because of some infrastructural, government policy, geographical, social, and personal features of the populace which hinders the growth with contentment.

This survey proffers information about what, when, where, who, how much and for what specific purpose the ICT is constructive definitely useful to firms who are in the business of education and telecom for designing their services mix especially to rural India. And particularly this research also provides a strong base and acts as a guide to the future researchers based on which they can mold their research on topics related to ICT.

## 6. Conclusion

Since 1990s India has developed on the footsteps of the evolution of ICT in a big way and successfully transforms the country into a "Knowledge Superpower". In line with the country's ICT policy, all the state governments initiated to develop their own IT policy and meticulously works on the development of ICT based education system by proffering the required telecom services even to the rural. Through which India has competently achieved the breakthrough in producing the large pool of ICT based quality human resource. Even some of the initial hick-ups the country has witnessed in this ICT oriented development particularly in education and telecom fields, concerned governments with a great pace addresses the same and set right the things in the affected areas. All these ICT oriented efforts of the stakeholders of the two core fields viz., education and telecom has competently lead to the evolution of high quality human capital in the country. The study offers most precious first-hand information about the perceptions of rural India towards ICT which is first of its kind and absolutely useful to all the stakeholders for review purpose and also has a great scope for further research.

## References

- Al-mutawkkil, A., Heshmati, A. & Hwang, J.S. (2009). Development of telecommunication and broadcasting infrastructure indices at the global level. *Telecommunications Policy*, 33, 176-199.
- Arvanitis, S., & Loukis, E.N. (2009). Information and communication technologies, human capital, workplace organization and labor productivity: A comparative study based on firm-level data for Greece and Switzerland. *Information Economics and Policy*, 21, 43-61.
- ADB (2009). *Telecommunications and ICT*. Asian Development Bank. Retrieved March 13, 2015 from <http://www.adb.org/sectors/ict-in-key-sectors/telecommunications>
- Bajwa, G. S. (2003). ICT policy in India in the era of liberalization: Its impact and consequences. *Global Built Environment Review*, 3(2), 49-61.
- Carayannis, E. G., & Popescu, D. (2005). Profiling a methodology for economic growth and convergence: Learning from the EU e-procurement experience for

- central and eastern European countries. *Technovation*, 25, 1-14.
- Cohen, D., Garibaldi, P., & Scarpetta, S. (2004). *The ICT revolution: Productivity, differences and the digital divide (Eds.)*, Oxford, United Kingdom: Oxford University Press.
- Cronin, F. J., Parker, E. B., Colleran, E. K., & Gold, M. A. (1991). Telecommunications infrastructure and economic growth: An analysis of causality. *Telecommunications Policy*, 15, 529-535.
- Datta, A., & Agarwal, S. (2004). Telecommunications and economic growth: A panel data approach. *Applied Economics*, 36(15), 1649-54.
- DOEE (1998). *Survey of information and communication technologies in schools. Department of Education and Employment*. Norwich, UK: The Stationary Office.
- Gandhi, M. K. (1931). Upliftment of villages, *Young India*, 23<sup>rd</sup> April, 46: 12.
- Gates, Bill. (1999). *Business using a digital nervous system*, London: Penguin.
- Grace, J., Kenny, C., & Qiang, C. Z-W. (2003). *Information and communication technologies and broad based development: A partial review of the evidence*. World Bank Working Paper, Technical Report 12. Washington, DC: World Bank.
- Lam, P. L., & Shiu, A. (2010). Economic growth, telecommunications development and productivity growth of the telecommunications sector: Evidence around the world. *Telecommunications Policy*, 34, 185-199.
- Laursen, K. (2004). New and old economy: The role of ICT in structural change and economic dynamics. *Structural Change and Economic Dynamics*, 15, 241-243.
- Lewin, D., & Sweet, S. (2005). *The economic impact of mobile services in Latin America*. Technical Report. London: Report for the GSMA, GSM Latin America, and AHCJET.
- Lipsey, R. G., & Carlaw, K. I. (2004). Total factor productivity and the measurement of technological change. *Canadian Journal of Economics*, 37, 1118-1150.
- Meng, Q., & Li, M. (2002). New economy and ICT development in China. *Information Economics and Policy*, 14, 275-295.
- OECD (2002). *Measuring the Information Economy*. Paris, France: OECD. Retrieved March 14, 2015 from <https://www.oecd.org/sti/ieconomy/1835738.pdf>
- Plepys, A. (2002). Sustainability in the information society: The grey side of ICT. *Environmental Impact Assessment Review*, 22, 509-523.
- Starr, L. (2001). *Sometime this year [online]*, Retrieved March 14, 2015 from [http://www.education-world.com/a\\_tech/tech075.shtml](http://www.education-world.com/a_tech/tech075.shtml)
- Tcheng, H., Huet, J.-M., Viennois, I., & Romdhane, M. (2007). Telecoms and development in Africa: the chicken or the egg? *Convergence Letter*, 8, 16.
- Thomson, H. G. Jr., & Garbacz, C. (2007). Mobile, fixed line and Internet service effects on global productive efficiency, *Information Economics and Policy*, 19, 189-214.
- UNDP (2003). Human Development Report 2003, The United Nations Development Program. New York. Retrieved from [http://www.undp.org/hdr2003/UNEP\(2002\)](http://www.undp.org/hdr2003/UNEP(2002)).
- UNESCO (2007). The UNESCO ICT in Education Programme. UNESCO Bangkok, Thailand. Retrieved March 14, 2015 from <http://unesdoc.unesco.org/images/0015/001567/156769e.pdf>
- Van Ark, B. (2002). Measuring the new economy: An international comparative perspective. *Review of Income and Wealth*, 48, 1-14.
- Waverman, L., Meschi, M., & Fuss, M. (2005). The impact of telecoms on economic growth in developing countries. *The Vodafone Policy Paper Series*, 2, pp. 10-23.
- Wolde-Rufael, Y. (2007). Another look at the relationship between telecommunications investment and economic activity in the United States. *International Economic Journal*, 21, 199-205.
- World Bank (2003). *ICT and MDGs: A World Bank Group Perspective, Global ICT Department*. The World Bank Group. Washington, DC. Retrieved March 12, 2015 from <http://documents.worldbank.org/curated/en/538451468762925037/pdf/278770ICT010mdgs0Complete.pdf>
- World Bank (2011). *Capturing Technology for Development: An Evaluation of World Bank Group Activities in Information and Communication Technologies*. Washington, DC: Independent Evaluation Group, The World Bank Group. Retrieved March 12, 2015 from [http://ieg.worldbankgroup.org/Data/reports/ict\\_evaluation.pdf](http://ieg.worldbankgroup.org/Data/reports/ict_evaluation.pdf)
- Wright, C. (2000). *Issues in education and technology: Policy guidelines and strategies (Ed.)*. London: Commonwealth Secretariat, p.167.
- Yoo, S. H., & Kwak, S. J. (2004). Information technology and economic development in Korea: A causality study, *International Journal of Technology Management*, 27, 57-67.
- Zhang, P., Aikman, S., & Sun, H. (2008). Two types of attitudes in ICT acceptance and use. *International Journal of Human Interaction*, 24(7), 628-648, doi: 10.1080/10447310802335482.