

Socio-economic Impact of Cellular Phones Growth in Pakistan: An Empirical Analysis

Shahnawaz Malik

Chairman and Professor of Economics, Bahauddin Zakariya University Multan, Pakistan
E-mail: shahnawazmalik@bzu.edu.pk

Imran Sharif Chaudhry

Associate Professor of Economics, Bahauddin Zakariya University Multan, Pakistan
E-mail: imranchaudhry@bzu.edu.pk

Qaiser Abbas

M. Phil Scholar, Department of Economics, Bahauddin Zakariya University Multan, Pakistan
E-mail: qaiser_bzu@yahoo.com

Abstract

This paper investigates the socio-economic impact of using cellular phones based on primary source of data from urban and rural areas of Dera Gazi Khan District of Punjab province. Since innovation in the telecommunication sector through cellular phones has changed the concept of communication, it has become the source of economic growth and employment opportunities at macro level and improved the situation of health, emergency, social contacts, entertainment, efficient decision making, traveling and easy market access for a common man at micro level. There are significant studies on using cell phones internationally but noteworthy attention in terms of research has not been given to this emerging issue in Pakistan so far. This study fills the gap in the literature. According to the elementary data analysis, respondents of the rural areas are benefited more than the urban areas in using cell phones as it becomes the main source of information of local markets, nationwide changes in political and economic conditions and social contacts. It is also found that almost half of the respondents admit that cell phones render the main source of family cohesion, access to doctor or police and give opportunities of employment directly or indirectly. Finally it is concluded that growth of cell phones has strong and significant impact on their lives both economically and socially.

Key words: Cell Phones; Communication; Socio-economic variables; Employment Opportunities; Pakistan

I. Introduction

The use of cell phone has rapidly become an integral part of our lives and has become the source of economic growth and employment opportunities at the country level (Madden and Savage, 2000 & Sridhar and Varadharajan, 2007). In many countries, mobile phones are often people's only way of telecommunication (CSR Report, 2003). They are addressing their specific needs and encouraging the use of mobile technology as a force of positive social and environmental changes (Banks & Burge, 2004). Over the

last three decades, the global economy has gone through revolutionary changes and a development in telecommunication technology has triggered a complex pattern of social and economic change.

Mobile phone is more than a communication device. The technological progress and deregulation of telecommunication industry has considerably lowered the marginal costs of communications. International organizations such as World Trade Organization (WTO) and International Telecommunication Union (ITU) are reassessing the increasing importance of telecommunication services in the economic development of the countries and specially its socio-economic impact on common individuals. These organizations believe that, if mobile phone is introduced appropriately, it can be a useful tool for development. Mobile technology is being used in rural phone networks for telemedicine, small business development, market trading and farming, and humanitarian aid and community services. Cellular penetration has been reached 3.7 billion and it is estimated that over fifty percent of the world's population owns a mobile phone and that cause eighty percent of the world's population that live within the range of a cellular network by the end of 2008 (Bhavnani, 2008). About 1.2 million new GSM connections are installed and nearly 7 billion messages are sent in every day, which is acknowledgement of both cell phone popularity and cost efficiency.

Telecommunication sector is the largest industrial sector in the world accounting for 1.6 percent of the global economy in 2006 and mobile operators have spent more than \$234 billion for building GSM and 3GSM networks since 2002 and Annual mobile advertising expenditures will be \$14 billion in 2011 (Wireless Intelligence, Q4 2007). Sale of handsets alone has amounted to US\$136 billion worldwide in 2006 and this sector has seen unprecedented growth in recent years. Only Nokia 1100 has been sold more than 200 millions around the world (Consumer International, 2008).

Mobile phones substitute for fixed lines in less developed economies and are playing the same crucial role that fixed telephony played in the richer economies in 1970s and 1980s. After the emergence of mobile phone technology, the mobile phone has influenced almost every aspect of social life, for example the mobile phone culture, everyday mobile phone usage, mobile phone courtesy, mobile phone use by the youth, gender difference in mobile phone usage, and political use of mobile phones, many scholars focus on the social role of the mobile phone as the 'fifth media', following newspapers, radio, television and the Internet. The benefits of telecommunications in enhancing the welfare of families and society are well recognized. Telecommunications also allows better access to services that enhance a society's health and wellbeing such as healthcare and social services (Lane, 2006). It is used both for maintaining a hierarchical relation within the family and also providing a sense of security and emotional support (Bell, 2005). Farmers are using mobile phones to ensure the best prices for their crops, small-scale entrepreneurs are contacting potential clients, and grandparents are talking to their children and grandchildren hundreds of kilometers away (IDRC, 2003). Mobile telephony is not, as is sometimes claimed, a "frivolous luxury" or "a rich man's toy" but an important business and social tool, allowing users to conduct their affairs with greater efficiency and lower.

The most important feature of a cellular phone is its portability where the call is made to a person and not to a place. Poor and rural populations benefit most from mobile

telephony because they are least likely to have alternatives and rural people are thankful to the modern technology which made the communication much more easier and cost-efficient. In the beginning of cellular service in the world especially in the developing world, cell phone was considered as something luxury and took as a status symbol but after the realization of its importance in social cohesion and economic activity generator, now it has become the essential part of life. It has reshaped both social and business contacts. It has become the central axis around which the lives of entrepreneurs revolve. It sets and structures their daily life routine with wake-up rings, agenda alerts, 24-hours calls, Tricky uses in business bargaining, Performing business management tasks, Self-management, SMS and news feeds. It brings the business office to the home, blurs the private life with the business operations, disturbs family dinners with customer relations, and encroaches on vacation trips (including writing numerous holiday greetings). In essence, the artifact becomes the ‘magic wand’ par excellence (Mei & Yun, 2008). The features available on mobile handsets, such as caller identification, voice mail, call forwarding, call waiting and the facility of receiving and transmitting short text messages, data, and graphic with nominal charges is worth living.

Both poverty and lack of information are mutually interrelated. Deployment of mobile phones does have a multi-dimensional positive impact on sustainable poverty reduction. The dissemination of information together with serving rural areas has double anti-poverty imperative. It can raise positive aspects as levels of education, efficiency, health, sense of security, and improves family and social cohesion (Bhavnani, 2008). Mobile telephony is highly valued by the poor as a tool for strengthening social ties and for increased personal security, and that it is beginning to prove useful for enhancing business and employment opportunities (Galperin, 2007).

Mobile phone calls reduce the transaction costs and saves time when users are on trips, thus telecommunications infrastructure effectively lowers transaction costs in various markets and contributes to the macroeconomic growth (Norton, 1992). Mobile phones are quickly becoming an affordable, germane, and accessible tool to improve the livelihoods of individuals and groups in developing countries. Digital wireless phones have great potential to bridge the gap between the “haves” and the “have-nots”, given their accessibility, affordability, and fast infrastructure implementation. It is often informally shared between several people in the community, due to a strong culture of sharing communication tools. This gives way to a multiplier effect, as the impact of a single phone is spread out across several individuals, or even an entire community (Sinha, 2005).

This paper is arranged as follows. Section 2 describes the literature review on the topic. Profile of cellular phone industry is given in section 3. Data sources and methodological issues are addressed in section 4. Section 5 reports the results and discussion. Finally conclusion is given in the last section.

II. Literature Review

Although many studies have been undertaken internationally but least attention has been given on this issue in Pakistan. Cohen (2001) observed that telephones were not luxuries or mere convenience but rather essential business tools that could dramatically improve the productivity of poor Bangladeshis. According to author, Grameen telecom expanded their network to 4543 villages out of 65000 in 2001, which changed the

economic and social status of poorer villages dramatically. Above Eighty percent of village phone used for discussing financial issues like information about market price, market trends and currency exchange rates, remittances from family members living in big cities of Bangladesh or overseas and by farmers to get good price information from middlemen. Author estimated that each village phone operator earns on average a net profit of \$ 4.80 per week which is nearly twenty-four percent of average household income. Ninety Five percent of total village phone entrepreneurs are women, which show the maximum impact of phone on the gender issues. Social problems like emergency call for health or to government in flooded situation are very much important for poor people. Rural families use it to share their physical and economic issues with overseas family members also.

Robert Mourik (2003) studied that, mobile phone has a significant impact on UK economy as it increases its GDP up to £5 billion and employment impact is 160,000. Public mobile generates £8,200 million in benefits for the UK economy. Author concluded that social benefits are equally stronger when above eighty percent people in a survey say that it gives peace of mind for loved ones' safety, increase own personal safety, it organizes social life, and forty percent considered that it is more productive at work. The young people consider that mobile changed their lives, making it easier to communicate with others at any time and in any place. Safety, security and emergency use of mobile phone is another benefit as they feel safer and more secure and approximately 80-100 lives are saved in a year in UK through making an emergency call to the ambulance for its early arrival.

Frost & Sullivan (2006) studied in their comprehensive survey report of 800 mobile phone users in four (Argentina, Brazil, Colombia and Mexico) Latin American countries where the socio-economic impact of mobile phones on rural, semi rural people is worth living. Throughout the region, the different mobile operators have invested over 16,000 million dollars in the last four years with 2.5 percent of all capital investment, twenty percent of total FDI and this cause over 2.3 million inhabitants work directly or indirectly and mobile operators have contributed with over 11,000 million dollars through different existing taxes. Translated into growth of the GDP for Latin American countries, ten percent of the mobile penetration increase represents 0.3 percent annual growth in addition to the GDP.

The authors concluded that cell phone has become the essential part of a common person especially for their social lives as they admit that it has enhanced their social cohesion, communication with their relatives and family members in the same location. The mobile phone has reached to 86.1 percent which is 68.1 percent higher before the introduction of mobile phone, while for Relatives/friends that live far away 74.7 percent and 68.3 percent respectively. Mobile phones bring 39.8 percent improvement in emergencies contacts. Health/doctor service improved by 40.8 percent, whereas 67 percent people feel more secure in case of an emergency and 52 percent feel more informed,

MTC Report (2006) analyzed that telecommunication and liberalization of this sector contributes significantly towards Arab countries economy and particularly their people. In Morocco, the results of competition were stunning, as penetration rose from just over one percent in 1999 to 38 percent in 2005 while Mobile penetration in Bahrain

increased from 64 percent in 2002 to exceeding hundred percent in 2005 which lead to five percent of the increase in GDP. In Jordan, the number of employees in the sector increased markedly over the Four-year period – a growth of 42 percent – that illustrates how mobile liberalization has spurred employment. The ratio of mobile penetration to fixed line penetration was 365 percent for Jordan, 343 percent for Bahrain and 775 percent for Morocco that show the popularity and efficient use of mobile phone in the region. It can easily compare with Egypt’s telecom sector (duopoly market structure) with pricing heavily regulated by the government. With 12 million subscribers this sector provides only 4000 jobs, contributes 4.05 percent share to GDP, gives 16 percent penetration rate and results net profit Margin as 21.3 percent.

Kushchu (2007) examined the role of mobile phone in 6 countries, Brazil, China, India, Korea, UK and Lithuania, with using 6 ”c” method (Connection, Convenience, Charisma, Companionship, Care & Culture). Brazil got social benefit through rural development, improving personal communication, strengthening family connections and increasing sociability .For India mobile phones have become a tool for the poor rather than making a popular perception that cell phones are associated with the rich. Korean society is enjoying its social benefits at individual and national levels in terms of economy, politics, culture, education and entertainment. Lithuania acquired desire of freedom and personal independence of having control over life, whether it’s work or leisure. In UK mobile phone is a source of intra-family communication, security guardians for most youngsters, adult women and aged people

The economic impact of mobile phone growth for both country and the individuals’ level is very rich for all these countries. Annual FDI in the mobile phone industry in India is 17,756 million while Korean exports of mobile phones were worth 2.2 billion dollars in August 2006. In the UK 46.5 percent, of people use their mobile phone as part of their job. In Brazil, there were 9 millions of downloads each month in 2004, which accounted for a total revenue of around US\$ 100 million. Beijing Recruitment Center launched the service of applying for jobs on mobile, there have been 20,000 job seekers subscribing it.

Finally it is concluded that the impact of mobile phone growth has significant positive effects on the economy and society in all over the world.

III. Profile of Cellular Phone Industry in Pakistan

Pakistan is also in line with the rest of the world in growth of cellular phone industry. Mobile services in Pakistan were started in the late nineties. Licenses for operating cellular mobile service in Pakistan were awarded to M/S Pakcom Pvt. Ltd. (Instaphone) and Paktel simultaneously in 1990. Both the companies were using same Analogue Mobile Phone System (AMPS) technology. Mobile technology being new in the country and heavy taxes made mobile phone definition “something luxury and for status symbol”. However the regulatory push as well as other fundamental changes, like introduction of Calling Party Pays regime (CPP), reduction in taxes and Mobilink coming on telecommunication scene of the country, introducing the new global mobile system (GSM) technology gave mobile users a choice to switch over from AMPS to GSM. Major changes in the mobile industry of Pakistan came in the form of operator competition, call rates reduction, and additional value added services, however took place

with the introduction of 4th mobile operator (public sector company) U-Fone by the incumbent PTCL in 2001.

Pakistan cellular industry has got sustainability as 5th cellular operator and world's 7th largest cellular operator "Telenor" started their operation in March 2005. That was the first time when foreign direct investment was made from the European side. Last but not the least Warid also took active part in diffusion of cell phone immediate after Telenor in May 2005. Network coverage of almost ninety percent of the total population of Pakistan has made mobile industry even more attractive for foreign investment (PTA, 2007).

Growth of cellular phone industry in Pakistan is as marvelous as in developed countries and especially in star Asian countries. The cellular industry reached to 89,325,296 subscribers in July 2008 from just 306493 connections in 2000. That not only changed the penetration rate from 3.66 (1.66 percent mobile phone) per 100 in 2001-02 to 49.91(42.6%) per 100 in 2006-07 but also changed the concept about cell phone "A Luxury Thing" to "A Necessary Devise".

Success of the telecommunication industry especially cellular industry of Pakistan has changed the economic and social conditions of the country. At country level, Mobile sector contributed, a total of Rs. 312 billion to the economy in 2006, representing more than five percent of GDP. Mobile communication in Pakistan has raised GDP growth rates by 0.12 percent for each one percent increase in penetration. Resultantly, an increase of about 28 million in subscribers between 2005 and 2006 has contributed 1.7 percent to the country's GDP growth (Deloitte, 2006). Approximately 2,718.7 Million US\$ were invested in cellular industry in 2006-07. Telecommunication industry was the biggest sector for foreign investment 1824.2 million US\$ (35 percent of the total) in 2006-07 and great part went to cellular operators, During 2007 mobile segment contributed more than Rs. 66.41 billions to national exchequer in the form of taxes which is more than 70 percent (100 billion) of total telecom contributions. In 2006, total activation tax paid by mobile sector was Rs. 11.4 billion, which grew to Rs. 17.6 billion, showing a growth of 24 percent whereas withholding tax paid by the sector grew from Rs. 8.5 billion to Rs. 17.4 billion showing almost hundred percent increase. About 1,366,698 people were engaged in telecommunication sector till 2006-07 in which 743,025 were direct or indirect part of cellular industry and cellular operator earned Rs.133,132 million in 2006-07 (PTA 2007).

The cell phone industry has created socio-economic awareness among the users in changing their life style, in improvement of their business related activities, saving time on intercity trips and local visits and ultimately save money and increase in their sales and income. The use of mobile phone on average made 35 percent increments in the sales of individual businessmen. Use of mobile phone has also increased the access to medical, financial and other services. It also improved family cohesion and elevated women's role (PTA 2007).

IV. Source of Data and Methodology Issues

Statement of the Hypotheses

After presenting the review of some significant studies, it is hypothesized that using cell phone has positive impact on socio-economic variables. Since cell phone is

playing its part more than an electronic device, it has not only changed social and economic life of its users but has also changed the whole scenario of the communication. We choose to limit our study to 17 dependent variables as proxies of socio-economic characteristics with a single independent variable (Cell Phone use) in order to observe the impact of cell phone usage. The detail list of variables is given in table 1.

Table 1 List of Selected Variables

Variable	Variables' description	
EXPLANATORY VARIABLE		
CPU	Cell Phone User	=1 if the Respondent have cell Phone =0 if the Respondent have not cell Phone
DEPENDENT VARIABLES		
USG	Usage	= 1 if there is usage impact on respondent = 0 if there is no impact
LLP	Land line phone	= 1 if Respondent have Lined Line Phone = 0 if Respondent not have Lined Line Phone
SAT	Save Time	= 1 if save time = 0 in not save time
SAM	Save Money	= 1 if save money = 0 if not save money
RET	Reduced Traveling	= 1 if Reduced Traveling = 0 if not Reduced Traveling
IOI	Impact on Income	= 1 if Impact on Income = 0 if no impact on income
WEF	Work Efficiency	= 1 if work Efficiency improve = 0 if no impact
STR	Save Transportation	= 1 if Save Transportation = 0 if not Save Transportation
CSA	Customer Satisfaction	= 1 Customer Satisfaction Increase = 0 no change in Customer Satisfaction
FTR	Financial Transaction	= 1 if improve Financial Transaction = 0 if no change in Financial Transaction
DCM	Decision Making	= 1 if impact on decision making = 0 if no impact on decision making
JOS	Job Searching	= 1 if Source of Job Searching = 0 if no impact on Job Searching
SOB	Sociability	= 1 if improve in sociability = 0 if no impact on sociability
FCO	Family Cohesion	= 1 if source of family cohesion = 0 if no change in family cohesion
ACC	Accessibility	= 1 if its easy source of accessibility = 0 if no impact on accessibility
IOR	Impact on Responsiveness	= 1 if impact on responsiveness = 0 if no impact responsiveness
ETE	Entertainment	= 1 if source of entertainment = 0 if no source of entertainment

Sources of the Data

To analyze the socio-economic impact of cellular phones growth in a less developed district like DG Khan of Punjab province, primary data set is used. A sample of 300 respondents is drawn with the following steps.

- i. District DG Khan has been divided into three tehsils (DG Khan with population 1543125, Taunsa Sharif 431006 and tribal area with the population of 153869).
- ii. It has been further divided into rural-urban form as DG Khan has 296327 urban based populations in 8 Union Councils (UC), Taunsa Sharif has 87467 urban population while tribal area is totally rural based.
- iii. Sampling is drawn from the total population as per tehsil level and also from the rural and urban populations based on stratified random sampling and simple random sampling techniques.
- iv. Minimum ten percent of females are interviewed for better assessment.
- v. One-third respondents were those who have not their own cell phones to check the comparison impact of “have” and “Have not” cellular phone.

Logit Regression Model

In this study, Binary Logit econometric model is used to examine the impact of cell phone on various socio-economic variable groups in terms of binary characteristics.

As the generalized form of our equation can be written as;

$$L_i = \ln (P_i/1-P_i) = \beta_1 + \beta_2 D + u_i$$

Where,

D = Explanatory variable in terms of Binary variable, A respondent having cell phone = 1 otherwise = 0

L_i = Dependent binary Variables (Proxies of socio-economic characteristics of respondents)

β_1 = Coefficient of Intercept

β_2 = Coefficient of Explanatory Dummy Variable

u_i = Stochastic error term, $i = 1, 2, 3, \dots, n$

n = Number of observation ($n=300$ in our sample)

The empirical results are obtained by making estimations in pair-wise regression in which explanatory variable (having cell phone) remained the same and dependent variables are changed.

V. Results and Discussion

The means of communication have changed with the advancement in telecommunication system, particularly with the expansion of mobile phone. Before the cell phone, PTCL was the leading partner with twenty-nine percents and followed by PCO with twenty three percent. Most of rural people (except two percent) have no access to both the facilities (PTCL & PCO) that’s why they used to travel themselves or send messengers, but now the situation is totally different as 94 percent respondents (282/300) depend directly or indirectly on cell phone communication and nearly 42 percent admit that their dependency rate is between 75-100 percent on cell phone. Dependency rate of rural people of DG Khan Tehsil, Tounsa and entire tribal areas is much higher than urban.

The results of Logit regression estimations are reported in table 2 and show that cell phone usage has significant and positive impact on all economic variables of urban-based sample at 1 percent level. According to the results, usage of cell phone increases financial transactions of the respondents. It is statistically significant at 1 percent level and having odd ratio more than 1 which confirms positive impact of cell phone on financial transaction of urban people. Due to less availability of fixed lined phone and

very costly alternative sources like PCO (public Call Office) and self-visit, cell phone has changed the way of financial transaction. Now from a hawker to an executive businessman can easily settle their financial transactions. The use of cell phones increases work efficiency of the respondents. In the busy urban life, everybody likes to do work with great efficiency. These people didn't want to waste their time in their business-related activities like making visit for dealing, transaction and making deliveries. The use of cell phone is the cheapest and easiest way to do all this and give opportunity to concentrate on your work more efficiently. The use of cell phone is a real business creating sector especially for urban people. Many users of cell phone related with markets in a single city acknowledge the income-generating sector for both ways of direct and indirect business activities. Customer satisfaction level has been improved due to using cell phones of different business related people. Now cell phone has become the main and single way to keep in touch for both customers and clients. Transportation cost has been reduced due to cell phone dealing and placing orders. Another result shows that decision-making is also improved as the cell phone used has been improved. The use of cell phone improves the ability of urban people to make the decision more efficiently with keep in touch with the current situation of local business market. Cell phone is proved to be a good source of job searching and job creating.

The empirical analysis based on social variables of urban respondents is reported in table 3. These results are very impressive and as per expectations. The use of cell phone has significant and positive impact on two social variables named SOB (Sociability) and FCO (Family Cohesion). In case of both variables, cell phone usage is significant at 1 percent level and odd ratios are more than 10 which show strong impact of cell phone on sociability and family cohesion. In the busy city life cell phone is consider as a blessing to keep a regular touch with friends and other family members out of city. It is empirically proved that cell phone usage saves time and reduces traveling. In other words, cell phone reduced the traveling and is a good source of saving time in the form of meeting with friends and family members within the city and outside the city even abroad. They use cell phone for regular connections with each other, which decrease the wish to meet each other. Dependency rate of cell phone is increasing as the cell phone coverage is extending from big cities to small villages. Cell phone is easiest and cheapest way to get entertainment that's why people are getting used to for using it as sources of entertainment. The results also show that cell phone has positive impact on ACC (Accessibility) and IOR (impact on responsiveness). These variables are not significant but still their odds ratios are higher than one which conform the positive relation of cell phone and accessibility and responsiveness. Cell phone has negative relation with LLP (Landline Phone) as per expectation and remains only within the premises of well-established family as status symbol.

Table 2 Bi-variate Logit Regression Results Based on Urban Sample (Economic variables)

Explanatory Variable	SAM	IOI	WEF	STR	CSA	FTR	DCM	JOS
Constant	-1.56 (-4.01)	-0.73 (-2.31)	-2.35 (-4.49)	-0.73 (-2.31)	-1.28 (-3.58)	-3.81 (-3.77)	-1.28 (-3.58)	-1.56 (-4.01)
CPU	2.41*** (5.44)	1.04*** (2.79)	3.25*** (5.75)	1.24*** (3.31)	1.96*** (4.74)	3.96*** (3.85)	2.05*** (4.93)	1.91*** (4.37)
Odd Ratio	11.19	2.82	25.90	3.44	7.10	52.50	7.75	6.74
N	150	150	150	150	150	150	150	150
Overall significance test (G)	37.75	8.15	55.56	11.58	26.49	46.02	28.85	23.43
Log-likelihood	-84.61	-99.89	-76.07	-97.84	-90.51	-76.59	-89.06	-91.77

Table 3 Bi-variate Logit Regression Results Based on Urban Sample (Social variables)

Explanatory Variable	SAT	RET	SOB	FCO	ACC	USG	IOR	ETE	LLP
Constant	-1.55 (-4.01)	-1.55 (-4.01)	-0.93 (-2.84)	-0.93 (-2.84)	1.71 (4.18)	-1.28 (-3.58)	0.08 (0.29)	-1.04 (-3.10)	-0.26 (-0.88)
CPU	2.28*** (5.16)	2.19*** (4.98)	2.49*** (5.98)	2.71*** (6.30)	0.06 (0.13)	1.51*** (3.70)	0.26 (0.74)	2.19*** (5.39)	-0.20 (-0.58)
Odd Ratio	9.78	8.97	12.13	15.06	1.06	4.54	1.30	8.95	0.81
N	150	150	150	150	150	150	150	150	150
Overall significance test (G)	33.74	31.24	41.70	47.46	0.016	15.67	0.54	33.54	0.33
Log-likelihood	-86.97	-88.33	-75.30	-70.29	-62.52	-95.47	-102.36	-83.76	-100.78

Note: *** Indicate that coefficients are significant at 1 percent level.
 ** Indicate that coefficients are significant at 5 percent level.
 * Indicate that coefficients are significant at 10 Percent level.

Table 4 Bi-variate Logit Regression Results Based on Rural Sample (Economic variables)

Explanatory Variable	SAM	IOI	WEF	STR	CSA	FTR	DCM	JOS
Constant	-0.75 (-2.42)	0.04 (0.15)	-0.30 (-1.02)	-0.47 (-1.59)	-0.47 (-1.59)	-1.44 (-3.89)	-0.66 (-2.15)	-0.85 (-2.69)
CPU	2.45*** (5.91)	0.46 (1.30)	1.28*** (3.48)	1.31*** (3.58)	1.22*** (3.35)	0.68* (1.61)	1.35*** (3.63)	1.35*** (3.58)
Odd Ratio	11.60	1.59	3.62	3.74	3.42	1.99	3.87	3.87
N	150	150	150	150	150	150	150	150
Overall significance test (G)	40.23	1.68	12.51	13.34	11.66	2.78	13.99	13.79
Log-likelihood	-73.91	-99.45	-92.32	-94.28	-95.87	-87.55	-95.06	-96.95

Note: *** Indicate that coefficients are significant at 1 percent level.
 ** Indicate that coefficients are significant at 5 percent level.
 * Indicate that coefficients are significant at 10 Percent level.

Table 5 Bi-variate Logit Regression Results Based on Rural Sample (Social variables)

Explanatory Variable	SAT	RET	SOB	FCO	ACC	USG	IOR	ETE	LLP
Constant	-0.66 (-2.15)	-0.85 (-2.69)	0.12 (0.44)	0.12 (0.44)	2.37 (4.54)	-0.21 (-0.73)	1.07 (3.20)	-0.21 (-0.73)	-1.44 (-3.89)
CPU	2.28*** (5.62)	1.52*** (4.00)	2.20*** (4.85)	2.34*** (4.99)	0.09 (0.16)	1.40*** (3.75)	1.54*** (3.01)	0.96*** (2.67)	-0.58 (-1.22)
Odd Ratio	9.80	4.58	9.09	10.45	1.10	4.08	4.70	2.63	0.56
N	150	150	150	150	150	150	150	150	150
Overall significance test (G)	35.50	17.35	26.54	28.91	0.02	14.49	9.44	7.24	1.44
Log-likelihood	-76.28	-94.63	-62.92	-60.60	-41.80	-88.22	-52.27	-96.90	-60.02

Note: *** Indicate that coefficients are significant at 1 percent level.
 ** Indicate that coefficients are significant at 5 percent level.
 * Indicate that coefficients are significant at 10 Percent level.

To examine the impact of cellular phone on economic variables in rural areas, the results are reported in table 4. The estimation of economic variables shows that out of eight variables, six are significant at one percent level. The empirical results show that rural people are saving sufficient amount of money due to cell phone usage. They can travel less and save transportation with the cell phone usage. The odd ratio is very high which confirms the strong positive relation with the cell phone use. The cell phone usage has positive but insignificant impact on their personal income (IOI) which is expected and acceptable because the rural people have not enough opportunities to build a business and to use the cell phone as source of income. Another significant result states that people are able to save extra transportation cost with the help of cell phone usage. Cell phone is also positively related to customer satisfaction (CSA) as people are now easily accessible to their broker and contacting people in their businesses. Cell phone has significant impact on FTR (Financial Transaction) of rural people. It is significant at 10 percent level which is again understandable because of less economic activities of rural people as these people have the agriculture products which become mature six months later. Cell phone has enough impact on decision making of rural people as they can make decision without wasting time and they are able to receive enough information of local market quickly and can decide what to do. Job searching and possibility of doing job any where any time has been expanded due to cell phone usage and availability.

The results with reference to the impact of cell phone on social variables are reported in table 5. These empirical findings on social variables of cell phone usage of rural people show the extra ordinary results as all the variables except on ACC (Accessibility) and LLP (Landline Phone) are significant at 1 percent level and three of them have odd ratios more than nine which shows that cell phone has strong impact on the social lives of rural people. The result shows that cell phone has positive impact on time saving variable. Rural people have to travel very long to get the benefits of big city. Cell phone has decreased their traveling and has saved lot of their time. The impact of cell phone on sociability and family cohesion is significant at one percent level as rural people have not enough sources to keep regular contacts with their family members and friends out of city and especially out of country. Sources other than cell phones are very costly and inconvenient and with the portability of cell phone, it has made things very

easy and convenient as shown from their level of significance and odd ratio. Due to this mean of communication usage dependency rate of cell phone is very high and impact on responsiveness is equally important for rural people as they have combined family system and they have to re-act all the condition of sorrow and happiness. As cell phone is only single electronic device (no internet, video game and music center) it is widely used for personal entertainment other than just making phone calls in rural areas. Cell phone usage has negative impact on landline phones and has inverse relation as per expectation because rural people have approximately nothing in the form of other way of communication like fixed line phone etc.

VI. Concluding Remarks

The salient features of cell phone are playing their role more efficiently than these are normally considered. The usage of cell phone other than calls such as looking time, listening alarm, sending SMS, seeing calendar and using calculator has made it a multidimensional device. A large number of users having concept of missed-call to convey their messages without bearing any expense what so ever. More than half (50 percent in rural and 70 percent in urban areas) reported that they send/receive messages (SMS). On an average, 6 messages are sent in a day which is the ever cheapest way of conveying message to the desired person. Half of the respondents have a view that it was a good sourcing of entertainment due to its extra functions other than phone calls making/receiving, 29 percent take help or use mobile phone for sports/entertainment activity and 22 percent use it to get current sports updates.

Traveling was the core issue in this district with especially scattered population all along its boundaries. Almost half of the total respondents (143 out of 300) admit that mobile phone has reduced their both form of traveling (within the district and other districts). More than 58 percent of respondents state that cellular phone is becoming the source of earnings. Improving work efficiency, customer satisfaction, better communication with employees and subordinates, in rural areas, it is the only way of communication for remittances dealing especially for persons working overseas. Half of the respondents showed their intention that cell phone is the main source of employment in these days. It creates job in the form of vendors, security guards, engineers, sales man, franchise offices, and executive offices and at the same time activities like cell phone repairing, maintaining, reselling business, ring tones downloading etc are also in progress.

Social aspects of cell phone usage in the district are very significant as it was expected. It is that main source of family cohesion, access to doctor or police and playing very important part in solving day-to-day problems. Most the respondents strongly admit that cell phone is playing important role in their social lives. Respondents of the rural areas are benefited more than the urban because cell phone is not used just for communication but it is also the main source of information of local market, nationwide changes in political and economic conditions and changes at international level also. More than two-third of the respondents believe that women's say in family affairs has increased to almost 50-70 percent due to access cell phone. These people believe that cell phone has made the people very conscious about their relatives and it is the simple and more importantly cheapest way to exchange information about safety and security of each other. More than half of the respondents are sure that cell phone is now 70-100 percent important in the safety and security of common men generally and rural men especially.

About 85 percent of the respondents strongly admit that cell phone is very important in emergency, two-third believe that it has improved access to doctor or health care personals, 81 percent view that it is the source of act in emergency, 58 percent think that it is quickest way to contact police in any mishap and 80 percent say that it is very easy and cheapest way to inform someone illness or death.

The overall impact of cell phone can be seen through in terms of what has happened in their life style. It is believed to be the cheapest way of communication, easy to access someone, easy to contact in emergency, facility as a source of saving time and money due to less traveling, means of contact to family and friends, and so on. The overwhelming response of respondents suggests that cell phone has strong impact on their lives both economically and socially.

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