Indian Management Studies Journal 19 (2015) 155-166

Indian Management Studies Journal

Determinants of Internet Access in Kumaun Region of Uttarakhand and the Implications for Universal Service

Rajeev Kandpal* and N. S. Bisht**

* *Deptt. of Management, Kumaun University, Nainital*

** *Deptt. of Management, Kumaun University, Nainital*

Abstract

Provision of broadband connectivity to rural and remote areas of the country offers a unique opportunity to empower local communities. However, as the use of internet becomes widespread, non-participation may lead to further social exclusion of specific segments. Accordingly, Universal Service Fund strategies need to carefully address the issue of differentials in broadband access amongst various segments of the population.

Results from a survey conducted in Kumaun region of Uttarakhand (India) show very poor levels of usage of the personal computer/internet/email. The study finds that capability to use the PC/internet/email is associated with education level, income, age as well as type of locality (Urban/Rural), but not with gender.

We recommend adoption of a direct subsidy USOF program to support the internet services at all government recognized schools and colleges. USOF support may also be considered for the supply of internet access devices in less profitable and rural areas. The development of Internet Kiosks providing web-browsing and allied services needs to be prioritized as a key area.

Key Words

Universal Service Obligation, Telecommunication, Subsidies, Broadband, Internet, E-mail

INTRODUCTION

The National Telecom Policy announced by the Department of

Telecommunications in 2012 aims to enable both the rural and urban citizens of India to participate in the Internet and web-economy for equitable and inclusive development across the nation. The vision, as stated in the document, is to provide secure, reliable, affordable and high quality converged telecommunication services anytime, anywhere for an accelerated inclusive socio-economic development (Department of Telecommunications, 2012).

OBJECTIVES

This study aims to study the usage characteristics relating to the PC/ Internet/Email in the Kumaun region of Uttarakhand. The objective is to analyze how the various demographic variables influence the (a) capability to use, and (b) usual points of access to these technologies, so as to make recommendations on USOF support for provision of broadband connectivity to rural & remote areas.

DATA COLLECTION AND METHODOLOGY

This paper presents the results related to usage characteristics of personal computer (PC), internet and email of a wider study based upon data collected from 2026 respondents from the four districts of Almora, Bageshwar, Nainital and Pithoragarh in Kumaun division of Uttarakhand. Primary data was collected through a validated questionnaire schedule which probed the respondents about their capability to use, usage characteristics and usual place of access for internet and email. Extensive literature survey was done regarding surveys undertaken on telecommunication usage characteristics, user needs and preferences in various parts of the world. For developing the questionnaire, a number of questionnaires earlier used by various studies provided useful reference point.

As part of the sampling strategy, it was decided to interview approximately 500 individuals in each of the four districts under study. In order to ensure that samples are collected from diverse locations within a district, care was taken to ensure that –

(a) Each of the development-block within the district is represented in the sample, as far as possible, in equal proportions. This measure ensured that locations chosen in each district were diverse and the impact of location-specific factors (e.g. the predominance of a particular economic activity, etc.) was minimized.

(b) Within a district, approximately equal numbers of samples are drawn from urban and rural locations. This enabled a meaningful comparison of urban and rural usages/ preferences, which was seen as highly relevant to the study since the present universal access policies in India segment population solely on the basis of rural/urban criterion.

The selection of the four districts, namely Almora, Bageshwar, Nainital and Pithoragarh was influenced by a number of criteria. For purpose of field work, it was

considered desirable to select districts with varied socio-demographic characteristics, in order to facilitate comparison of usage characteristics amongst populations residing in different areas. Study of areas differing from each other permitted comparative analysis to be introduced in the research design, thus enabling identification of causative factors behind observed differences and more rigorous hypothesis testing. The districts were selected so as to provide numerous demonstrable examples of differences in terms of –

- Type of locality (Rural/ Urban)
- Terrain (Hilly/ Plain area)
- Level of telephone service coverage (single/multiple service providers and technologies)
- Accessibility of the locality (motorable/ non-motorable etc.)

Selection of Nainital district was influenced by the factor that it provided an opportunity to make a comparative study of hilly as well as plain areas, since it has rural and urban centres in both the terrains. Including Bageshwar and Pithoragarh districts in the field of work enabled study of remote areas, where communities living in non-motorable locations without any telephone service coverage could be surveyed. Almora district was included since it has two major hilly urban centres (Almora and Ranikhet).

STATISTICS AND RESULTS

Capability to use telecommunication devices

It is seen from Table 1 that whereas an overwhelming majority of the respondents considered in the research study can operate the cell phones as well as landline phones, only a minuscule percentage of respondents reported the capability to use a personal computer / internet / email. Not everyone capable of using the computer has the capability to use internet / email.

Table 1

Capability to Operate Telecommunication Devices

	Percentage of Respondents (n = 2026)
Landline Phone	88.10%
Cell Phone	93.93%
SMS	65.05%
Personal Computer	33.17%
Internet	27.79%
Email	27.15%

The district-wise analysis of the capability to use various communication devices (Table 2) reveals that except the respondents of Nainital region, a very small

number of respondents in other districts reported the capability to use personal computer, internet and emails. The higher figures in respect of Nainital district may be explained due to the higher income and service coverage levels in the area. Accordingly, it may be concluded that the usage of internet and emails is found to be very little in the selected regions of Uttarakhand.

Table 2

District-wise Capability to Use

	Almora	Bageshwar	Nainital	Pithoragarh
Landline Phone	450 (89.5%)	364 (74.3%)	439 (90.9%)	532 (96.7%)
Cell Phone	467 (92.8%)	441 (90%)	474 (98.1%)	521 (94.7%)
SMS	302 (60%)	227 (46.3%)	414 (85.7%)	375 (68.2%)
Personal Computer	130 (25.8%)	70 (14.3%)	401 (83%)	71 (12.9%)
Internet	93 (18.5%)	49 (10%)	375 (77.6%)	46 (8.4%)
Email	87 (17.3%)	46 (9.4%)	374 (77.4%)	43 (7.8%)

Table 3 depicts the capability to use communication devices for different age categories. Whereas little variation is seen across the age groups in respect of the capability to use the landline and mobile phones, the variation is remarkable in respect of SMS, Personal Computer, Internet and E-mail, the. For instance, it is seen that 48.8% of the respondents below 25 years of age could use the internet, as against only 12.11% of respondents in the age group of 45 years and above.

Table 3

Age-wise Capability to Use Communication Devices

Percentage of Respondents (n = 2026)

	Less than 25 years (n=346)	25 to 34 years (n=608)	35 to 44 years (n=502)	45 years and above (n=570)
Landline Phone	89.31%	92.60%	90.24%	80.70%
Cell Phone	98.27%	97.70%	95.02%	86.32%
SMS	84.97%	77.80%	65.54%	38.95%
Personal Computer	53.47%	40.30%	29.68%	17.37%
Internet	48.84%	35.86%	21.31%	12.11%
Email	47.40%	35.20%	21.12%	11.58%

Determinants of Capability to Use Communication Devices

The relationship between the capability to use communication devices and the demographic profiles of the respondents (e.g. gender, income, location, age and education level) is further analysed in order to determine the influence of a demographic factor on the capability to use. The Chi-square test is applied to test the null hypothesis that there is no association of the demographic factor with the capability to use a communication device. The results of the Chi-square test are shown in Table 4.

Table 4

Influence of Demographic Factors on the Capability to Use PC/Internet/Email

Variable	Capability to use		
	PC	Internet	Email
Gender			
Male	529	430	418
Female	143	133	132
Chi-Square Statistic (P Value)	2.183 (0.140)	0.062 (0.804)	0.239 (0.625)
Cramer's V Statistic	0.033	0.006	0.011
Monthly Income			
Less than Rs. 5000	53	43	40
Rs. 5000 to Rs. 9999	80	52	50
Rs. 10000 to Rs. 19999	160	121	117
Above Rs. 20000	379	347	343
Chi-Square Statistic (P Value)	381.63 (0.000)	398.4 (0.000)	402.858 (0.000)
Cramer's V statistic	0.434	0.443	0.446
Location			
Rural	206	150	145
Urban	466	413	405
Chi-Square Statistic (P Value)	183.96 (0.000)	201.22 (0.000)	199.16 (0.000)
Cramer's V Statistic	0.301	0.315	0.314
Education			
Uneducated	0	0	0
Did not complete Class V	0	0	0
Completed Cl. V but not Class X	11	8	8
Completed Cl. X but not a Graduate	105	73	70
Graduate and above	556	482	472
Chi-Square Statistic (P Value)	708.62 (0.000)	622.303 (0.000)	607.64 (0.000)
Cramer's V Statistic	0.591	0.554	0.548
Age Group			
Less than 25 years	185	169	164
25 to 35 years	245	218	214
35 to 45 years	143	107	106
above 45 years	99	69	66
Chi-Square Statistic (P value)	147.41 (0.000)	176.51 (0.000)	170.76 (0.000)
Cramer's V Statistic	0.27	0.295	0.29

The results demonstrate that –

- In general, a significant association exists between the five demographic factors (gender, income, location, age and education level) and the capability to use PC/internet/email. However, the variable gender presents an exception since no significant association is observed between gender and the capability to use PC, Internet and Email at 95% level of confidence.
- Education level is seen to exert the strongest influence on the capability to use (Cramer's V). As expected, more educated respondents are seen to have better capability to use the PC/internet/email.
- After education, income is the next significant determinant of the capability to use a PC, internet and email. It needs to be kept in mind that education and income may be mutually dependent variables. Further, income also influences the familiarity with various communication devices by affecting their level of ownership.
- The type of location (i.e., Rural or Urban) shows a significant association with capability to use. However, other demographic variables like income and education show stronger association with capability of usage.

Usage of Email and Internet

The respondents were also asked whether they had ever used internet and email. In the overall sample for the four districts, 73% of the respondents reported that they had never used the email/internet.

Except for Nainital district, very poor usage levels are seen in the other three districts. The much higher percentage of email/internet usage seen in Nainital district may be attributed to better telecommunication services in the area as well as the higher income levels in the district.

Usage of Internet / Email – Association with Demographic Variables

In order to study the level of association of usage of email / internet with the age of respondents, the Chi-square test is applied in order to test whether usage of emails and internet is associated with age and income of the respondents.

The Chi-square statistics reveal that usage of internet / email is significantly associated with income level and age of respondents. Respondents from the higher income and lower age groups are more likely to have used the internet and email.

Place of Access for Email / Internet

The responses (Table 5) indicate that the most usual place of access to the email/internet is home. Almost 61% of the respondents who reported having ever used the internet/email (n = 543) indicated so. The second most popular place for internet access is place of work. Private internet cafes are also popular access points. In Almora district, as many as 67.03% respondents reported that it was one

of their access points.

Very significantly, the data connectivity at the village panchayat level seems to be non-functional in the area of study. Only 3 respondents (from Nainital district) indicated the village panchayat as one of the places for internet access.

Table 5

Usual Place of Access for Internet / Email – District-wise Comparison

	Percentage of Respondents (%)				
	Almora (n=91)	Bageshwar (n=45)	Nainital (n=362)	Pithoragarh (n=45)	Total (n=543)
Private Internet Cafe	67.03	8.89	43.92	13.33	42.36
University/College/School	2.20	6.67	20.99	2.22	15.10
Home (Own Phone)	42.86	71.11	62.98	71.11	60.96
Friends/ Neighbour	3.30	15.56	17.13	0.00	13.26
Place of Work	6.59	24.44	57.73	35.56	44.57
Village Panchayat	0.00	0.00	0.83	0.00	0.55

The income-wise comparison of the usual place of access (Table 6) shows that the lower income groups rely much more on private internet cafés for internet access than the higher income groups.

Table 6

Usual Place of Access for Internet/ email – Income-wise Comparison

	Percentage of Respondents (%)				
	Less than Rs.5000 (n=41)	Rs.5000–Rs9999 (n=50)	Rs.10000–Rs.19999 (n=123)	Rs.20000 or above (n=329)	Total (n=543)
Private Internet Cafe	80.49	46.00	47.97	34.95	42.36
University/ College	7.32	8.00	17.89	16.11	15.10
Home (Own Phone)	34.15	54.00	59.35	65.96	60.96
Friends/ Neighbour	2.44	8.00	14.63	14.89	13.26
Place of Work	0.00	26.00	43.09	53.50	44.57
Village Panchayat	0.00	0.00	0.00	0.91	0.55

Reasons for not having Internet Access at Home

83.6% of the respondents (n = 2026) indicated that they did not have internet access at home. Table 7 compiles the reasons furnished for not having internet access at home. 47.37% of the respondents did not feel the need for an internet connection.

Another 15.3% responded that they and members of their household did not know what internet is. These results reflect the poor awareness levels about the internet in the area of study, consequently resulting in little demand for the service. The non-awareness of the internet was much less in Nainital district (3.14%) as compared to Almora (27.86%) and Pithoragarh (15.83%). This relates to the higher internet usage levels seen in Nainital district as compared to other districts (74.95% respondents in Nainital district reported having used it at least once).

Table 7
District-wise Reasons Furnished for not having Internet Access at Home

Reason for not having Internet at Home	Percentage of Respondents (%)				
	Almora (n=464)	Bageshwar (n=458)	Nainital (n=255)	Pgarh (n=518)	Total (n=1695)
You or someone in your household plan to subscribe\ connect in the next six months.	0.86	7.42	4.31	14.67	7.37
You and the members of your household do not know exactly what the internet is.	27.80	8.73	3.14	15.83	15.28
The local area of your household is not covered by a broadband access network.	13.79	3.28	5.10	2.70	6.25
You do not need an internet connection.	75.43	41.48	31.76	34.94	47.32
The cost of buying a personal computer and modem is too high.	15.30	16.16	4.71	3.09	10.21
The interested members of your household have access at work, school or elsewhere and this is sufficient.	3.66	2.62	36.08	3.28	8.14
You or someone in your household is concerned about access to unsuitable content.	10.13	0.00	15.29	0.00	5.07
The installation/subscription cost for the broadband network is too high.	1.72	0.00	14.12	0.00	2.60
Other (Please Specify).	0.00	0.44	1.96	0.00	0.41
Don't know.	10.99	27.95	9.41	34.17	22.42

Table 8

Income-wise Reasons Furnished for not having Internet Access at Home

Reason for not having Internet at Home	Percentage of Respondents (%)				
	<Rs.5000 (n=498)	Rs.5000–Rs 9999 (n=382)	Rs.10000–Rs.19999 (n=419)	Rs.20000 or above (n=396)	Total (n=1695)
You or someone in your household plan to subscribe\ connect in the next six months.	0.60	2.62	7.88	19.95	7.37
You and the members of your household do not know exactly what the internet is.	32.53	15.97	5.97	2.78	15.28
The local area of your household is not covered by a broadband access network.	9.24	7.33	3.82	4.04	6.25
You do not need an internet connection.	60.64	60.21	41.53	24.24	47.32
The cost of buying a personal computer and modem is too high.	14.46	17.80	5.97	2.02	10.21
The interested members of your household have access at work, school or elsewhere and this is sufficient.	2.21	3.40	11.46	16.67	8.14
You or someone in your household is concerned about access to unsuitable content.	4.22	6.02	6.68	3.54	5.07
The installation/subscription cost for the broadband network is too high.	0.80	1.83	5.25	2.78	2.60
Other (Please Specify).	0.40	0.26	0.00	1.01	0.41
Don't know	14.66	19.63	27.45	29.55	22.42

The income–wise analysis of the reasons furnished is shown in Table 8. The awareness of the internet is seen to be higher in higher income categories. Only 2.78% of the respondents in the highest income category reported that they were not aware what internet is, as against 32.53% in the lowest income category. Also, the need felt for the internet was much lower in the lower income categories.

10.22% of the respondents in the overall sample felt that the cost of buying a personal computer and modem is too high. This figure was as high as 14.46% in the lowest income group. These facts indicate that the cost of the personal computer and modem may be a significant barrier to the ownership of internet access at home.

RESULTS AND DISCUSSIONS

Usage of Internet/Email

A significant association exists between the demographic variables of education level, income, location and age and the capability to use PC/internet/ email. However, the variable gender shows no significant association with capability to use PC, Internet and Email.

Very poor email/internet usage levels are indicated in the area of study, with 73% of the respondents reporting that they have never used the email/internet. However, the results for Nainital district are different where almost 75% of the respondents reported having used the internet/ email. Respondents from the higher income and lower age groups are more likely to have used the internet and email.

Place of Access

The place most frequently used to access the email/internet is home, followed by place of work. Private internet cafes are the next popular access points. Further, it is seen that respondents from lower income groups rely more on private internet cafés for internet access than the higher income groups.

The village panchayat is negligibly used for accessing internet in the area of study. Only 3 respondents (from Nainital district) indicated the village panchayat as one of the places for internet access. This is significant, as the USOF has generally focussed on Village Panchayats to provide public access to telephones as well as broadband services.

Reasons for Non-ownership of Internet

47.37% of the respondents did not feel the need for an internet connection. 15.3% responded that they and members of their household did not know what internet was. These results reflect the poor awareness levels about the internet in the area of study, consequently resulting in little demand for the service. The awareness of the internet is seen to be higher in higher income categories. Only 2.78% of the respondents in the highest income category reported that they were not aware what internet is, as against 32.53% in the lowest income category. Also, the need felt for the internet was much lower in the lower income categories.

10.22% of the respondents in the overall sample felt that the cost of buying a personal computer and modem is too high. This figure was as high as

14.46% in the lowest income group. Very few of respondents indicated school/ college/ university as a usual place of access.

RECOMMENDATIONS

From the policy perspective, USOF must consider the preferences and competencies of target population for locating public access facilities. The study finds that despite the lower age groups showing a much higher capability to use the PC, internet and email, a very minuscule proportion has indicated schools/ colleges as usual points of access.

Since the cost of PC and modem appears to be a barrier to adoption of internet, the USOF policies must focus on these issues. One plausible USOF initiative could be encouraging development of low cost computing and access devices suitable for needs of rural population. It is recommended that USOF support may be considered for the supply of internet access devices in less profitable and rural areas.

The lower income groups show more reliance on private internet cafés for internet access than the higher income groups. This study also reveals the non-existent internet access at village panchayat level at least in the area of study. Accordingly, policy interventions should focus on promoting public access through internet cafes.

The very low demand for internet necessitates that the factors for low demand e.g. digital literacy, relevant content, language barrier, purchasing power etc. be examined. Alternate strategies need to be developed for fulfilling informational needs.

Note : This paper has been written for academic purposes and the views and opinions expressed herein are personal. The views and opinions expressed herein should not be ascribed in any form whatsoever to the Govt. of India.

References

Akhtar, S.; and Gregson, J. (2001), Internet Technologies in the Himalayas : Lessons Learned During the 1990s, *Journal of Information Science*, 27(1), pp. 9-17.

Alampay, E. (2006), Analyzing Socio-demographic Differences in the Access and Use of ICT in the Philippines Using the Capability Approach 27(5), *The Electronic Journal on Information Systems in Developing Countries*, 27(5), 1-39.

Bist, R. S. (2007), ICT Enabled Development and Digital Divide : An Indian Perspective, 5th International CALIBER, Chandigarh : Punjab University, Chandigarh.

Chaudhuri, A.; Flamm, K. S.; and Hor, J. (2005), An Analysis of the Determinants of Internet Access, *Telecommunications Policy*, 29, 731-755.

Department of Telecommunications (2012), National Telecom Policy, 2012. Retrieved May 1, 2014, from www.dot.gov.in: http://www.dot.gov.in/sites/default/files/NTP-06.06.2012-final.pdf

Flamm, K.; and Chaudhuri, A. (2007), An Analysis of the Determinants of Broadband Access, *Telecommunications Policy*, 31, 312-326.

Hauge, J. A.; Chiang, E. P.; and Jamison, M. A. (2009), Whose call is it? Targeting Universal Service Programs to Low-Income Households' Telecommunications Preferences, *Telecommunications Policy*, 33, pp. 129-145.

Hudson, H. E. (2004), Universal Access : What have we learned from the E-rate? Telecommunications Policy, 28, 309-321.

LaRose, R.; Gregg, J. L.; Strover, S.; Straubhaar, J.; and Carpenter, S. (2007), Closing the Rural Broadband Gap : Promoting Adoption of the Internet in Rural America, *Telecommunications Policy*, 31, 359-373.

Meitei, S. M.; and Devi, P. (2004), User Needs : A Case Study of Community Information Centres of Manipur State, 2nd Convention PLANNER, Imphal : Manipur University.

Scott, N.; McKemey, K.; and Batchelor, S. J. (2004), The Use of Telephones Amongst the Poor in Africa : Some Gender Implications. Gender, *Technology and Development*, 8(2), 185-207.

Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O.; and McKemey, K. (2005), The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction : A Study of Rural Communities in India (Gujarat), Mozambique and Tanzania. Commonwealth Telecommunications Organisation for UK Department for International Development.

Sreekumar, T. T. (2007), Cyber Kiosks and Dilemmas of Social Inclusion in Rural India, *Media, Culture & Society* © 2007 SAGE Publications (Los Angeles, London,, 29(6), pp. 869–889.

TNS Opinion; and Social (2010), E-Communications Household Survey. Retrieved October 14, 2014, from http://ec.europa.eu/public_opinion/archives/ebs/ebs_335_en.pdf