



How Does 'Geography Matter' when the 'World is Flat': Re-Understating Core-Periphery through the Technological Variability in West Bengal

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ABSTRACT

The study has significantly identified that locations are critical to impact ICT access as well as the usage which further manifested as digital inequalities. It shows how the individual-level operational and attitudinal disparity along with access inequality complement the previous analyses and theories where it has already been observed that there are prominent rural-urban distinction in ICT adoption and also variations among different urban centres. It is found that not only the material access decline from a core urban location towards its peripheries, but the functional diversity and intensity and the attitude towards the ICTs also display a similar pattern. The pattern among the individuals from a rural or an urban residence also differs significantly. However, the gap is higher in case of a comparatively developed region than a less developed where the overall penetration itself is poor.

Keywords: ICT, digital inequalities, operational disparity, attitudinal disparity

Information and communication technologies are believed to have important consequences in the reorganization of global space and present an opportunity to deliver the fruits of development to every corner of the world which traditionally remained concentrated in certain privileged pockets. Nonetheless, the emergence of comparatively new ICTs has also provoked much debate both in and out the domain of academia in relation to the locations, geographies and information ecologies (Singh, 2008; Christopherson *et al.*, 2008; Harvey, 2011) and now has become one of the contested aspects of development with the concern whether such technological potentials are rendering any significant differences in actual sense. Where several commentators have marked the introduction of ICTs as the pioneer to 'end of geography' (O'Brien, 1992); 'death of distance' (Cairncross, 1997); and claimed that the world

is becoming 'flat' (Friendman, 2006); there are a few that argued ICT-led globalization to actually dramatizing the existing unevenness in the form of 'digital divide' (Warf, 1995; McCann, 2008; Christopherson *et al.*, 2008).

However, as the theories of digital divide imply, conceptualizing the ICT diffusion as well as understanding the digital divide has many dimensions and they are certainly not the products of disparate implementation of infrastructural networking alone. In this respect, Attewell (2001) has suggested that propagation of ICTs and inequality are associated more with the pattern and disparity in its use where on a similar note Hargittai (2002) referred access differentials as the first level determinant of digital divide while ability and use govern the second level. It is thus the interaction of actual and effective access to ICTs, which finally determines different rates, and pattern of digital

expansion, which in turn ultimately results in variable ICT penetration hence differential development pattern. In this place, Dijk (1999) has theorized three more kind of access (i.e. the psychological access, skill access and usage access) besides the material access and Hargittai (2002) while suggesting five important dimensions of digital inequality has largely emphasized upon the differences in the use of apparatus to access various ICT applications, autonomy and the type of use. Nonetheless, in spite of the theoretical understanding that access is not the only problem but rather that the key success lies in the relevant use of ICT components (Thomas and Wyatt, 2001; Marine and Blanchard, 2004), the focus area of ICT related researches have often been in and around the access point, while the functional part has largely been neglected. This is predominantly due to the very limited availability of data and also owing to the fact that it is impossible to explore the operational dynamism unless substantial individual assessment has been eventuated. The overall system of ICT penetration and digital inclusion is therefore still only half-understood.

The current research paper is an attempt to bridge this aforesaid lacuna. Grounded in a primary data it tries to identify the major trend and dynamics of access and moves beyond to trace out the inequalities in the structure of ICT uses. It essentially considers how location has significant influences on differential digital outcomes in terms of a state's ICT advancement. Therefore, 'location' has been taken as the prime independent variable and considering its operation diversity, the use of Internet has been given utmost priority. Nevertheless, indicators of ICTs have also largely been seen to highlight the supply concerns while the demand side factors have throughout remained obscure. Now this is high time to realize that next to technological accessibility, there is a much needed need to document the extent and pattern of ICT uses to make a holistic inference of the overall system. The sole objective of the study therefore is to understand the individual usage pattern besides measuring the accessibility across location. It is to see how the pattern of ICT availability and propensity to take advantage of opportunities presented by the technology vary among users from rural and urban

areas and also between different urban centres with different characteristics. The results from the analysis are expected to have considerable implications for understanding the complete trend of ICT diffusion as well as the scope for future intervention to make it more convenient to the general population.

Framework for the Analysis

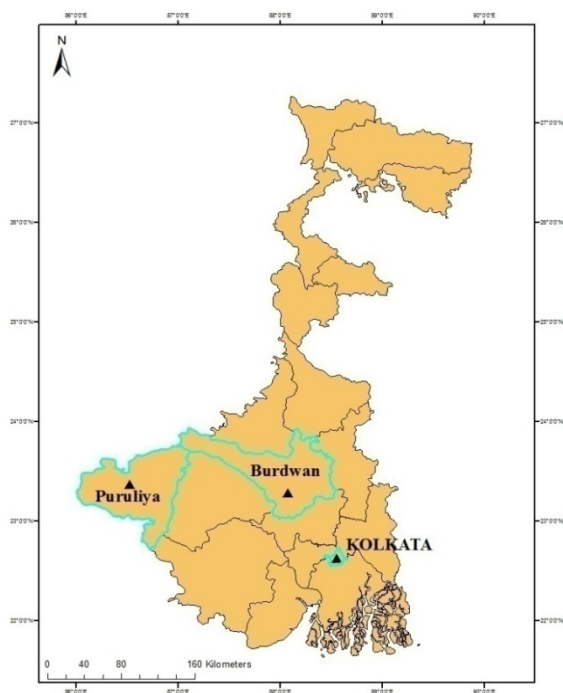
The present framework has been made especially to evaluate the location dimension of individual ICT engagement. This is hereby an attempt to resolve the limitations of ICT's usage composition in addition to addressing the aspect of general accessibility where survey and interview data has been gathered from university students of West Bengal as a case study (See table 1 for a comprehensive state detail).

Table 1: State Statistics

West Bengal	
Population	91.3 millions
Share in India's Population	7.28 %
Urban-Rural Break up of Population	31.87: 68.13 (%)
Literacy Rate	68.64 (%)
Per Capita Income (at Constant Price)	34229 (in ₹)
GSDP for 2011-12 (at Constant Price)	3402340 (in millions)
HDI	0.61

Specific locations (See map 1) are selected strategically so that the spatial arrangement of ICT access and usage can be documented and compared from a core region to its peripheries besides determining the rural-urban status of ICT development. In this relation, Kolkata, the metropolitan hub of West Bengal; Bardhaman, situated within 100 km distance from Kolkata and a relatively remote location of Purulia have been chosen for the survey. An ICT development index calculation (Appendix 1) reveals the highest ICT advancement to be solely concentrated in Kolkata metropolitan region while the district of Bardhaman reports an average and Purulia shows a very poor kind of a situation for the same. This clear diffusion pattern from the core urbanized centre towards the periphery however is

one of the major reasons to pick the State for the case study. Table 2 features other characteristic details of the districts that can further help in the understanding of their significant position within the state. This involves both a quantitative aspect regarding ICT availability and intensity of usage as well as a qualitative side which focused on the participatory behaviour as well as attitude towards ICT.



Map 1

Source: Conceptualized by the Researcher

Table 2: District Statistics

	Population	Per Cent of Rural Population	Per Cent of Urban Population	Literacy	HDI Rank
Kolkata	4,496,694	0	100	86.31	1 (0.78)
Bardhaman	7,717,563	60.11	39.89	76.21	5 (0.64)
Purulia	2,930,115	87.26	12.74	64.48	16 (0.45)

Source: West Bengal Human Development Report, 2010

In terms of the selection of Interviewers university students have been considered as the prime respondents in response to the approach of *digital-native*, advocated by Marc Prensky (2001) which considers young people to

stand at the forefront of the entire digitalization process as they are most likely to be exposed to the ICT networks and assumed to be more 'innovative, cosmopolitan and adaptable to the technological changes'. In addition, young people are seen to have a natural affinity for digital media, which makes them distinguishable from the preceding generations (Smith, 2013). Thus, growing up in the era of information revolution and significant ICT advancements, ICT access and applications are seen to have rapidly spread amongst the youth designating them as the savvy 'digital natives'. Also, given the fact that within the next few years they are supposed to enter the job market which is being increasingly characterized by ICT functioning, it is expected that they will form the section of population most affected by the current information and technology revolution.

Table 3: Sampling Overview

University Location	Number of Students Interviewed	Background: Rural (80)	Background: Urban (100)	Male (96)	Female (84)
Kolkata	60	15.0%	85.0%	56.7%	43.3%
Bardhaman	60	58.1%	41.9%	45.2%	54.8%
Purulia	60	58.8%	41.2%	57.4%	42.6%
Total	180	44.7%	55.3%	53.2%	46.8%

Source: Field Survey, 2013

After all, the inability to efficiently use ICTs would prove to be an impediment while technological competence can put them into an advantageous position. Students therefore are the major future users of ICTs which will ultimately determine the overall social as well as economic returns of current technological advancement. IAMAI statistics have also supported the idea stating that in India growth is accelerated through the ICT adoption by the youth mainly the college-going students. The study has also taken into consideration the fact that institutional environment can influence ICT usage besides supplying ICT components to the students. Malecki (2001) here suggests that it is only the college and universities in small towns and rural areas that probably have the capability to match the telecommunication infrastructure available in the metro cities. Hence, taking universities as the field of the survey also ensures a threshold level of technological

accessibility, comparable between the metropolitan and other than the metro locations.

A total of 180 students (see table 3 for detailed characteristics) from three different universities have been asked on a random manner to participate in the survey in the month of November, 2013; 60 of which are based in the metro city of Kolkata, 60 are from the University of Bardhaman (Burdwan) at a less than 100 km distance from Kolkata while the rest belong to the relatively remote and backward district of Purulia. Only postgraduate students have been interviewed to retain the age and educational qualification constant. However, as majority of the respondents were unaware of their household incomes, they could not be categorized according to their economic situations. This poses as a limitation of the study as economic background is a crucial determinant of ICT access and use.

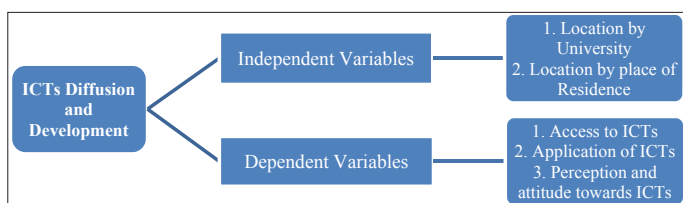


Fig. 1: Categorization of Variables for the Primary Analysis

Source: Conceptualized by the Author

The survey has been planned in a way that first, the respondents were asked to fill up the questionnaires where questions were mainly on access, availability and application of various ICTs and then a follow-up study including in-person interviews have been conducted. The questions on access were quantified as ‘yes’ or ‘no’ and in the application section questions have been asked about various online services the students use while the intensity of using those applications have been categorized in a five-point scale. Multimodality of internet usage has been measured by cross-tabbing the number and type of activities engaged in, following the analysis by Lu Wei (2012). For this eleven questions on different applications of the internet has been asked to the respondent where if the answer was ‘yes’, it has been coded as 1 and if ‘No’, zero. The internet engagement pattern for each location category has been computed by calculating the percentage students engaging with the

number of activities. For the attitudinal and perception on ICTs, respondent’s concepts and subjective assessment about ICTs use, impacts, benefits and risks have also been documented for a qualitative analysis. See Fig. 1 for a detailed understanding of the variables taken for the survey.

Analysis of Study

Level I: ICTs and the Access Factor

Accessibility is fundamental of the many factors that shape the spatial structure of ICT development. It is central to the growing inequality driven by the ICTs which primarily initiate the digital divide. Access to computers, laptops, Smart phones as well as mobile phones therefore denotes the possible penetration into the digital world while having an internet connection marks the direct entry into the same. However, among all the independent variables that influence access, the current analysis focuses on the factor of location, which determines the access in both a direct and an indirect way. In a direct way, it influences the access to infrastructure while in an indirect way it governs the effective access to the technologies in terms of the socio-economic characteristics of that location. Thus while the access to ICTs in a given location form the basis for the penetration into the information society, its cultural background determines the trend of adoption of different technologies by society. This essentially determines the interrelationship between ICT components and digital development of any particular location.

It is well evident that in terms of ICT availability, there are significant differences between the selected locations (see Fig. 2 and 3). While the district of Kolkata has the bulk share of households with internet, computers and telephone facilities (more than the national average), the districts of Bardhaman and Purulia are still having a lot to achieve. Bardhaman being closer to the capital reports ICT ownership marginally over the state average while in case of Purulia ICT adoptions are much lower than average. However, though the respective cities retain the similar pattern as the districts, the gap is smaller which indicates towards a convergence at the city level. Hence, it is reasonable to argue that in terms of effective ICT

adoption, there will be differences among the students of the corresponding locations as well, if not much in terms of technological access, which will further help to understand the variability in the autonomy and the type of use despite a relatively similar ICT-background.

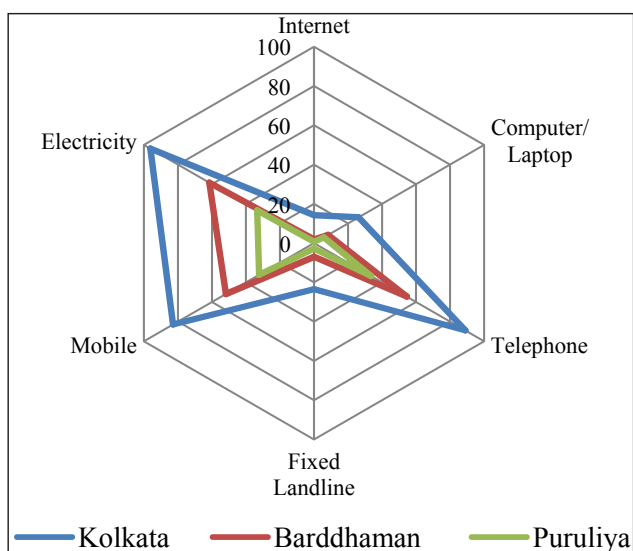


Fig. 2: District-Wise ICT Distribution

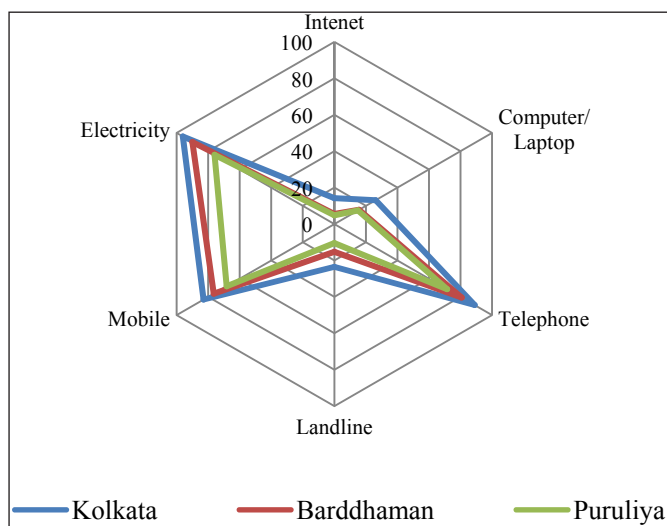


Fig. 3: City-Wise ICT Distribution

Source: Census, 2011

The analysis of the access pattern among the students attempts to establish the location dimension of ICTs in two ways.

- ❖ Identification of the access pattern across various urban centres by a separated analysis of students from three universities with increasingly peripheral location vis-à-vis the metropolitan city.
- ❖ Identification of rural-urban access pattern taking into account the sample of Bardhaman and Purulia. Kolkata has not been considered here due to inadequate sample for rural students (see Table 3).

Access by University Location

Not all the urban areas have similar pattern of ICT development because differential degree of urbanism certainly have numerous kinds of influences. Therefore, in spite of the prominent urban bias of ICTs, it allows only specialist urban centres with high value added services and infrastructure to extend their powers, which induce another level of unevenness in ICT adoption, essentially between cities (Graham, 2002). Breaking down the responses, the survey result reveals distinct patterns of access to telecommunication technologies for different university students. Broadly, in terms of the ownership of ICT devices, students from the metro city of Kolkata are observed to have maximum access while students from Purulia based university have the minimum access for most of them. In addition, 90% students from Kolkata based universities have Internet access while for Bardhaman the figure is 74.2% and for Purulia it is even lesser (63.2 %) (See Table 4).

Table 4: Access to ICTs by University Location (in Per Cent)

Location by University	Computer Laptop	Smart-phone	Mobile Phone	Internet	
Kolkata	63.3	60.0	51.7	100.0	90.0
Bardhaman	54.8	21.0	16.1	100.0	74.2
Purulia	19.1	32.4	13.2	100.0	63.2
Total	44.7	37.4	26.3	100.0	75.3

Source: Field Survey, 2013

*Respondents can have multiple possessions instead of one. Each figure thus represents share of students having access to a particular ICT for each location.

Hence, the survey reflects a decreasing pattern of ownership from the most influential capital city to the next higher order urban centre of Bardhaman district

and then finally to a relatively remote town of Purulia. Nonetheless, it is worth mentioning that despite the disparity in access to a computer, smart phone or internet connection, every single student owns a mobile phone. Hereby there is a reason to believe that the main device which would have the most positive effect on ICT penetration is the wireless device indicating a direct access.

However, as identified by the sociologist Hargittai (2001) the ICT inequality picture is incomplete without incorporating the aspect of use of the technology. Although about 75% students have said to have personal access to the internet but there are wide variations in the source of internet usage, device through which students access the internet and the frequency of being online. Tables no. 5 and 6 suggest that in personal internet connection and broadband quality access there is an orderly distribution from the Kolkata city region to relatively less developed locations, similar to the pattern of material availability among the students. While the Kolkata based students are mostly using a computer or a laptop to connect to

the internet, majority of Purulia based students are seen to use their mobile phones and the students from Bardhaman are using the both. In addition, almost all students from a Kolkata based university possess their own internet connection while in case of Bardhaman and Purulia there are groups which rely on common and public medium to avail such services. Students are also said to use other's (a friend or a family member) connection when it is necessary. Nevertheless, unlike Kolkata, there are also many students from Purulia and relatively a few of Bardhaman University who prefer being disconnected instead of going to a cyber café or accessing from institutional network, if not having a personal connection. This presumably reflects a lack of interest in internet usage or rather an attitude which portray the medium as not so important a factor in their daily lifestyle. The gap between usage and importance of internet among different locations bearing different characteristic features are evident from both table 5 and 6.

Apart from the material access, source and type of access what determines the extent of digital penetration

Table 5: Source of Internet Connection by University Location

Location by University	Access to Internet (in Per Cent)				No Connection
	Personal Connection	Cyber Café	Institutional Connection	Using others Connection	
Kolkata	90.0	10.0	0	0	0
Bardhaman	72.6	17.7	6.5	0	3.2
Purulia	63.2	11.8	10.3	4.4	10.3
Total	74.7	13.2	5.8	1.6	4.7

Source: Field Survey, 2013

* Though the respondents access the internet from different sources, here the major source of connection has been documented.

Table 6: Type of Internet Connection by University Location

Location by University	Type of connection(in Per Cent)			
	No Connection	Narrowband Connection	Broadband Connection	Internet in Phone
Kolkata	10.0	3.3	75.0	11.7
Bardhaman	25.8	3.2	50.0	21.0
Purulia	36.8	13.2	2.9	47.1
Total	24.7	6.8	41.1	27.4

Source: Field Survey, 2013

is the degree of the usage, because participation in digital world cannot merely be answered by measuring the haves and have not rather it is a question of intensity of usages i.e. the extent to which people are using such technologies for relevant and effective functions. This largely includes the number of hours spend on the internet and its frequency of operation by the students. Therefore, it may be possible that a large number of students have access to technological devices and internet, but very few of them are actively participating in the information society. Tables 7 and 8 represent the variations in such terms of operation.

Table 7: Frequency of Internet Usage by University Location (in Per Cent)

Location by University	Frequency of Access to Internet				
	No Connection	Daily	Weekly	Monthly	Occasionally
Kolkata	0	71.7	15.0	6.7	6.7
Bardhaman	1.6	33.9	41.9	16.1	6.5
Purulia	10.3	26.5	23.5	23.5	16.2
Total	4.2	43.2	26.8	15.8	10.0

Source: Field Survey, 2013

Table 8: Time Spend on Internet on a Monthly Basis by University Location (in Per Cent)

Location by University	Monthly Time Spend on Internet			
	Less than 5 hour	5hr-25hr	25hr-50hr	More than 50hr
Kolkata	20.0	8.3	16.7	55.0
Bardhaman	51.6	14.5	12.9	21.0
Purulia	67.6	5.9	8.8	17.6
Total	47.4	9.5	12.6	30.5

Source: Field Survey, 2013

It is evident from the statistics that while majority of students of Kolkata region have told that they have daily accessibility, only 34% of students from Bardhaman and 26% from Purulia have reported the same. Majority of the Bardhaman based students go online on a weekly basis while for Purulia it ranges between weekly and monthly access. In addition, in case of Kolkata the average number of hours spent on the internet monthly is also much higher than that of Bardhaman and Purulia.

More than half of the students of Kolkata have stated that they spend more than 50 hours in a month while a majority of (67%) students from Purulia use internet for less than 5 hours monthly on an average. Many students also said that they are certainly not required to be online frequently and they access internet occasionally only when needed, mainly to execute government related activities e.g. filling up a form etc. Hence, there are reasons to believe that in terms of consistent internet usage the metro city of Kolkata is leading with a majority being connected to the net on a prolonged and regular basis, followed by Bardhaman and lastly Purulia where very few students are seem to be connected actively.

Access by Rural-Urban Residence

Theories have already revealed that ICTs are urban centered² as technological opportunities are more promptly available to the urban population and is considered to be highly suitable for the urban lifestyle. The survey results are also supportive to the fact and reveal a considerable gap between the students of West Bengal from a rural and urban location. From table no. 9 the difference between rural-urban materials accesses to ICTs are quite prominent except that mobile phones that have recently achieved 100% accessibility in both the sector.

In addition, the numbers of students who are not connected to the digital network are higher among rural students than the urban group. This shows that though all the surveyed students are of comparable educational qualification and age group, location exerts a certain kind of influence in their practice as well as approach towards the ICTs. Urban areas being relatively more developed in terms of socio-economic characteristics than the rural seem to have an effective influence on both possessing a technological device and its sufficient utilizations. The difference is also prominent between rural and urban students of two different universities. However, it is worth noticing that as students from rural locations have lesser personal internet connection, they have greater tendency towards using a cyber café, institutional connection or sought a friend's help whenever they need to access the internet. This demonstrates that there is considerable demand for

ICTs among the rural students where access might be the sole problem.

Table 9: Material Access to ICTs by Rural-Urban Residence (in Per Cent)

Location By Residence	Computer	Laptop	Smart-phone	Mobile Phone	Internet
Bardhaman R	30.6	25.0	11.4	100.0	63.9
Bardhaman U	88.5	15.4	19.5	100.0	88.5
Purulia R	12.5	30.0	7.5	100.0	60.0
Purulia U	28.6	35.7	21.4	100.0	67.9

Source: Field Survey, 2013

*Respondents can have multiple possessions instead of one. Each figure thus represents share of students having access to a particular ICT for each location.

Table 10: Source of Internet Connection by Rural-Urban Residence (in Per Cent)

Location by Residence	Access to Internet			
	Personal Connection	Cyber Café	Institutional Connection	Using others Connection
Bardhaman R	66.7	27.8	5.6	0
Bardhaman U	92.3	3.8	3.8	0
Purulia R	70.0	10.0	15.0	5.0
Purulia U	78.6	14.3	3.6	3.6

Source: Field Survey, 2013

*Though the respondents access the internet from different sources, here the major source of connection has been documented.

Besides the access to different ICT devices there is also a gap between students from rural and urban origin in terms of the type of connection they use. This extends the terms of infrastructural availability to incorporate quality of information and communication services. Hereby, students from rural areas are observed more to use mobile phones to connect to the internet, while majority of the students bearing an urban background are accessing internet via computer or laptop through broadband connection.

Further, students from an urban background show a higher tendency to use the internet on a daily basis while majority of the students from rural areas are more likely to be online weekly or monthly. Therefore,

while more than 40% students from the first group are spending more than 50 hours monthly in connecting to the internet, from the latter almost 70% of students use internet for less than a 5 hour period (See Table no. 12 and 13). In this place, it is reasonable to state that urban students are active participants of the digital world while the demands among the rural students are largely driven by necessities.

Table 11: Type of Internet Connection by Rural-Urban Residence (in Per Cent)

Location by residence	Type of connection			
	No Connection	Narrowband Connection	Broadband Connection	Internet in Phone
Bardhaman R	36.1	5.6	30.6	27.8
Bardhaman U	11.5	0	76.9	11.5
Purulia R	40.0	7.5	0	52.5
Purulia U	32.1	21.4	7.1	39.3

Source: Field Survey, 2013

Table 12: Frequency of Internet Usage by Rural-Urban Residence (in Per Cent)

Location by Residence	Frequency of Access to Internet				
	No Connection	Daily	Weekly	Monthly	Occasionally
Bardhaman R	2.8	11.1	50.0	25.0	11.1
Bardhaman U	0	65.4	30.8	3.8	0
Purulia R	10.0	22.5	27.5	22.5	17.5
Purulia U	10.7	32.1	17.9	25.0	14.3

Source: Field Survey, 2013

Table 13: Time Spend on Internet on Monthly Basis by Rural-Urban Residence (in Per Cent)

Location by Residence	Monthly Time Spend on Internet			
	Less than 5 hour	5hr-25hr	25hr-50hr	More than 50hr
Bardhaman R	77.8	11.1	2.8	8.3
Bardhaman U	15.4	19.2	26.9	38.5
Purulia R	70.0	7.5	7.5	15.0
Purulia U	64.3	3.6	10.7	21.4

Source: Field Survey, 2013

Therefore, the difference between a rural and urban location in impacting the adoption of ICTs have been

well established from the survey results. Not only is the access to technological instruments differing across the rural-urban location, but also the type and magnitude of usage indicate a significant gap between the two. However, internet cafes and institutional networks are increasingly presenting opportunities before the rural students while mobile phones further seem to have utmost potential to bring majority into the network of information society.

Level II: ICTs and the Application Features

Theories (e.g. Dijk, 1999; Hargittai, 2002; Attewell, 2001; Thomas and Wyatt, 2001) have been seen to give more importance to the application factor rather than access as they have long realized that ownership of a mobile phone, a computer or a laptop does not fully demarcate the ICT penetration of a household or an individual. Providing a technological device to an individual does not mean that he or she would effectively put that device into use for an efficient outcome. Therefore, following what Sen (1992) has argued it can be stated that equal access may not always lead to equal functionality.

Nevertheless, it is evident that among all ICTs, internet is posing as the most important as it presents a wide range of operational applicability. Today it is not just a medium to acquire information and contact people living miles away, but a means to avail numerous kinds of services, be it consulting health issues with doctors from different corners of the world or getting education from a distant institution or engaging into e-commerce. It is now possible to cater to airlines, railways, book cinema tickets and also to buy books, clothing and different luxury items utilizing the e-commerce space. However, the accessibility to all these features is not equal for everyone. A large segment of population of India are yet to reach a stage to incorporate internet in their traditional lifestyle largely due to differential access to infrastructure and their lack of consciousness about the contemporary features. In this respect, often it has been criticized that though ownership of ICTs are expanding in recent times, it is restricted to limited applications and thus aggravating the digital divide from a usage point of view. In most of the cases ICTs are to being used for entertainment purpose and in

performing government related activities while its commercial usage possibilities are yet to get explored by majority of the masses. Many of the people are having a social networking account merely to follow a trend but they are certainly not aware of online shopping and bill payment processes. All these lead to a gap in access to opportunities provided by the ICTs which is further said to be responsible for a deepening digital divide in spite of the narrowing gap of material access in recent times.

Hereby, the thrust of the present analysis is to evaluate how far the students have incorporated ICTs into their day to day lifestyle and if location has any significant influence upon the patterns of ICT usages. The analysis has been done categorizing various ICT applications into three major sub-groups, i.e. personal, educational and commercial, where internet is considered as the prime ICT medium.

Personal Usage

In each sub-category of personal applications, Kolkata based students are reported to use more services than students of any other university. The gap between Kolkata based students and Bardhaman based students is very marginal while the difference is prominent between the students from relatively less developed Purulia region and the students of the Metro city. More than 90% students of Kolkata are said to have an email account, account in social networking site and also are frequent in browsing. The figures are 95.2%, 74.2% and 89.5% respectively in case of students from Bardhaman University while for Purulia 18% students do not have an email account and more than 30% students said that they are neither connected through any social networks nor do they indulge in any online browsing. In addition, apart from the differences between students of three different universities of three distinct locations, the gap is also prominent between the students originally from an urban or a rural residence.

In every application component, the students from urban areas are observed to be involved more actively than that of the students from the rural areas. Hence, it can be said that in general the students prefer certain technological applications over others and the locational hierarchy continues to retain its authority, though

Table 14: Pattern of Personal Usage of ICTs by University Location (in Per Cent)

Location by University	Email Account	Social Networking	Online chat	Connecting family members	Connecting old friends	Browsing
Kolkata	96.7	91.7	55.0	70.0	90.0	92.50
Bardhaman	95.2	74.2	51.6	64.5	80.6	89.50
Purulia	82.4	63.2	41.2	44.1	75.0	68.70
Total	91.1	75.8	48.9	58.9	81.6	86.60

Source: Field Survey, 2013

Table 15: Pattern of ICTs Usage by Rural-Urban Location (in Per Cent)

Location by Residence	Email Account	Social Networking	Online chat	Connecting family members	Connecting old friends	Browsing	
Bardhaman	R	91.7	63.9	55.6	50.0	80.6	91.7
	U	100.0	88.5	46.2	84.6	80.8	100.0
Purulia	R	85.0	53.6	47.5	40.0	60.0	67.5
	U	78.6	70.0	32.1	50.0	67.9	78.6

Source: Field Survey, 2013

*As respondents may perform multiple numbers of activities, each figure represents percentage share of different activities to the total students for each location.

marginal in some cases. This orderly and divergent online involvement gets further prominent when an inquiry is made into the number of social groups on the networking sites each location holds and the number of people that form a part of those regional groups.

As an example, to understand the importance of Internet in personal functions, students were further asked about the implications of internet for keeping updated with world affairs. Here too variable answers were received which again reflect the differential location dynamics of ICTs usage. Majority of the students from urban areas said that the internet is indeed an influential technology which enables them to know what is happening around the world while students from rural areas appear to be less concerned in using the internet to keep in touch with world affairs. A distinction between students from urban and rural areas is thus quite evident such that urban students are more eager to stay updated with outside news and world activities and show a higher tendency to use the ICT while students from rural areas are still lacking enough interest. There are differences between students belonging to different universities as well. Most of the students of Kolkata based university said

that the internet helps a lot while this share of students decreased considerably for Bardhaman and further for Purulia. Almost 20% students of Purulia have said that they do not use internet to remain updated about world activities.

Educational Usage

Considering that the internet has a lot to offer to the students, questions have been asked on whether students use the internet for their study, whether they avail books and articles from online libraries and whether their respective institutes consider internet as an effective tool to communicate with the students. On the first two questions, not much difference was found between Kolkata and Bardhaman as students from both the Universities seemed considerably aware of the benefits provided online with regard to the availability of information on various topics and access to a huge archive of books, articles and reports which otherwise may not be available in the libraries that are physically closer to them. Students of Purulia based University are observed to depend lesser on the online information bank, where a large number of students have said that

Table 16: Importance of ICTs in Keeping in Touch with World affairs (in Per Cent)

Location by University	Internet in keeping touch with the world affairs				
	Very	Fairly	Sometimes	Little	Not at All
Kolkata	61.7	15.0	13.3	5.0	5.0
Bardhaman	50.0	9.7	29.0	6.5	4.8
Purulia	42.6	20.6	14.7	2.9	19.1
Total	51.1	15.3	18.9	4.7	10.0

Source: Field Survey, 2013

Table 17: Importance of ICTs in Keeping in Touch with World affairs (in Per Cent)

Location by Residence		Internet in keeping touch with the world affairs				
		Very	Fairly	Sometimes	Little	Not at All
Bardhaman	R	36.1	8.3	38.9	8.3	8.3
	U	69.2	11.5	15.4	3.8	0
	R	37.5	30.0	10.0	2.5	20.0
Purulia	U	50.0	7.1	21.4	3.6	17.9

Source: Field Survey, 2013

Table 18: Pattern of Educational Usage of ICTs by University Location (in Per Cent)

Location by University	Internet for study	Online library access	Institution or teachers communication through internet
Kolkata	91.7	33.3	86.7
Bardhaman	93.4	32.3	32.3
Purulia	73.0	13.2	29.4
Total	85.9	25.8	48.4

Source: Field Survey, 2013

they are at all not aware of any kind of virtual libraries. Regarding the institutions communicating with the students via internet majority of the Kolkata based students responded in the affirmative while in case of Bardhaman and Purulia it did not appear to be of much relevance as mobile phones are seen to be most convenient.

Regarding educational functionalities, too there are some differences between students from urban and rural locations. This can largely be owed to the fact that while for large-scale educational assistance it is required to have access to computers or laptops and internet connections, rural households are less likely to be equipped with such ICTs than the urban households.

Besides, lack of awareness is one of the major reasons behind such low responses.

Commercial Usage

On a primary level, commercial usage of ICTs include online bill payments, online shopping, booking of railways tickets or movie tickets etc. and also banking through the internet. This is one of the most noteworthy features of modern ICTs today, as activities are becoming more time efficient and effective. Using online applications one can easily avoid long queues for paying electricity bills or booking a railway ticket with instant transactions while for people from rural areas there is no longer a need to travel long to neighbouring urban

centres to manage bank accounts or to buy things, which is otherwise not available nearby. Therefore, activities that traditionally involved a long process to accomplish today appear to be just a click away via the internet. However, there are again considerable differences in utilizing these opportunities by different section of people, by society and by location as well. Where a number of network services, transaction operations, and delivery systems are still highly dependent on locational characteristics, lack of awareness, unfamiliarity with the technological applications and fear of using new technologies often emerge as the central reasons.

Table 19: Pattern of Educational Usage of ICTs by Rural-Urban Location (in Per Cent)

Location by Residence	Internet for study	Online library access	Institution or teachers communication trough internet	
Bardhaman	R	91.7	30.6	25.0
	U	96.0	34.6	42.3
Purulia	R	69.4	12.5	26.8
	U	77.8	14.3	30.0

Source: Field Survey, 2013

*As respondents may perform multiple numbers of activities, each figure represents percentage share of different activities to the total students for each location.

The present survey has also depicted some similar trends specific to a group of population or a location. Differences have been prominently showing up in this relation compared to other forms of usages among the students both in terms of their university locations and by rural and urban location of origin. Popularity of online commercial operations is greater in case of the students from the metro city while there is not much of a gap between those from Budwan and Purulia University.

More than 50% students of Kolkata based universities appear to be familiar with online booking, billing and shopping while it is less than 30% for the others. 68% of the students from the metro have said that they shop over the internet while for Bardhaman it is 32% and for Purulia only 13%. In this respect too there are differences between the students of rural and urban location. Urban students are seen to be more tech savvy

and indulge in more commercial operations than their counterparts hailing from rural areas. However, the intensity of involvement even varies within the rural and urban students between Bardhaman and Purulia.

Among the students, the intensity of usage differs furthermore. Taking example of online purchasing, 85% Purulia based students said that they are not at all engaged in e-commerce activities while majority of the students from Kolkata mentioned that they sometimes use internet to shop with a few that report shopping very frequently. More than half of the students of Bardhaman University claimed never to purchase anything online while only 13% said 'sometimes' and 8% said that they shop quite an often.

Table 20: Pattern of Commercial Usages of ICTs by University Location (in Per Cent)

Location by University	Booking Online	Online Bill Payments	Shopping Online
Kolkata	58.3	51.7	68.3
Bardhaman	27.4	19.4	32.3
Purulia	20.6	20.6	13.2
Total	34.7	30.0	36.8

Source: Field Survey, 2013

Table 21: Pattern of Commercial Usage of ICTs by Rural-Urban Location (in Per Cent)

Location by Residence	Booking Online	Online Bill Payments	Shopping Online	
Bardhaman	R	16.7	8.3	25.0
	U	42.3	34.6	42.3
Purulia	R	22.5	20.0	12.5
	U	17.9	21.4	14.3

Source: Field Survey, 2013

*As respondents may perform multiple numbers of activities, each figure represents percentage share of different activities to the total students for each location.

However, the example of 'online shopping' has a two-way implication. When in metros or big cities the services are prompt and efficient; in case of small towns and rural areas they often take longer time. In addition, there are also differences in providing additional benefits. While

an urban area or a metro city like Kolkata enjoys all round facilities provided by these shopping networks, small-scale urban centres of Bardhaman and Purulia along with the rural locations are not even eligible to avail such services.

Table 22: Frequency of Online Shopping by University Location (in Per Cent)

Location by University	Intensity of Online shopping			
	Very Often	Sometimes	Not Much	Not at All
Kolkata	8.3	35.0	25.0	31.7
Bardhaman	8.1	12.9	12.9	66.1
Purulia	1.5	5.9	7.4	85.3
Total	5.8	17.4	14.7	62.1

Source: Field Survey, 2013

Table 23: Frequency of Online Shopping by Residential Location (in Per Cent)

Location by Residence		Intensity of Online shopping			
		Very Often	Sometimes	Not Much	Not at All
	R	5.6	13.9	5.6	75.0
Bardhaman	U	11.5	11.5	23.1	53.8
	R	0	3.6	10.7	85.7
Purulia	U	2.5	7.5	5.0	85.0

Source: Field Survey, 2013

All these lead to variations in customer demand that again influence the online enterprises to serve the big cities more and more while neglecting those with fewer customer bases. Thus, conditions attached to ICT applications often configure the users and users again configure these applications in turn (Crang *et al.*, 2009). This shows how inequality is embedded in the structure itself where only ubiquitous connectedness might be of no help without proper implications of the applications.

Purpose of Usage: An Overview

For a collective understanding of the utilization pattern of ICT applications, the functions have further been categorized broadly as educational applications, personal applications, commercial usages and government related activities. In general, most of the

students who claimed to be active users are observed to use the Internet mostly for educational purposes, personal usages and to some extent for entertainment. However, for the majority, it is just an essential medium for filling up forms and performing essential job related activities, that are increasingly becoming digital in today's time to save time and involve people from distant areas. The Kolkata based students are reported to exhibit highest tendency to incorporate the internet into their daily activities while students of Purulia are noticed to be less exposed to differential usage opportunities provided by the ICT. The percentage difference between Bardhaman and Purulia is however comparatively less than that of the gap between Metro and less developed region of Purulia. In relation to students originally belonging to either a rural or an urban area also there are differences in share of students operating various ICT led applications. In every operation, students from an urban background reported a greater share of involvement than those who originally lived in a rural area. However, while for the students of Bardhaman the convergence points are admission related activities, educational and personal use; in case of Purulia, the rural-urban differences are marginal in every operational activity. The location differences are most striking in response to the commercial usages of the internet and between those who have adopted a comprehensive application of ICTs.

Hence, all these advocate that students from urban areas and particularly those from the metros tend to be more adaptive to the technological changes and advancement while for the bulk of small town and rural students using the internet is often a kind of a necessity as many of the activities today are becoming increasingly 'online-only' with progressive digitalization of various enterprises. In this respect, it can also be argued that as majority are accessing internet from mobiles, if not Smart phones or computers, the magnitude of using diverse kind of applications get hampered. Also awareness of various ICT services and enthusiasm to explore is what lacks significantly.

Multimodality of Internet Use

Depending on the level of accessibility and outlook,

students from various locations may tend to engage in different kinds of internet activities. The progression from a single use to a higher frequency and variety of uses is thus one of the conditions which ensure higher degree of ICT penetration and presumably higher ICT development. The number of activities one engage in through the internet also reflects upon the kind of activities students are most likely to participate in as with increasing participation more sophisticated modes of activities tends to be added. The table number 25 is a demonstration of the overall relationship between the number and type of internet activities for all the students interviewed. This shows how multimodality of internet use varies with the incorporation of different types of activities, from basic to advance operations.

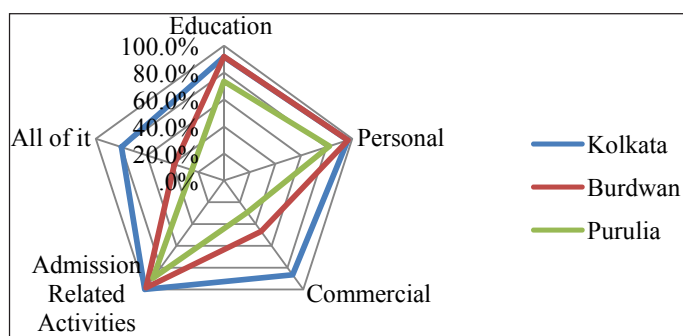


Fig. 4: Applications of ICTs by University Location

Source: Field Survey, 2013

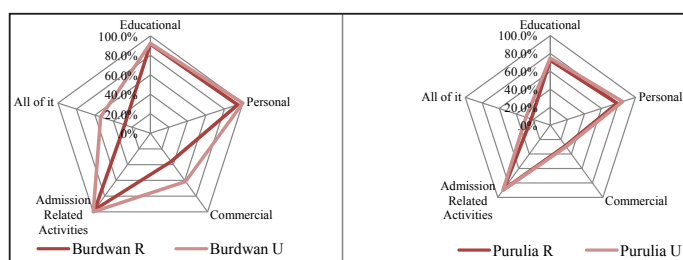


Fig. 5: Applications of ICTs by Rural-Urban Location

Source: Field Survey, 2013

The study depicts that when students operate only a specific number of activities majority of them tend to be concentrated only on some basic activities, but as the engagement frequency increases students keep getting associated with more complex types of internet usage and progressing towards more effective use

of the technology. For example, if students are only performing two types of online activities they usually use it for government related activities i.e. filling up forms or submitting job applications and for academic purposes and if dealing with five kinds of activities, along with the previous two they would mostly engaged in emailing, reading news and getting travel information. With increase in participation, students tend to use the internet for booking tickets, paying bills, shopping, accessing online libraries and using twitter for blogging etc.

The locational analysis of the multimodality has captured a very interesting trend, which adds a significant dimension to the spatial structure of ICT use. It has been seen that with higher concentration at the bottom quartile, students from urban origin tend more to be engaged with diverse kind of internet usages while online activities in rural areas are remaining specific to certain basic applications. The average number of activities for urban students is 7.18 while for the rural it is 5.17. Same pattern is evident for the multi-scale urban locations where students from Kolkata University (7.68¹) are seen to be more versatile users than the students from Bardhaman (6.47) and from Purulia University (5.11) furthermore. Thus, as seen in multimodality analysis higher engagement leads to more complex functional incorporation and more association into the information society, it is reasonable to state that urban as well as the metro based students are more advantageous in today's digital world while the rest are lagging behind.

Level III: Attitude and Perspective towards ICTs

The literature on ICT development has mostly identified the importance of access while some also illuminated the application factor over the access as the first only ensures a possibility to adapt ICTs while its effective utilizations call upon the beneficiary outcomes. Dijk (2006) claims that addressing the issue of digital divide would be incomplete without studying the attitude towards the telecommunication technologies while, on a similar note, DiMaggio and Hargittai (2001) highlighted that in understanding the digital inequality there is significant need to focus on individual choices and behaviour to such technological responses. Thus, it can be said that

Table 24: Multimodality of Internet Use

Type of Activities	% of Internet Activities												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Admission related activities	100.0	100.0	60.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Study	0	50.0	50.0	50.0	63.6	80.0	76.2	97.4	96.3	100.0	100.0	100.0	100.0
Travel information	0	0	60.0	33.3	100.0	81.8	100.0	97.4	100.0	100.0	100.0	100.0	100.0
E-mailing	0	0	40.0	100.0	81.8	90.9	95.5	100.0	100.0	100.0	100.0	100.0	100.0
Social networking	0	0	40.0	33.3	18.2	45.5	90.9	87.2	88.9	96.0	100.0	100.0	100.0
Browsing	0	0	40.0	33.3	36.4	68.2	81.8	97.4	100.0	100.0	100.0	100.0	100.0
News	0	0	20.0	66.7	81.8	77.3	90.9	100.0	100.0	100.0	100.0	100.0	100.0
Online chat	0	0	0	0	18.2	18.2	40.9	64.1	63.0	68.0	42.9	100.0	100.0
Booking tickets	0	0	0	0	4.5	4.5	7.7	50.0	59.3	72.0	92.9	100.0	100.0
Paying bills shopping	0	0	0	0	0	18.2	9.1	12.8	25.9	56.0	85.7	100.0	100.0
Bloggng	0	0	0	0	0	0	0	0	0	0	0	0	100.0
% of N	0.5	1.1	2.6	1.6	5.8	11.6	11.6	20.5	14.2	13.2	7.4	4.7	2.1

Source: Field Survey, 2013

*The shading indicates those activities engaged in by more than 50%.

Table 25: Internet Engagement Pattern across Locations

No. of Activities	Internet Engagement pattern (Percentage of students)				
	Original Location		University Location		
	Rural	Urban	Kolkata	Bardhaman	Purulia
0	4.7	1.9	0	1.6	7.4
1	0		0	0	1.5
2	2.4	1.0	0	0	2.9
3	12.9	1.9	2.7	3.6	10.3
4	18.8	2.9	3.0	10.4	13.3
5	20.0	7.3	6.7	11.3	17.6
6	12.9	15.9	9.8	14.9	17.5
7	12.9	25.2	18.3	32.0	16.2
8	9.4	20.6	28.5	16.2	7.4
9	3.5	13.0	17.7	3.2	4.4
10	2.4	6.7	6.7	6.5	1.5
11	0	3.8	6.7	0	0
Total	100.0	100.0	100.0	100.0	100.0

Source: Field Survey, 2013

*Location wise maximum concentration of activities has been highlighted.

Box 1: A Comparison of Multimodality of Internet Use between the Developed West and the Developing

	Number of Internet Activities										
	1	2	3	4	5	6	7	8	9	10	11
Email	69.8	84.7	92.9	93.6	97.5	99.3	98.4	100	100	100	100
News	11.4	28.0	63.2	76.7	90.3	89.0	96.8	98.1	100	100	100
Travel service	8.2	39.5	50.7	65.2	76.3	84.6	84.6	92.9	98.9	92.6	100
DIY info	8.6	19.9	41.1	53.9	66.1	79.1	78.2	81.4	95.0	100	100
Politics	1.2	7.9	20.7	47.9	70.1	75.2	89.4	90.4	100	88.9	100
Search people	.8	7.5	17.0	26.0	33.9	57.8	85.6	90.7	90	100	100
Read blog	.0	1.6	4.6	15.8	27.8	52.2	75.6	93.1	93.9	94.5	100
SNS	.0	6.7	9.1	15.7	29.4	39.4	59.6	81.7	93.4	100	100
Write blog	.0	.8	1.3	2.1	4.2	13.4	19.1	42.6	76.7	100	100
Twitter	.0	1.9	.0	.5	2.1	5.8	8.8	16.3	36.2	92.6	100
Dating	.0	1.6	.2	3.4	3.1	4.4	4.4	13.4	16.1	29.6	100
% of N	3.9	5.9	8.7	12.2	13.8	11.0	8.0	5.8	2.9	.9	.1

Note. The shading indicates those activities engaged in by more than 50% in the relevant column.

Source: Wei Lu, 2012, p. 308

The above is an example of multimodality of internet use among some American individuals. Comparing this with the situation among the Indian individuals (table no. 24) it is evident that both the intensity and diversity of internet use vary significantly from the developed West to the developing. The above table shows that there are variations in the type of activity, even among those who have used one or two activities while in case of India those who are observed to be performed only one or two activities are seen to be largely engaged in few basic activities e.g. for admission related works and for study. Thus, it can be said that in the developed nations using an internet is often govern by individual preferences while in case of the developing it is more to be driven by necessity. Also, though the activities taken in both the analysis are not perfectly similar, it is quite clear that the West are more to be engaged with advance types of internet usages while the individuals who perform high-end exercises online are hardly a few in India.

though access primarily determine the functionality of ICTs, it is the consciousness of the individual that dictates an active participation and largely shape the outcomes of an information society.

Hence, besides quantifying the accessibility parameters, the present study also attempts to understand the behavioural pattern of students towards ICTs and its impact on their lifestyle. It is to see if location has significant bearing on dimensions of access to ICTs and how it can influence the individual in using such technologies. In general, 50% students have said that internet is helpful for all while 12% strictly characterized it as an urban phenomenon and 26%

claimed it to be useful only for a section of population. In addition, almost 15% alleged that internet can be a tool beneficial for all if not concentrated in cities and not for a petty section of population. When asked about the importance of ICTs, across all the universities and irrespective of the rural-urban origin, students have acknowledged internet as an important tool for study, being in contact with friends and family as well as a tool for entertainment. By and large, it is also considered to be helpful in providing information not only regarding conventional learning but also knowledge outside of the text book. However, when asked about ICT's relevance in their lifestyle, there were differences in opinions.

While on one hand, many from Purulia and Bardhaman despite recognizing the utmost relevance of internet in the globalized world remarked that the internet is of not much use to them, on the other hand there are some from the metro city who have identified it as an indispensable tool and impossible to work without. In addition, it has appeared that for majority of students of Bardhaman and Purulia University, internet is nothing more than a medium for filling up forms and submitting applications for jobs. It is also interesting to note that these students have also found ICTs to be urban centric with more schools having provisions of computer education, strong signals and good quality services while rural areas are lacking bulk of the infrastructure, required for an effective incorporation of ICTs into daily life. In this respect students from rural background are seen to be most vocal while some have also pointed out the economic viability of internet use in rural areas besides just the skill building to operate ICTs. However, it is worth mentioning that majority of the students from outside the metropolitan region, are more concerned about the negative sides rather than those which are useful. It appears that there is a sense of restriction from the use of internet owing to the unknown fear of cyber crimes, different online threats and bugs. Also students are concerned about sites with ill contents and its bad impact on lifestyle other than exploring the advantages of such medium. Students from the metro city of Kolkata have also highlighted that merits or demerits of a technology depend upon how respective users are operating the internet or for what context they need it. For them the internet is said to be tremendously helpful if it is used in a proper and impactful way.

Hence, there are reasons to believe that location has considerable bearing in influencing the attitude towards ICT usages. The in-person interviews bring out clearly that there are some differences in perception between the students from Kolkata city region and others and also between the rural and urban respondents. While majority of the urban and Kolkata based students think internet has 'more merits than demerits' the other half is still unaware of the immense possibilities and activities offered by the ICTs. Nevertheless, some students have also talked about people becoming more and more

dependent on technology today and so becoming idler and consequently they are losing individual connection with the surrounding environment. A masters student from Kolkata University wisely pointed out that '*internet acts both as a boon and curse in today's world*'.

CONCLUSION

To sum up, it can be concluded that the analyses following the survey has significantly identified that locations are critical to impact ICT access as well as the usage which further manifested as digital inequalities. It shows how the individual-level operational and attitudinal disparity along with access inequality complement the previous analyses and theories where it has already been observed that there are prominent rural-urban distinction in ICT adoption and also variations among different urban centres. It is found that not only the material access decline from a core urban location towards its peripheries, but the functional diversity and intensity and the attitude towards the ICTs also display a similar pattern. The pattern among the individuals from a rural or an urban residence also differs significantly. However, the gap is higher in case of a comparatively developed region than a less developed where the overall penetration itself is poor.

The study hereby explores that digital divide is not just a phenomenon between nations, states or districts, but the roots of the disparity lies in the adoption pattern of individuals where 'access' prepares the base condition, 'application' ensures the magnitude and 'attitude' works as the driving force behind such ICT penetration. Thus, it is reasonable to state that a single factor alone doesn't determine the ICT development, rather it is an interplay between the above three dimensions which shape the final ICT outcomes. However, technologically speaking, mobiles are observed to have utmost potential to connect individuals to the ICT network, as the connectivity is found to be least affected by spatial characteristics and reports almost a hundred per cent availability among all the respondents. In contrast, the internet is seen to be the most variable ICT medium, not only in terms of access but also regarding the device through which it is being connected, the location (autonomy) from which it has been availed and the intensity and functionality

Appendix X: Weighted Activity Score across Locations

No. of Activities	Internet Engagement pattern				
	Original Location		University Location		
	Rural	Urban	Kolkata	Bardhaman	Purulia
0	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.02
2	0.05	0.02	0.00	0.00	0.06
3	0.39	0.06	0.08	0.11	0.31
4	0.75	0.12	0.12	0.42	0.53
5	1.00	0.37	0.34	0.57	0.88
6	0.77	0.95	0.59	0.89	1.05
7	0.90	1.76	1.28	2.26	1.13
8	0.75	1.65	2.28	1.30	0.59
9	0.32	1.17	1.59	0.29	0.40
10	0.24	0.67	0.67	0.65	0.15
11	0.00	0.42	0.74	0.00	0.00
Average	5.17	7.18	7.69	6.48	5.12

Source: Calculated from the data collected during the field survey, 2013

of its use. While students from a metro city and with an urban background showcased predominance in owning broadband connection, daily internet access and maximum time spend online, the respondents with a rural residence or from non-metros present relatively poor intensity of usages with maximum connecting to the network through their cell phones and with minimum hours spending in there. Hence, as greater use of ICTs are one of the important feature of an 'knowledge society' (as identified by the Planning Commission, 2000), it can be argued here that people with greater and better urban influences are also the faster to enter the society while for the rest at the peripheries it is still a long journey for catching up.

Therefore, the high ideals of information technology with dreams of potential development resulting into a widespread welfare benefitting a larger circle are yet to be achieved. Global restructuring of production system may have lost its prominence and world's division of north south as core and periphery may have become less relevant, but the pattern of ICT development are emerging with newer sets, probably somewhat superimposed on the older pattern, of subservient

relation with modified operational scales. Thus, the core periphery relations have, in no way, disappeared where the trickle down phenomenon is still to become a reality in a major way. This incites the formation of an uneven kind of 'information society' in the country where 'geography matters' although its significance and consequences may change and evolve. The key findings hereby are theoretically conjugant and have ample practical implications for the betterment of ICT infrastructure as well as enhancement of its operational activities in future towards an inclusive development.

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Endnotes

- 1 West Bengal is predominantly an agriculture dependent state where other major economic activities are largely concentrated in and around the major city area. In terms of ICT based development the state of West Bengal has been categorized among the 'aspiring leaders' by the e-readiness measurements (NCAER, 2008) demonstrating a moderate level of ICT development pattern.
- 2 The urban-centered growth of ICTs is globally identified by Gottman (1982), Graham (1996, 1997), Graham and Marvin (1996) etc. while in Indian context it is supported by a number of commentators, for example, Desai (2006), Rao (2005), Dasgupta et al., (2002), Singh (2007).