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Understanding the 'Digital Divide' - An Investigation of Mobile and Mobile Service Usage among Rural and Urban Consumers in Delta Districts of Tamil Nadu

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Abstract

Objectives: To investigate the usage and preferences for mobile and mobile services among respondents in rural and urban areas of delta districts of Tamil Nadu and identify their impact on digital divide. **Analysis:** The research was conducted across various parts of Tiruchirapalli and Thanjavur districts of Tamil Nadu. A sample of 340 respondents (140 in rural areas and 200 in urban areas) was approached with a questionnaire (bilingual-Tamil and English) having pre-tested items. Convenience sampling method was used. Appropriate statistical tools were employed to analyse the basic data. Multiple-Regression was used to build the digital divide model. **Findings:** The analysis has pointed out the usage pattern of the rural and urban respondents across mobile-oriented and mobile-service oriented factors. Further the model indicates the extent of influence of these two variables in creating the digital divide. The service providers need to improve the standard of service in rural markets to strategically narrow down the existing digital gap. Similarly, the online activities of the rural population are also limited to messaging and few mobile applications. Mobile handset manufacturers should promote the use of smart phones in rural areas by introducing customise, affordable and feature rich models. With such a digital gap existing, it may slow down the development process and may restrict the beneficiaries from getting the government's aids on time. The people in both urban and rural areas too should familiarise themselves with the use of various online services of the government and other voluntary organisations. Though the data usage is relatively low, the trend has picked up as the rural youth are familiar with these technologies. **Applications/Improvements:** This study has taken into consideration, two major communication factors viz., mobile and mobile service and investigated their impact on digital divide which is a new orientation in this area.

Keywords: Digital Divide, Mobile Usage, Rural-Urban Divide, Rural Consumer Behaviour

1. Introduction

The Telecommunication in India, is one of the largest and rapidly emerging industries in the world. India, being a populous country is fast catching up with other countries in terms of subscriber base and soon it is expected to notch the second spot after china. With around 12 operators, India is having relatively cheaper mobile tariffs in the world. In October 2015, the total subscriber base has surpassed the 1 billion mark to enter the league with China. No other country in the world other than these two has

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this tag. Bharti Airtel Ltd., has over 200 million subscribers making it the country's top mobile service provider. This Big-Billion mobile market has projected tremendous YOY growth in the next few years too.

According to '*We Are Social*', there are 559 Million mobile subscribers (not unique users) in Urban-India and 417 Million mobile subscribers in Rural-India[1]. Further, the ratio between *urban mobile subscribers*: *urban population* stands at 147%, whereas the ratio for *rural mobile subscribers* to *rural population* stands at only 46%. This indicates the lower penetration of mobile phones and services in rural pockets. This may be attributed to the concerns relating to 3 A's- namely Adaptability, Affordability and Accessibility. The rural consumers are relatively not-so-adaptive like their urban counterparts and hence it requires consistent efforts to tune them adapting new technology. Similarly the rural economy doesn't permit everyone to have a mobile phone like in the case of urbanites. This leads to the challenges regarding affordability. The rural mobile network is relatively weak in terms of connectivity.

[1] https://www.techinasia.com/india-move-236-million-mobile-internet-users-2016

As quoted by the rural marketing journal published by Rural Marketing Association of India (RMAI), the penetration of mobile phone in rural India has registered a growth rate of over 70 per cent between 2010 and 14. In[2] rural consumers prefer mobility to stay connected which is supported by their preference for music and games. If this is the case of mobile phone and service usage in rural areas, the urban consumers registered higher usage with smartphones becoming common. *Digital divide* can be defined as "the gap between two or more communities living across various geographical areas at different socio-economic levels with regards both to their opportunities to access ICTs and to their use of the internet for a wide variety of activities". Thus in the context of this paper, 'digital divide' as a term can be understood as the probable existence of digital gap in the use of mobile and mobile services between rural and urban communities residing in the chosen geography. This article attempts to investigate the usage and preferences for mobile and mobile services among the rural and urban areas of delta districts of Tamil Nadu.

[2] http://www.rmai.in/ejournal/national-international-trend/5-how-smartphones-are-penetrating-deeper-in-rural-india

There are dimensions of digital divide in the Indian context and related challenges to bridge the same. The emergence of digital information rich and digital information poor groups within societies and perhaps in the global environment can be attributed to the phenomenon of digital discrimination prevailing among various social, political and working groups. They explained how digital divide can influence the development of the society at large[1].

In another study authors have identified that Information and Communication Technology (ICT) can result in curtailing poverty by improving the accessibility of the poor towards health, education, government and other financial services. They also insisted on building low-cost digital infrastructure to bridge the digital divide between the poor and the rich[2].

In order to achieve sustainable development, the social and economic issues of a country should be considered as they can narrow down the digital divide between rural and urban populations. The author insisted on the importance of setting up of community information centres to reduce the digital gap. The educated and unemployed rural youth need to be imparted with certain technological skills to access internet sources as one of the measures for correcting the bias[3].

Further, 'digital divide is simply not an issue of access but obstacle to use ICT'. It means 'tele-density, mobile and internet-divide'. The unequal development in the society is due to rising population, inadequate funds, affordability and setback in implementing policies and programmes of the government. The paper also suggested that the Government should work towards connectivity provision, content creation, capacity augmentation, core technology creation and exploitation, cost reduction, competence building, community participation and commitment to the deprived to bridge the digital divide[4].

Another article pointed out that "across the globe, the digital divide is measured based on the level of ICTs usage among rich and poor countries. This overlooks the fact that there are ways in which deprived, uneducated persons in developing nations benefit from the internet without any use of ICTs. These benefits mostly occur due to those intermediaries who transfer applicable knowledge available from the ICTs to beneficiaries in a relevant form to suit their specific needs. The author quoted India as a reference and indicated that in this country usage understates actual beneficiaries by at least 30 percent.

Thus, this paper put forward the idea that digital divide be based on usage and other forms of benefit from the internet in developing countries"[5].

The influence of residential background of consumers on the purchase decisions was investigated in another article. The results indicate that there is no significant difference between 'price' and 'style-consciousness' while purchasing mobile phones between rural and urban consumers. At the same time, significant difference of 'quality', 'functions' and 'brand consciousness' of consumers for purchase of mobile phone between rural and urban consumers is proved. The paper also brought out the fact that rural consumers are less 'quality', 'functions' and 'brand conscious' compared to urban consumers. Friends, television and retailers are the source of information and purchase decision is taken by the self[6].

A study on "factors influencing buyer behaviour of mobile phone buyers in Kadapa district in India" had analysed the various types of marketing strategies adopted to acquire the attention and cognition of both existing and potential customers. They also studied the role of these marketing strategies in the buying process of the consumers. Results indicated that the following factors namely income, advertising and level of education determine the decision of owning a mobile phone[7].

In another study, the authors selected factors such as price, social group, product features, brand name, durability and after sales services to analyse their influence on purchase decisions for mobile phones. From the analysis, it is understood that price followed by mobile phone features motivate consumers to go for a mobile phone[8].

A comparative study regarding internet usage by rural and urban college students, found that majority of the students use internet facilities and rural student use it at home whereas urban student use it at commercial places. Urban students use internet for specific information and rural students use it for education. Majority of the students irrespective of regional differences, don't use internet sources like e-magazines, e-journals, e-books, wikis and blogs[9].

A recent study highlighted that "digital divide has created disparities among dissemination of information and access to the knowledge resources between the rich and the poor, rural and urban, computer literates and computer illiterates, etc., and if the government and the civil society do not take effective steps in bridging this digital divide it would get blown up into a larger problem of disparities in opportunities and consequently take the shape of economic disparities". Different ways need to be explored for minimising this digital divide for taking the information technology to the society[10].

1.1 Statement of the Problem

The role of communication in the lives of human habitat is significant in this modern era. Communication facilitates the dissemination of information from various government and other agencies regarding the welfare schemes to the public. The penetration of mobile phones into our society is so deep that fuelled the development of communication technology. However, the diffusion of mobile technology is not uniform across the country which is evident from the statistics available. Various studies have indicated the existence of digital divide between the rural and urban communities in India. The extent of this divide in terms of mobile and mobile service usage among rural and urban areas will give a clear understanding about how specifically this divide is spread and the strategies to narrow it down. This is very much required as the 'Digital India' initiative is gaining its momentum which has three pillars – "architecture and utility, delivery of government services and digital empowerment of people, and with the mega initiative that aims to bridge the digital divide". Thus a study covering the use of mobile and mobile services in rural and urban areas is attempted in parts of Delta district of Tamilnadu. This will draw useful inferences that can support and strengthen the understanding of digital divide and subsequent strategies to bridge it.

1.2 Objectives of the Study

The following objectives were structured to facilitate required outcome of this study:

- To identify the digital divide in terms of factors governing the use of mobile phones in the urban and rural pockets of delta districts of Tamil Nadu.
- To examine the factors relating to the use of mobile services that contribute to the digital divide in these areas.
- To develop a model to understand the influence of the mobile and mobile service factors on the digital divide.

2. Methodology Adopted

The research was conducted across various parts of Tiruchirapalli and Thanjavur districts of Tamil Nadu. A

sample of 340 respondents was approached with a questionnaire having pre-tested items to collect the responses of the target group in both urban and rural areas. Convenience sampling method was used for this purpose and the questionnaire was designed in bilingual fashion (Tamil and English) to facilitate easy understanding and registering responses. 140 respondents belong to rural areas and the remaining 200 belong to urban areas. The responses were grouped and analysed using appropriate statistical tools. This study adopted the research model as indicated in Figure 1, which consists of eight factors divided into two groups representing *mobile-related* and *mobile-service oriented*. These factors together will result in the digital divide as per the model framed by the researcher.

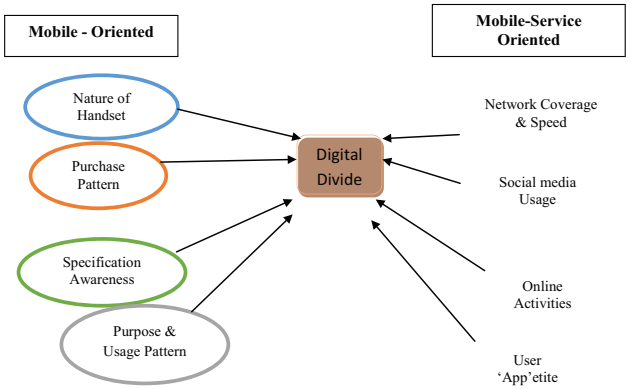

Figure 1. Research model.

Review of literatures has lead to the choice of these factors contributing significantly to the digital divide in a community. Among the mobile-oriented factors there are four sub-factors namely, nature of handset (basic/feature/smart phone with related features and performance); Purchase pattern (Budget, place of purchase, brand preference, accessories purchased); Specification Awareness (hardware awareness and preference, ability to differentiate and choose as per the requirements, source of information); and Purpose and Usage Pattern (need recognition, usage relating to various features of the handset). On the other hand, mobile-service oriented factors consists of four sub-factors namely network coverage and speed (connectivity and clarity of service, speed of data connectivity-2G/3G/4G); Social media usage (presence, extent of usage, preference); Online activities (internet usage, gaming, spending for data, online purchase, information access); and User 'App'etite (the usage of various types of mobile app, preference and purpose).

3. Results and Discussion

3.1 Respondents' Profile

The profile of rural and urban respondents is displayed in the Table 1 which indicate that the profile of rural and urban respondents differs significantly except for 'age'. These two clusters are having distinct characteristics across several demographics which are notable and relevant for further analysis too. Education and Monthly family income is different among rural and urban population. Typically, the rural respondent of the study is a Male in the age group of 31-40 yrs; completed schooling and is getting daily wage which amounts to Rs.10001-20000 per month. On the other hand, the urban respondent is a Male, in the age group of 31-40 yrs; completed graduation and earning a monthly income of 20001-30000.

Table 1. Respondents' profile

Demographic Factors	Based on Majority Responses	
	Urban	Rural
Gender	Male	Male
Age	31-40 Yrs	31-40 Yrs
Education	Graduation	Schooling
Monthly Family Income	Rs.20001-30000	Rs.10001-20000
Occupation	Salaried	Daily waged
Family Size	3	5

Source-Primary Data

3.2 Analysis of Mobile-Related Factors

The data in Table 2 reveals various facts regarding the mobile-related factors across both rural and urban markets. Urbanites mostly use smartphones whereas those in rural areas mostly use either a basic or feature phones only thus revealing the gap in terms of nature of the handset used. Further the major feature in the handset among urban users is dual camera facility as they may want to take photos, videos and selfie pictures. In rural areas the major feature found in their mobile handsets is FM radio and music.

When the purchase pattern is analysed, we can understand that urban users buy Micromax brand whereas rural users are not conscious about brands and we could see lot of brands being purchased without any specific brand having a major stake. Urban users purchase mobile

Table 2. Mobile oriented factors

Factors		Based on Majority Responses	
		Urban	**Rural**
Nature of Handset	Category	Smart Phone	Basic/Feature Phone
	Major feature	Dual camera	FM & Music
Purchase pattern	Brand	Micromax	Not-Specific
	Budget	Around Rs.10000	Below Rs.5000
	Nature	Brand New	Used
	Place of purchase	Branded Retailer/Online	Mobile resellers
	Accessories bought	Scratch guard / Back cover	Back Cover
Specification Awareness	Operating System	Yes	No
	RAM	No	No
	Internal Memory	No	No
	Camera Quality	Yes	No
	Screen size	Yes	No
	Ability to differentiate	No	No
	Source of information	Retailer	Doesn't matter
Purpose & Usage Pattern	Purpose	Socialisation	Stay Connected & Music
	Usage in hours/day	Upto 2 hrs	Upto 5 hrs.
	Repurchase Cycle	Once in 2 years	More than 2 yrs.

Source- Primary Data

handsets in the range of Rs. 10000 wherein the spend is relatively less in rural areas as they indicated that the budget is only below Rs. 5000. Interestingly, majority of the rural respondents mentioned that they use a second-hand mobile compared to urban majority saying that they buy brand new ones. The urban respondents buy the mobile handset from branded retail stores and online stores whereas the rural users buy it from mobile resellers. Scratch guard and back cover are the mostly bought accessories along with the mobile in urban areas and back covers are mostly bought in rural areas.

The research on assessing the awareness of the respondents in both urban and rural areas for handset specification indicate that urban respondents have awareness for operating system, camera quality and screen size but have no awareness for RAM and internal memory. Further they lack the ability to differentiate various brands based on the specification. The rural respondents have answered negatively to the questions regarding awareness for handset specification and ability to differentiate the handsets. Urbanites source information from the mobile retailers and rural respondents never bother about the specification to the extent of urban users.

Regarding the purpose and usage pattern, urban respondents buy mobile handsets for socialisation purpose and the rural respondents want to stay connected and listen to music. Surprisingly, the usage of mobile phones is relatively less in urban areas as majority of the respondents mentioned that they use the device up to 2 hours a day. On the other hand, the rural respondents mentioned that they use mobiles for up to 5 hrs a day. This may be due to the fact that they listen to FM and play music as a source of entertainment. The repurchase cycle is relatively low in urban areas as they replace their mobile handset once in two years and the rural users pull on for a longer time as their repurchase cycle is more than 2 years and in some cases even close to 4 years.

3.3 Analysis of Mobile-Service Related Factors

The data in Table 3 reveals that respondents have mentioned that in urban areas the network coverage is good and in rural areas it is average. The speed of data connectivity is mostly 3G even though Airtel and Idea have launched 4G services. This may be due to the handset incompatibility with 4G services in most of the cases.

In rural areas majority of the respondents use 2G services only as the penetration of 3G compatible smart phones is relatively low. Airtel/Vodafone tops mobile service brand used in urban areas and Airtel is the widely used mobile service brand in rural areas. Urban respondents use 2 SIM cards as against 1 in the case of rural users.

Table 3. Mobile service oriented factors

Factors		Based on Majority Responses	
		Urban	Rural
Network Properties	Coverage	Good	Average
	Speed	3G	2G
	Service Provider	Airtel/ Vodafone	Airtel
	No. of SIM card	2	1
Social Media Usage	Presence	Yes	Not much
	Usage	Regular	Occasionally
	Preference	WhatsApp	WhatsApp
Online Activities	Internet Usage	High	Low
	Gaming	Yes	No
	Data usage	Up to 500 MB	Not Aware
	Online purchase	Occasional	Never
	Information access	Educational	No idea
User 'App'etite	Use of Mobile Apps	High	Limited
	Purpose	Entertainment / Utility	Messaging
	Preference	E-commerce	WhatsApp

Source- Primary Data

The preference for social media usage is high in urban areas and there is not much of usage in rural areas. Further the use of social media is regular among urban users and is not much in rural areas. Both in urban and rural areas the most preferred social media platform is WhatsApp. As far as the online activities of the respondents are concerned, the internet usage is high in urban areas and is low in rural areas. Urbanites do lot of gaming online and the rural ones don't game at all. The data usage among urban respondents is up to 500 MB per recharge cycle and the rural respondents have no idea regarding this. Majority of the urban respondents do online purchase occasionally and rural respondents mentioned that they never do that. The urban respondents access educational information online whereas the rural respondents have no idea regarding either availability of information or the access and usage.

The user *'App'etite* (The tendency to use mobile Apps) was also researched and the analysis indicates that Mobile App usage is high in urban areas and is relatively low in rural markets. Urbanites mostly use entertainment and utility oriented mobile applications as against rural respondents who use it for messaging mostly. E-commerce mobile applications are mostly preferred by urban respondents and rural respondents prefer WhatsApp which seems to be the only familiar application in these areas.

3.4 Regression Analysis Predicting Digital Divide by Mobile/Mobile Service Factors

Step-wise regression analysis is carried out with the overall sample and the results are displayed in the Table 4. The independent variables are introduced one after the other to test the extent of influence on the dependent variable. The value of standardized beta coefficient (β) indicates the nature of influence (either positive or negative) of independent variable on the dependent variable. From the Table 4, the values relating to the regression model can be read. In the model, step 1 has the R^2 value as 0.477, which indicates that the independent variable, *'mobile service oriented'* account for 47.7% of the total variance in the digital divide. F-value (732.34) is also found to be significant at 0.05 level. The value of standardized beta coefficient (β-0.69) indicates a significant positive influence of '*mobile service oriented*' on '*digital divide*'.

In step 2, where another variable viz., '*mobile oriented*' is entered which results in a considerable change of 10.1% in R^2 value yielding a total variance explained in the dependent variable of 57.8%. The F value - 550.50 is significant indicating the fitness of the model. Further, The β-value (=0.453) for the variable 'mobile service factor' has changed with the inclusion of 'mobile factor' (β = 0.397). Thus, the regression results indicate that the variable '*mobile service* oriented' is the most contributing to the overall regression model developed in this study. To further validate the model the collinearity statistics were analysed with focus on tolerance and Variance Inflation Factor (VIF).

It was found that all the values are within the permissible limit and this confirms that there is no multi-

Table 4. Mobile/mobile service factors impacting digital divide

Model	R^2	F	Variables	Unstandardised Coefficients(B)	Standardised Beta Coefficients (β)
Step1	0.477	732.34*	(Constant)	1.397	
			Mobile service oriented	0.651	0.690*
Step2	0.578	550.50*	(Constant)	1.033	
			Mobile service oriented	0.427	0.453*
			Mobile oriented	0.349	0.397*

(Significant at 0.05 level)*

collinearity between the independent variables. Thus the model indicated in Figure 2, explains that the two independent variables together yield a total variance of 57.8% as explained by the Step 2 of the model. Hence, we could infer that apart from these two independent variables there could be some other variables which may account for the rest of variance on the dependent variables that are not considered in this model. It can be understood that mobile-oriented factors impact the digital divide among rural and urban areas to a meagre level (10.1%) within which the sub-variable namely 'Nature of handset' impacts the digital divide significantly when compared to the other three sub-variables. The other independent variable namely 'mobile service oriented', emerges as the most influential variable (47.7%) of the digital divide existing between the rural and urban areas. Among the four sub-variables of this, 'Social media usage' is the strongest influencer (19.7%); followed by 'online activities' (11.4%).

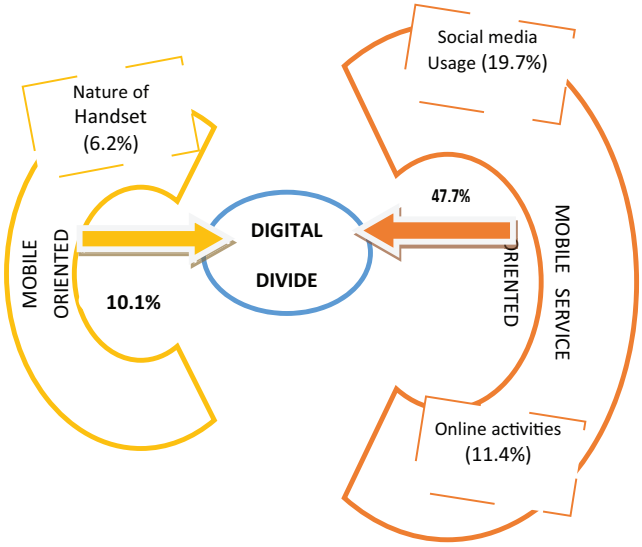

Figure 2. The model explaining rural-urban digital divide.

4. Conclusion

This study has thrown lights on this digital divide existing between the rural and urban markets and what significantly influences this gap was also understood. Now it is the time for action by all the stakeholders connected with the digitalisation process of the country. The initiatives of the Government of India must be well supported by each of them and the plans of setting up smart cities must consider the implications of this type of research studies being conducted across the country.

There is a need for a consolidated effort by all those who are directly and indirectly connected with this mission so that India can successfully devise strategies to narrow down the gap. Once it is done, the digital dreams of the country will be a reality and India will be looked upon as a benchmark in the global league by other Nations to emulate similar efforts for the development of their country.

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