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# Appraising WhatsApp in the Indian Context: Understanding the Rural Sentiment

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**Abstract:** Web-based instant messaging applications are predominant as means of Internet usage in rural settings. This becomes particularly interesting in the Indian rural context where applications like WhatsApp are accepted and used extensively, while the Internet is still rather an alien concept for a large part of the population. While adoption of these applications is motivated by ease of access, ease of use, and other facilitating conditions, to better understand the collective acceptance, the role of social influence needs to be contextualized for the rural areas in point. To this end, we use the analytical lens of social capital to understand and elaborate on the rural sentiment around the usage of WhatsApp. We triangulate a thematic analysis of qualitative details from an ethnographic study with the sentiment analysis of selected parts of interviews conducted during the study. This mixed-method study throws light on how social constructs in rural households play a role in defining technological usability and habits, as well as individual-level perceptions and sentiments. Our study, which illustrates the usefulness of mixed methods in ICT4D, has implications for various stakeholders to understand the usage patterns and perception of digital platforms in rural contexts.

**Keywords:** Digital Platforms, WhatsApp, Social Capital, Sentiment Analysis, Rural India.

## 1 Introduction

With more than half a billion people using the Internet in India in 2019 (IMRB, 2019), the growth of Internet adoption in the country sees rural adoption acquiring increasing importance. This significant increase in Internet penetration has led governments to deliver various services in online mode and also to invest in building digital platforms such that inclusion is achieved (Mir, Kar, Dwivedi, Gupta, & Sharma, 2019; Mir, Kar, Gupta, & Sharma, 2019). However, it is well understood that the types and frequency of the usage, impact, and also the pattern of consumption of online services are significantly different in urban and rural areas owing to the different socioeconomic profiles of urban and rural internet users (Venkatesh & Sykes, 2013; Kenny & Kenny, 2011; Galloway, 2007). ICT4D research has attempted to understand these differences through theoretical means including the Sustainable Livelihoods Approach (Scott, Garforth, Jain, Mascarenhas, & McKemey, 2005), the choice framework (Kleine, 2010), and social network theory (Venkatesh & Sykes, 2013) among others. However, studies with a focus on the social aspect around ICT adoption and impact in rural areas are still relatively scarce, with few examples constituting exceptions (Selouani & Hamam, 2007; Thapa, 2012).

With rural people spending more time online, it becomes more interesting to understand how their offline social structure plays a role in online interactions and how these interactions affect their social structure. In any social structure, these interactions depend on personal, material, and social factors. Understanding these factors demand more micro-level, in-depth studies. In rural areas of India, with an increasing number of smartphones and other mobile devices, and with increasing levels of Internet penetration, the study of how social structures are reflected in online interactions and vice versa, presents an interesting case; on which limited ICT4D research has been conducted so far.

WhatsApp is a Web-based instant messaging application that makes it for a large part of global Internet usage, with more than 200 million active users in India before 2018 (Statista Report, 2017). A large part of online interactions takes place through WhatsApp across many communities including those in rural India (Sánchez-Moya, & Cruz-Moya, 2015; Digital Empowerment Foundation, 2018). Research shows that WhatsApp has gained popularity due to reasons including the design features that allow ‘emergent users’ (Devanuj & Joshi, 2013) like those in developing countries to overcome the barriers towards technology usage (Balkrishan, Joshi, Rajendran, Nizam, Parab, & Devkar,

2016). In this study, we focus on understanding types of usages that WhatsApp is serving in rural areas and explore the sentiments related to these usages. We ask the following research questions:

1. What are the rural sentiments related to various usages of WhatsApp?
2. How does social capital play a role in the generation and development of these sentiments?

To answer our questions, we triangulate a thematic analysis of data collected from an ethnographic study of rural Rajasthan (North India) with sentiment analysis of selected parts of interviews conducted during the study. Our data reveals that offline social relations in the rural social environment are reflected in the patterns of usage of WhatsApp and the sentiments associated with them. One-to-one or group interactions on WhatsApp leverage upon *bridging*, *bonding*, and *linking* social capital (Putnam, 2000; Woolcock, 2001) in ways that we discuss below. Social capital theory helps to understand the interconnected links between personal, material, and social factors in a rural setting. Based on the results of our analysis, the links we establish in the discussion help in understanding the appraisal of instant messaging platforms in the context of the rural sector in developing countries.

This paper is structured as follows. Section 2 contextualizes sentiment in the information systems' space, justifying the choice of social capital as a theoretical lens for the study. Section 3 explains the research flow, followed by our research method. In Section 4 we analyze our data, and in section 5 we discuss the implications and conclusions from the study.

## 2 Literature Review and Theoretical Framework

Moving from the classical to the neo-classical theory of capital introduces value to the masses in the form of Human Capital, Cultural Capital, and also, Social Capital (Lin, 2017). While human capital is a form of investment in human factors (e.g. skill, knowledge, experience), that provides profit or benefit to an individual; social capital derives its value based on the collective interactions of a group, in turn providing benefits to the society and its members.

Social capital is a term used in many different ways in various fields of research. The central idea means that all the various associations of a person or a group work as assets to them. Bourdieu was one of the antecedents to discuss social capital while defining it as "the aggregate of the actual or potential resources that are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu 1986). Later Coleman focuses on its functions (Coleman, 1988) and Putnam discusses two different forms of social capital called bridging and bonding social capital. While bridging social capital is inclusive and is often related to weak ties between individuals, bonding social capital is exclusive and represents strong ties in close relationships with family, friends or neighbors (Putnam, 2000; Putnam, 2002)

The initial approach in terms of social capital for online interactions was the same applied for media in general; that of time displacement. It suggested that the time spent online comes most likely from an earlier offline activity which was social (Nie, Hillygus, & Erbring, 2002). Later on, it was argued that unlike traditional media, the internet is an interactive space having sociability *within* (Williams, 2006; DiMaggio, Hargittai, Neuman, & Robinson, 2001). Several of the studies focus on understanding how various factors from the real-life affect the online social behavior while using online social network sites and applications including WhatsApp. These studies establish the role played by experience (Leong, Ibrahim, Dalvi-Esfahani, Shahbazi, & Nilashi, 2018) and psychological factors including social support (Aharony, & Gazit, 2016; Gazit, & Aharony, 2018). Aharony also studies the kind of social capital that WhatsApp interactions generate (Aharony, 2015). In this study, we focus on the sentiments around WhatsApp usage and explore the role that social capital plays.

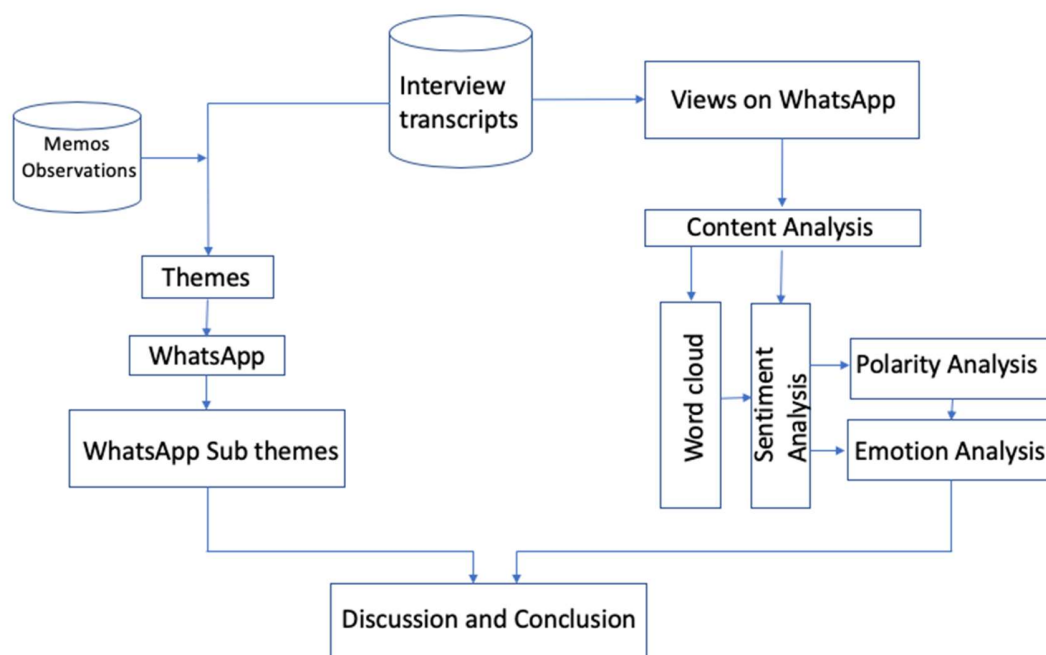
### 2.1 Sentiment Analysis

Opinions expressed by people are subjective expressions of their sentiments (Liu, 2010). With the growing trend of people expressing their opinion on various web platforms, numerous techniques have been developed that enable analysts to process these in text form and dig out meaningful information using linguistics and natural language processing (Liu, 2012). Content analysis and sentiment analysis represent types of such techniques that have been used extensively in information systems research (cf. Rathore, Kar, & Ilavarasan, 2017; Bijarnia, Ilavarasan, & Kar, 2020 ). A number of these studies are based on the analysis of a large amount of data from social media such as Twitter and Facebook. The data analysis is used to get insights on various business and prediction aspects including market

research eg. product co-creation (Rambocas, & Pacheco, 2018; Rathore, Ilavarasan, & Dwivedi, 2016; Chamlerwat, Bhattachakosol, Rungkasiri, & Haruechaiyasak, 2012), customer engagement (Bijarnia, Khetan, Ilavarasan, & Kar, 2019), financial market study eg. stock prediction (Mittal, & Goel, 2012), election prediction (Singh, Dwivedi, Kahlon, Pathania, & Sawhney, 2020) among others. Recent mixed-method studies have used these techniques on text data from other sources like reports and qualitative interview transcripts (Parmar, Maturi, Dutt, & Phate, 2018; Güven, S., Steiner, M., Ge, N., & Paradkar, A., 2014). In this work, we use content analysis including sentiment analysis on interview transcripts and triangulate it with thematic analysis.

### 3 Method

The research flow of this mixed-method study is shown in Fig. 1 below. Subsequently, the research methodology is explained in detail. An ethnographic study was conducted by the lead researcher in a rural Gram Panchayat (village area) in Rajasthan, a state of north India, to explore the interplay between broadband and various socio-economic and cultural factors in an Indian rural setup. The researcher spent around eight months during the year 2018 in the core village and the adjacent town while collecting data through in-depth interviews, observations during interviews, and informal interactions. The interviews were audio-recorded, transcribed, and coded with multiple rounds of thematic analysis with the help of NVIVO12. During the process of coding, the usage of the messaging application WhatsApp emerged as one of the prominent elements. The recurrent presence of this topic in the discussions led our focus in the direction of examining rural sentiment around WhatsApp specifically.



**Fig. 1:** Flow of Research

Thematic analysis and content analysis are two common approaches used for an in-depth understanding of a phenomenon. For an overall detailed understanding of the same phenomenon, these approaches can complement each other quite well. Thus, we parallelly conducted a content analysis of the text from the transcripts. While a word cloud (Fig. 2) indicated major concepts emerging in interviews, a sentiment analysis (Fig. 3) in the form of polarity analysis helped in understanding whether emotions were positive or negative. A detailed Emotion analysis then provides a detailed score of eight different kinds of emotions. We see the results from these parallel analysis processes together and then discuss the implications. The process is described in Fig. 1.

### 3.1 Demographic Description

Baral is located in the Ajmer district of Rajasthan State in India, 70 KM from the district headquarter. With around 500 households at the core of this rural area, the population is a good mixture of two religions and various castes. As a common practice, men in households work in the mills on temporary or permanent jobs, while females take care of agriculture and livestock. Literacy is said to be close to a hundred percent in Ajmer district, however, the level of education varies by a large magnitude. The majority of the elderly population has two to ten years of school education. Younger adults, 20-35 years old ones, have mostly completed school education at the least. Occupation choices involve the job of a painter, carpenter, confectioner, tailor, construction worker, property dealer, general store owner, mobile and electronics store owner, and teacher among others. In the other part of the Gram Panchayat, which is attached to the town, teachers, banking professionals, chartered accountants, doctors, electronic, automobile, cloth, and other merchandise shop owners are included in the list of occupations. On income standards, the majority of the population falls under the lower middle class and below that. On average, every two out of ten households were such that one or more members contained a keypad phone, but no smartphone. In households where the household head is relatively younger, within the range of 20-40 years, the household heads mostly own a smartphone. In other cases, the young adult male/s in the household most frequently own a smartphone. Female adults in the household in the majority of the cases own a keypad phone for their use. Younger and newlywed females and those who are about to get married are often an exception to this case. Some girls who are earning or are continuing higher studies have their smartphones. WhatsApp has become one of the most common applications used in recent years. Before 2016 there were relatively very few WhatsApp users there in the village. For this study extracts from the interview transcripts of 34 respondents who talked about WhatsApp usage in different forms are used. Respondents belong to age 15 to 60 years.

### 3.2 Content Analysis

Content analysis (Harwood & Garry, 2003) is used to find out the hidden meaning from large text data. This type of analysis uses principles from text mining and natural language processing (Kayser & Blind, 2017). We have used two content analysis techniques i.e. Word cloud (Heimerl, Lohmann, Lange, & Ertl, 2014) and sentiment analysis (Pang & Lee, 2008). Word cloud is a set of words that are most frequent in the text data. Using NVIVO12, we created a word cloud with the selected text consisting of the responses of the qualitative interviews regarding WhatsApp. In Sentiment analysis, we try to identify how sentiments are expressed in a text. For the sentiment analysis, we perform polarity analysis and Emotion analysis. Polarity analysis suggests whether the sentiments expressed in the text are overall negative or positive, while in Emotion analysis the text is evaluated in terms of emotions including anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. Sentiment analysis is performed with R programming using *syuzhet* and *dplyr* packages. For each Sentiment type, the range of scores is 1 to 8. We first selected all the interviews where a respondent has talked about WhatsApp usage in any form. From these interview transcripts, those portions were manually picked where details around WhatsApp usage are being discussed, this gave us the dataset for content analysis. These segments of conversations were classified majorly into five different categories that were frequently being discussed: video calling, chat with close connections, communication with social connections, job search, and education-related communication, and work-related communication. Content analysis was then performed on the filtered data.

### 3.3 Thematic Analysis

The thematic analysis provides a controlled way to understand and structure the ideas emerging from ethnographically collected data (Aronson, 1995). Through a thematic analysis, we identify, organize, and find meaningful patterns in our data and understand the shared experiences concerning the particular research questions for the study (Braun, & Clarke, 2012). We followed the following steps:

**Step1.** Familiarizing with the data: we evaluated the transcripts and memos and wherever needed, the audio files repetitively while trying to read the assumptions that the respondent had at the time of interviews.

**Step 2.** Initial codes: Initial codes were generated by highlighting the relevant text sections. This part led us to statements and emotions that were shared commonly, and those that stand out as exceptions.

The statement talks about the initial perception that was generated possibly during various conversations that the respondent had had with her peers and surrounding people about an unfortunate incident in the village. It also talks about how interactions with her kids later restructured her biases towards the usage of these web platforms.

**Step 4.** Structuring themes: various components of ideas and experiences that were meaningless in exclusion are bridged together to make sense in a collective view in this stage (Leininger, 1985). The sub-themes were linked to themes.

## 4 Analysis and Findings

A word cloud with the responses of the qualitative interviews discussing the WhatsApp application is shown in *Fig. 2*. A word cloud highlights the most repeatedly used words in the responses, and the size of the word shows how frequently the word was used in the conversations. Word cloud provides us with a preliminary filter to refine the broader concepts from the text (DePaolo, & Wilkinson, 2014). The words situated close to each other represent that they are often used in the same or related context. For example 'communication', 'network', 'information', 'connected' are in close connection, depicting one aspect of WhatsApp usage being staying connected in a network supporting information flow.



**Fig. 2.** Word Cloud showing the ideas reflected upon in the responses

Another aspect can be seen in the upper left part of the diagram where words like ‘friends’, ‘family’, ‘kids’, ‘status’, ‘group’, ‘conversation’ are connected closely. These indicate the conversations between close friends and family. In the upper-right part of the figure words like ‘work’, ‘document’, ‘job’, ‘publicity’ ‘classes’ ‘share’ can be seen in close connection, indicating another prominent usage of WhatsApp in connection with a job, work and education. We identify five broader concepts that we use as a guideline in the emotion analysis below.

#### 4.2 Polarity Analysis

The second technique of content analysis was sentiment analysis which is performed in two different ways: polarity analysis and Emotion Analysis. Fig. 3 shows the results of the polarity analysis conducted using NVIVO12. The diagram shows that a majority of the views given by the respondents are ‘moderately positive’ in nature. The number of ‘moderately negative’ sentiments deducted by the software are relatively few. Strong reactions, both positive and negative are fewer in number yet significant. These results show the overall acceptance of WhatsApp usage in rural areas. Rural people have more positive sentiments regarding WhatsApp usage than negative sentiments. We further investigate these sentiments through Emotion analysis.

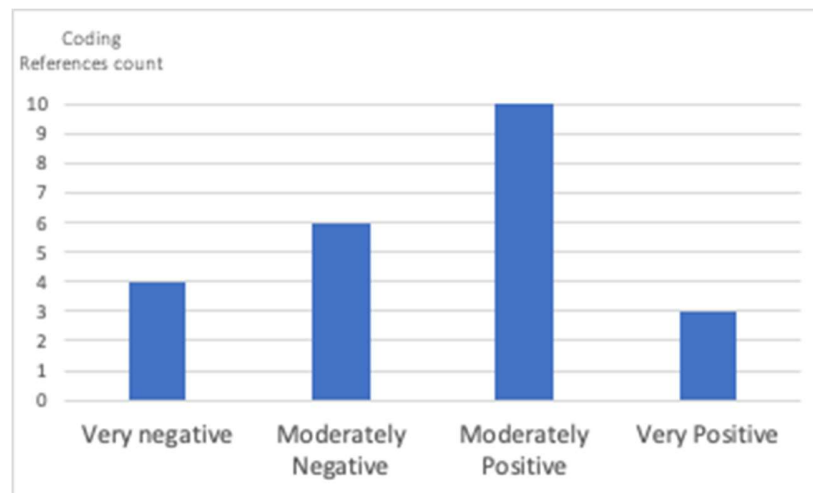


Fig. 3. Polarity Analysis Results

#### 4.3 Emotion Analysis

Fig. 4 shows the graphical representation of results from Emotion analysis performed on different categories of WhatsApp usage, which were earlier defined manually. Using R programming the text in these categories was rated between 0-8 on eight different emotions anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. Also, overall positive or negative sentiment is indicated on the same range of value here. The categories were guided by the word cloud, results for each of the five categories are explained below.

**WhatsApp Video Calling.** Overall sentiments are positive for video calling. Among emotions, trust value is high, respondents have largely shown trust in the WhatsApp video calling feature. One of the potential reasons given by the respondents for this finding is that they can see the person on the other side (See Fig. 4(a)).

**Communication with Social Connections.** This includes connections within society, within people with same caste or ethnicity who usually stay connected through WhatsApp groups. The messages in these groups are generally forwards that are perceived as informative and relevant. Overall sentiments are positive, however significant negative sentiments are also observed here. This might be since these are considered time killing engagement. Anticipation is observed high in the responses in these categories. Small areas in yellow depict fear in some of the responses (see

Fig. 4(b)).

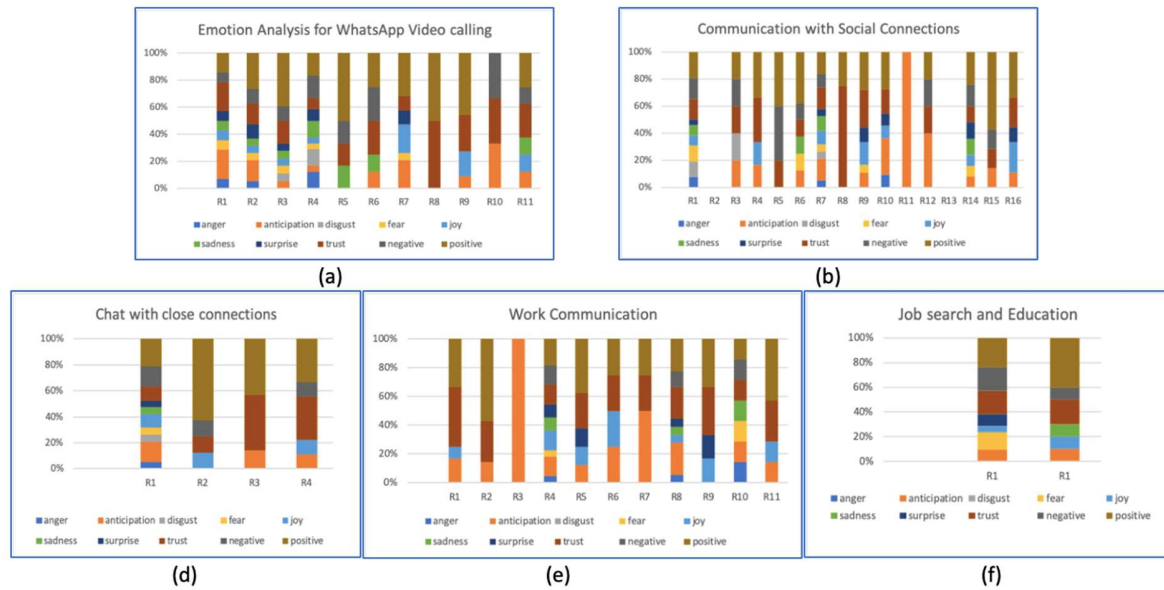


Fig. 4. Emotion Analysis for various categories of WhatsApp Usage

**Chat with close connections.** Responses in this category were fewer in number since talking to close connections, call or video calls are the preferred mode. Among emotions trust along with joy and anticipation are prominent (See Fig. 4(c)).

**Work Communication.** Trust along with high anticipation is shown in the responses in this category. Work communication includes one to one or group interactions where the exchange of documents and information is common. This also includes usage of WhatsApp for business publicity and day to day tasks. The sentiments are mostly positive, and the graph shows joy and surprise emotions as well (See Fig. 4(d)).

**Job search and Education.** The responses on this category show a good mix of sentiments, both positive and negative sentiments can be seen in the graph. Positive sentiments still can be seen in the majority. Students and employment seekers use the application and join a group where they can communicate and get relevant information like study material, details about new openings, process, and date of application, etc. ( Fig. 4(e)).

#### 4.4 Thematic Analysis

Our thematic analysis results in eight different themes around WhatsApp namely usage, concerns, emotions, stigmas, resistance, addiction, constraints, and motivators (See Fig. 1). Ideas in these themes are discussed below.

**Usage.** usages of WhatsApp for the people in this area are categorized into three major categories. The forms of social capital bonding, bridging, and linking social capital directly reflect in these three usage patterns. The first category includes communication with family and friends (bonding) which majorly include video calling and sending and receiving photographs of the members and responding to those. Video calling also provides indirect access to less educated people who are not comfortable using other text-based features of the application. For example, an elder lady who uses a keypad phone otherwise gets access through her kids who make video calls to her relatives for her:

*“Kids do make a call for us to our family, relatives. I talk to my mother and father...A video call, there is our picture on the screen and theirs as well. I: So they make the call for you or you do it yourself? R1: They make the call*



*I only talk. I: What more do you do? R1: We just talk, how are you doing, what did you cook, what did you do all day and things like that. What else to do?"*

The second category is that of social connections which usually include distant relatives, friends from the same locality, people from the same caste or ethnicity among others (bridging). The most common information flow is in the form of forwarded messages. This also works as a source of information for current affairs and news, also local information flow. Even after being time-consuming, people continue to be a part of these groups for the sake of connectedness.

*"More than half is Jhutha Prachar (false advertising) on WhatsApp. Small things blow up. They write small things in such a big way to make it viral."*

The third category includes work, employment search, and education-related usages in this context (linking). Students and job seekers join these groups usually created by e-Mitra and coaching centers who keep on sending details on vacancies for a job, examinations, and study content on these groups. Many of the people instead of going on different websites to look for options rely on these groups for the majority of the information in this regard. Some of the local business owners use WhatsApp groups to market their products in nearby areas.

**Emotions.** The emotions associated with WhatsApp are a mixture of positive and negative. Though people have accepted usage in their day to day life, there are different notions around it including gender-based biases and stigmas, apprehension and fear of doing something wrong with it, and exposure to misinformation, inappropriate content especially for young teens, frustration because of it being time-consuming and being a popular 'time pass'. Positive notions include a sense of connectedness, empowerment-based on the ability to use, and to learn and based on the information gained. When used for connecting with close friends and family it provides joy, belongingness, and contentment.

**Concerns.** The concerns around WhatsApp usages are majorly formed by collective notions based on experiences of people around or based on the stories that float across the afternoon and evening chit-chats in the village. These concerns include 'fake news', inappropriate content, misuse of the platform, addiction, and too much time consumption. Also, the inadequate network is another concern in those areas, though mobile internet works fine across the majority of the parts of the village.

**Stigmas.** The stigmas that exist there in the local rural society are reflected in their usage of WhatsApp as well. One example being gender inequality, in the majority of households a young adult or sometimes teenage male is the first one to get mobile phone access. Females still carry keypad mobile phones so that they can talk to the family. Even when they do have a smartphone, they are expected to use it with restraint.

*"Video calling as well the kids they do, I don't pay much attention to that. I: You never used it? R1: No I haven't...I: And your daughter has a smartphone... R1: No my daughter doesn't do that either... never..."* (sounded more like she ought not to indulge in all this).

**Resistance.** Resistance towards learning as well as usage post-learning is more evident in older generations. One of the major reasons is that adoption is still new in these areas and people in their circle are not using similar technology. Various stigmas discussed above also cause resistance.

**Addiction.** Addiction is not that common among the surveyed individuals; however, people do have the habit of having to check messages on their device, mostly in the evening hours. Interviews display a realization that these habits can lead to addiction.

**Constraints.** Apart from lack of access, lack of education forms major constraints for text-based applications. Learning to use these applications take many efforts for uneducated people even to use the video calling options. The stigmas and concerns sometimes work as constraints towards access and usage.

**Motivators.** Though WhatsApp is a text-based technology, it contains features that let people overcome the barriers that they traditionally experience. Pictures, video, and video calling options are usable even for indirect users. A sense of connectedness, information access, a sense of empowerment, joy of connecting to the close family motivates such users often. Another motivating factor is the possibility of saving money through different usages.

## 5 Conclusion and Implications

Our study illustrates and appraises the core sentiments associated with the usage of WhatsApp in a rural area of north India. The combination of sentiment analysis with thematic analysis of the interviews conducted leads us to identify the key sentiments into play, then deepen our awareness of them through an examination of the eight thematic constructs. Our findings depict a mixture of positive and negative sentiments, each associated with various types of users and with the past experiences lived by interviewees. Putnam's concepts of bridging, bonding, and linking social capital serve to illuminate people's use of the messaging service, providing a basis for further investigation of the multiple topical trends in the analysis.

Our analysis reveals that the social constructs around which respondents' opinion cluster play an important role in shaping people's habits and usage of WhatsApp. Though these connections are quite evident in places, the indirect influence on other aspects needs to be explored step by step. For example, while the surveyed individuals show anticipation towards distant connections, bonding social capital in close connections is reflected in terms of trust, anticipation, and joy. Sentiments of fear and anger are also reflected indicating the concerns and stigmas around the usages, these sentiments recur among users who are less acquainted with the new technology (e.g. older people) and those whose awareness of instant messaging is mostly indirect.

There are two orders of implications from this study. Firstly, the stylized facts reported here – of which we have sought to reach primary sensemaking through Putnam's theory – display a high degree of heterogeneity, hence providing a first picture of the range of sentiments associated with new technology in a rural area. These sentiments – and the relations of their variety with different categories of users within the same context – require greater analyses to understand the roots of their formation, and to appraise their implications for usage of WhatsApp and other instant messaging services. The stylized picture produced in this study constitutes a solid basis to do so, in further analyses that will focus on sentiment formation – building causal theory on the roots of sentiments – and the consequences of the associations of specific sentiments with technology usage.

Secondly, this study serves as a means to throw light on the advantages of using mixed methods in ICT4D. Mixed methods, which traditionally see a limited application in our discipline, have recently been taken up in the Information Systems (IS) discipline (e.g. Zachariadis et al. 2013) as a means to illuminate the same phenomenon through multiple, complementary angles. Our study has sought to do so by combining the quantitative insights of sentiment analysis with the qualitative features of thematic analysis, hence providing primary explanations for the quantitative results displayed. This has led us to observe a quantitative picture of the data collective and, at a second stage, provide qualitative explanations for it, hence integrating two methods that do not find large complementary applications in ICT4D to date.

It is the benefits of this mixed-method application that we want to throw light on as we conclude the paper. In a domain like ICT4D, where interpretive research predominates, mixed methods offer the possibility to explore the same phenomenon under two concomitant lights, which illuminate each other by providing complementary insights on the same observation. The importance of doing so, already illustrated in IS at large (Zachariadis et al. 2013), is enhanced in ICT4D by the importance of appraising users' view of phenomena, to avoid the design-reality gaps (Heeks 2002) that lead to failure. We hope, on these grounds, that our study can serve as a basis for wider applications of mixed methods to ICT4D, with a view of generating more in-depth appraisals of user perspectives in their context of generation.

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