

BROWN, WILEY STEVEN, Ph.D. Toward an Understanding of the Impact of Mobile Data Services on Individual Quality of Life. (2016)  
Directed by Dr. Prashant Palvia 203 pp.

The ubiquity of information technology has increased at an exponential rate since the inception of the internet. This phenomenon has only been compounded by the ability to connect through wireless mobile devices. The concept of quality of life (QOL) has been a highly researched area in many different disciplines, although there is a dearth of research on this concept and how it relates to the field of information systems. This study examines how mobile data services (MDS) is used in a multitude of life domains and what influence this has on an individual's QOL. This research incorporates both qualitative/interpretive and quantitative methodologies to better understand this phenomenon. First we conduct interviews to gain a better understanding of the life domains influenced by *MDS use* and how these different types or use influence the QOL of individuals. Next a large scale quantitative survey is undertaken to test the hypothesized relationships emanating from the interpretive study. The survey is then administered in two different countries to test the significance national culture might play on *MDS use*. Findings suggest similar results from the U.S. and India and provide support for the usefulness of the research model and Maslow's Hierarchy of Needs theory to explain how *MDS use* relates to an individual's QOL. Contradicting much of the literature on the negative effects of work-life conflict and *MDS addiction*, our findings suggest that individuals are motivated by certain needs and make rational decisions based on realized motivational needs. While work-life conflict and *MDS addiction* might have negative influence on relationships with friends and family, continued use of MDS

leading to these behaviors was shown to be positively related to esteem and self-actualization needs, respectively. Findings also suggest cultural differences paired with economic dissimilarities between the U.S. and India from the qualitative and quantitative studies.

TOWARD AN UNDERSTANDING OF THE IMPACT OF  
MOBILE DATA SERVICES ON INDIVIDUAL  
QUALITY OF LIFE

by

Wiley Steven Brown

A Dissertation Submitted to  
the Faculty of The Graduate School at  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

Greensboro  
2016

Approved by

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To Christina, Harrison, and Lincoln for all of your support and encouragement.

APPROVAL PAGE

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## **CHAPTER I**

### **INTRODUCTION**

With the inception of the internet and the proliferation of mobility in Information Technology (IT), we are now living in what is referred to as an “always on” environment. Pew Research reports that as of April 2015, sixty four percent of American adults own and use a smartphone device. Informate Mobile Intelligence reports that the average American is digitally connected for 4.7 hours a day and communication through electronic means is continuously increasing (Greengard, 2011). The term ‘ubiquitous computing’ was first expressed by Weiser (1991) as he anticipated computer capabilities in all places at all times. He also suggested that the technology would become so incorporated in an individual’s daily lives that we won’t even notice the devices that are connecting us. We believe the time Wisser (1991) describes is now.

In previous IS research, the overall performance of technology has been measured by how effectively it meets a specific need at the time of use. Examples include: measuring for satisfaction (Liang, Lai, & Ku, 2007) or intention to use (Gefen, Karahanna, & Straub, 2003). Many products are developed to meet specific needs and therefore measuring these types of technologies with the methods mentioned above is sufficient. Other technologies such as computers, tablets, and smartphones have the ability to meet a multiplicity of needs. One fundamental problem with trying to study these types of technologies in the same way is that they do not take into account whether

there is continued use of the technology and how continued use might influence the individual. IS research that focuses on the influence of continued use of technologies is growing rapidly and has been a main concern for many researchers (Anol Bhattacharjee, 2001; Lenz & Kuhn, 2004; Sun, 2013). An important function of IT is to improve an individual's life in some way but yet there is a dearth of IS studies that focus on how continued use of IT influences an individual's quality of life (QOL). This research seeks to fill this gap by exploring the nature of how mobile devices are being used and how this continued use influences an individual.

Our research agenda is to better understand how the use of mobile data services (MDS) influences an individual's QOL. The foremost objective of any IT is to make life better for the user by creating some form of added value. The IT of focus in this study is MDS, which is defined by Hong & Tam (2006, 164) as "an assortment of digital data services that can be accessed using a mobile device over a wide geographic area". We are interested in the ubiquity of IT and its influence on QOL, and so we share Hong & Tam's (2006) view of MDS and focus on devices that are connected through a mobile communication network (i.e. smartphones, iPhones) for this research. The uniqueness of MDS to connect individuals to the internet at all times has had profound effects on individual's behavior (Matusik & Mickel, 2011; Turkle, 2012). Before MDS, individuals were restricted by a connection that, at best, would allow them the freedom to roam about their workplace or home. An individual had to make a conscious decision to be connected to the internet through a desktop or laptop computer. Now with notifications through MDS, individuals are constantly reminded by a beep or a vibration that they have an

email or have received a friend request from a social networking site. Sometimes these interruptions are planned and beneficial such as a calendar reminder of an upcoming meeting (Matusik & Mickel, 2011). Unfortunately, many other times these notifications serve as interruptions that distract the individual from normal activities and cause them to focus their attention elsewhere (Church & de Oliveira, 2013). Continuous interruptions generate a world of constant distractions for those who choose to adopt MDS. What isn't well understood is how this new ubiquity and the unparalleled connectedness that is now available, due to advancements in capabilities of MDS, influences an individual's QOL. Do distractions associated with *MDS use* increase the chances of *MDS addiction*? What other *effects of MDS use* influence an individual's QOL?

This study consists of four major objectives. First we explore the ways MDS are used in different life domains. Previous research on *MDS use* (Jung, 2014; Yoo, 2010) suggests that researchers need to extend beyond IT adoption and better the understanding of how IT is being used and how what influence that use has on an individual's behaviors. This recommendation is most relevant for types of IT which can be used in many different ways to achieve a variety of objectives such as MDS. One of the most unique characteristics of mobile devices is the vast array of capabilities available in many different areas of an individual's life. Therefore, we seek to develop an understanding of the many life domains that are influenced by *MDS use*. Next we will investigate the effects associated with *MDS use* and how different levels of *MDS use* in certain life domains might influence these *MDS effects*. A large volume of previous research argues that the ubiquity of this technology has had major negative effects such as smartphone

addiction (Khang, Woo, & Kim, 2012; Turel & Serenko, 2010), technostress (Ayyagari, Grover, & Purvis, 2011) and also a negative impact on work-life balance (Chesley, 2005; C. A. Middleton, 2008; Yun, Kettinger, & Lee, 2012). This research seeks to better understand both the positive and negative *effects of MDS use*. Next, we present and test our research model which incorporates motivational needs from Maslow's Hierarchy of needs theory. We test how motivational needs relate to an individual's perception of their overall QOL. Lastly, this research explores how national culture might influence how individuals use MDS and how that use influences QOL. Using Hofstede's understanding of culture we see two main national cultural differences between the U.S. and India. When compared to India, the U.S. is more of an individualistic society that also measures lower in terms of power distance. By comparing both qualitative and quantitative data from the U.S. and India we seek to explain differences using prevalent culture research (Hofstede, 1984).

In summary, the main research questions for this dissertation include the following:

1. What life domains are influenced by the use of MDS?
2. What are the *effects of MDS use*?
3. How does *MDS use* influence overall QOL?
4. What role does national culture play in how *MDS use* influences overall QOL?

To begin to approach these questions, we first need to understand previous research on the constructs of interest including: *MDS use*, *effects of MDS use*,

motivational needs, and QOL. Then we discuss the exploratory qualitative study, which provides information in the development of the research model, and provides a better understanding of the first two research questions above. Following the qualitative study, we develop a positivist survey instrument which is administered in the United States to test hypothesized relationships which formed from the interview data. This instrument is simultaneously administered to individuals from India. We chose India because it represents a different national culture and helps us to explore the influence national culture might have regarding *MDS use* and help us explain implications of this research to different cultures.

There are numerous contributions of this research agenda containing both practical and research implications. Developers are constantly searching for new markets for app development and information from this study provides life domains in which *MDS use* is not currently being utilized, therefore providing new markets for app developers. We also identify the positive and negative *effects of MDS use* and while some have been explored in previous studies, to our knowledge, no research has attempted to provide a holistic view of the *effects of MDS use*. While there has been a recent push towards research on MDS which addresses the negative *effects of MDS use* (Tarafdar, D'Arcy, Turel, & Gupta, 2015), adoption rates of smartphones continue to rapidly increase. Therefore we need to better understand the positive *effects of MDS use* the influence they have on QOL. Lastly, this research will explore the influence national culture has on the research model and the relationships hypothesized. It is infrequent that a study is duplicated in another country and we believe this part of the dissertation adds

insights into cultural differences on many levels. Measuring differences in *MDS use* and *effects of MDS use* provides a better understanding on how national culture influences the way individuals use this technology. Together, the overall contribution of the three Parts provides both new and improved knowledge about technology use and fills important gaps in research on this topic in the IS field.

The sections of this dissertation are outlined as follows: Section II includes a thorough literature review including concepts related to MDS and QOL. Section III comprises the theoretical foundations that relate the concepts of interest and guide the development of the research model. Section IV proposes the initial research model and the research objectives. Section V describes the methodology for each Part of the study. Sections VI, VII, and VIII discuss the three parts to the research agenda. Section IX includes the discussion of findings. Lastly, section X includes the conclusion followed by references and appendices.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Mobile Data Services (MDS) Use**

Global smartphone sales to individuals have grown 42.3 percent since the end of 2012 with a total of 968 million sold in 2013, according to Gartner, Inc. (2014). This phenomenal growth not only has the attention of the business world, it has researchers in a frenzy to better understand how this influences individuals and society.

A tremendously unique aspect of MDS revolves around the many ways it is used and the instant information that it provides individuals. Advancements from basic cell phones to smart phones has opened up a whole new realm of possibilities and with constant development of new applications (apps) for these devices, the possibilities continue to multiply. Moving forward from a recent time when individuals merely made phone calls and sent text messages, now they have the ability to make financial transactions, check email, purchase goods, record television shows, set home alarm systems, and the list goes on and on. The vast array of capabilities can only be compared to that of a computer. The main difference is that a computer (even a laptop) is larger and therefore less likely to be accessible at all times. Computers are also restricted to a location with internet access in order to maximize capabilities. Accessibility with MDS is available essentially everywhere. What effects do these new capabilities through the use of MDS have on individuals?

Previous research has characterized three main classifications that distinguish *IT use* by its purpose and therefore increase the understanding of the underlying objectives of *IT use*. The three main classifications of prior research comprise of utilitarian, hedonic, and social behaviors. For the purposes of this research, we focus on how these three groupings of *IT use* constitute how individuals choose to use their MDS.

Utilitarian use is described as facilitating effective and efficient action (Wakefield & Whitten, 2006). Some examples of utilitarian use include behaviors such as sending an email, retrieving documents, searching for information, making financial transactions, etc. While a large amount of research has focused on work related utilitarian use (C. A. Middleton, 2008), there is also a large amount of utilitarian use that can be associated with using MDS for personal activities. For example, an individual might use MDS to access personal bank accounts and make transfers through a mobile application or they can purchase new shoes for their children. Utilitarian use that centers around a personal agenda has been essentially ignored by previous IS research but it is essential to consider personal utilitarian use as we seek to develop a more holistic view of *MDS use*.

Another use classification from previous studies is hedonic behaviors, which are defined as actions that generate pleasure from the consumption or use of a product (Schroeder, 2010). Some examples of hedonic behaviors include playing games, watching videos, or participating in other entertainment related actions. For example, these include using a device to play “angry birds” while you are waiting to get your oil changed or surfing you tube for the latest trending videos.

The final classification used to explain the purpose of IT use is social behaviors, which are described as using IT to communicate in order to maintain and develop social relationships (Orlikowski & Scott, 2008). Examples include text messaging, calling, emailing, or communicating via social networking sites and applications. A growing number of individuals have also begun to use video messaging in order to socially connect with their friends, relatives, and even coworkers.

It is important to note that there is some overlap between the three types of use and they are not meant to be mutually exclusive (Wakefield & Whitten, 2006). For example, an individual sending an email might be involved in multiple classifications of use for the one action. The purpose of the email may be twofold as they are fulfilling both hedonic and social needs as this email is a way of sharing a joke which brings joy to the sender and also helps them maintain their relationship with the receiver of the email. Classifying IT use in this way has been well accepted in IS research and is useful to help us better understand why individuals are using their MDS.

The three classifications of utilitarian, hedonic, and social have helped researchers understand how individuals use their devices and have led to a number of studies involving adoption of MDS. A large portion of previous IS research on MDS adoption has been focused around the use of the Technology Acceptance Model (TAM) to understand why individuals adopt mobile devices (Chong, Chan, & Ooi, 2012). More recent research has called the use of TAM into question in environments that mandate the use of MDS such as work environments where phones are provided thereby misrepresenting results of this model (Wu & Lederer, 2009). Findings are somewhat

mixed but the main outcome is that TAM must be modified in order to understand individual behaviors in an environment which mandates use of the IT of focus.

Voluntariness is defined as the degree of free will in the adoption decision of an information system(Wu & Lederer, 2009) and has been found to influence both adoption and continued use (W. Wang & Butler, 2007). Hong & Tam (2006) developed an adoption model that reflects the unique characteristics and usage contexts of MDS which differ greatly from the adoption models developed for business use.

Research on the adoption of MDS has attracted many top IS journals, although more recently there have been multiple calls for IS researchers to focus on continued use and how the continued use of MDS influences individuals behaviors (Jung, 2014; Yoo, 2010). A recent article by Garg & Telang (2013) increases understanding of what individuals are doing with their devices by developing a method to better comprehend the applications individuals are downloading. They offer an innovative technique of using public data to deduce the rank–demand association for the purchased applications (apps) on Apple’s iTunes App Store. Actual differences between the number of downloads of apps is unclear, because the only publicly available information from Apple is ranked data. Using the Pareto distribution, they develop a method to infer differences between certain apps and find an actual difference between the apps ranked on the App Store by using only the public data supplied by Apple. They suggest that this method will be duplicated for the Android Play Store as well in future research. While the focus of this study seeks to develop a method in aiding future researchers in understanding how to find the exact number of downloads for apps, it does not help us understand what apps are

being used after they are downloaded. Just because a certain app is downloaded more does not mean that individuals are actually using that app more frequently or even keep the app on their phone after downloading. Therefore in order to better understand how individuals are using their apps we will need a different approach than what Garg & Telang (2013) have developed.

Another interesting bit of information from this article that helps inform the research agenda is a table which displays the category percentages of the apps that were downloaded from the App Store. This list is recreated in Table 1 below. App developers must choose from a list of predetermined categories provided by Apple to classify their apps into one category. It's useful to view the different categories and infer the vast range of life domains which are influenced by *MDS use*. Garg & Telang (2013) were interested in understanding how individuals use MDS by developing a method to bring meaning to the vast amounts of public knowledge on App downloads. While their main concern focused around better understanding the adoption of apps, this study will go a step farther by measuring the level of continued use of MDS in different life domains.

**Table 1. Percentage of Categories of Apple Store Apps in Top 200 Paid List**

<b>Category</b>	<b>Category Percentage</b>
Games	38
Productivity	13
Entertainment	7
Utilities	6
Photography	5
Education	5
Business	4
News	3
Music	3
Lifestyle	2
Books	2
Sports	2
Reference	2
Weather	2
Social Networking	1
Navigation	1
Travel	1
Finance	1
Healthcare & Fitness	1
Medical	<1

\*Adapted from: Garg & Telang (2013)

### **2.1.1 MDS Use: Beyond Adoption**

When new technologies are first introduced, the research base is typically focused around adoption but in order to remain useful research on that technology must soon shift towards studying that technologies continued use and value added. We believe that the number of smartphone adopters has reached a level in which research needs to evolve to focus on how these devices are being used and what influence that has on behaviors. Recent research by Jung (2014) and Yoo (2010) reiterate this idea by suggesting that research on MDS needs to move away from adoption and towards a better understanding

of what individuals are doing with MDS. In other words, research on MDS needs to focus on more than just the adoption of the mobile devices. It is suggested that one of the main reasons for the IS field to shift the focus on continued use is because *MDS use* offers the individual the unique ability to personalize their device in ways that allow them to pursue a variety of goals (Jung, 2014). In other words, individuals are not just adopting a static product with a set number of functions like many IT but rather a device with countless capabilities and functionality. Therefore, researchers should be much more interested in what individuals' are doing with the devices and how that impacts their lives (Yoo, 2010).

Kim, Kim, & Wachter (2013) present a study that extends beyond adoption in which they develop a model and test hypotheses surrounding the topic of mobile engagement. In their study, they propose a mobile user engagement (MoEN) model, which includes users' motivations, perceived value, satisfaction, and engagement intention in order to help explain mobile user engagement. Encompassing more than just user intentions, Kim et al. (2013) use motivations including utilitarian, hedonic, and social use to help explain how users reach perceived value, satisfaction and mobile engagement intention with MDS.

Recent research by Sun (2013) focuses on the adoption and post adoption of technology which suggests that individuals participate in herding behaviors while making IT adoption decisions and during the post adoption stage. Herding decisions are described as discounting one's own beliefs and imitating others while making adoption decisions. These adoption decisions are described as "fragile" meaning they can easily be

discounted in the post adoption stage (Sun, 2013). Herding research is more common in trendy markets such as fashion. This comparison helps to explain how some technologies can be so popular for a small amount of time, only to be abandoned for the next technological fad. Herding behaviors would seem to be extremely useful in explaining the erratic gaming and social media app markets which tend to increase rapidly and quickly decline (Soh & Tan, 2008).

A study by Bødker, Gimpel, & Hedman (2014) explores how MDS influences individuals by applying a Time-out/Time-in approach to longitudinal field study data of smartphone users. This purpose of this study is to develop and understand the evolution of the relationship between an individual and MDS. Using a combination of surveys, interviews, and focus groups the authors studied *MDS use* of a group of 15 graduate students of various demographics. They suggest that the early stages of adoption involve a time-out distinction in which the user is “taking time out of everyday life to accomplish a circumscribed task or engage reflectively in a particular experience” (Bødker et al., p. 143, 2014). For example, the user might take time out of everyday life to learn about their new device or to show friends a unique attribute of their device. As the ‘newness’ begins to wear off of their device, the users will participate in time-in behaviors in which the technology use corresponds with the flow of ordinary life. For example, a user might listen to music on their device while studying or they might spend some time on Facebook while waiting at the doctor’s office. Bødker et al. (2014) suggest that at a certain point the individual goes through a ‘becoming’ process when they move away from the time-out and into the time-in distinction. They argue that this is an ongoing

process in which the technology becomes more and more integrated into their daily lives so that an individual's life become indistinguishable from the technology.

Using a value-oriented perspective, Jung (2014) explores the goals users pursue through smartphone use. He argues that the value oriented approach is more appropriate to study MDS than the commonplace traditional research on user adoption, suggesting that “users are active subjects who pursue their own goals with the technology rather than passive individuals who are assumed to respond to the given technology” (Jung, p. 313, 2014). Therefore, rather than being interested in what factors influence an individual's adoption, Jung was interested in what individuals do with the technology, more specifically the goals they wished to achieve using the technology. Findings suggest that four elements: socialization, productive daily life, improving communication and acquiring information have major roles in the means-end goal structure; and that the two main functions used to satisfy these goals were the communication function and information search function. The author offers one major limitation of this study is that it does not account for the negative *effects of MDS use*, which is extensively documented in recent MDS research. Jung argues that the exclusion of negative *effects of MDS use* in this research stems from the use of a means end approach, which basically states that individuals use a means to a positive end goal, and he provides the following reasons as to why they should be included for future research.

Recently, a negative outcome of IT use has begun to receive attention from IS researchers (e.g. internet addiction in (Young 2007), technostress (Tarafdar et al. 2007)). Considering that a negative impact of IT use can distort individuals' IT behaviour, research on the negative side of IT use should be included in IS research (Turel

et al., 2011). Therefore, future research may need to revise the traditional means-end (p.317)

Our research agenda answers Jung's call to conduct research on *MDS use* which includes both positive and negative *effects of MDS use*.

## **2.2 Possible Effects of Mobile Data Services (MDS) Use**

A new focus has emerged from recent research in the field of IS which draws attention to the negative *effects of MDS use*. Examples include smartphone addiction (Khang et al., 2012; Turel & Serenko, 2010), technostress (Ayyagari et al., 2011) and the negative impact on work-life balance (Chesley, 2005; C. A. Middleton, 2008; Yun et al., 2012). The *Information Systems Journal* has issued an ongoing call for papers on "The dark side of information technology use" (Tarafdar et al., 2015; Tarafdar, Gupta, & Turel, 2013). Tarafdar et al. (2013) suggest that the benefits that IT use has enabled can sometimes lead to unpredicted negative effects such as "addiction, misuse, overuse, overload and stress" (p.270).

As the popularity of smartphones has now saturated the personal market and individuals have found themselves unable to disengage from behaviors such as texting, participating in social media, or playing online games (Khang et al., 2012). A recent book by sociologist Sherry Turkle entitled "Alone Together" seeks to help better understand the cultural changes that are taking place due to the ongoing use of mobile technologies (Turkle, 2012). The second part of the book focuses on Turkle's research on mobile devices and how living in an 'always on' environment impacts the ways

individuals interact with one another. Her research centers on teens and how they have been influenced by advancements in mobile device capabilities such as: text messaging, participating in social networks, and playing multiplayer online games such as second life. The book discusses the stresses on teenagers as they are constantly interacting with family, friends, and strangers through these different types' media. Another important idea that emerged from Turkle's research suggests that individuals are abandoning face to face communication. There is a dramatic decrease in the act of speaking with others whether face to face, or on the telephone. These methods of communication are being replaced by less invasive methods of communication such as email and texting. Turkle (2012) also documents the continued struggles individuals face concerning how much information they want to share about themselves through social media. She explains how many individuals often create profiles that represent an exaggerated version of themselves or completely misrepresent themselves in a positive light. Another interesting area discussed in this book is the increased participation of individuals in virtual communities. People create their own avatars and inhabit virtual worlds as a method of escaping the boring and sometimes harsh realities of their actual lives. Turkle (2012) suggests that many of these individuals say that they prefer their virtual lives over their actual lives. From this research it's clear to see how mobile devices continue to constantly influence individual behaviors. The following sections present relevant *effects of MDS use* which have been included in previous studies.

### **2.2.1 Mobile Phone Addiction**

When email-enabled phones came into existence, the term “crackberrys” quickly became known as slang for Blackberry mobile devices, because of the inability of users who own this brand of phone to detach themselves from the technology (Mazmanian, Orlikowski, & Yates, 2004). The Blackberry was one of the first brands of smartphones with email capabilities and therefore were adopted primarily by working professionals so that they could have access to email away from the office. Unfortunately, research has found that *MDS use* entails unanticipated consequences such as addiction which results in a dependence on the technology. Research by Mazmanian et al. (2004) focused on understanding how individuals become addicted and find themselves unable to disconnect from certain behaviors. For example reading work email while having dinner with their family or on a date with their spouse. The negative aspects of mobile device use include dysfunctionality and addiction (C. Middleton & Cukier, 2006; Turel & Serenko, 2010). “Mobile email addiction is a form of non-substance addiction that involves excessive interaction with both a mobile technology (mobile device) and the content (electronic communication) under conditions of psychological dependency” (Turel & Serenko, 2010). Researchers on the topic suggest that mobile email addiction may be a problem which both organizations and individuals need to address to reduce the risk of negative consequences. Capabilities accessible through MDS have now advanced well beyond the focus of Turel & Serenko’s (2010) study on mobile email use, presenting individuals with new capabilities that may be even more addictive, such as the use of social media and multiplayer games.

A recent study by Oulasvirta, Rattenbury, Ma, & Raita (2011) focuses on habits related to *MDS addiction* involving the repetitive habit of frequently *checking* one's device. They suggest that the number of capabilities and ubiquity through the use of smartphones allows a unique habit forming behavior they refer to as *checking*. For example, clicking the power button to view information on your device even if you haven't received any messages or notifications. While they conclude that the habit of *checking* one's phone was considered more of an annoyance rather than addiction, they also suggest that as smartphone developers continue to proliferate quick access capabilities to dynamic content, behaviors such as checking one's device will become more addictive in the future. This research article was based on secondary data from a previous study and data was collected from 2004-2005. It is unknown how the *checking* behavior has changed since that time and what impact this has on perceptions of addiction. Has technology reached the point where Oulasvirta et al. (2011) have suggested, where the *checking* behavior becomes an addictive effect rather than an annoying effect.

### **2.2.2 Technostress**

Studies such as by Mazmanian et al. (2004) suggest that individuals feel pressure to be responsive and available at all times which can sometimes be stressful. The conception of technostress has been an interesting focus of recent research on information communication technologies (ICTs). While the term technostress was introduced in 1984 by a clinical psychologist named Craig Brod, research on the concept has only recently received increased attention from IS researchers. Technostress refers to the stress

experienced by individuals due to the use of ICTs. The array of recent research focuses on understanding: the antecedents of technostress (Ayyagari et al., 2011), influence on role stress and productivity (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007), and how technostress influences job satisfaction and commitment (Ragu-Nathan et al., 2008).

No research on technostress has focused solely on what types of *MDS use* might influence technostress. Ayyagari et al. (2011) included MDS in their conceptualization of ICTs but also included other forms of ICTs such as computers, software and other technologies. The pervasive nature of MDS warrants the need to study how it might influence technostress. Previous research is very useful in understanding the ways technostress is related to job related ICT use. We believe the infiltration of *MDS use* for personal agendas might also influence an individual's technostress. A study by Matusik & Mickel (2011) corroborates the notion that mobile devices are being used for much more than work related activities. They suggest that the employer, who once held a central role in influencing how individuals use their mobile devices is not as influential as previous studies have suggested. While much of the focus on Technostress has been on work related use, Matusik & Mickel (2011) suggest that not only do individuals feel pressure to be responsive and available for work related needs, they also feel the same pressures to be responsive and available to sources external to their employers, such as family, friends, and communities. With the maturity of *MDS use*, the increasing number of individuals adopting this technology, and the increasing amount of *MDS use* for personal agendas merits the need to better understand how MDS and technostress might be related.

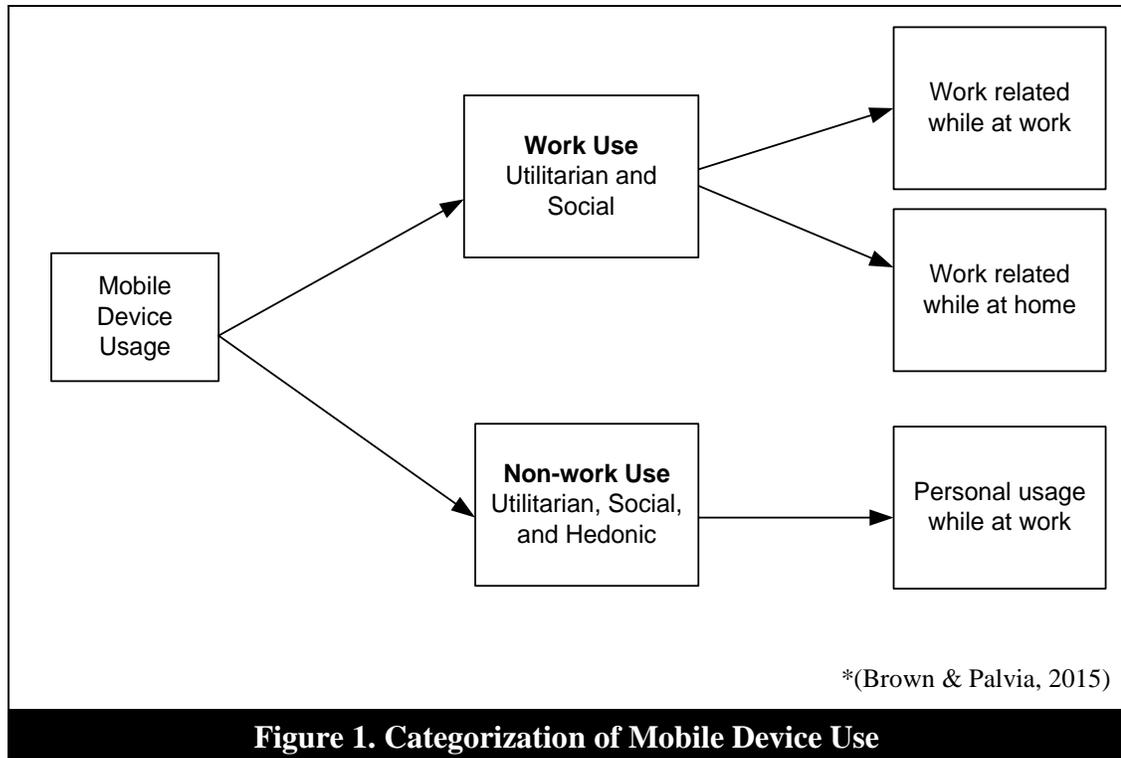
### 2.2.3 Work-Life Balance

The adoption and continued use of MDS began with a strong push from businesses that issued email enabled mobile devices to their employees in order to improve response time, preparedness, and the conception of being available at all times. (C. A. Middleton, 2007). Work-life balance can be explained as a person's perception of concord and stability between work and life domains (Hill, Hawkins, Ferris, & Weitzman, 2001). Work-life balance is a well-researched concept in the field of human resources (Chang, et al. 2010). As a construct, work-life balance can be operationalized as high satisfaction or low conflict in both work and life domains (Chang et al., 2010).

A study conducted by Chesley (2005) focuses on understanding how mobile device use influences negative spillover between work and home lives. In this longitudinal study, they concluded that mobile device use is directly related to negative spillover while computer use is not related to negative spillover. This finding suggests that the influence of *MDS use* is much different than that of computer use, which is constrained by location.

In a recently published study, we developed a research model and survey instrument to empirically test how *MDS use* influences work-life balance (Brown & Palvia, 2015). Results from this previous study were the motivation for this dissertation which serves as a pilot study. The focus of that study showed how the use of MDS relates to the struggle individuals perceive in finding a balance between two life domains (work and life). Concepts of interest in the domain which were included in this study consist of *MDS use*, productivity, employer expectations, flexibility in work structure,

and work-life balance. Figure 1 demonstrates this novel categorization of *MDS use* as it pertains to the work and life domains. This categorization builds on previous research to incorporate the three use categories of utilitarian, hedonic, and social.

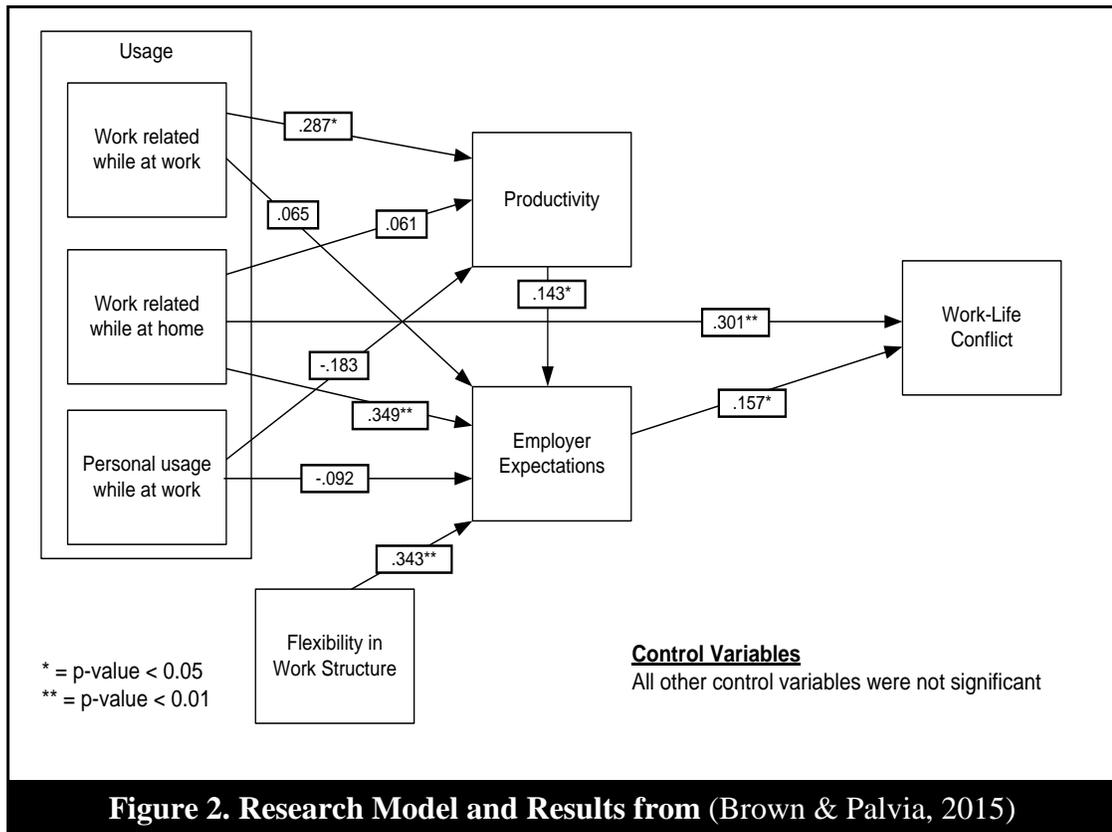


**Figure 1. Categorization of Mobile Device Use**

In order to study *MDS use* and how it influences work-life balance we found it useful to develop this categorization to show how different types of use influenced concepts in different ways. Therefore we distinguished between the type of use (utilitarian, hedonic, and social) and the location where the use was taking place, in order to operationalize the different ways individuals use MDS and how that use might influence work-life balance. While more recent research has shown hedonic use to be relevant in the work place in certain situation such as training and user engagement (Kim

et al., 2013) hedonic use was not included in the conception of work related use for this study. Research shows that while users may find pleasure from work related IT use, the inherent reason for the incorporation of hedonic IT use in the work place is because of the strong underlying associated utilitarian and social motivations. For example, a training simulation at work might have a strong underlying utilitarian motivation to help employees better understand procedures in the work environment but might also be classified as hedonic.

Based on previous IS literature, we created a theoretical model to illustrate the constructs of interest and how they relate to one another. Data was collected from 165 individuals of varying demographics, who were required to be employed and use a smartphone device. This research serves as an important step in understanding the influence mobile device use has on employees' perceptions of productivity, employer expectations, flexibility of work structure, and work-life balance. Our model showing the results is shown in Figure 2 and the findings and hypotheses are listed in Appendix B for your convenience.



Highlights from the findings of this study include:

- individuals using mobile devices for work related activities while at work will have increased productivity
- employer expectations have increase due to:
  - an increase mobile device use at home to conduct work related activities
  - greater productivity
  - greater flexibility
- the use of mobile devices at home for work related activities contributes directly to work-life conflict
  - increased employer expectations contribute to work-life conflict

This research functioned as a precursor and pilot study to this dissertation. As stated before the use of MDS continues to increase in an unprecedented way. *MDS use* has extended beyond the professional domain and is now very prominent in personal related domains as well. As the IS research community has suggested we have extended the research from understanding the influence MDS has on working professionals to include a more holistic view of how *MDS use* is influencing individuals in all of life's domains. The motivation of this dissertation aligns with the growing number of individuals who are adopting and using MDS for personal use in many different life domains and warrants further exploration.

### **2.3 Quality of Life (QOL)**

The concept of QOL has been a topic of studies in many fields including sociology, psychology, economics, marketing, health-care, education, etc. Unfortunately the concept of QOL has been typically ignored in the IS literature despite a few studies. Some papers focus on a particular life domain in order to evaluate QOL, for example measuring the quality of work life (Igbaria, Parasuraman, & Badawy, 1994) rather than trying to understand how technology might influence an individual's QOL as a whole. A few IS studies have focused one satisfaction with one or two life domains but very few have considered a holistic view of QOL. One explanation is that researchers may believe that the IT of focus in their study may not influence an individual's overall QOL but rather it influences a one or two domains, such as work-life balance.

A number of review papers on QOL have been published in other fields which outline the history of the construct, its definitions, and appropriate survey questions (Ferriss, 2004; Schuessler & Fisher, 1985; M. J. Sirgy et al., 2006). For a complete review of QOL you can refer to these papers. A full review is not included here for reasons of focus and brevity but we will discuss areas of importance.

The concept of QOL has been around since possibly the start of civilization (Schuessler & Fisher, 1985). Organizations such as the Russell Sage Foundation, the Institute of Social Research (University of Michigan), and the National Opinion Research Center at the University of Chicago supported research on QOL and social indicators throughout the 1960s and into the 1970s. While many researchers agree that the concept was termed QOL around the 1960's, studies that focused on closely related items such as happiness, wellbeing, and life satisfaction were already conspicuous in academic research (Schuessler & Fisher, 1985). One example is a book by Burgess & Cottrell (1939) on happiness in marriage. The conceptualization of QOL essentially grew from research which focused on measuring the living conditions of families and was comprised of a number of factors including socio-economic status, level-of-living, and social status (Sewell, 1940). This research was followed by Cottam & Mangus (1942) who identified satisfaction with individuals education, communication, economic security, housing, sanitation and safety, and electrical conveniences. They termed this phenomenon as the "standard of living". It was this body of research which led to a book by Campbell, A., Converse, P. E., & Rodgers (1976), where scale construction of QOL measures including satisfaction for several life domains was undertaken.

The review paper titled “Quality of Life Research and Sociology” by Schuessler and Fisher (1985) gives comprehensive examination of the research on QOL from the United States and Canada. QOL has been a highly researched area in sociology and many researchers have endeavored to define, measure, and better understand what influences QOL. Mixed findings suggest that while the concept of QOL and many related concepts are prominent in sociology research, QOL is not well understood and needs to be further explored. Ferris (2004) reexamined the concept of QOL and how it relates to the field of sociology by reviewing advancements in academic research after the Schuessler and Fisher (1985) paper was published. He suggests that the QOL concept “has not gained coinage in general sociology ...however, there is evidence that QOL concept is beginning to be recognized” as a topic worthy of research (Ferriss, 2004, p. 49). At the end of the review by Schuessler & Fisher (1985), a long list of criticisms and rebuttals is provided, demonstrating the concerning problems with the current research base and making recommendations for future research. These criticisms show a state of infancy for QOL research as they suggest a lack of a clear definition of QOL, specificity of the construct, a differing use of subjective and objective measures, no standard items for subjective measures, and a lack of theory (Schuessler & Fisher, 1985). While more recent research has attempted to develop a better understanding of QOL and fill the gaps mentioned above, some of these criticisms are still in existence today.

Ventegodt, Merrick, & Andersen (2003) develop the Integrated Quality of Life Theory (IQOL) which incorporates a spectrum of conceptualizations from the most subjective QOL construct of wellbeing to the more objective measures of QOL such as

marital status, income, and health. This theory seems to try to incorporate all of the related constructs of QOL which are: wellbeing, life satisfaction, happiness, meaning in life, biological order, realization of life potential, fulfillment of needs, and objective factors (ranging from subjective to objective respectively). In an effort to unite related concepts into one QOL theory is insightful and interesting in explaining subtle differences in the aforementioned concepts, the theory itself is conceptual in nature and there is no mention of a way to measure its worth. The authors propose that the central construct, existential quality of life unites the subjective and objective measures. They also explain that it is “impossible to express...in words, because the experience does not belong to the world of logic and order but to the irrational, life's own space and quality, through an experience that is present and spontaneous and beyond any dimension that would be required of rational description and analysis” (Ventegodt et al., 2003, p. 1037). Therefore, while this theory is useful for understanding related QOL constructs, it is not currently a testable theory.

Felce & Perry (1995) describe the concept of QOL as “elusive” and suggest that the conceptualization in academic research has been erratic. In this research, the authors propose a model of QOL that includes subjective measures, objective measures, and individual values. Subjective measures seek to identify how an individual perceives their QOL by asking questions such as “how happy are you with your everyday life”. Objective measures seek to understand the lifestyle conditions of an individual by collecting data such as income, living conditions, physical health, etc. (Felce & Perry, 1995). Lastly, individual values allow the individual to rank life domains in regards to

the level of importance. This addition allows the researcher to understand why individuals with the same satisfaction levels of QOL in a certain life domains might have differing views on overall QOL. This is because they have dissimilar individual values of how important that life domain is to them. In other words, Felce & Perry (1995) suggest that individuals have differing perceptions of the importance of life domains and how they influence their overall QOL. They suggest that objective descriptors, subjective indicators, and individual values influence overall QOL. These three constructs are conceptualized as having a triadic reciprocal relationship and it is also suggested that all three concepts can be influenced by external factors.

Our definition of QOL matches best with what Ventegodt et al. (2003) place on the most subjective spectrum, called *wellbeing*, which is described as an assessment of one's own quality of life. We adopt the view that QOL is defined as an individuals' cognitive evaluation of fulfillment in needs or wishes in important life domains (Campbell, Angus, Philip E. Converse, 1976). This conceptualization matches with the definition of subjective wellbeing in some literature and the two terms have been used interchangeably in most of the QOL literature (Ed Diener, 2000). For the purposes of this study we will refer to this concept as QOL. An interesting characteristic of QOL is that it requires a self-evaluation of an individual's satisfaction with life. An interesting characteristic of *MDS use* is its potential to influence a large number of life domains and therefore it is appropriate to investigate how *MDS use* influences various life domains as well as overall QOL.

### **2.3.1 Life Domains**

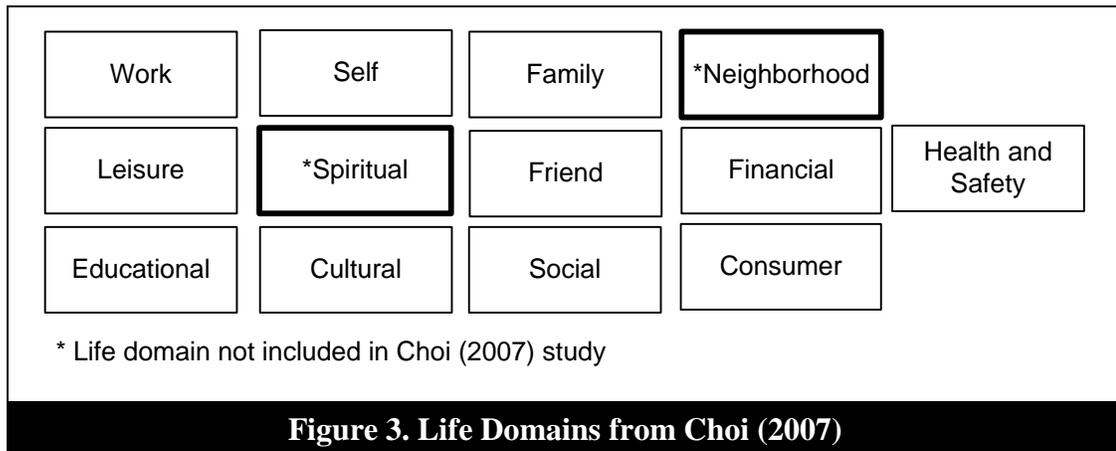
QOL is described as a multi-dimensional construct so in order to better understand perceptions of overall QOL, it is often necessary to break the concept down into smaller sub categories called life domains. Schuessler & Fisher (1985) describe how most researchers limit QOL to a particular life domain. Examples of this view include research on quality of urban life, quality of work life, and quality of family life. This more granular view allows researchers to better understand what influences a particular life domain and in turn how changes in that life domain influence overall QOL. Very rarely has any research attempted to include all life domains.

Different methods have been used to better understand how much particular life domains influence overall QOL. For example, Browne et al. (1997) developed a weighting scale to evaluate the level at which particular life domains influence overall QOL. Through a procedure called “judgment analysis”, weights for domain importance are derived. They suggest that sometimes this procedure may be impractical and therefore the authors developed and tested a direct weighting procedure which bypasses the need for subjective analysis (Browne, O’Boyle, McGee, McDonald, & Joyce, 1997).

Another area of concern in understanding how life domains influence overall QOL is the vast number of domains and the lack of general consensus on specific domains to include in overall QOL. Research by Cummins (1996) grouped 173 different life domains into seven headings as used by the Comprehensive Quality of Life Scale (ComQol). The seven headings consist of: material well-being, health, productivity, intimacy, safety, community, and emotional well-being. Felce & Perry (1995) developed

a similar framework which consists of five groupings: development and activity, emotional wellbeing, social wellbeing, material wellbeing, and physical wellbeing. Other attempts have been made to organize and condense the number of significant life domains but to date there is no consensus of any kind.

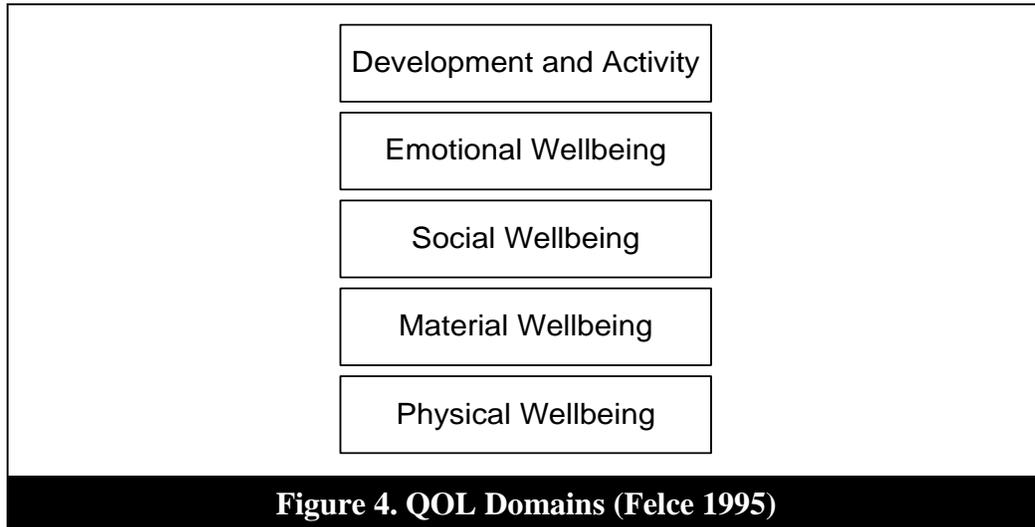
More recent research by Choi et al. (2007) developed a framework of life domains by conducting an in depth literature review. They suggest thirteen life domains from previous studies on QOL. In order to better understand the influence of life domains on overall QOL, often researchers only focus on a single life domain such as quality of work life. QOL is a multi-dimensional construct and therefore sometimes it is difficult to understand or include all life domains in one study. In order to avoid this issue researchers focus on a limited number of life domains which allow the researchers to better understand what influences a particular life domain and consecutively how that will affect overall QOL. Life domains included in the Choi et al. (2007) study are cultural, leisure, work, educational, consumer, financial, health and safety, family, friend, social, self, neighborhood, and spiritual. Through a sequence of focus group interviews they suggest that only 11 of these 13 life domains are influenced by MDS. Figure 3 displays the thirteen life domains and the two bolded life domains were found not to be influenced by MDS.



While there was overlap in the research we found on life domains, there was no consensus on the life domains which should be included. Felce & Perry (1995) argue that there is more agreement on the important life domains than on the conception of QOL. Using previous research on life domains they develop a typology which is recreated in Figure 4. The authors categorized previous research on life domains under these five dimensions: physical wellbeing, material wellbeing, social wellbeing, emotional wellbeing, and development and activity.

Felce & Perry (1995) propose that physical wellbeing includes the life domains of health, fitness, and physical safety. Material wellbeing includes domains such as income, possessions, transportation, neighborhood/home, and security. Social wellbeing consists of interpersonal relationships with family and friends and community involvement. The emotional wellbeing dimension subsumes self-esteem, self-fulfillment, religion, and status. Lastly, Development and Activity includes life domains such as education, leisure, and career. For the purposes of their research model, individuals would be asked

to rank the importance of life domains in order to give meaning to the objective and subjective measures collected.



Similar weighting scales are used to measure QOL in the field of psychology, such as The Schedule for the Evaluation of Individual Quality of Life (SEIQoL). Others include one developed by Browne et al.(1997), which is intended for those lacking the time for SEIQoL and the judgment capabilities necessary with that measure.

The earlier frameworks (Cummins, 1996; Felce & Perry, 1995) seem a bit oversimplified while Choi (2007) provides a framework that encompasses a wide range of life domains in which there seems to be a great deal of overlap between domains. In part I of this dissertation we conduct a qualitative study through the use of interviews in order to develop our own life domain framework. This framework allows us to determine how MDS is being used in relevant life domains in order to study how *MDS use* influences QOL.

## 2.4 Culture and MDS

Studying the effects of cultural differences has been an area of exploration that has attracted numerous fields of academic research. Culture is defined as “the collective programming of the mind which distinguishes the members of one category of people from those of another (Hofstede, 1984, p. 389). For the purposes of this research agenda, we seek to better understand how cultural differences might influence the constructs that are included in our study. For example, previous research has shown that culture can play an important role in influencing *MDS use* (Best, 2014; Kauffman, 2005), individual needs and motivation (Maslow’s hierarchical needs) (Hofstede, 1984; Taormina & Gao, 2013), and the levels of perceived QOL (Ed Diener, 2000; Leelakulthanit & Day, 1993).

While there are a number of studies that examine mobile phone adoption in a specific country (Lu, Liu, Yu, & Wang, 2008; Niculescu & Whang, 2012), there are not many studies which are interested in understanding how cultural differences might influence continued use of MDS. A recent study by Techatassanasoontorn & Kauffman (2014), concerned with better understanding the diffusion of mobile devices, suggests that culture may play an important role in the adoption of MDS. In their study, to better understand the gap in early stages of diffusion known as *takeoff*, they use cultural clusters of countries in order to account for cultural differences. They also suggest that differences in culture will influence IT usage by world regions. For example, more advanced countries will “enjoy advanced multimedia applications” through *MDS use* while individuals in developing countries such as Africa rely on MDS for “basic

economic needs” such as seeking employment (Techatassanasoontorn & Kauffman, 2014, p. 87).

Understanding the concept of QOL across cultures requires a better understanding of how it has been studied in previous research. The concept of subjective wellbeing (SWB) and QOL are used interchangeably in many research initiatives (Felce, 1997). Diener et al. (1999) provide an evaluation of research on SWB. In this study, they suggest many cultural differences in how individuals from different national cultures evaluate the quality of specific life domains. For example, they suggest that wealthier nations appear to have a higher SWB than poor nations. Surprisingly they found that differences in individual’s income does not have a causal relationship to SWB in wealthier nations, whereas the same cannot be said for poor nations (E Diener et al., 1999). This finding supports Maslow’s Hierarchy of needs in which the poor nations are more interested in fulfilling basic human needs and therefore income is more essential to their evaluation of QOL so that they can afford the basic motivational needs.

A study by Leelakulthanit & Day (1993) compared QOL measures for individuals from the U.S. and Thailand. The major finding from this study was that the U.S. in general has a higher QOL. Also, evident from this study is the significant importance of material needs and economic development for individuals from Thailand but these were not significant in the U.S. This finding again supports Maslow’s Hierarchy of Needs in evaluating QOL. Diener (2000) provides some interesting insights on the correlation of income and QOL and how culture may be the reason for irregularities found in previous studies. Japan was ranked as a high income country but had very low measures of SWB.

Diener suggests that this may be due to the fact that Japan is a “highly regulated society with strong conformity pressures and very high expectations” (Diener, 2000, p. 39). Also noted from this study was a number of really poor nations who reported higher than expected SWB due to the fact that they have much lower expectations and are satisfied with less, as compared to the more wealthy nations. Our study will explore the cultural differences in *MDS use* by comparing findings from two countries with differing cultures in order to better understand cultural differences. We chose to explore the U.S. as the focal country of our study and we also chose India as they represent differing levels of both economic development and national culture.

Other than cultural differences discussed in countries with differing economic factors and GDP/income, which are well documented, we also use Hofstede’s four dimensions of national culture to compare findings from the U.S. and India (Hofstede, 1984). Hofstede suggests that we can measure differences in culture by examining how a group of people value *masculinity*, *individualism*, *power distance*, and *uncertainty avoidance*. *Power Distance* “defines the extent to which the less powerful person in a society accepts inequality in power and considers it as normal” (Hofstede, 1984, p. 390). For example, a democracy would have low *power distance* because all individuals have the right to vote and each vote carries the same weight. *Individualism* is a characteristic of culture in which a group scoring high in *individualism* will be concerned mainly with their own interests and the interests of their immediate family. On the other hand, a group scoring low in *individualism* consists of a tightly integrated society where individuals feel like they are part of a group and will make decisions based on the

interests of that group. Countries that score high in *Masculinity* are concerned with power ambitiousness and competitiveness while more feminine cultures place value on building relationships and caring for others. Lastly, *uncertainty avoidance* is a characteristic of culture which measures how comfortable an individual feels in situations that are unstructured or unpredictable and the extent to which that individual will try to avoid these types of situations (Hofstede, 1984). In a larger study comparing national culture Hofstede evaluated countries on how they scored on these four factors. Two main differences are found between the U.S. and India. India represents more of a collectivist society and therefore they scored much lower (48) on individualism than the U.S. (91) (Hofstede, 1983). These two countries also differ greatly when comparing their power distance scores. The U.S. has a power distance of 40 and India has a much higher score of 77 (Hofstede, 1983). This suggests that the national culture in the U.S. is more concerned with their own interests and the interests of their immediate family and individuals from India are more likely to be more loyal to a group. We believe these cultural differences to be evident in this study and will discuss their relevance to our research model and the constructs of interest.

## **CHAPTER III**

### **THEORETICAL FOUNDATIONS**

#### **3.1 Mobile Data Services and Quality of Life**

An abundant amount of IS research has focused on adoption of IT and tries to better understand the adoption process and the characteristics or antecedents that lead to adoption (Hong & Tam, 2006; Venkatesh & Brown, 2001). While these types of studies are important, they ignore any lasting effects that the adopted technologies have on individuals or societies. IT in general have been shown in some studies to have a positive influence on an individual's QOL (Artz, 1995; Hills & Argyle, 2003; Wei & Leung, 1998). There have been limited studies that focus on the positive influence of MDS other than those of influencing a given life domain or meeting a certain need. The vast array of capabilities available to individuals through *MDS use* sets it apart from other types of IT, and therefore it's important to understand how MDS influences global QOL. Research that indicates a positive effect of MDS seems to only be concerned with adoption (Hong & Tam, 2006; Lu et al., 2008; Sarker & Wells, 2003) while the research on continual use and influence of MDS have shown an abundance of negative effects. One exception to this skewed negative view of MDS engagement is a study by Choi et al. (2007) which focuses on how mobile devices positively influence a number of life domains and overall QOL. By incorporating the satisfaction hierarchy model and bottom-up spillover theory, Choi et al. (2007) show that satisfaction with mobile devices has significant influence on

an individual's satisfaction in important life domains which spillover to satisfaction with overall QOL. While we applaud efforts by Choi et al. (2007) to incorporate a holistic view of QOL, a major weakness, as noted by the authors themselves is that the questions measuring MDS experience satisfaction were conveyed in positive terms and might lead to systematic response error (Singleton & Straits, 1993). Their research ignored any negative effects of continued *MDS use*, which is so well documented in IS research. Therefore this research does not provide an accurate understanding of how *MDS use* influences QOL. Therefore, considering the previous literature on IS, it would be important to incorporate both positive and negative effects when conducting a study that seeks to better understand how *MDS use* influences QOL.

Another major limitation of Choi's study is that it focuses on "satisfaction" with *MDS use* in life domains but ignores to measure the level of *MDS use* in each domain. The amount of use in a particular life domain, we argue, would have an impact on the negative and positive *effects of MDS use* and on QOL. For example, the impact on someone who uses email on her device once a week compared to someone who uses it every 15 minutes could be very different. One who checks email too frequently might perceive a negative effect such as an increase in work-life conflict. By measuring levels of *MDS use*, we can propose relationships between level of use and *effects of MDS use*.

Lastly, there are tautological issues in the Choi study. First, they measure attitudes associated with positive use and then follow by asking questions about how use in the associated domain has led to satisfaction with life domains and lastly, how *MDS use* influences satisfaction with overall life. There seems to be a great deal of correlation

between these questions, therefore the results might inflate the significance of the relationships. For example, suppose an individual is asked about how satisfied she is with her *MDS use* in the family domain by asking about their satisfaction level with “getting in touch with family members through MDS to relive their worries” (Choi, Lee, Im, & Kim, 2007, p. 613). That individual is then asked “how has the quality of your family domain changed since you first started using MDS. If an individual recognizes that MDS has allowed them to contact members of their family in a positive way, they will also perceive that MDS has positively influenced their family domain. So obviously there is a strong correlation between these two questions which would result in a significant relationship. Furthermore, these questions and measures seem to be repetitive and do not lead to an insightful understanding of how MDS influences an individual’s QOL.

In order to develop a refined understanding of QOL and expand on Choi’s framework, we developed a research model, which addresses many of the issues discussed above and draws from various theories and frameworks from the IS field and from sociology.

### **3.2 Relating MDS Use to QOL**

We discovered a couple of possible theories from the QOL literature to help us connect *effects of MDS use* to QOL. First, we’ll discuss Maslow’s Hierarchy of Needs Theory and how it compares to the QOL facets hierarchy presented by Felce & Perry (1995). Next, we’ll discuss a lesser known theory of QOL called Multiple Discrepancies

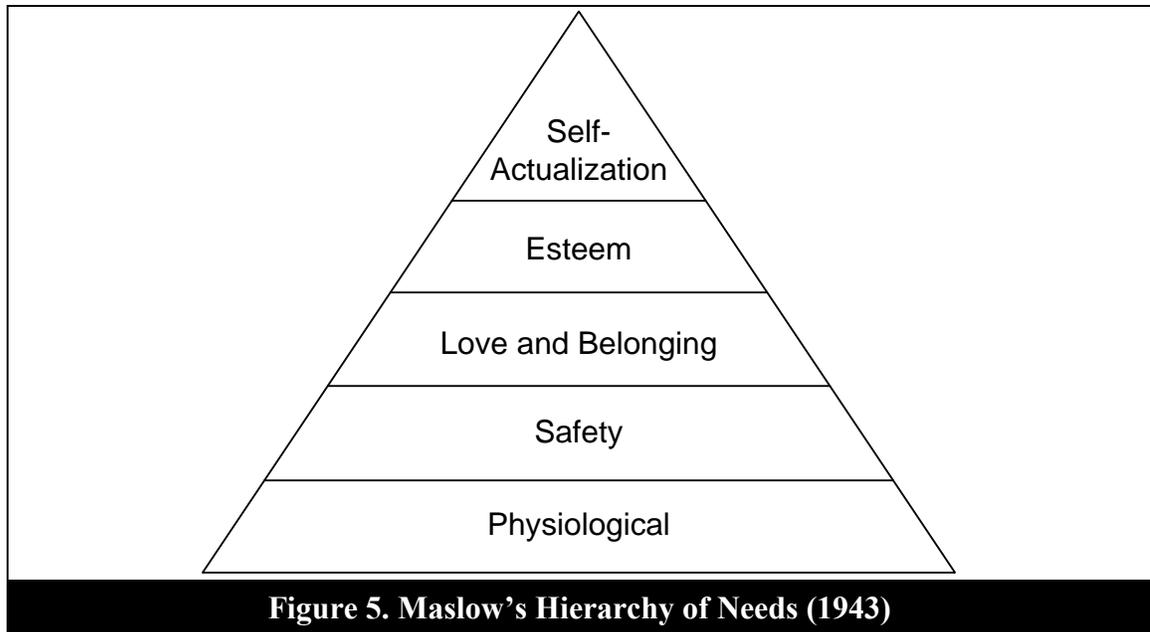
Theory (MDT). We chose to include motivational needs from Maslow's Hierarchy of Needs in the final research model to relate *effects of MDS use* to QOL. MDT was removed from the research model due to issues related with measurement and results from previous studies on how well the theory accounted for QOL.

### **3.2.1 Motivational Needs**

An individual's conceptualization of their own QOL may contain many attributes and exhibit various characteristics. It may not be a simple linear or even a unidimensional scale. Attempting to measure the QOL domain on a unidimensional linear scale may be an oversimplification and results can be misleading. Therefore, we need to develop an improved and nuanced understanding of how to evaluate the importance of life domains. In this regard, the classical motivational theory developed by Maslow provides important underpinnings for this research.

The research by Maslow (1943) resulted in the development of a motivational theory known as Maslow's hierarchy of needs. This theory seeks to explain the motivation behind why humans behave the way they do. He suggests that all humans have certain needs and when those needs are not met, we are motivated to behave in ways to fulfill those needs. This theory is often illustrated using a triangle which includes the five levels of needs, from the lower order (bottom of the triangle) to the top order as illustrated below in figure 5. The two levels of basic needs are located at the bottom of the triangle and can be referred to as basic or deficiency needs. The two levels of needs located in the middle consist of psychological needs and the top level of Maslow's hierarchy of needs contains self-actualization which is considered a self-fulfilling need.

The lower order needs must be fulfilled before an individual will begin to be motivated by higher order needs. For example, an individual would want to make sure that they have food before they would worry about having a new car.

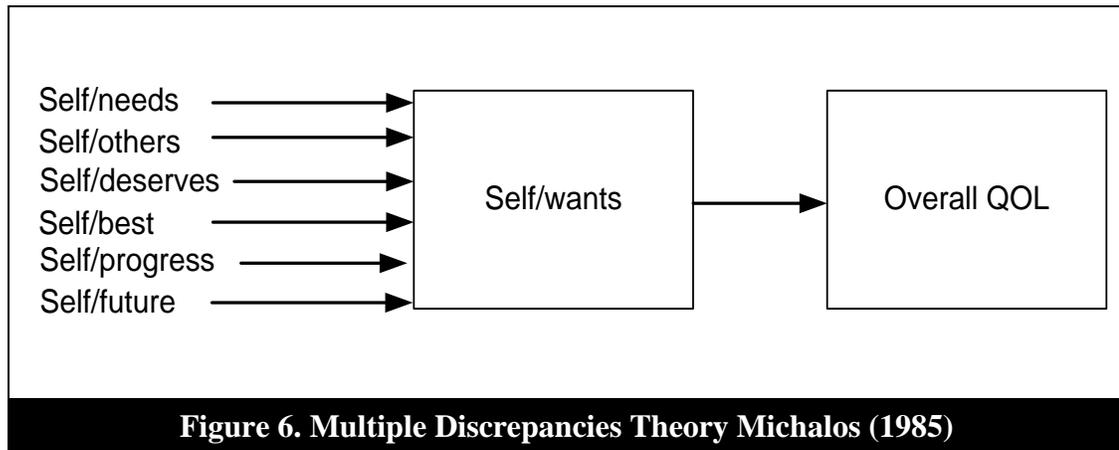


There have been criticisms to Maslow's hierarchy of needs theory. Wahba & Bridwell (1976) argue that the hierarchy is actually not a hierarchy at all and found little evidence to support the hierarchy. Hofstede (1984) argued that the hierarchy was ethnocentric and failed to represent individuals raised in a collectivist society. In spite of the criticisms, Maslow's hierarchy of needs theory remains a very popular framework in sociology and many related disciplines. Our own motivation in using this framework is to be able to relate various motivational levels at which life domains are impacted by the use of MDS. In the next section, we will begin to explain how these concepts relate to one another and explain the conceptualization of how *MDS use* influences QOL.

### **3.2.2 Self Wants Gap**

Multiple Discrepancies Theory (MDT), developed by Michalos (1985) is concerned with how individuals subjectively evaluate their QOL. MDT posits that there is a gap between what an individual has and what the individual wants (self/wants) which directly influences QOL. As seen below in Figure 6. Self/wants serves as the mediating variable between a number of discrepancy variables and QOL. These discrepancy variables include: self/needs, self/other, self/deserved, self/needs, self/progress, self/future, and self/best.

Self/needs is described as the perceived discrepancy between what one has now and what one needs. Self/others is the perceived discrepancy between what one has now and others have. For example, an individual might see pictures of a friend's new home on Facebook and make comparisons. Self/deserves consists of the perceived discrepancy between what one has now and what they feel like they deserve or merit. Self/best is the perceived discrepancy between what one has now and the best one has ever had in their past. Self/progress is the perceived discrepancy between what one has now and what one expected to have right now three years ago. In other words, this measures how an individual perceives they have progressed in the last three years compared to where they imagined they would be now three years ago. Lastly, Self/future is described as the perceived discrepancy between what one has now and what one expects to have in five years.



Since its conception MDT has been used mainly as a way to account for variance in QOL using a number of different approaches (Jacob & Brinkerhoff, 1997, 1999; Michalos, 1985; M. J. Sirgy et al., 2006) and to compare MDT to other QOL theories (Blore, Stokes, Mellor, Firth, & Cummins, 2010; Schulz, 1995). Findings from these studies are somewhat mixed in the amount of variance accounted for by using MDT and the adequacy of using MDT over other QOL theories. While initially we planned to include MDT in the model, measuring difficulties and less than satisfactory findings with previous studies caused us to remove it from the research model. We hope to include the concept of MDT in future studies as we believe the information available through MDS might have an influence in the discrepancies between how we evaluate our current situation with the things that we want to have.

## CHAPTER IV

### INITIAL RESEARCH MODEL AND OBJECTIVES

#### 4.1 Research Overview

As indicated in the literature review and theoretical foundations sections, research on the concept of QOL in the IS field is severely lacking. A few extant studies which have considered overall QOL include Artz (1995) who suggests that QOL has been enhanced with the evolution of the computer and Choi et al. (2007) suggest that MDS positively influences QOL. When evaluating how IT influences QOL, most researchers focus on satisfaction with a particular life domain. Unlike most IT, *MDS use* is unique in its ability to influence a multitude of life domains which requires a more holistic approach, in order to accurately measure QOL. A number of different research methods have been used to investigate the concept of QOL and possible factors that influence QOL including: interviews, ethnography, content analysis, and surveys. Recent research suggests that there is a dearth of mixed methods research in the field of IS and advocate that this type of research can help develop “rich insights into various phenomena of interest that cannot be fully understood using only a quantitative or qualitative method” (Venkatesh & Brown, 2013, p. 21). Following the requests of previous research to focus on continued use of IT (Jung, 2014; Yoo, 2010) and the use of mixed methods (Venkatesh & Brown, 2013), this study seeks to answer these calls by exploring beyond MDS adoption and focusing on the continued use of MDS and its influence on QOL.

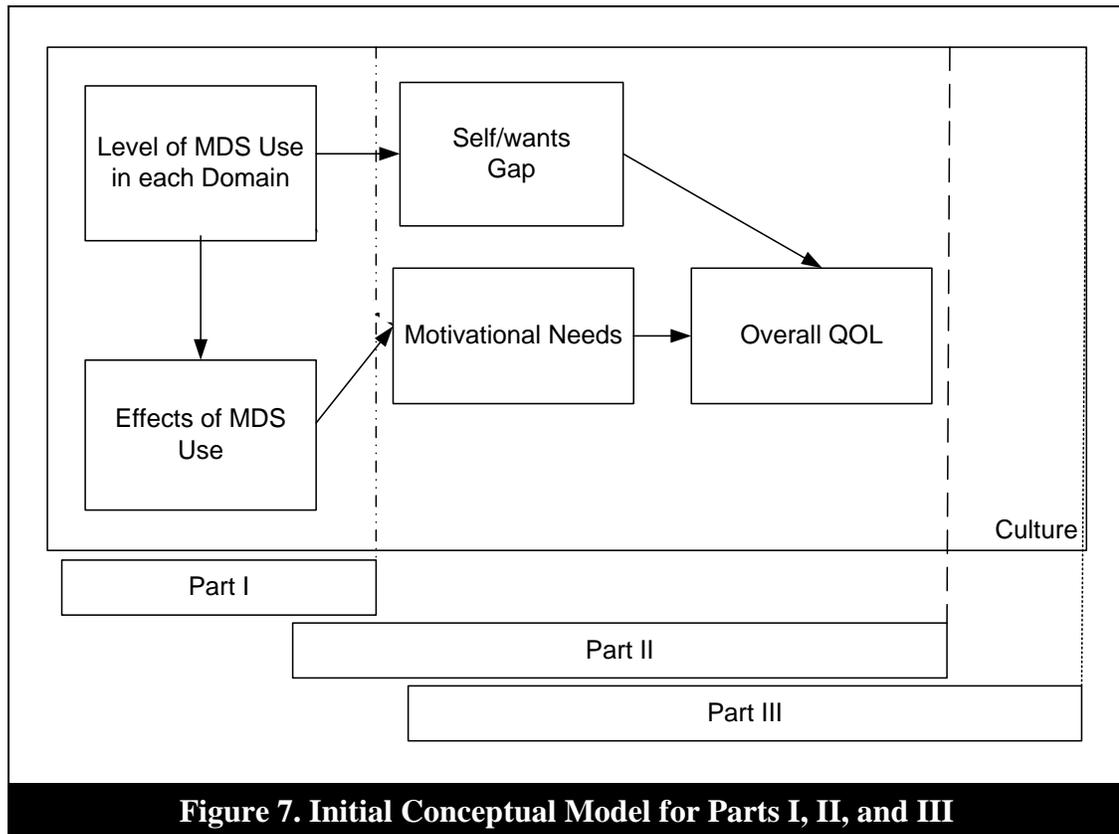
This research prospers from the combined use of qualitative interviews helping to build the research model followed by a quantitative survey method to test the research model.

Part I of this study has two main objectives. First, we develop an understanding of the many life domains that are influenced by the use of MDS. Second, we investigate the *MDS effects* associated with *MDS use*. For example: Turel & Serenko (2010) suggests a relationship between mobile email use and mobile phone addiction.

Collection of data through the exploratory interpretive study allows us to develop and better understand the relationships between *MDS use* in different life domains and the *effects of MDS use*. We collected data from the U.S. and India in able to provide a more holistic conceptualization of how *MDS use* influences QOL and how culture impacts this relationship.

In Part II of this research, we are concerned with establishing how the constructs from Part I (*MDS use* and *effects of MDS use*) influence QOL. By incorporating theory from Maslow's Hierarchy of Needs, we develop a better understanding of the motivational needs that are influenced by *MDS effects*. We collected data from individuals in the United States using a quantitative survey in order to test numerous hypothesis and to assess the value of the research model. Lastly, Part III of this research explores cultural differences in *MDS use* by using a cross cultural examination.

Administering the same survey instrument in India, we collect additional data on individuals from another country (with a different national culture) and compare findings with results from Part II to explore any cultural differences that influence the model. The initial research model is shown below in Figure 7.



## 4.2 Research Questions

The research questions described earlier coincide with Part I, Part II, and Part III in which each part of the study builds from the previous parts as seen above in Figure 7. From the interpretive qualitative study in Part I, we seek to answer the following research questions:

RQ1: Part I: What life domains are influenced by the use of MDS?

RQ2: Part I: What are the *effects of MDS use*?

Parts II and III consist of administering an online quantitative survey instrument to test the research model and determine any cultural differences emanating from the data.

Therefore, we seek the answers to the following questions:

RQ3: Part II: How does *MDS use* influence QOL?

RQ4: Part III: What role does national culture play in how *MDS use* influences QOL?

### **4.3 Preliminary Research Model**

#### **4.3.1 Level of MDS Use**

One important area lacking in research on *MDS use* in the IS field can be seen in how *MDS use* is measured. Academic research has been published which focuses on the negative *effects of MDS use* including concepts such as addiction (Turel, Serenko, & Bontis, 2011) and technostress (Tarafdar et al., 2007). We believe one essential element that has been overlooked in studies such as these is that the measurement used to account for *MDS use* is insufficient. A majority of IS research which does include a measure of *MDS use* has adopted a standard use measurement. This usually consists of one single item, such as asking an individual about the amount of time spent using MDS (Ayyagari et al., 2011). Research by Turel et al. (2011) provide a good measure of an individual's mobile email use with the inclusion of eight items in order to better understand addiction to mobile email. Given the numerous life domains in which MDS has influence, it would seem that using an overall measure of *MDS use* would be insufficient and we must expand upon what Turel et al. (2011) has created to include the numerous capabilities of MDS. Even research by Choi et al. (2007) who developed a number of items to measure MDS satisfaction in 11 life domains, lacked measures of actual use. Given the nature of this study and to inform research on *MDS use*, we believe that it is imperative to measure

the level of use in each domain so we can better understand how the level of use in each domain influences the *effects of MDS use*. In the research model, we propose that different levels of *MDS use* influence certain *effects of MDS use*. Specific hypotheses for these relationships are formed from the initial qualitative study. For example, in our survey instrument, we measure the level of *MDS use* in the professional domain and we also measure include the *MDS use effect* of work-life conflict. We hypothesize that the level of *MDS use* in the professional domain would have a positive relationship with work-life conflict. In other words, if an individual is constantly engaged in using their smartphone for work activities, we posit that they would also be more likely to experience work-life conflict. The *MDS use* and *effects of MDS use* constructs and relationships between them are developed in Part I of our study and tested in later Parts II and III of the study.

#### **4.3.2 Effects of MDS Use**

One of the major questions set forth from the call for papers in an ongoing special edition on negative impacts of IT in *Information Systems Journal (ISJ)* is “What theoretical frameworks can be developed to understand the paradox of positive and negative impacts associated with IT use? (Tarafdar et al., p.271, 2013). Since this time, ISJ has extended this special addition in order to better understand how IT use is influencing our society. This study will provide insightful information and will improve upon former studies by incorporating a holistic view of QOL by understanding how MDS is used in different life domains, and its influence on both positive and negative *effects of MDS use*. We have learned from previous literature that constructs such as mobile phone

addiction, technostress, and work-life conflict are some of the negative *effects of MDS use*. Other than aiding individuals in meeting certain defined needs, we believe the research on positive *effects of MDS use* is severely lacking. We seek to better understand both positive and negative *effects of MDS use* through our qualitative interpretive analysis in Part I. As seen in the example above, our quantitative survey will measure the levels of *MDS use* and what influence that has on the *effects of MDS use*. Therefore, we propose that there will be both positive and negative direct relationships between the level of *MDS use* and *effects of MDS use*.

#### **4.3.3 Motivational Needs**

Using Maslow's Hierarchy of Needs theory (Maslow, 1943) this research will seek to better understand how the *effects of MDS use* influence the motivational needs developed from Maslow's research. We use data from our interviews and previous research in this area to hypothesize the relationships between *MDS use* effects and Motivational Needs. Following Maslow's work, it can be assumed that individuals who feel that MDS has had the most influence on the self-actualization need should have the highest QOL. These concepts are discussed in more depth in Part II of our study.

#### **4.3.4 Self Wants Gap (from Multiple Discrepancies Theory)**

The conceptualization of self wants from MDT was initially included in the research model but due to further examination of previous research on use of the theory, we decided to remove it from our model. Previous research suggested difficulties measuring the constructs in MDT (Jacob & Brinkerhoff, 1999). Also, previous research compared MDT's usefulness in accounting for QOL in which other theories were more

successful (Blore et al., 2010; Schulz, 1995). MDT was to be used to account for part of the variance in QOL as this is how it has been used in previous studies (Blore et al., 2010; Michalos, 1985; Schulz, 1995). We hope to include the concept of MDT in future studies if further developments in the theory continue.

#### **4.3.5 Quality of Life**

Maslow's Hierarchy of Needs is a theory developed to understand motivations behind human behavior. In other words, it seeks to explain what drives individual behavioral choices. This theory has been used to better understand QOL (M. Sirgy, 1986) and has even been used to measure QOL (Taormina & Gao, 2013) in previous studies. We will test the relationship between motivational needs and QOL in order to evaluate Maslow's Hierarchy of needs theory. Using Maslow's theory, we posit that individuals who perceive that *MDS use* is most relevant to aiding them in meeting self-actualization needs should have a higher QOL. On the other hand, individuals who are using their MDS to meet lower level needs such as safety and physiological needs would have a lower QOL. This will test the usefulness of Maslow's Hierarchy of Needs theory to measure how *MDS use* influences QOL. If this theory holds we would expect to see stronger relationships as we move from the lower level needs to the higher level motivational needs in Maslow's theory. Next we will discuss the methods chosen to develop and test our conceptual model.

## CHAPTER V

### METHODS

A recent *MISQ* article by Venkatesh et al. (2013) suggests that mixed methods research has been termed the third paradigm as it seeks to incorporate both qualitative and quantitative methods which require multiple worldviews. Mixed methods research, not to be confused with multi-method research, combines multiple worldviews by incorporating a combination of both qualitative and quantitative paradigms. Mixed methods research can be fragmented into the nature of the multiple methods used. The combination of studies may be conducted concurrently which means that they are conducted at the same time and therefore are independent of one another or the research methods may also be conducted sequentially in which the findings from one approach seek to inform the other.

It is suggested that a mixed method approach should be employed if the research seeks to serve one of seven purposes (Venkatesh & Brown, 2013). This mixed method research falls under their framework as having a developmental purpose which they describe as “Questions for one strand emerge from the inferences of a previous one, or one strand provides hypotheses to be tested in the next one (p.26)”. Venkatesh & Brown (2013) further describe how a qualitative study can be used to develop constructs and form hypotheses and should be followed by a quantitative study to evaluate the research model. This study will follow the general guidelines and validation suggestions set forth

by Venkatesh & Brown (2013) for the use of mixed methods research. The specific methodology for each study is described in its own section below.

## CHAPTER VI

### PART I. EXPLORATORY QUALITATIVE STUDY

The method of exploration in Part I consists of hermeneutic analysis of qualitative interviews. Interviewing individuals about their current *MDS use* allows us to gain a deeper understanding of the life domains which are influenced by this technology. Understanding this phenomenon is best explored by asking individuals to describe their feelings, opinions and perceptions of how they are currently using their MDS and the influence it has on their lives. The interactive process of interviewing individuals generates new knowledge on their perceptions of the world from data collection and interpretation (Kvale, 1996). There are three main purposes for conducting this qualitative study. First, we seek to gain a deeper understanding of how individuals use their MDS in different life domains. Next we explore how these particular types of use are related to both positive and negative outcomes, labeled *effects of MDS use*. Lastly, this qualitative process is used to inform the second and third parts of the study and the development of the research model for the positivist study. The interviews are used in the development of hypotheses relating constructs of interest in the research model and to help us generate items representing new constructs. The interviews also inform the development of the quantitative instrument, which is then used to test the research model use in Parts II and III. In order to better understand what influence national culture might have on how individuals use MDS, we interviewed individuals in both the U.S. and India.

This inclusion gives us a perspective from both cultures and allows us to better inform the quantitative study by which we will further test cultural differences.

## **6.1 Research Design**

This exploratory study seeks to better understand how individuals currently use their mobile devices and explores the positive and negative effects associated with *MDS use* in different life domains. Interviews using convenient samples are used to increase the understanding on how *MDS use* influences an individual's QOL. This qualitative analysis is used to refine the domains of *MDS use* which have been suggested by previous literature (Choi et al., 2007; Cummins, 1996; Felce & Perry, 1995; Felce, 1997), by reducing and consolidating the number of domains. We will also use the interview data to help develop items representing *MDS use* in each of the life domains. Likewise, we are interested in understanding the *effects of MDS use* (both positive and negative) that individuals associate with domain specific *MDS use* in order to develop a holistic understanding of this phenomenon. A pre-test of the semi-structured interview questions was conducted on a panel of four individuals consisting of three IS professors and one sociology professor. They assessed the understandability and functionality of the interview questions and provided feedback leading to improvements in the wording and ordering of the questions. Feedback from the pre-test was incorporated allowing for better flow and understanding of the semi-structured interview questions.

Next we pilot-tested the interview questions by conducting four pilot interviews. The pilot process is used to ensure that interview questions produce novel information,

which is necessary for the research agenda. After the pilot test, we felt like the interviewees needed to elaborate more on ways they use *MDS*. This would help to ensure that we capture the vast array of life domains which are influenced by *MDS use*. Therefore, after conducting these pilot interviews, new questions were added encouraging interviewees to expand upon the ways they currently use their mobile devices. The initial four pilot interviews were included in the full study, which is encouraged by Richards (2005).

### **6.1.1 Participants**

Interviewees were selected by means of convenience sampling through open recruitment via word of mouth including both personal and professional contacts. In order to provide diverse perspectives of *MDS use*, purposeful sampling was also present in the sampling process (Creswell, 2007). We wanted the individuals interviewed to represent various demographic elements including age, gender, and occupation. Table 2 represents combined demographic information from the U.S. and India. This data was collected to ensure we proved an inclusive demographic sample. Specific individual data is presented in Appendix C. The semi-structured interviews began with a number of demographic questions including questions about the individual's age, gender, education level, and job type. Semi- structured interviews were conducted on twenty three individuals from the U.S. (as recommended by Creswell (2006)). We also conducted eleven interviews on individuals from India in order to compare *MDS use* in different national cultures. Interviews continued until we reached a level of data saturation in which new interviews were no longer providing novel information.

**Table 2. Demographical Information on Qualitative Study**

# of Dependent Minors	U.S.	India
0	14	4
1	2	2
2	6	5
3	1	0

Age Range	U.S.	India
18-24	2	0
25-34	8	4
35-44	3	3
45-54	4	2
55-64	3	2
65+	3	0

Current Household Income	U.S.	India
under 10k	0	1
10k-20k	0	1
20k-30k	1	0
30k-40k	0	0
40k-50k	2	1
50k-75k	4	3
75k-100k	3	3
100k-150k	10	0
over 150k	2	1
rather not say	1	1

Education Level	U.S.	India
Some College	3	0
College Graduate	13	2
High School or Equivalent	1	0
Doctoral Degree	1	1
Master's Degree	3	8
Vocational/Technical School	2	0

Employment Status	U.S.	India
full time	19	10
part time	1	1
retired	3	0

Marital Status	U.S.	India
Single	3	1
Married	15	10
Living with another	2	0
Divorced	2	0
Widowed	1	0

Personal Device	U.S.	India
Yes	19	9
No	4	2

Daily Hours Spent on Device	U.S.	India
<1	1	1
1-2	10	1
2-3	0	0
3-4	9	3
> 4	3	6

Race	U.S.	India
Asian	2	10
Hispanic	2	0
White	18	0
African American	1	0
Not Assigned	0	1

Satisfaction with Use	U.S.	India
Not Enough	2	2
Satisfied with Amount	8	6
Too Much	13	3

Gender	U.S.	India
Male	10	7
Female	13	4

Pseudo names were assigned to the interviewees to ensure protection of privacy and identities. The three selection criteria for interview candidates were:

1. at least 18 years old
2. use a smartphone device
3. employed

### 6.1.2 Data Collection and Analysis

We collected data through the use of semi-structured interviews. Questions were asked of individuals to gain a better understanding of how individuals use MDS and any perceived effects related to their *MDS use*. On average, interviews lasted about 45 minutes with the shortest being around 30 minutes and the longest over an hour. Interviews were conducted using three methods: in-person, through Skype, and phone. All but one of the U.S. interviews were conducted face to face and all of the India interviews were conducted through Skype and phone due to geographical restraints.

These interviews were voice recorded and transcribed to allow for open and axial coding. The coding procedures were used to identify the important life domains which are influenced by *MDS use* and the *effects of MDS use*. A listing of interview questions is presented in Table 3.

<b>Table 3. Semi-Structured Interview Questions</b>
<i>What type of mobile phone do you currently use?</i>
<i>Will you please tell me a little bit about how you use your (type of phone)?</i>
<i>Which areas of your life are affected by this use?</i>
<i>Tell me more about the specific ways in which you use your (type of phone)?</i>
<i>Please explain any positive or negative influence that you associate with a particular type of use (I will refer to the uses they mentioned in the question above)?</i>
<i>How does this affect your life?</i>
<i>Is there an area in your life in which you feel your (type of phone) is most helpful?</i>
<i>Is there an area in your life in which you feel your (type of phone) has negative outcomes?</i>
<i>How do you feel your (type of phone) use influences your overall quality of life?</i>
<i>When evaluating your QOL what do you compare your life to?</i>
<i>Given the topic, is there anything else you would like to add?</i>

The interview questions were developed to encourage the interviewee to share about their *MDS use* with as little intervention as possible by the interviewer, allowing us to minimize the likelihood of manipulating or influencing responses. Therefore, all follow up questions consisted of asking the interviewee to simply expand upon their answers and tell us more about the topics of interest.

### **6.1.3 Validity and Reliability in Part I**

Validity in qualitative research is concerned with credibility and the ability to confirm findings (Richards, 2005). A popular method of checking the reliability of qualitative data is respondent validation (Richards, 2005). Interviewees were allowed to examine the transcription of the interviews and make corrections and clarifications. All who responded suggested that we had captured their ideas and therefore the data should be considered to have high validity. None of the respondents seemed deceitful in their answers and we felt individuals were very open and honest with their answers. Face validity is present as well, as we were able to relate the classification of *MDS use* and the *effects of MDS use* to other research.

Reliability in qualitative research is concerned with consistency of processes. For example the interviewing process, how the data is collected and handled, and the coding process (Richards, 2005; Weber, 1990). All aspects of the interview process and data analysis were performed with much rigor. We believe the qualitative data to be highly reliable considering the inclusion of semi-structured interviews along with the research protocols in place consisting of: recording interviews, transcribing, and the coding

process of using the same technique through multiple iterations of coding and then recoding by the same researcher.

## **6.2 Qualitative Results**

The first step of qualitative analysis consists of coding the interview data (Rubin & Rubin, 1995). Codes consist of words or short phrases which account for like attributes in a way that collectively capture meaning based on visual data (Saldaña, 2009). Coding interview data allows the researcher to “arrange things in a systematic order”(Saldaña, 2009, p. 8). Strauss & Corbin (1990) suggest the use of open and axial coding to better understand and explain social phenomenon. Open coding is a process that identifies and reveals hidden concepts within interview data (Strauss & Corbin, 1990). Axial coding allows the researcher to determine how the lower level codes identified from the open coding process, relate to form higher level themes and then how these themes relate to one another (Strauss & Corbin, 1990). Descriptive codes consist of the demographic data which was collected about interviewees and can be used to help understand relationships between themes.

Interviews were imported into NVIVO 10 after transcription into MS Word format. The choice to use NVIVO was based on accessibility and functionality. NVIVO refers to codes of text as “nodes” and that terminology is used in this study to denote a code. The interviews (word document sources) were also coded using classification attribute values (descriptive codes) which allowed us to conduct queries and develop matrices on the data. Attribute values included information provided by the interviewees

such as: personal or employer issued device, employment status, gender, race, age, education, marital status, dependent minors, income, satisfaction with use, and average number of hours spent on MDS per day.

The first round of open coding involved selecting important concepts from each of the 35 interviews and identifying codes to represent those concepts. The initial open coding of the data revealed 142 different codes. Table 4 shows all the codes from this first round of coding.

**Table 4. List of Codes in First Round Coding (duplicates removed)**

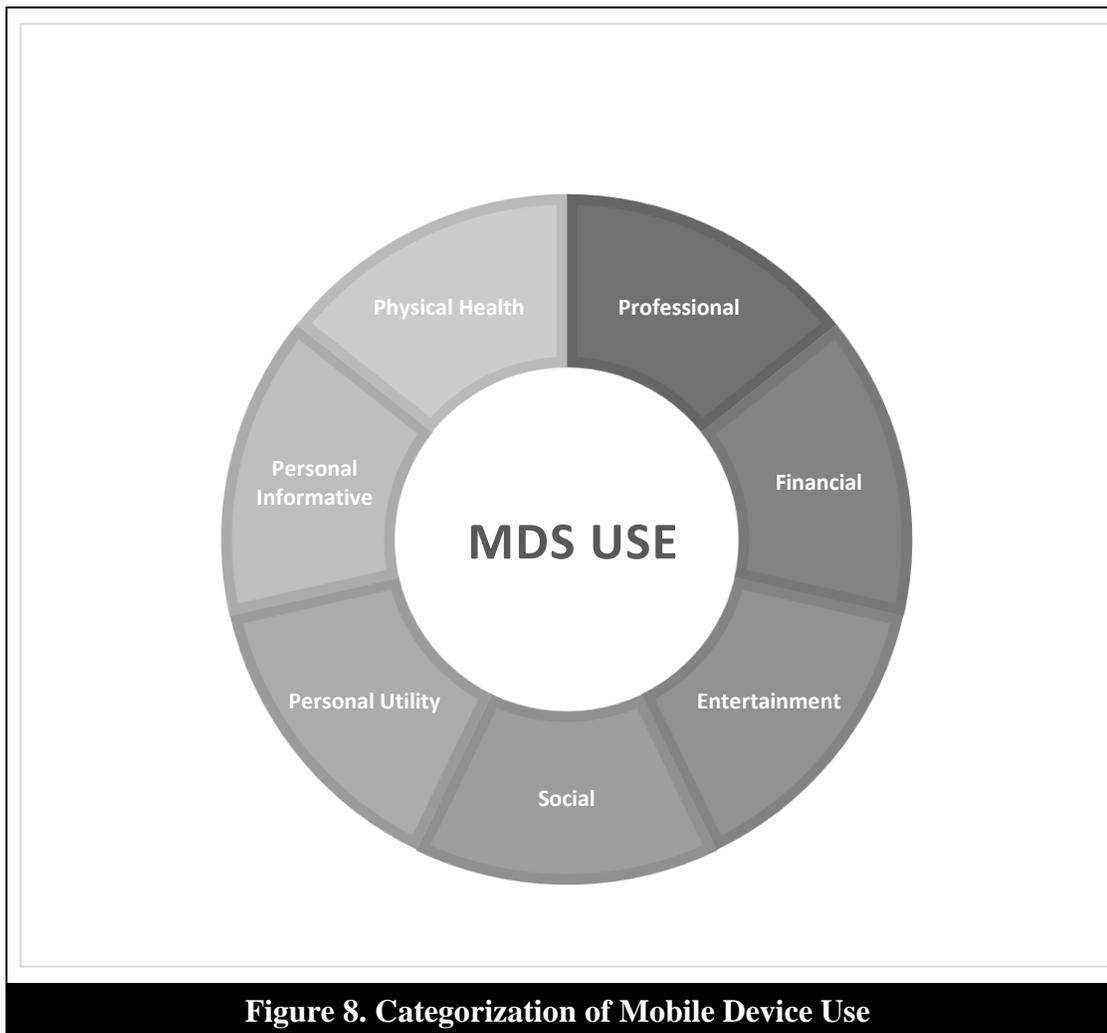
access work documents	E-books	loss of face to face communication	selfie
add self-restrictions	efficiencies	loss of privacy	sense of security
addicted	email	make a list	share pictures
alarm clock	entertain kids	mobile hotspot	shopping
attached to devices	exercise	more informed	skype
availability	Facebook	movie tickets	socializing
being tracked	FaceTime	negative	sports scores
book taxi	fact finding	neglectful	stay updated
browsing	family time	operate and start car	step counter
calculator	fantasy football	order pizza	surf internet
calendar	faster	organized	take notes
calorie counter	find safety	pay bills	take pictures
candy crush	finding deals	phone call	television remote
changed communication	flashlight	Pinterest	text message
check flight status	FM transmitter	play games	time waster
check stock prices	fun	positive	transfer money
checking habit	future	positives outweigh negatives	traveling
compare to friends	getting impersonal	power user	true communication suffers
compass	GPS golf	prepared	twitter
complaints from others	GPS/Directions	productivity	waste of time
connected	grocery store list	quick access	watch movie
connectivity	Groupon	radiation effects	watch Netflix
convenient	growth	read articles	watch you tube video
cooking	happy	read bible	weather
current news	hard to disconnect	real good time	WhatsApp
cut back on time spent	ignore others	recipes	withdrawal symptoms
cyber dad	inclusive	record videos	work calendar
dangerous	information	reference tool	work calls
dependent on devices	Instagram	religious quiet time	work email
deposit check	instant information	reminders	Work GPS
diary	internet	restaurant menu	work record meetings
diet	intrusive	rude	work texts
disable notifications	keep in touch	running	work-life balance
distraction	LinkedIn	safety	work WhatsApp
easier	listen to music	save money	
enjoy	loss of concentration	saves time	

The next step consisted of using axial coding to determine how these lower level codes which were identified from the open coding process (Table 4), relate to form higher level themes and then how these themes relate to one another (Strauss & Corbin, 1990). This was an iterative process in which we were continuously searching for new concepts and modifying the codes.

Research based on quantitative methods alone tend to base their research models: constructs and relationships, solely from *a priori* frameworks which were previously developed in past research (Lee & Hubona, 2009). One of the main benefits of mixed-method studies is the ability to let the axial coding organically emerge from the data we collected from the interview process (Venkatesh & Brown, 2013). In many cases, we used in vivo codes which refer to phrases from the actual words used by the interviewees (Saldaña, 2009). In many cases, we were able to relate the in vivo codes to constructs from previous literature. For example the term “always connected” and “always available” were used many times throughout the interviews to describe an individuals’ feelings about how MDS influences their communication. The IS field refers to this phenomenon as presenteeism which can be described as an individual’s accessibility to and from others (Ayyagari et al., 2011). For the purposes of this research, the term signifies how accessible you are to others and how accessible others are to you through the use of MDS. The use of in vivo coding allowed us to discover this phenomenon from the data and then we were able to revisit the literature and rename it to be consistent with current IS literature. Next we discuss *MDS use* in life domains which emerged from the interviews.

### 6.2.1 Mobile Data Services (MDS) Use: Codes and Themes

In the evaluation of our interview data using open coding, we identified 82 codes related to how individuals use MDS. With the use of axial coding these lower level codes were grouped into seven higher level themes. The themes are presented in figure 8.



These seven themes represent the life domains which emerged from our interview data and include: professional, financial, entertainment, social, personal utility,

personal informative, and physical health. These seven high level themes are described briefly in sections 7.3.1 through 7.3.7. Table 5 presents the seven major qualitative themes for *MDS use* in life domains, the number of codes from the open coding process that were included in each domain, and the frequency of occurrence.

<b>Table 5. <i>MDS Use</i> in Life Domains-Major Qualitative Themes</b>		
<b>Domains</b>	<b>Number of Codes</b>	<b>Frequency of Occurrence</b>
Professional	13	114
Financial	11	61
Entertainment	12	132
Social	13	194
Personal Utility	13	122
Personal Informative	14	60
Physical Health	6	21

#### *6.2.1.a Professional Domain*

During the interviews, respondents continually detailed the ways they use their mobile devices to conduct work related activities. Many of the participants referred to types of communication such as: email, text messaging, phone calls, and the use of social media to connect with colleagues. Similar types of work related communication are found in other IS research (C. A. Middleton, 2008; Wakefield & Whitten, 2006). Using MDS as a means to communicate is expected as mobile devices were developed to provide wireless communications. A number of studies have been conducted which seek to better understand the use of MDS for work related purposes and how it influences the individual (Brown & Palvia, 2015; Orlikowski & Scott, 2008). The samples below suggest that communications through MDS allow for employees to connect to the work

place at times when they don't have computer access or just because it is much more convenient than having to log in to their laptop. It was very apparent how convenient and helpful our interviewees found their MDS to be when it involved communicating with their coworkers.

Provides easier access to customers...without having to boot up a computer or be in an office.

For work...emails, texts, phone, calendar when I am away from my desk or in meetings.

There was also a prevailing utility type of use which was found in the professional domain with examples including the use of calendars, GPS, and note taking applications. In reference to professional use, individuals described how they used their MDS to complete work related tasks. The use of MDS to provide utility in the professional domain, to our knowledge has been excluded from academic studies. Instead IS research has chosen to focus on communication capabilities through MDS in the professional domain (Srivastava, 2005; Yun et al., 2012). Many interviewees described how much more prepared they are because of the use of professional calendars through their MDS. They mentioned that the ability to sync calendars with work accounts allowed them a sense of security knowing that they were always aware of upcoming meetings and events.

Examples include:

Also, the calendar is really helpful since I am connected to my work calendar. If a meeting gets changed late at night then I can check it from my phone. I don't look at my work emails away from work

unless there is an emergency and we deal a lot with China so my night time they are active over there. I use a Chinese app and my Chinese partner has it as well so we can communicate thru that app for work.

A few of the interviewees, whose jobs require a great deal of travel such a salesperson, described the use of GPS and online navigation through their MDS to provide reliable directions to new destinations. They are continually travelling to new places and the convenience provided through MDS is described as “a life saver” and one suggested “I don’t know how I ever got anywhere before my smartphone”.

I was traveling last week and I was in a new place so I had find many directions and searching companies that I will meet with. It would have been very difficult if my smartphone was not there. So that is one of the major parts that have become in our lives.

Methods of communication accounted for 69% of professional use demonstrating how important the use of MDS is for keeping in touch with colleagues and staying up to date on current circumstances through email and other methods of communications.

Table 6 presents the 13 axial codes for *MDS use* in the professional domain along with the percent of occurrence across the interviews.

<b>Table 6. Codes for <i>MDS Use</i> in Professional Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
access work documents	3%
LinkedIn	4%
mobile hotspot	3%
reminders	5%

stay updated	4%
take notes	3%
work calendar	18%
work calls	12%
work email	35%
work GPS	5%
work record meetings	1%
work texts	11%
work WhatsApp	7%

### 6.2.1.b Financial Domain

In the axial coding process, a pattern presented itself representing *MDS use* in the financial domain. This domain consists of online banking, ecommerce, making reservations, etc. With most banks now offering online services and applications, many individuals have adopted the use of MDS to transfer or deposit money into their bank accounts. Although there are heightened security risks (Herzberg, 2003) many interviewees suggest that the “rewards outweigh the risks”. This is described as a “huge” convenience allowing individuals immediate access to their funds without having to travel to their local bank to make a deposit or transfer money from one account to another.

I love online banking and bill paying and depositing checks...using the phone’s camera without visiting a branch and being able to move money around from one account to another.

Each year more and more merchandise is ordered online and increasingly these purchases are being made through MDS (Wareham, Zheng, & Straub, 2005).

Interviewees suggested advancements in security and access to services such as PayPal have made it so much easier for them to shop online. The term M-shopping (M-mobile) was termed recently and has become increasingly important in marketing and retailing (R. J. H. Wang, Malthouse, & Krishnamurthi, 2015). A number of interviewees suggested the use of apps and websites in order to find coupons or good deals on products in order to save money. One suggested that they “recently discovered an app that allows me to find great deals on products so instead of playing a useless game while I’m putting my son to sleep I can shop for products and save some money”. Another described her shopping behaviors around Christmas time.

I do a lot of online purchases so if you had asked me about last month’s usage I probably was on it more for Christmas shopping and sales.

This domain is also filled with financially related services such as reserving transportation or a movie, checking stock prices, ordering a pizza, and paying bills. Many describe the different uses associated with the financial domain to be “convenient” and “time saving” methods of conducting a financial task. They are also a method of saving money as the individual is both more informed and has more options than are available without the use of MDS. One individual discussed the use of her Papa John’s app in order to purchase meals for their family. She described this app as a “life saver which helps me save money and time”. This interviewee described how easy it was to order her meals through the app because her pizza preferences, address, and methods of payment were saved, so she only needs to open the app, log in, and with a couple of selections the

pizza is on its way to her home. Many also discussed the ability to reserve a movie ticket was extremely convenient and helpful. One man discussed how he orders tickets a couple of times a month on his way home while riding the bus. “I’ll check with my wife and just order it right there on the bus, and I don’t have to wait in line or find out the movie is sold out”. Some other examples include:

Taxi providers like Ola...all cab service providers have an app to book taxis from there smartphones, board a train, or catch an airplane, or a bus station, we use taxi more around the city, I use them 7 to 10 times a week

It’s easy and quick and in an instant I can book a movie ticket

Table 7 lists the 11 axial codes that represent the financial domain. You’ll notice a fairly even spread of codes throughout this domain suggesting a wide variety of services which relate to the financial domain.

<b>Table 7. Codes for <i>MDS Use</i> in Financial Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
book taxi	5%
movie tickets	20%
save money	8%
order pizza	7%
shopping	16%
finding deals	10%
pay bills	11%
check stock prices	7%
transfer money	5%
Groupon	3%
deposit check	8%

### 6.2.1.c Entertainment Domain

The entertainment domain also emerged from the interviews as an important life domain. Individuals are constantly accessing their MDS to be entertained or simply “kill” a little time between engagements. This domain stems from previous research on the different types of *MDS use*, in particular the study of hedonic behaviors (Kim et al., 2013; Wakefield & Whitten, 2006). Hedonic behaviors are defined as actions that generate pleasure from the consumption or use of a product (Schroeder, 2010). We found 12 distinct axial codes which fit into the entertainment domain and are presented in Table 8. While most respondents refer to their own entertainment such as playing music in the car or playing online games with friends, a number of participants also suggest that they use their MDS as a means of occupying their children or providing entertainment for guests. Sometimes the *MDS use* in this domain is planned such as watching a movie by streaming from a mobile device to a television, but most of the individuals suggest that their use in this domain is usually unplanned. These unplanned behavior include “killing time, playing a game or surfing the internet while waiting at the doctor’s office” or “just getting a few free moments to watch some you tube videos, you know something entertaining”. Playing online games through the use of apps was a dominant code found throughout the interviews. Games such as candy crush and clash of clans were mentioned as a fun and entertaining way to spend some down time instead of watching TV. Some other examples of *MDS use* in the entertainment domain include:

I have an older TV without Wi-Fi so I bought google chrome and I stream some of the good movies from my phone to the TV about once or twice a week.

It's a filler time like when I'm waiting at the airport, when I'm not reading or watching a movie. I don't play games very often, only when I have 5 or 10 minutes to kill or I don't have a book to read or music to listen to then I might play a game.

YouTube is very convenient for several different things whether for research or just getting information or highlights of sports games and I use that a lot

I do have Pandora and I kind of get my mornings going because it's such a wide range of music. I could technically listen to anything that I feel like so that's always convenient. We're going on a long road trip and I can put Pandora on a specific genre of music that I like to listen to while on a road trip instead of the radio. There's too much static with the radio, especially if you're going to a different city or something like that.

This is not daily but I use to watch movies when I fly

<b>Table 8. Codes for <i>MDS Use</i> in Entertainment Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
candy crush	2%
eBooks	3%
fantasy football	2%
entertain kids	9%
surf internet	4%
FM transmitter	1%
play games	32%
watch movie	8%
watch Netflix	5%
Diary	1%
watch you tube video	15%
listen to music	19%

#### *6.2.1.d Social Domain*

Mobile phones were developed to communicate wirelessly with one another. Very quickly, they have progressed from simple flip phones into highly functional smartphones with almost limitless capabilities. From previous research, we learn that social behaviors are described as using IT to communicate in order to maintain and develop social relationships (Orlikowski & Scott, 2008). These capabilities include many different methods of socialization such as voice communication, text messaging, email, and connecting with friends and family through social media. A large number of the interviewees describe an ability to “connect with anyone at any time” and the “convenience” and “security” this provides. Many of the individuals also suggest a joy or happiness in being able to connect with family or friends. Examples include being able to communicate with someone who they “had lost contact with and now I’m able to connect through Facebook”.

The use of social media through MDS has grown exponentially as smartphone adoption has continued to grow in the personal domain. Facebook in the U.S. and WhatsApp in India were very well represented in the interviews. More traditional methods of use in the social domain were also prevalent including phone calls, text messages and email to communicate with friends and family. As shown in Table 9 the social domain is the most referenced domain in this study and was formed from 13 codes comprising a total of 194 occurrences throughout the interviews. From the examples below, it’s evident that individuals feel an increased sense of convenience and joy in the unlimited ways they can connect with friends and family through MDS.

Our son has a very long drive home from work each day and he has started to call during that drive time just to chat.

Keeping in touch with friends by sending a quick text when there is no time for in-depth conversations.

Social media enables me to maintain contact with friends and neighbors. Because many of my friends have moved or live in other parts of the country, I am able to stay in touch with them. Social media lets me know when a friend is on-line or available, and we often call each other when it appears the other is on-line.

I like the convenience of it. I have family and friends in other countries and they have an app called “WhatsApp” and I use it every day to keep in touch with them. It’s free and all it requires is internet so I use that a lot.

Basically WhatsApp is a big thing now...so I believe the whole communication is happening through WhatsApp. I believe more than 95%. There are many groups; work group, friends, personalized groups. Most of our work and fun is happening through that. Any type of work related communications or contact is happening through that app.

**Table 9. Codes for *MDS Use* in Social Domain**

<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
FaceTime	1%
Skype	4%
Socializing	1%
Selfie	1%
Facebook	20%
share pictures	5%
phone call	13%
text message	17%
Twitter	3%
WhatsApp	9%
Instagram	2%
keep in touch	8%
Email	17%

### 6.2.1.e Personal Utility Domain

The personal utility domain like the other domains emerged from the interview data. A pattern of utility use for personal purposes was apparent from the axial coding. From previous research we learn that Utilitarian use is described as facilitating effective and efficient action (Wakefield & Whitten, 2006). While a large amount of research has focused on work related utilitarian use (C. A. Middleton, 2008), there is also a large amount of utilitarian use that can be associated with using MDS for personal activities. Utilitarian use with a personal agenda has been essentially ignored by previous IS research but is essential to consider for two reasons. First, the drastic change in MDS adoptions moving away from professionally required adoption and into personally motivated adoptions suggests that future research on MDS must investigate the personal utility individuals gain from their use. Secondly, we seek to develop a more holistic view of how MDS influences QOL.

What emerged from the interview data was how the personal utility domain covers a wide range of use in which MDS is used to replace another functioning utility item. Examples of these items that are replaced through smartphone capabilities include cameras, video cameras, GPS devices, calendars, alarm clocks, calculators, flashlights, etc. Many of the different personal utility domain uses are described as being a *“convenience...saving time because I don't not need to carry the item my smartphone replaces”*. A clear example is the use of smartphones as cameras. An individual has the convenience of taking a picture anytime they have their phone with them, whereas before MDS that individual would have to carry a camera with them at all times. These devices

that MDS replace provide some type of utility. The convenience added through having these capabilities through MDS allows individuals a sense of increased productivity and convenience. Often interviewees described a feeling of satisfaction because they were allowed to take a picture and suggested that they would have not been able to capture that moment in time. Some told how they remembered a time when they had to be proactive and look up directions to a new location beforehand and how much more convenient it is to “just get in my car and ask my phone for directions”. This domain contained 13 different codes which are displayed below in Table 10. Examples include:

GPS is another important aspect of the phone that I use, in India the roads are very curvy and confusing so the GPS is very helpful. The roads are not marked well and it’s hard to find your way.

On one hand you don’t have an alarm clock anymore, I don’t wear a watch anymore because I have my phone.

My smartphone has eliminated the need for two standalone devices when I travel, GPS and camera

Positive-able to stay organized by using a mobile calendar app

I feel prepared because I can always capture moments without a huge camcorder. Definitely a positive.

<b>Table 10. Codes for <i>MDS Use</i> in Personal Utility Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
alarm clock	11%
calculator	6%
calendar	12%

compass	1%
flashlight	2%
GPS/directions	16%
grocery store list	5%
make a list	8%
operate and start car	1%
record videos	2%
take pictures	20%
television remote	2%
traveling	14%

#### 6.2.1.f Personal Informative Domain

The personal informative domain comprises the number of ways interviewees expressed how they used their smartphones to gather information. Oulasvirta, Rattenbury, Ma, & Raita (2011) describe how individuals “do tasks in new ways, often interleaving and cross- pollinating between activities; they share and gather information in new ways”. Before smartphones, individuals needed other sources to access this type of information but with the ubiquity created through *MDS use*, we now have access to virtually an unlimited amount of information. A large number of these codes reflect a common function of informing the individual so they can make better decisions.

For example, twenty three percent of the interviewees described how they used a weather app to provide them with the temperature and daily forecast so they could plan appropriately on how to dress and travel. Information provided from this domain increases an individual’s knowledge so that they are more prepared to make more informed decisions. Examples also include uses such as checking sports scores or surfing the internet, which provide the user with information that they are interested in or curious

about. The codes are presented in Table 11. *MDS use* in the personal informative domain can also serve as reminders of things to accomplish such as a grocery list.

Examples include:

Using YouTube to determine how to do projects of all types, and for many other reasons like checking the weather

I use my phone to inform me about my day. Weather, news, stock prices...maybe tracking airline flights when our son is flying in to visit or viewing real estate. Sometimes I search for recipes or listen to educational podcasts

I like to use my phone for fact-finding and surfing the internet when we're thinking about what we might do over the weekend (what's on tap, what the ski conditions are like, who's that actor in that show we're watching? Junk stuff)

I am pretty much fond of spiritual side of my life, so with the help of smartphone it's easy for me to get access to various articles on that.

<b>Table 11. Codes for <i>MDS Use</i> in Personal Informative Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
browsing	7%
check flight status	3%
cooking	5%
current news	8%
fact finding	8%
organized	7%
Pinterest	8%
read articles	3%
read Bible	3%
recipes	5%
religious quiet time	5%
restaurant menu	3%

sports scores	10%
weather	23%

### 6.2.1.g Physical Health Domain

The last domain consists of the physical health domain. This domain seems to center around exercise and diet, the two critical areas associated with maintaining a healthy lifestyle. From the thirty five interviews, there were only four instances of individuals discussing the use of MDS to track their nutrition and diet. Individuals use apps to help them keep up with their eating habits such as tracking daily calorie intake. What was much more prominent in the interviews were the number of participants who discussed that they use apps to help track their physical activity. One surprise was that no one mentioned the use of wearable fitness tracking devices such as the Jawbone, Fitbit, or Garmin during the interviews. These devices have the capability to sync with your MDS and track physical activity and exercise.

Recently there has been a rapid increase in sales of these devices (Kranz et al., 2013). They are still considered to be in the introduction stage and therefore have not been adopted by a large percentage of individuals. Apple Inc. released the Apple Watch in April 2015 and one of the key selling points is that it's "a smarter way to look at fitness" (apple.com/watch). As with other Apple products that have driven demand in a new market such as the iPod and the iPad, it is likely that this product will spark a growth in this domain. The participants discussed the use of their phones to track physical activity but, we believe, with the addition of these devices more individuals will begin to use their MDS to track their fitness activity. As shown below in Table 12 the

health/fitness domain consisted of 6 different codes and was mentioned 21 times during the 35 interviews. Examples include:

I got a fitness tracker watch for Christmas so I am using some of the apps on that.

Outside of social media...I have used it to Tabata. It's an exercise app.

I use an app to track my daily calorie intake. I'm on a diet and this helps me to keep up with the foods that I have eaten throughout the day. So far it has been very helpful.

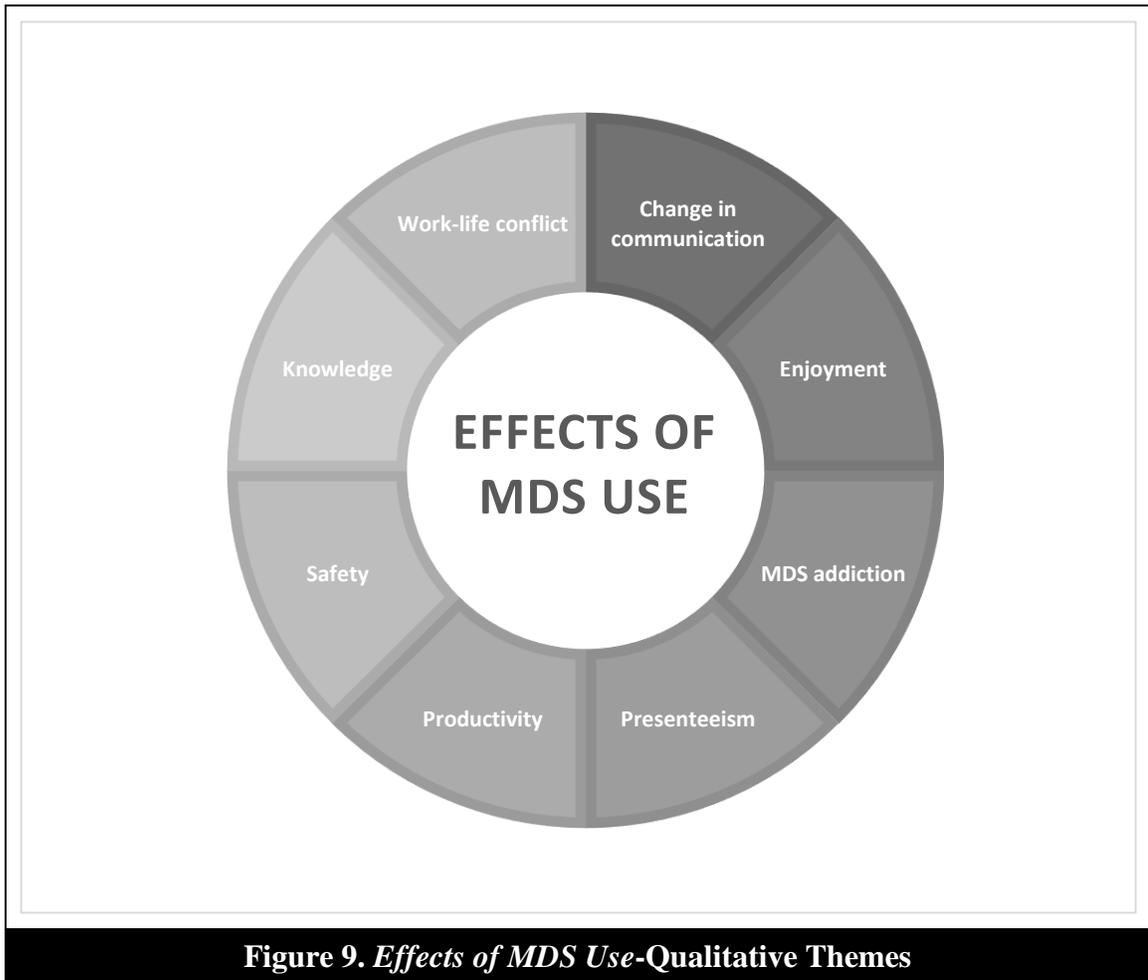
<b>Table 12. Codes for <i>MDS Use</i> in Health Domain</b>	
<b>Code</b>	<b>Percent of Occurrence Across Interviews</b>
calorie counter	10%
diet	10%
exercise	19%
GPS golf	14%
running	38%
step counter	10%

### **6.2.2 Effects of MDS Use: Codes and Themes**

In the evaluation of the interview data using open coding, we identified 64 codes relating to the perceived *effects of MDS use*. Throughout the interviews, individuals were asked to describe any positive or negative influences they have experienced due to *MDS use*. Individuals discussed the many ways they perceive MDS to be helpful and they also explained the ways they felt *MDS use* was an interruption or a hindrance to their daily lives. Using axial coding, these lower level codes were grouped into eight higher level themes. These themes represent both positive and negative *effects of MDS use* which

emerged from the interview data and include: Change in communication, enjoyment, *MDS addiction*, presenteeism, productivity, safety, knowledge, and work-life conflict.

Figure 9 presents the qualitative themes representing the *effects of MDS use*. These eight high level themes are described briefly in following sections.



#### 6.2.2.a *Change in Communication - Loss of Face to Face Communications*

It's worthwhile to think about life before cell phones, in particular how individuals behaved before the mass adoption of smart phones. What was life like before

people were so connected? Some of the interviewees brought this topic up during the discussion and a common theme revolved around a loss of “real” communications. Some researchers, like Turkle (2012) suggest that the type of connectedness we have with MDS has actually led to an increase in disconnectedness. In her book, she suggests that the way we interact as humans has changed and that face to face conversations and even phone calls are scarce in today’s society. Face to face communications provide more visual cues and allow for the ability to interact with one another providing a better environment to build relationships when compared to other forms of communication (Newman & Scot Ober, 2012).

Other forms of communication such as texting and instant messaging are just surface level communications that aren’t as meaningful or as “real” as face to face or even voice communications. Communication through text messages, email, instant messaging, and social media have increased rapidly and have changed the ways individuals communicate (Turkle, 2012). Gone are the days of face to face communication and even phone conversations which are being disregarded as individuals prefer less obtrusive methods. There were 6 open codes which emerged and were placed into the *MDS effect* grouping of a change in communication. This MDS effect was referenced 17 times throughout the 35 interviews. The following examples from the interviews paint a clear picture of how these individuals feel that their lives are lacking human interaction and face to face communication due to the way they communicate through *MDS*.

At the dinner table at home or at restaurants for example, everyone is on their phone and not talking to each other. People use smart phones while watching TV programs instead of talking to each other. Ultimately my phone use can affect me negatively because I spend time using it instead of face to face time with others.

My use can be negative because I'm relying so much on the messaging service to keep in touch with friends versus talking or seeing them in person

I tend to always have it with me and will get too involved with what I'm looking at on it or talking with someone via text message and miss out on conversations and life. I think it's a great tool, however, sometimes the use of it gets out of control and should be limited. I think text messages instead of real conversations can be good when used for simple things. But complex conversations or conversations that should be conducted in a person-to-person scenario shouldn't be done via text messages. I think people take a text message too conveniently and I would much rather they call and talk to me than expect I will reply back to a text. Don't get me wrong, I use it the same way too....but probably shouldn't.

This first group of examples from the interviews suggests that *MDS use* in the social domain would have a relationship with a change in communications, in particularly a loss of face to face communication. Interviewees discuss how they are constantly engaged in the use of their phones and tend to ignore whatever is going on around them. For example, one interviewee discussed how he found himself ignoring his wife during a valentine's dinner, because he was bombarded with a number of texts from a friend and felt he had to reply. In this case, he was using his mobile device to communicate (*MDS use* in the social domain) with a friend instead of spending time with his wife on their valentine's dinner. Probably, the most significant sample from above is the last one, in which the individual discusses how she believes that there is a lack of face to face

communications and relationships suffer because most people prefer to communicate through text messages. She goes on to admit that she also behaves in this manner but that she probably shouldn't. Therefore we propose that the more an individual uses their MDS for social purposes the more likely they are to prefer a digital method of communications over the traditional face to face communication method. Based on this proposition, the following hypothesis will be examined further in the quantitative study:

*H1a: MDS use in the social domain is positively related to the effect "loss of face to face communication".*

Not only does *MDS use* in the social domain cause individuals to prefer to communicate through electronic methods but use in the professional domain has also been influenced by communication capabilities through *MDS use*. The focus of the next set of examples from the interviews suggests that *MDS use* in the professional domain influences a loss in face to face communications as well.

My phone conflicts with face-to-face interactions with people, especially in the workplace with the convenience of IM'ing and email

Texting my clients makes quick communication easy but takes away from face to face or voice communication

From the above examples, it's clear that some individuals prefer digital communications to interact with coworkers and even clients. They suggest that these types of digital communications distract them from having meaningful face to face

conversations which help build and maintain relationships. Therefore we hypothesize that:

*H1b: MDS use in the professional domain is positively related to the effect “loss of face to face communication”.*

Turkle (2012) discusses how the younger generation, which has grown up with the internet and cell phones with text messaging capabilities, have difficulty communicating in face to face situations. Although it is out of the scope to further explore this phenomenon in the quantitative study, we would like to recommend this as a promising area for future research. The questions asked of the interviewees in the study focused primarily on their own use of MDS. It was very interesting to see so many of the interviewees deflect from answering questions about their use and changed the focus of their answer on how the younger generations use MDS. In particular, when we were discussing the negative *effects of MDS use* such as *MDS addiction* and loss of face to face communications. Some interesting questions based on the examples from the interviews below which will be included in future studies include: Is it mainly the younger generation who prefer to communicate in a non-face to face setting? What ways does the loss of face to face communication have on society, personal relationships, and professional relationships? Does the younger generation know how to communicate in a face to face setting? If not what influence does that have on their quality of life and the ability to create and maintain relationships? Is there an age gap that presents itself and hinders communication between generations because the younger generation prefers digital communications and the older generation prefers voice or face to face

communications? Here are some examples which led us to propose these questions for future research.

The only negative I see is kids these days being so enthralled in technology and not in human interaction.

True communication with people suffers due to cell phones advances technologies. The younger population uses text messages as their main source of communication. You look around restaurants and all you see is people staring at their phones. What happened to a good face-to-face conversation with people?

I don't think there is an area if I didn't have a Smartphone that I would be so much better. Well, maybe interacting with other people because I don't feel I'm as dependent on the phone as other people. I feel like if I'm talking to someone who's even a little bit younger than me they're constantly on it. It looks like a monkey trying to peel a peanut. They're constantly on it all the time and they don't even look up and that makes me sound really old and I can't believe I said it. It doesn't affect me in my day-to-day but sometimes I feel like they (smartphones) affect society more.

The most important use is communicating with our children to know that they are ok. Younger people today are much more into text messaging than they are phone calls and emails. So we are forced to operate with them on their level, but it's not that bad.

#### **6.2.2.b Enjoyment**

Enjoyment was another axial code which emerged from reviewing the interview data. The open codes of fun, joy, happy, and real good time were referenced 14 times during the interviews. Enjoyment in IS literature has become known as a variable of flow and has been defined as, "how intrinsically pleasant and interesting using...some technology...is"(Argawal, Karahanna, & Agarwal, 2009). We share this view of

enjoyment and the examples below suggest that *MDS use* in the entertainment, utility and social domains might positively influence an individual's enjoyment.

Music...It's a great way to listen to music you are wanting to hear which I enjoy

I use the Foxfi app to create a mobile hotspot for Netflix that is streamed to our TV, my wife's tablet, and now the kid's tablet that we got them for Christmas. Everybody gets to have a real good time because of my wireless signal.

Many of the interviews suggested how they like to listen to music while they are working, driving, exercising, or just relaxing around their homes. Increases in the ability to stream wireless entertainments such as movies and videos has increased rapidly over the last five years. A growing number of people in the U.S. are "cutting the cable" and using internet based applications and devices to provide television services to their home. This is evident in the second sample above, where the interviewee discussed how he has unlimited data through his mobile plan and can use his signal to create a hotspot at home which allows them to connect a number of devices to the internet providing a "real good time" for his family. Other examples included playing online games, and reading books to provide joy or happiness.

I want to say my social life is affected. It has allowed us to still be part of my friend's lives even though I'm not physically with them. It makes you feel pretty good knowing that I can keep in contact with them and we're still able to communicate and send pictures, it's like you're there but not physically there.

For my enjoyment it's usually other apps like reading the paper or checking Twitter, Facebook, etc.

Interviewees described a feeling of enjoyment and “feeling pretty good” knowing that they have the ability to communicate with friends and family through *MDS use* in the social domain. Connecting with others through social media via use of MDS has allowed individuals to rekindle old relationships which would not have been possible without the technology (Kaplan & Haenlein, 2010). Being able to share photos and videos with friends and family who live far away was another example in how *MDS use* in the social domain provides a sense of enjoyment.

I happy with what this technology can do and if I can use my phone to enhance things like my golf round by using GPS without purchasing something extra I like that.

It's fun because I can use my compass to educate my nephew. It allowed me to teach him how to use a compass and gave him knowledge of directions. I'm a popular person and am happy to share with others information from my smartphone.

The examples above show enjoyment from *MDS use* in the personal utility domain. Being able to use MDS to provide some type of utility such as using an app which displays a compass to educate a nephew was described to provide joy. All of these examples show that capabilities from *MDS use* such as listening to music, watching TV, connecting with friends on Facebook, and the convenience of using MDS to provide personal utility lead to a sense of enjoyment. Based on these findings from the interviews, the following hypotheses will be examined further in the quantitative study:

*H2a: MDS use in the entertainment domain is positively related to the effect of “enjoyment”.*

*H2b: MDS use in the social domain is positively related to the effect of “enjoyment”.*

*H2c: MDS use in the personal utility domain is positively related to the effect of “enjoyment”.*

### **6.2.2.c MDS Addiction**

Turel et. al (2011) define technology addiction as “a physiological dependency which is manifested through excessive use”. The 12 open codes for *MDS addiction* include: addicted, attached to devices, checking habit, hard to disconnect, ignore others, dependent on devices, withdrawal symptoms, loss of concentration, distraction, rude, time waster, and waste of time were grouped together to represent *MDS addiction*.

The data for this domain describes how individuals constantly struggle to disconnect from their devices and the strain that *MDS addiction* can have on the relationships with their friends and family. For some, there is a feeling of withdrawal when they cannot check their phone or if they leave it somewhere by accident. For others, they get into arguments with their spouse or their children because they are ignoring their family’s needs. While some individuals were very open and honest about their addiction to MDS, others seemed to focus on how others (predominately younger individuals) were addicted to MDS. Here are some examples of the 45 references coded as *MDS addiction*:

Social media – apps like Facebook; checking on what’s going on in the world while you’re sitting with people you should be giving your undivided attention to the “here and now”.

It has affected individuals going to bed. It used to be around 10 o’clock or so and now it’s 12 or even 1. Some junior members of my team are always using WhatsApp and it really effects when they are going to bed and they are unable to disconnect from this during the day as well. They are always messaging and chatting and can never concentrate on their current situations. You’ll be talking to them and suddenly they pick up their phone and start chatting.

Yea, sometimes what happens, were so addicted to our smartphone that we ignore everything else. If your sitting with family members or friends you have a habit to check what’s happening on your phone and you lose your presence in the group and they realize you’re not giving them your attention and leads to a discussion and even a quarrel about how addicted you are to your phone. I am able to control my addiction but I know others who cannot take their eyes off of their smartphone and every 5 or ten minutes they have to check it and it gives a bad impression. It gives the impression that you are not important. I have overcome my addiction, I have fixed my time for the amount of time I can spend on what’s app and social networking sites and checking email. It helps me manage my time better. Not completely but maybe 80-90 %. Having certain apps on my phone can also tend to be a time waster. I can sit and look at Facebook for an hour and have accomplished nothing of what I intended to do in an evening.

I always check it. That’s probably the most negative thing too, when I wake up in the morning. I don’t roll out of bed but sit there and kind of look at my phone and mind-numbingly wake up. You put the TV on and it’s really bright and blaring and there’s noise so I kind of look at the phone to adjust my eyes and get my brain working again. I don’t like having to do that and if I didn’t have my phone I would feel out of routine. If I’m bored I’ll look on Facebook or Twitter or something like that. It’s not productive but I feel like I’m attached to it.

I guess I could say it has affected my productivity because I can be searching the web or watching a game or doing research and suddenly 20 or 30 minutes have gone by and it’s not like you can get that time back. I will probably say I could have used the time for something more productive.

There are times probably when I'm on my phone at home and doing something for a long period of time...on it for 5-10 minutes and I catch myself not paying attention to my kids. They might have been calling for me for 5 or 10 minutes and I haven't even heard them. And spending time with my husband. I catch myself using it at dinner sometimes. When I get on it I'm not spending a lot of time. I might not touch it at all at work but I might veg out on it when I get home.

Usually my kids want me to give complete attention to them and I find myself answering emails and taking calls for work and they do not like that. They call me cyber dad and take my phone away from me sometimes when it gets to be too much. My wife will also let me know when I have been too neglectful.

It can be a little stressful feeling like I'm always connected to people from my job. It would be nice to be free of it for a week or two. When we were in Europe without access it was very freeing.

It would definitely be drawing my attention away from what's in front of me or what should be important like family or I'm sitting in a meeting and checking email and that's drawing attention away from the presenter or in the meeting. I just don't like how it steals attention and is a distraction

The use of MDS in the social domain, in particular the use of social media, seems to be the focal influence on *MDS addiction* from the interview data. Personal informative (surfing the internet for information) and professional (work email) are also life domains which seem to be related to MDS addictive behaviors. Therefore we present the following hypotheses:

*H3a: MDS use in the social domain is positively related to the effect of "MDS addiction".*

*H3b: MDS use in the entertainment domain is positively related to the effect of "MDS addiction".*

*H3c: MDS use in the professional domain is positively related to the effect of “MDS addiction”.*

#### **6.2.2.d Presenteeism**

The concept of "presenteeism" emerged from the interview data. During the axial coding, a clear pattern from the interview data was evident but we had to refer to previous literature on presenteeism (Ayyagari et al., 2011) in order to properly label this concept. We noticed many of the interviews described a deep feeling of connectedness to others through *MDS use*. Presenteeism is described as how accessible you are to others and how accessible others are to you (Ayyagari et al., 2011). The concept of presenteeism was very prevalent from the interviews. Open codes included connected, availability, easy access, and connectivity. The instant connectivity (presenteeism) to friends and loved ones available through *MDS use* in the social domain was described as “powerful”, “helpful”, and “positive”. Here are some examples of presenteeism from the interviews:

I do like the fact that I am always available to my family.

So many areas are enhanced through the smartphone apps. Instant communications in several forms may be the most powerful and helpful.

My phone allows me to immediately share news/pictures with friends and family

It allows me to be more mobile, go where I want, do what I want and still maintain connectivity with what I need to stay connected with. I.e. banking – no matter where I can take care of financial needs, and interpersonal relationships that may require attention. As stated before, it gives me access to any information I need “on demand”.

Texting is very positive. It's a way to respond to people, especially in meetings when I'm tied up. It is a great way for people to reach me if there's an emergency. Makes me feel connected.

I often make calls that I am able to talk to people about anytime – able to make calls in car when driving to have conversations that I may not have after I arrive home

Yea it is helpful in many areas of my life because it has changed how I maintain communication with friends and acquaintances. It has increased my availability, I can reply faster, I'm always available. I have my device at all times and all places. It I'm traveling or in the park I can respond at all times.

Respondents referred to presenteeism in a positive manner when it centered on social use, such as being available to and having availability to communicate with friends and family. Many even discussed how they were able to reconnect or grow new personal relationships because of the capabilities provided through MDS. Therefore we present the following hypothesis:

*H4a: MDS use in the social domain is positively related to the effect "Presenteeism".*

Many respondents also described how the concept of presenteeism relates to *MDS use* in the professional domain. It is clear from the interviews that individuals feel an added pressure to respond to communication, which stems from improved accessibility through MDS. This was described as “an unanticipated expectation” suggesting that individuals feel a need to respond to communications because of the increased presenteeism through MDS. For example, they expressed pressures to answer emails, phone calls, and text messages at times that were intrusive to their current activity. As

seen from the examples below, most of the interviewees discuss how *MDS use* in the professional domain relates to presenteeism by explaining the positives with the negatives. Examples of presenteeism from the professional domain include:

Using emails...it makes keeping up with work easier but you never get a break from work. I guess it's an unanticipated expectation.

Makes me more efficient at work, but it also keeps me more connected to work while I am off

Great to be able to answer emails as they come in, but the expectations is also there that you do (expected to answer emails)

It can be a little stressful feeling like I'm always connected. It would be nice to be free of it for a week or two. When we were in Europe without access it was very freeing.

It seems as though while they appreciate the increased connectivity to the professional domain, there may be some underlying need for self-regulation so that they are able to disconnect from work on occasion. This concept manifests from the following example, as one respondent discusses a need for "balance" and the ability to "restrict" themselves from responding at all times. Therefore, with proper guidelines and self-imposed restrictions presenteeism could be considered a positive when it comes to connecting with others in the professional domain. This suggests that self-regulation may also play a role in how individuals are influenced by presenteeism in the professional domain.

It's very positive because it does improve my accessibility during travel. Communication, of course, is probably most used to talk to

people in another area and the ability to work. I am connected to work all the time and can respond when needed. But there's always a balance, as long as your peers and your supervisors know that you are not deliberately avoiding them and not answering their calls I think it's fine. I have to restrict myself from responding sometimes or it can get to be too much.

To better understand the relationship between *MDS use* in the professional domain and the concept of presenteeism we hypothesize that:

*H4b: MDS use in the professional domain is positively related to the effect "Presenteeism".*

#### **6.2.2.e Productivity**

The influence of *MDS use* on productivity materialized from the interview data and consisted of 12 open codes including: faster, efficiencies, saves time, productivity, easier, instant information, prepared, convenient, inclusive, and reference tool. Most studies that include the concept of productivity tend to focus on productivity in the professional domain (L M Hitt & Brynjolfsson, 1996; Saari, 2006). This study follows that conceptualization as respondents continued to describe how efficient they are because of *MDS use* in the professional domain. Here are some examples:

with work – it allows me to stay ahead without walking into the office to the unknown each day.

At work it makes me more efficient

Also, the calendar is really helpful since I am connected to my work calendar. If a meeting gets changed late at night then I can check it from my phone. I don't look at my work emails away from work unless there is an emergency and we deal a lot with China so my night

time they are active over there. I use a Chinese app and my Chinese partner has it as well so we can communicate thru that app for work.

Therefore, we hypothesize:

*H5a: MDS use in the professional domain is positively related to the effect of productivity.*

While most studies including the construct of productivity focus around productivity in the workplace, we believe that it is useful to broaden this scope to include personal domains which were revealed in the interviews. Many of the participants explain how convenient it is to have a device which includes “so many capabilities”. From the examples below it’s clear to see how a smartphone can be a replacement for so many other devices. Because of this, some respondents suggest that mobile devices are “all inclusive” and the convenience that comes from using them allows individuals to be much more productive. For example, many of the interviewees suggested how convenient it was to have a camera on their smartphones and that without them they would have not been able “to capture that special moment” with a picture. Other examples include:

My smartphone has eliminated the need for two standalone devices when I travel, GPS and camera

with my personal life it’s just a huge convenience.

Definitely would be a convenience thing so if I know I’m driving down the street and I need to pick up something at the store...so having it there and knowing it can do anything basically that I what I want it to do.

Some of my life is made more convenient by this use. I can check the weather at any given time, check on my son's behavior at school from a school app, use the maps to get directions, locate where my next meeting is at work without having to look on my calendar at my desk and answer emails quickly for work. I am able to save money from some of these apps by checking for deals and coupons at stores and restaurants that I wouldn't normally have a hard copy with me wherever I am.

Given this information we form the following hypothesis:

*H5b: MDS use in the personal utility domain is positively related to the effect of productivity.*

Two aspects of productivity include efficiency and effectiveness (A Bhattacharjee & Premkumar, 2004) . Respondents in this study suggest that by using their mobile device, they are able to complete tasks much faster because they are always connected and have “immediate access to the information they need”. This suggests that *MDS use* in the personal informative domain increases efficiency. For example, many interviewees mentioned an increase in productivity because of the information that was available to them from *MDS use*. Everyone with a smartphone has access to virtually any information that is on the internet and the use of apps such as google search allow individuals instant answers to their questions. Effectiveness is another aspect of productivity and the use of MDS capabilities such as calendars, notes, and lists allows individuals to be more prepared for certain situations. For example, some respondents suggest that they don't necessarily like to respond to emails using their MDS but reading emails from others allows them to be more prepared for the next day. This gives them a sense of security because they know they feel more informed by the use of MDS and can

make more informed decisions, thereby increasing their effectiveness. Here are a few examples of how *MDS use* in the personal informative domain relate to productivity.

Work efficiencies have increased and the speed of information and communication is high and precision is very high because. My judgements become better

It's so efficient having all types of information at my fingertips

I use my phone to inform me about my day. Weather, news, stock prices...maybe tracking airline flights when our son is flying in to visit or viewing real estate. Sometimes I search for recipes or listen to educational podcasts

We hypothesize that:

*H5c: MDS use in the personal informative domain is positively related to the effect of productivity.*

The financial domain was also filled with the idea of increased productivity.

Using shopping apps allows individuals to save money by finding special deals and using electronic coupons. The financial domain is also filled with making reservations and making online purchases which interviewees viewed as a major increase in productivity.

One interviewee in particular describes “the daunting task of having to wait for the bus for up to four hours” before the development of an application enabled them to join an online waiting list, thereby allowing them that extra time to be more productive. Here are a few examples:

I am able to save money from some of these apps by checking for deals and coupons at stores and restaurants that I wouldn't normally have a hard copy with me wherever I am.

I do a lot of online purchases so if you had asked me about last month's usage I probably was on it more for Christmas shopping and sales.

Taxi providers like Ola...all cab service providers have an app to book taxis from there smartphones, board a train, or catch an airplane, or a bus station, we use taxi more around the city, I use them 7 to 10 times a week.

We hypothesize that:

*H5d: MDS use in the financial domain is positively related to the effect of productivity.*

#### **6.2.2.f Safety**

Respondents described a sense of safety by having their phones with them and knowing that at any moment they could have access to contact someone in a time of need. This MDS effect consisted of four open codes: safety, help, emergencies, security. Interviewees suggest that the use of MDS gives them a sense of safety and security knowing that they can contact someone and get help in any situation. Therefore just by having their phones, they get an added sense of security which they did not have before the use of MDS. A study by Nasar, Hecht, & Wener (2007), which looked specifically at how phones influence the perception of safety, also suggests that having a mobile device creates an added perception of safety. All of the examples below refer to having a way to communicate with others in a time of need and this gives them a sense of safety and security.

This allows you to be available in case of emergencies and allows you to stay in touch no matter the distance.

I take my phone with me to the warehouse at work because if I got injured or fell down the stairs I'd be able to call someone for help.

When I was in college, one of the girls was running and got run over and broke her leg but didn't have her phone with her so it took her a while to get help. So I carry my phone with me all the time.

Checking in quickly and easily w/ family gives me a sense of security

With my phone I feel safer when I am not at home and I just feel safer when I have it with me. I feel better that my kids can contact me when they need me.

I feel much safer than I did before I had an iPhone

I guess if you got locked out of your house. I haven't done it before but my mom's boyfriend got locked out when we just moved into a new house so one time my mom was at home and me and my boyfriend drove out and we were 5 or 10 minutes away from home and she called and said we had to come by and she had gotten locked out and didn't have a spare key anywhere. It helped her and it would help me in the same situation.

Most of the situations above revolve around the ability to contact others in a time of need (Larose, Rifon, & Problem, 2007). While most of these quotes from the interviews suggest a feeling of safety the capability to contact someone in a time of need, we don't believe that *MDS use* in the social domain would have any influence on the *MDS effect of safety*. Instead, a further investigation revealed a different domain which might influence the perception of safety. Below are a few examples.

My phone is very helpful when I'm lost, or looking for info, or for safety reasons

It's great to know the weather without having to sit through the morning news to find out so I can dress comfortably

This can be a great tool when lost or need directions and estimated time of arrival. Especially in a sketchy neighborhood.

Keep up with news alerts so I know what's going on around me. I feel safer knowing what's going on.

Sometimes I use it (MDS) as a flashlight so I don't trip over something

If lose keys, can open car and start car

The personal utility domain for *MDS use* consists of MDS taking the place of another device which provides utility. Examples above suggest that using MDS in the personal utility domain can be used to take the place of safety related items including car keys, a flashlight, GPS, and television (to inform about the weather and news). All of these items were mentioned in a way to suggest that they provide some sort of utility that increases their perception of safety. Therefore we hypothesize that:

*H6a: MDS use in the personal utility domain influences the MDS effect of safety.*

#### **6.2.2.g Knowledge**

Throughout the interviews, one constant was how helpful everyone considered their smartphones to be. In particular, individuals suggested how much they used their MDS to learn about something new or search for some type of crucial information. Jung

(2014) suggests that mobile devices have progressed from being simple communication tools into personal mobile computers with endless possibilities. Just as Sher & Lee (2004) discuss how Information technology can be considered a facilitator for enhancing dynamic capabilities through knowledge management, we believe these concepts can also be discussed in reference to an individual's personal life

From the interviews it was clear that individuals perceive that the capabilities available through the use of MDS, such as constant accessibility to information allows them to be more knowledgeable and gives them the opportunity to make better life decisions. Below are some examples from the interviews which suggest that *MDS use* leads to an increase in knowledge about a variety of types of information. The three main *MDS use* domains which seemed to be related to knowledge were personal informative, personal utility, and professional domains.

I always feel so informed because I have easy access to emails, texts, and my calendar. I can look up anything quickly just by saying "OK Google" and asking. It's just the best thing ever!!!

I like to use my phone for fact-finding and surfing the internet when we're thinking about what we might do over the weekend (what's on tap, what the ski conditions are like, who's that actor in that show we're watching? Junk stuff)

Easy to find forecast and to navigate to addresses using GPS. The wide range of usage is unbelievably powerful and extremely informative

I use my phone to inform me about my day. Weather, news, stock prices...maybe tracking airline flights when our son is flying in to visit or viewing real estate. Sometimes I search for recipes or listen to educational podcasts

I was traveling last week and I was in a new place so I had find many directions and searching companies that I will meet with. It would have been very difficult if my smartphone was not there. So that is one of the major parts that have become in our lives. When I'm away from my laptop or desktop I use it for different things which keep me connected with work or with friends or with my boss.

For work...my phone provides me with key information through emails, texts, phone, and calendar when I am away from my desk or in meetings.

While not quite as evident from our interviews as these three domains, we also feel that the growth of *MDS use* in the health domain suggests that it provides useful knowledge which allows you to be healthier as seen below.

I use the Edomondo app to track my morning runs. It gives me distance and time and seems to be really accurate. It also sends my times to my email and I can easily keep up with my personal record.

Therefore we make the following hypotheses:

*H7a: MDS use in the personal informative domain is positively related to the effect of knowledge.*

*H7b: MDS use in the personal utility domain is positively related to the effect of knowledge.*

*H7c: MDS use in the professional domain is positively related to the effect of knowledge.*

*H7d: MDS use in the health domain is positively related to the effect of knowledge.*

#### 6.2.2.h Work-Life Conflict

Lastly, the MDS effect of work-life conflict emerged from the axial coding process. Five open codes were used to explain work-life conflict. They are; family time, neglectful, complaints from others, work-life balance, and intrusive. These codes were used in the context of work life interfering in the personal lives of the respondents. Work-life conflict suggests that there is too much overlap between the family and work domains so much so that the work domain is seen as being invasive (C. A. Middleton, 2008). It's very evident from the codes below how individuals perceive *MDS use* is influencing work-life conflict. Many suggest that they are ignoring their children and spouses because they are constantly completing work tasks while at home. Sometimes this leads to disagreements and disappointment from spouses and children because they feel ignored and neglected. Again, a large portion of responses from this axial code seem to be influenced by presenteeism and the connectedness available through *MDS use*.

It always puts work at your fingertips which can take over family time.

Constant emails makes keeping up with work easier but you never get a break from work which tends to affect my time with family

I get too many emails at too many times of the day.

The time I spend with my family gets affected as I feel that I am dedicating more and more time to using the phone.

Family time in the evenings especially are affected in a negative way. I get work emails and collaborate with a number of universities worldwide (UK Malaysia) and with the time difference I'm always getting messages from people in those areas. I pretty much have a 15 hour work day and have to respond to these people.

In the late evening when I get a lot of work calls I'm not able to spend that much time with my kids so usually they take my phone away and that's one negative is that I'm not spending enough time with those around me such as family

Usually my kids want me to give complete attention to them and I find myself answering emails and taking calls for work and they do not like that. They call me cyber dad and take my phone away from me sometimes when it gets to be too much. My wife will also let me know when I have been too neglectful.

It (MDS) is influencing both ways. My husband is in industry and his use is very high as compared to me. He is constantly connected to work and it has a toll on our personal life.

Therefore we suggest that the following hypothesis:

*H8a: MDS use in the professional domain is positively related to the effect of work-life conflict.*

### **6.2.3 Cultural Differences**

There were many similarities when comparing the two data sets from the U.S. and India and the relationships between the concepts already discussed seem to hold true in both the national cultures of the U.S. and India. The quotes presented in the previous sections and the development of how these concepts are related to one another emerged from a combination of both data sets. When analyzing the two data sets separately and comparing them directly, there were a few interesting differences between the cultures and this section will focus on these differences.

### 6.2.3.a Cultural Differences in MDS Use

When comparing the interview data from the U.S. and India, some differences developed in the ways individuals use their MDS. Table 14 presents the percentage of participants who discussed *MDS use* in the life domains separated by country. Notice the similarities in percentages even though roughly half as many individuals were interviewed from India compared to the U.S. While these percentages have not been analyzed statistically, they suggest that the ways MDS is used in different countries are very similar.

Domain <i>MDS use</i>	India	U.S.
Financial	55%	46%
Social	100%	100%
Entertainment	82%	79%
Professional	82%	63%
Informative	100%	88%
Health and Fitness	9%	29%

### 6.2.3.b Self-Regulation

During the data collection process the U.S. interviews were completed first and then the India interviews were conducted. The same pattern was followed during the coding phases with the U.S. being coded first followed by the coding of the India interviews. The concept of self-regulation did not emerge until we began coding the India interviews. Self-regulation is described as “operating through a set of psychological sub functions that must be developed and mobilized for self-directed change” (A. Bandura, 1986). Self-regulation is also described as a person’s intention,

desire, and ability to control their own motivation and behavior (Albert Bandura, 1977).

For the purposes of this study, individuals who imposed self-regulation recognized a problem with excessive use (possibly addiction) and acted to either change the settings of their phone or physically leave their phone in a different location so it would not be a distraction.

While some form of self-regulation was mentioned briefly in regards to the professional domain, the concept of self-regulation manifested itself in the use of the app “WhatsApp” from the India interviews. The concept of self-regulation was voiced by many participants in India and also one U.S. participant who discussed the use of WhatsApp. Without self-regulation, in the form of changing notification settings, this application becomes a constant distraction to individuals’ daily routines due to the invasive nature of this method of communication.

I would rather be connected all the time. Except when you have too much Facebook or WhatsApp and I have turned that notification off because with WhatsApp, if we have a group message, let’s say we have a 10 year reunion for middle school, you have 40 people in the chat room and we have a different time schedule (pause) their day time is my night time so I don’t want to be bothered. I want to go to sleep. So I will switch off the notifications so when I wake up I might see 100 messages but none of them bothered me because it was muted.

I realized I was becoming addicted so I stopped. Even if I was in the middle of a meeting and I would get a notification and now I have disabled these. It was a big distraction which I dealt with for months with constant distractions so I disabled them. I leave my phone in my pocket and when I go to meetings I leave it at my desk although I see other constantly being affected by this and always checking their messages. Before I probably used my phone 3 to four hours a day.

The use of WhatsApp seems to have a direct connection to mobile device addiction due to the invasive nature of the *push* default notifications associated with use of the application. Some individuals mentioned that they recognized the *push* notifications as a problem and changed their settings in the application to a *pull* notification method. Using the *pull* notification method just means that the individual would need to open the application to view messages rather than have them automatically notify them every time they receive a communication (*push*). One individual also mentions how they simply leave their phone in their desk so the app's intrusive nature does not affect their work performance like it does to their coworkers. As presented below, self-regulation seems to be very helpful in modifying this intrusive applications and the addictive behaviors to check the messages, which may be hindering the individuals' overall QOL.

I am able to control my addiction but I know others who cannot take their eyes off of their smartphone and every 5 or ten minutes they have to check it and it gives a bad impression. It gives the impression that you are not important. I have overcome my addiction, I have fixed my time for the amount of time I can spend on what's app and social networking sites and checking email. It helps me manage my time better. Not completely but maybe 80-90 %

People need to be able to restrict their use and a lot of teenagers do not have this skill and don't know when to stop using it. I'm very worried about how much my teenage sons will use their phones and how much they will use their phones in the future

We believe self-regulation is a very important concept in better understanding *MDS use* and *MDS addiction* and needs to be further analyzed to understand the

psychological sub functions. While self-regulation manifested itself from the intrusive nature of WhatsApp, there may be other intrusive applications and functions of *MDS use* which need further exploration. Self-regulation might also influence the relationship between the entertainment domain and *MDS addiction*, which was not apparent from the interviews but has been discussed in previous research (Mehroof & Griffiths, 2010; Soh & Tan, 2008).

#### **6.2.4 Summary Section**

We interviewed twenty three individuals from the U.S. and eleven individuals from India in order to better understand how they use MDS and what influence they believe this might have on their daily lives. We were able to gain a deeper understanding of how individuals use their MDS and established the life domains which are influenced by *MDS use*. This research also explored and developed concepts to explain the *effects of MDS use*. Next, hypotheses were developed based on the interviews and proposed the relationships between *MDS use* in life domains and *the effects of MDS use*. These hypotheses are summarized below in Table 15. We found many more similarities than differences between how individuals in the US and India described their use of MDS. It was discovered from the interviews that adoptions of certain apps might lead to differences in *MDS use* and *effects of MDS use*. This was very apparent from the way individuals from India described the addictive tendencies of the “WhatsApp” application. This also led to the discovery of the importance of self-regulation as a method to separate from technology so that you are able to focus on concerns of greater importance.

The interviews from this part of the study inform the second and third parts of the study to help develop the research model. This qualitative process also informs the development of the quantitative instrument, which is used to test the research model.

## CHAPTER VII

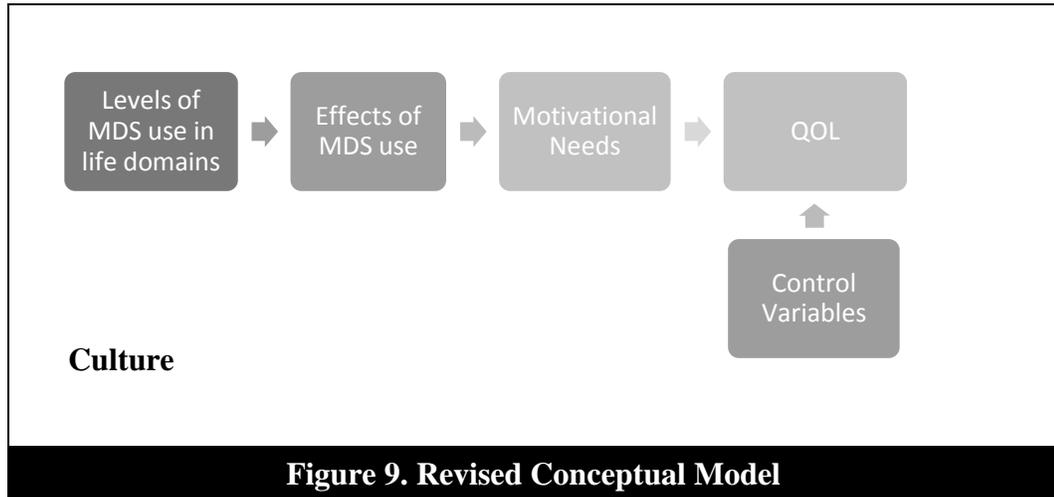
### PART II. QUANTITATIVE STUDY U.S.

The knowledge gained from Part I, the exploratory qualitative study, is used to refine the research model and develop hypotheses. In Part II, we test these hypotheses using a positivist survey instrument such as Venkatesh & Brown (2013) suggest. In Part III, we replicate the study by collecting data from India in order to explore cultural differences in *MDS use*, thus conducting a cross cultural examination. Administering the same survey instrument in India, we collect additional data on individuals from another country (with a different national culture) and compare findings with results from Part II to explore any cultural differences that influence the model.

#### 7.1 Model Development

In Part II, we are concerned with establishing how the constructs from Part I (*MDS use* and *effects of MDS use*) influence QOL. By incorporating theory from Maslow's Hierarchy of Needs, we seek to understand which motivational needs are influenced by the *effects of MDS use*. However, it was necessary to refine the research model based on the analysis from the qualitative study. After further literature investigation on Multiple Discrepancies Theory along with results from the qualitative study, we found that there is not much support for including MDT in the model. The

revised conceptual model is shown below in Figure 9. Next, we develop hypotheses relating *effects of MDS use* to motivational needs developed by (Maslow, 1943).



In addition to the relationships discovered from the qualitative study representing the first arrow above in the conceptual model, we elaborate here on the other relationships in the model. Table 15 presents the hypotheses we test that emanated from Part I of this research.

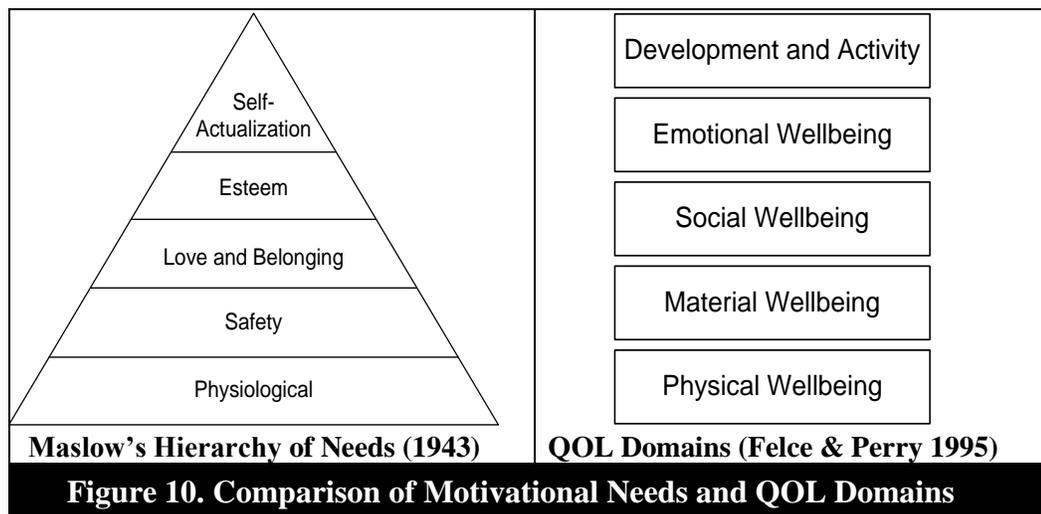
Next we present how *MDS effects* relate to motivational needs and present hypotheses that need to be tested.

<b>Table 15. MDS Use Hypotheses</b>	
<i>Hypothesis</i>	<i>MDS Effect</i>
<i>H1a: MDS use in the social domain is positively related to</i>	<i>Loss of face to face communications</i>
<i>H1b: MDS use in the professional domain is positively related to</i>	
<i>H2a: MDS use in the entertainment domain is positively related to</i>	<i>Enjoyment</i>
<i>H2b: MDS use in the social domain is positively related to</i>	
<i>H2c: MDS use in the personal utility domain is positively related to</i>	<i>MDS addiction</i>
<i>H3a: MDS use in the social domain is positively related to</i>	
<i>H3c: MDS use in the professional domain is positively related to</i>	
<i>H4a: MDS use in the social domain is positively related to</i>	<i>Presenteeism</i>
<i>H4b: MDS use in the professional domain is positively related to</i>	
<i>H5a: MDS use in the professional domain is positively related to</i>	<i>Productivity</i>
<i>H5b: MDS use in the personal utility domain is positively related to</i>	
<i>H5c: MDS use in the personal informative domain is positively related to</i>	
<i>H5d: MDS use in the financial domain is positively related to</i>	
<i>H6a: MDS use in the personal utility domain is positively related to</i>	<i>Safety</i>
<i>H7a: MDS use in the personal informative domain is positively related to</i>	<i>Knowledge</i>
<i>H7b: MDS use in the personal utility domain is positively related to</i>	
<i>H7c: MDS use in the professional domain is positively related to</i>	
<i>H7d: MDS use in the health domain is positively related to</i>	<i>Work-Life Conflict</i>
<i>H8a: MDS use in the professional domain is positively related to</i>	

### 7.1.1 Effects of MDS Use and Motivational Needs

In our search to relate *effects of MDS use* to QOL we discovered an interesting and very familiar lens with which to view QOL. Felce & Perry (1995) developed a classification of life domains in order to better conceptualize QOL. This classification embodies many elements from Maslow's Hierarchy of Needs theory. In fact, as seen below in Figure 10, they are essentially replicas of one another using terms which could be considered synonymous. In developing their classification of QOL, Felce & Perry (1995) pragmatically placed 33 life domains (found in previous research) under five dimensions and asked individuals to rank these dimensions in order to represent a

construct they call individual values. Where Maslow suggests the hierarchy presented below in Figure 6, Felce & Perry (1995) propose that individuals might have differing opinions on the importance of these five dimensions. We should note that in figure 6 below, we placed the dimensions from Felce & Perry (1995) in a parallel way so as to be able to compare the two theories. We will use this classification along with research related to motivational needs to help propose relationships between *effects of MDS use* and the motivational needs in order to help us better understand influence on QOL.



### 7.1.1.a Physiological Needs

The most basic needs as described by Maslow are an individual's physiological needs. In describing the hierarchy involved in his theory Maslow explains that "a person who is lacking food, safety, love, and esteem would most probably hunger for food more strongly than for anything else" (Maslow, 1943, p. 374). Therefore he suggests that until physiological needs are met, other needs may become non-existent or be pushed into the

background until that physiological need is met. After a want is satisfied, it is no longer a want (Maslow, 1943) and the individual will move past the physiological needs onto safety needs. Examples of physiological needs include oxygen, water, sleep, sex, physical health, and suitable temperatures which can best be described as biological or survival needs.

Maslow suggests that in today's society, most individuals are not constantly motivated by physiological needs because these needs have always been met. He explains that in today's society most individuals "experience appetite rather than hunger when they say I am hungry" (Maslow, 1943, p. 375). This means that while an individual might say that they are hungry if they haven't eaten lunch by 1:00 pm, they really aren't experiencing a deep physiological hunger in which they must have food immediately to survive. From the qualitative study, when individuals described their *MDS use* in the health domain they suggested that their MDS gave them knowledge about their physical health. Whether it was discussing how their MDS allowed them to calculate and list items they had eaten in order to calculate calorie intake or tracking some type of physical fitness, they felt better informed by *MDS use* in the health domain. Therefore, we hypothesize that:

*H9: The MDS effect of Knowledge is positively related to the physiological motivational need.*

#### **7.1.1.b Safety Needs**

The next level of motivational needs consists of safety needs which allow the individual to feel as if they are not in any physical danger. Maslow discussed the safety

needs of children to explain how an individual's motivational needs are shaped by their experiences and surroundings (Maslow, 1943). He suggested that in a 'good society', individuals do not worry about unsafe outcomes such as interaction with criminals, tyranny, wild animals, etc. Therefore, he suggest that in a stable society such as ours, we perceive items such as job security, the desire for a savings account, and various types of insurance to represent safety needs. Extended research on safety needs include concepts such as personal security, stability, investments, types of insurance, and financial security (Taormina & Gao, 2013). We suggest three *effects of MDS use* which might influence the safety motivational need as described by Maslow and others. Presenteeism through *MDS use* was often described in relation to "feeling safe" and "secure" in the interviews conducted in Part I of the study. Interviewees felt more at peace because they knew that if they had their mobile device, they could contact someone in case of an emergency. Therefore, we hypothesize that:

*H10a: The MDS effect of Presenteeism is positively related to the safety motivational need.*

*Knowledge* through *MDS use* is very influential and related to many of the domains of *MDS use* but it is also important to consider how it relates to motivational needs. We discussed the hypothesized relationships from personal utility, personal informative, and health domains to the MDS effect of *knowledge*. From the interviews, we gained a sense of knowledge from these domains which seem to relate to the safety motivational need. Knowledge about safety related concepts such as investments,

insurance, and overall safety and security warrant further exploration (Taormina & Gao, 2013). Therefore we hypothesize that:

*H10b: The MDS effect of Knowledge is positively related to the safety motivational need.*

The MDS effect of *safety* can be described as an individual's perception of personal safety. This concept was evident from the number of times it was represented in the qualitative study. Interviewees constantly described how just having their phone with them made them feel safer. *MDS use* in the personal utility domain is hypothesized to relate to the *MDS effect of safety*. Individuals suggest that the added utility of their MDS, allows them to replace multiple devices with one device and provides them an added sense of safety. For example, the use of GPS allows an individual an added sense of safety knowing that there is less likelihood that they will get lost if they have their MDS in their vehicle. The *MDS effect* representing *safety* is very similar to the personal safety component of the motivational safety needs which Maslow presented (Maslow, 1943). Therefore we hypothesize that:

*H10c: The MDS effect of Safety is positively related to the safety motivational need.*

#### **7.1.1.b Love and Belonging Needs**

The third level of motivational needs are the love and belonging needs. Maslow suggests that once the physiological and safety needs are met, an individual will then be motivated to fulfill their love needs. Maslow suggests that this will come with a feelings

of an “absence for friends, or a sweetheart, or a wife, or children”(Maslow, 1943, p. 382). This includes an individual’s needs of friendship, ties with family, and intimate relationships.

Presenteeism was discussed as having an increased sense of love and belonging associated with it from the interviews. While most researchers have chosen to view presenteeism through the lens of the professional domain focusing on the intrusive nature of presenteeism (Ayyagari et al., 2011), findings from the interviews suggest a much more positive influence of presenteeism. Individuals suggested that being able to contact friends and family at any time allows them to communicate more often and build better relationships. The ability to “instantly” share pictures and videos with family through *MDS use* was also discussed as a way to enhance those relationships. This was even more evident from individuals who were geographically separated from friends and family as it serves as a very inexpensive means to communicate through instant messaging and even video messaging. Therefore we hypothesize that:

*H11a: The MDS effect of Presenteeism is positively related to the love and belonging motivational need.*

The *MDS effect* of enjoyment is hypothesized to be related to three *MDS use* domains. They are entertainment, social, and personal utility domains. From the interviews, we see examples such as families using their MDS to watch a movie on their TV or providing an internet signal to family members tablets so that they can be entertained. We also see interviewees suggesting how they experience joy from connecting with others through social media by connection with their MDS. Lastly, they

describe a sense of joy or happiness from the utility provided through MDS such as one individual teaching his nephew about a how to use the compass on his MDS so that he could navigate in the crowded city. All of these examples lead to a sense of happiness or enjoyment in connecting with others through MDS. While playing online games through MDS can be very enjoyable it can also lead to highly addictive behaviors (Mehroof & Griffiths, 2010). Therefore we hypothesize:

*H11b: The MDS effect of Enjoyment is positively related to the love and belonging motivational needs.*

The MDS effect of *MDS addiction* is hypothesized to be related to the professional, social, and personal informative *MDS use* domains. It is apparent from the interviews that *MDS use* in all of these domains can create addictive behaviors in which an individual struggles to disconnect and “live in the here and now”. This is consistent with other literature which suggests that *MDS addiction* might negatively influence the relationships of those involved (Turel et al., 2011). Therefore, we hypothesize:

*H11c: The MDS effect of MDS addiction is negatively related to the love and belonging motivational needs.*

Research suggests that individuals are constantly choosing to communicate more through digital methods in lieu of a traditional face to face meeting (Church & de Oliveira, 2013; Turkle, 2012). The main question that comes out of research like this centers around what impact this will have on society and individuals. Will we forget how to interact in face to face situations? Will the younger generation grow up in an

environment which communication happens mainly through digital methods? We believe that a loss in face to face communications will only decrease the deep intimate relationships you have with friends and family. While the capabilities to connect with more people through MDS are wonderful, we believe they are negatively effecting an individual's love and belonging needs. Therefore we hypothesize:

*H11d: The MDS effect of a loss of face to face communications is negatively related to the love and belonging motivational needs.*

#### **7.1.1.c Esteem Needs**

Next Maslow describes the motivational esteem needs which consist of self-esteem, confidence, and achievement (Maslow, 1943). He suggests that in today's society there is a desire for a high evaluation of one's self, self-respect, self-esteem, and for esteem of others. This level of needs is twofold because it represents both how an individual views him/herself and also how others view the individual. In the case of how you view yourself, concepts such as achievement, strength adequacy, and self-confidence are considered important. As far as how others view you, reputation, prestige, recognition, and attention are important factors (Taormina & Gao, 2013).

In relating *MDS effects* to esteem needs, productivity and work-life conflict are two areas which we believe might be influential. An increase in productivity requires either the ability to increase outputs while maintaining inputs or decrease inputs while maintaining outputs (Lorin M. Hitt & Brynjolfsson, 1996). The term productivity has been used interchangeably with increases in efficiency, effectiveness, and quality (Saari, 2006). We hypothesize that *MDS use* in the professional, financial, personal informative,

and personal utility domains will all have a positive relationship with productivity. One area of shared experiences from these life domains and productivity from the interviews is a feeling of increased self-esteem and self-worth through *MDS use* in these particular domains. For example:

(My) work efficiencies have increased and the speed of information and communication is high and precision is very high because...my judgements become better informed.

Evaluating this statement, there is a sense of increased self-confidence because of the increase in productivity through *MDS use in the professional domain*. Previous research also suggests a positive relationship between productivity and self-esteem (Brockner, 1985; Judge & Bono, 2001). Therefore we propose that:

*H12a: The MDS effect of a productivity will influence the esteem needs.*

The literature on work-life conflict suggests that the boundary between work and life domains becomes less clear and therefore there is spill over from the work domain into the life domain causing a conflict (Chesley, 2005). The time employees are spending connected to the workplace through MDS is continuing to increase which leads one to question, why? What motivations do employees have to work longer hours by answering emails and text messages during non-traditional work hours. One reason why they might do so is to increase how their coworkers, in particular their management view their work ethic and worth to the company. Employees in this situation are choosing to blur the boundaries between work and life in order to increase their esteem needs. They want to

increase their reputation and gain attention and recognition for their hard work by working longer hours and “staying connected, even while on vacation”. Maslow suggests that once an individual meets their love and belonging needs they will move on to satisfying their esteem needs. The conceptualization of work-life conflict suggests that an individual is making a choice to conduct work related tasks at a time which conflicts with their life domain. This means that an individual is interested in other needs such as self-esteem needs which might be satisfied with increase time spent in the professional domain, leading to work-life conflict. Therefore, we hypothesize.

*H12b: The MDS effect of work-life conflict is positively related to the esteem needs.*

#### **7.1.1.d Self-actualization Needs**

Lastly, self-actualization needs are described as achieving one’s full potential and includes creative activities, problem solving, and learning. Maslow also describes this level of needs as an enlightenment phase which includes spontaneity, morality, and fulfilling one’s purpose in life. He goes on to offer the following “A musician must make music, an artist must paint, a poet must write, if he is to be ultimately happy (Maslow, 1943, p. 383). This suggests that in this phase, one truly discovers what it is they are called or drawn to do with their lives in order to find self-actualization.

We propose three *MDS effects* are related to the self-actualization needs as described by Maslow (1943). Increases in productivity have been suggested to be the main reason any IT is developed (Brynjolfsson, 1993). Throughout the interviews, individuals continually suggest how much more productive they were with their mobile

devices. When asked questions about QOL, many reminisced about the “ole days” before MDS and discussed the many conveniences created through *MDS use*. We would like to suggest that increases in productivity due to *MDS use* in the professional, financial, personal informative, and personal utility domains provide individuals with more capabilities than ever before. From the interviews, we see that they are using these capabilities available through MDS to enhance their life domains by increasing their productivity. Therefore we hypothesize that

*H13a: The MDS effect of productivity is positively related to the self-actualization needs.*

The amount of knowledge available through MDS is endless. Often this knowledge leads to discovery into facets of life in which the individual did not know existed or did not know they would be interested in. We argue that people are knowledgeable about what is going on in the world than ever before. This allows more potential painters, poets, and musicians the ability to discover exactly what they want to be by subjecting them to more of what life has to offer. Therefore, more musicians will have the ability to be influenced by music in order to discover what truly makes them happy. We hypothesize that:

*H13b: The MDS effect of knowledge is positively related to the self-actualization needs.*

Lastly, the MDS effect of *MDS addiction* is proposed to have a negative influence on self-actualization. *MDS addiction* is a physiological dependency found through

excessive use of a mobile device (Turel et al., 2011). Individuals tend to ignore items of importance to them because of *MDS use*. They can get angry or feel agitated when they are separated from MDS. Sometimes they get into arguments with loved ones or are late to appointments due to time spent on MDS. While we suggest a lot of positive outcomes associated with *MDS use*, the inability to disconnect from these devices can be detrimental to an individual's relationships and to realizing ones self-actualization needs. Therefore we hypothesize:

*H13c: The MDS effect of MDS addiction is negatively related to the self-actualization needs.*

### **7.1.2 Motivational Needs and Quality of Life**

Following more recent research on motivational needs such as (Taormina & Gao, 2013), this research seeks to better understand Maslow's hierarchy of needs theory in relation to *MDS use*. While we do not test Maslow's Hierarchy in this research model we test how the *effects of MDS use* influence motivational needs in order to better understand these relationships. Future studies should seek to test these relationships and further validate the use of Maslow's Hierarchy of needs in explaining the relationship between *MDS use* and QOL.

Maslow suggests that after individuals complete certain motivational needs, they move on to the next level in the hierarchy until they realize their self-actualization needs. For example, Maslow believed that once you reach the esteem needs, you no longer worry about the lower level needs and you also are not yet concerned about self-actualization because you have not satisfied your esteem needs. In order to test this

theory, we propose positive relationships between all of the motivational needs and QOL to see how *MDS use* is influencing QOL through motivational needs. While, Maslow suggests that, in today's society most individuals have moved beyond the physiological and safety needs, we seek to test this idea by proposing positive relationships with QOL. We also test, whether *MDS use* influences the relationships between love and belonging needs, esteem needs, and self-actualization needs and QOL. Therefore, it is important for us to test all motivational needs to see which ones are truly influencing QOL. We hypothesize that:

*H14a: Maslow's physiological needs are positively related to QOL*

*H14b: Maslow's safety needs are positively related to QOL*

*H14c: Maslow's love and belonging needs are positively related to QOL*

*H14d: Maslow's esteem needs are positively related to QOL*

*H14e: Maslow's self-actualization needs are positively related to QOL*

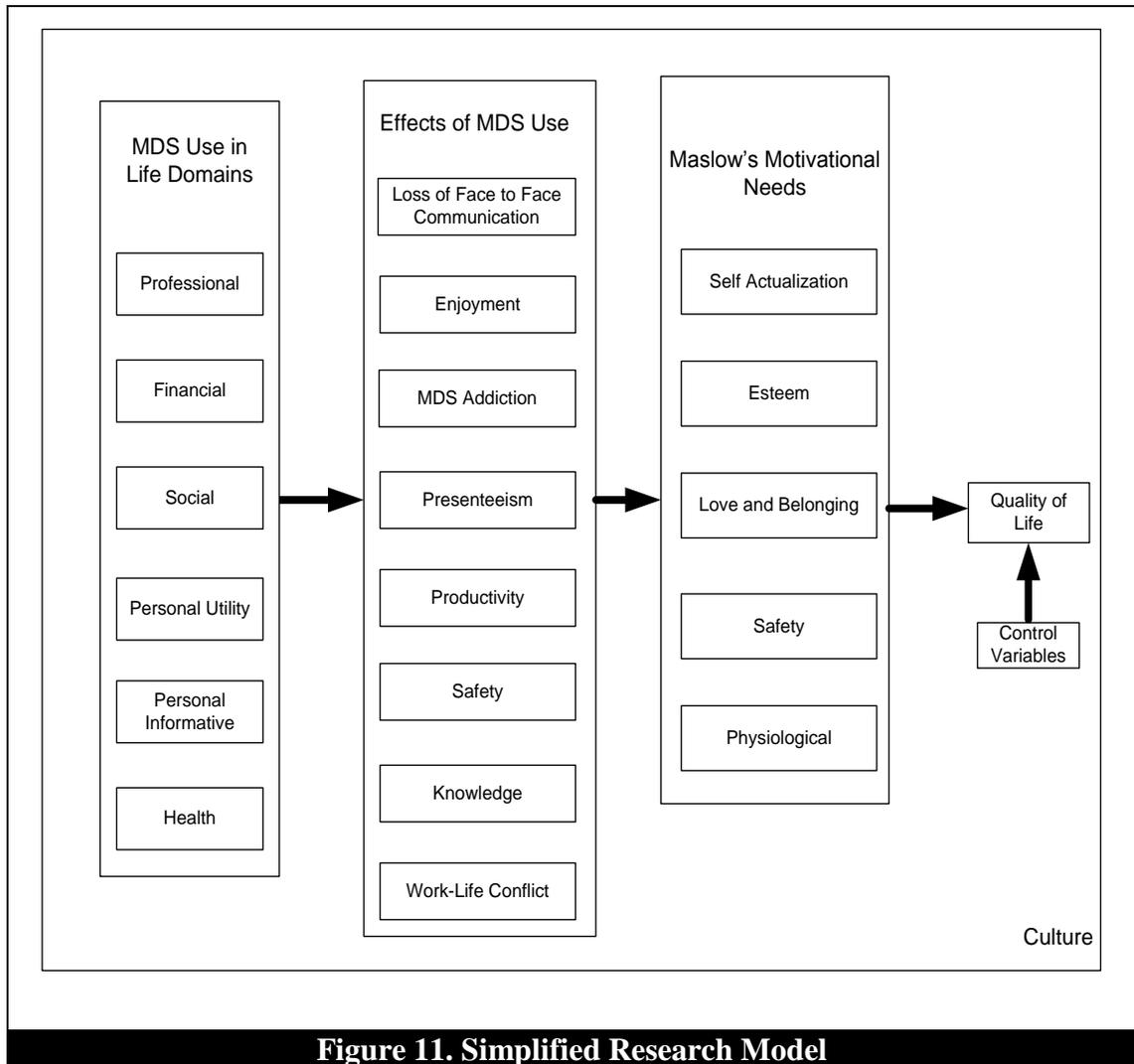
In their review of research on QOL Schuessler & Fisher (1985) suggest some background variables to consider when evaluating QOL. They suggest that age, gender, and income have been routinely correlated with QOL. Marital status has also shown to increase QOL (Campbell, Angus, Philip E. Converse, 1976). We treat these as control variables in the research model. Therefore, data was collected to control for age, marital status, income, education, and job role when measuring QOL.

The hypotheses between *effects of MDS use* and motivational needs and motivational needs and QOL are presented in Table 16.

<b>Table 16. Hypotheses between Effects of MDS and Motivational Needs And Motivational Needs and QOL</b>	
H9: The MDS effect of Knowledge is positively related to	Physiological Needs
H10a: The MDS effect of Presenteeism is positively related to	Safety Needs
H10b: The MDS effect of Knowledge is positively related to	
H10c: The MDS effect of Safety is positively related to	
H11a: The MDS effect of Presenteeism is positively related to	Love and Belonging Needs
H11b: The MDS effect of Enjoyment is positively related to	
H11c: The MDS effect of <i>MDS addiction</i> is negatively related to	
H11d: The MDS effect of a loss of face to face communications is negatively related to	
H12a: The MDS effect of a productivity is positively related to	Esteem Needs
H12b: The MDS effect of work-life conflict is positively related to	
H13a: The MDS effect of productivity is positively related to	Self-Actualization Needs
H13b: The MDS effect of knowledge is positively related to	
H13c: The MDS effect of <i>MDS addiction</i> are negatively related to	
H14a: Maslow's physiological needs are positively related to	QOL
H14b: Maslow's Safety needs are positively related to	
H14c: Maslow's Love and Belonging needs are positively related to	
H14d: Maslow's Esteem needs are positively related to	
H14e: Maslow's Self-Actualization needs are positively related to	

### 7.1.3 Full Research Model

Figure 11 depicts the final research model which emerged from the interview data and literature review.



**Figure 11. Simplified Research Model**

## 7.2 Quantitative Survey

Quantitative research paradigms draw on the principle methods of natural sciences and are appropriate for capturing the world as a concrete structure (J. W. Creswell & Clark, 2007). Through sophisticated quantitative approaches such as SEM, researchers attempt to examine relationships between concepts much like that of the scientific method from the natural sciences. This research paradigm treats individuals as a

product of their exposure to the external forces in the environment (Morgan & Smircich, 1980). Quantitative paradigms assume that reality is an objective phenomenon that lends itself to accurate measurement and observation. Therefore, external forces condition humans to respond in ways that are predictable and determinate (Pinsonneault & Kraemer, 2011). To further valid findings from the qualitative study, a quantitative study was conducted.

### **7.2.1 Research Design**

Results of the interpretive qualitative study provide rich insight into the development of measures of *MDS use* in life domains and the *effects of MDS use*. We also drew from previous literature in addition to knowledge from Part I of this study to understand these concepts and develop the hypotheses. A questionnaire was developed and administered to test the relationships between MDS, effects of MDS, motivational needs, and QOL. After development of the initial instrument, a pretest was conducted to access the opinions of professionals on the topic. This allows us to revise the survey and ensure that the chosen items are easily understood and representative (Straub, 1989). The pre-test was administered to two IS professors, and six IS doctoral students. These individuals were advised to review each item carefully and provide feedback. Feedback from the pre-test ensures that the measures are reliable with respect to content validity (MacKenzie, Podsakoff, & Podsakoff, 2011). After making suggestions provided from the pretest panel, a pilot study was conducted using sample of working professionals. These individuals were asked to complete the questionnaire and also review the items to ensure that there are no major issues in the development of the instrument or the flow of

the questionnaire. Based on 53 responses, the pilot test exhibited that the survey instrument displayed high reliability and validity. After reviewing feedback from the pilot test and making any necessary changes, the full questionnaire was administered to individuals in the United States and India. The purpose of a pilot is to test survey procedures, instrument, etc. So one pilot in the U.S. was deemed sufficient to ensure reliability in our survey instrument. Both data sets included individuals of varying demographical features such as age, ethnicity, income level, marriage status, industry, etc.

After the pilot test, we began the data collection process. Data was collected from individuals in the U.S. and India using a quantitative survey in order to test numerous hypotheses and to assess the value of the research model. In Part III, in order to conduct a cross cultural examination, data from individuals surveyed in the U.S. and data collected on individuals from India are compared to help us explore cultural differences.

The electronic survey was created and distributed to respondents through the use of Qualtrics online software. Data from the U.S. consisted of a combination of traditional recruitment methods, including convenience sampling of personal and professional contacts and distribution through Amazon Mechanical Turk (AMT). The increasing use of AMT as a recruitment tool for academic research, centers on its many benefits. AMT has been shown to provide valid data through more economical means (Mason & Suri, 2012), possibly better diversity in respondents (Buhrmester, Kwang, & Gosling, 2011), and comparable demographical range. Data collection through traditional means in the U.S. provided 256 responses, however only 196 were used due to failing the filters or not

completing the survey. Filters were included in the survey to ensure that respondents were at least 18 years old, currently employed, and used a smartphone. In addition to traditional recruitment in the U.S. we collected data from 40 more individuals through the use of AMT. There were 43 respondents through this method but two did not complete the filters and one failed an attention trap which was included in the survey. Attention traps are used to ensure that the respondent is reading through and responding to the survey questions. Therefore, the U.S. sample consisted of a total of 235 responses.

In India, we recruited 15 individuals through convenience sampling, originating from the participants of the qualitative study and 149 through the use of AMT for a total of 163 responses. Through AMT recruitment, we originally had 213 responses, including 61 (28.6%) individuals who either failed the filters or did not complete the survey and 3 individuals (1.4%) who failed the attention traps. Completion rates were relatively high considering this type of research and the length of the survey.

#### **7.2.1.a Measures**

The survey consisted of measures of *MDS use* which were derived from both the qualitative study and related previous literature (Brown & Palvia, 2015; Wakefield & Whitten, 2006). Where possible measures were adapted from previous studies. In order to capture the level of *MDS use* in each domain, respondents were asked to indicate the frequency at which they participate in the particular type of use. For example, they were asked to indicate the frequency with which they send emails to friends or family.

Answers included: never, rarely, sometimes, often, and almost always. *Measures for effects of MDS use* (Ayyagari et al., 2011; Kwak, Choi, & Lee, 2014; Netemeyer, Boles,

& Mcmurrian, 1996; Tarafdar et al., 2007; Turel & Serenko, 2010), *motivational needs*(Taormina & Gao, 2013) and QOL(Ed Diener, Oishi, & Lucas, 2009) measures were adapted from previous studies and measured on a 5 point Likert scale. Randomization was used within question sets in order to prevent bias due to ordering effects. Finally, the survey contained demographic questions pertaining to age, marital status, income, education, and job role. A complete instrument is available in Appendix A.

## **7.3 Results: U.S. Survey**

### **7.3.1 Participants**

The U.S. sample consisted of a good representation of all age levels. There was also nearly an equal distribution for males and females. The majority of the respondents were either single or married. Seventy seven percent of individuals had at least some college education and about half of the respondents had a full four year degree. Most respondents did not want to share income information but for those who did, there was again a fairly even distribution of levels of household income and the respondents represented many job roles. Table 16 presents the demographic details from the U.S. sample of 235 respondents.

**Table 16. Demographic Factors for U.S. Sample**

<b>Demographic Item</b>	<b>Level</b>	<b>Number</b>	<b>Percent</b>
<b>Age</b>	18-24	30	13%
	25-34	68	29%
	35-44	70	30%
	45-54	40	17%
	55-64	23	10%
	65 +	5	2%
<b>Gender</b>	Male	120	51%
	Female	115	49%
<b>Marital Status</b>	Single	93	39%
	Married	112	47%
	Divorced	6	3%
	Living with another	14	6%
	Separated	1	1%
	Widowed	2	1%
	Other	7	3%
<b>Education</b>	Less than High School	7	3%
	High School or Equivalent	30	13%
	Vocational/Technical School	16	7%
	Some College	63	27%
	College Graduate	84	36%
	Master's Degree	24	10%
	Doctoral Degree	11	5%
	Professional Degree	6	3%
	Other	1	0%
<b>Income</b>	Rather Not Say	74	31%
	under \$19,000	22	9%
	\$20,000-\$39,999	15	6%
	\$40,000-\$59,999	41	17%
	\$60,000-\$79,999	20	8%
	\$80,000-\$99,999	24	10%
	\$100,000-\$150,000	20	8%
	Over \$500,000	19	8%
<b>Role</b>	Upper Management	30	13%
	Middle Management	38	16%
	Administrative Staff	30	13%
	Support Staff	24	10%
	Student	36	15%
	Educator	30	13%
	Other	47	20%

### *7.3.1.a Data Analysis*

The measurement and structural models were analyzed using partial least squares equation modeling (PLS), in particular SmartPLS (Version 2.0.M3). PLS was chosen for its ability to handle complex models, and smaller sample sizes better than structural equation modeling (SEM) (Wetzels, Odekerken-Schroder, & Oppen, 2009). The use of PLS to measure complex models has been shown to perform similar to SEM assuming sample size exceeds ninety responses (Goodhue, Lewis, & Thompson, 2012).

### **7.3.2 Measurement Model and Structural Model**

The research model consists entirely of reflective measures. The quality of the reflective scales were assessed by examining reliability, convergent validity, and discriminant validity. This survey was carefully designed and implemented following proper procedures to assure high validities and reliabilities as suggested by Bagozzi (2011) and Venkatesh & Brown (2013). The sample data exhibited high composite reliabilities for all reflective scales. It is recommended that composite reliabilities exceed 0.70 (Fornell & Larcker, 1981). Most of the composite reliabilities exceeded 0.90 as depicted in Table 17, suggesting that the measures are reliable.

<b>Table 17. AVE and Composite Reliability for U.S. Sample</b>		
	AVE	Composite Reliability
Enjoyment	0.5788	0.8424
Entertainment Use	0.8725	0.9535
Esteem Needs	0.8995	0.9781
Financial Use	0.5289	0.8127
Health Use	0.6726	0.8914
Knowledge	0.7802	0.9141
Loss of Face to Face Communication	0.9118	0.9688
Love and Belonging Needs	0.8049	0.9428
MDS Addiction	0.6432	0.9151
Personal Informative Use	0.6692	0.8884
Personal Utility Use	0.6509	0.8815
Physiological Needs	0.8168	0.9469
Presenteeism	0.7516	0.9237
Productivity	0.7997	0.9522
Professional Use	0.6256	0.8923
QOL	0.8465	0.9566
Safety	0.8073	0.9436
Safety Needs	0.7396	0.9189
Self-Actualization Needs	0.8946	0.9714
Social Use	0.5284	0.8462
Work-Life Conflict	0.8003	0.9524

To improve convergent validity, items with loadings under .5 were dropped one at a time to ‘purify’ the instrument as suggested by (Churchill Jr, 1979) until there was a solution with high loadings of items on the appropriate constructs and low cross-loadings on other constructs. While analyzing the psychometric properties of our model, we found that some of the items of the constructs did not perform equally well across the U.S. and India samples. To maintain consistency, we dropped items from the models that did not perform well across both samples. This was an iterative process to ensure consistency and accuracy of the measures across samples. As suggested, convergent validity was

assessed by ensuring that all factor loadings exceeded 0.50 (Churchill Jr, 1979) and that the average variance extracted (AVE) exceeded 0.5 (Boudreau, Gefen, & Straub, 2011; Fornell & Larcker, 1981). The U.S. sample exhibited high factor loadings as depicted in Table 18, located in Appendix D. All AVE scores are also above 0.5 for the constructs as shown in Appendix D. The values suggest that the data exhibits convergent validity.

To assess discriminant validity, we ensured that the square root of AVE for each construct is greater than the corresponding latent variable correlations for each construct (Chin, 1998) and that factor loadings were greater than cross loadings. We found the square root of AVE for each construct was greater than the corresponding latent variable correlations. Latent variable correlations for the U.S. sample with the square root of AVE along the diagonal are presented in Table 19. Loadings did exceed cross loadings for the U.S. sample and are presented in Appendix D. These tests suggest that the data exhibits discriminant validity.

**Table 19. Latent Variable Correlations for U.S. Sample**

	Enjoy	Entertain	NdEste	Fin	Health	Know	Lf2f	NdLove	Addict	Inform	Util	NdPhys	Present	Prod	Proff	QOL	Safety	NdSafe	NdAct	Social	WL
Enjoy	<b>0.7608</b>																				
Entertain	0.5628	<b>0.9341</b>																			
NdEsteem	0.3396	0.2636	<b>0.9484</b>																		
Fin	0.4186	0.3511	0.2435	<b>0.7273</b>																	
Health	0.4298	0.2789	0.1502	0.4736	<b>0.8201</b>																
Know	0.3490	0.5888	0.3296	0.3390	0.2826	<b>0.8833</b>															
Lf2f	0.1308	0.0729	0.3988	0.1727	0.1631	0.1941	<b>0.9549</b>														
NdLove	0.3733	0.3243	0.7331	0.2611	0.1935	0.3193	0.2897	<b>0.8972</b>													
Addict	0.2974	0.1772	0.4419	0.2159	0.1847	0.1110	0.4341	0.3604	<b>0.8020</b>												
Inform	0.5433	0.4817	0.2063	0.4584	0.4844	0.5180	0.1578	0.2076	0.2016	<b>0.8180</b>											
Util	0.5454	0.4588	0.1871	0.4311	0.5198	0.3860	0.0717	0.2388	0.1747	0.5797	<b>0.8068</b>										
NdPhys	0.3372	0.1829	0.5604	0.3133	0.4166	0.2498	0.2572	0.4763	0.2834	0.2947	0.2648	<b>0.9038</b>									
Present	0.2173	0.3871	0.0254	0.1854	0.1970	0.3408	0.0278	0.1268	0.0890	0.3156	0.3028	0.0777	<b>0.8669</b>								
Prod	0.1928	0.5115	0.2885	0.2783	0.1209	0.6676	0.1526	0.2104	0.0203	0.3847	0.2715	0.1437	0.3652	<b>0.8943</b>							
Proff	0.2845	0.1957	0.2505	0.3075	0.2892	0.1872	0.0995	0.2260	0.1726	0.2632	0.3171	0.2360	0.0448	0.1610	<b>0.7909</b>						
QOL	0.2279	0.2654	0.6709	0.2069	0.2306	0.3440	0.3371	0.5771	0.3512	0.1697	0.1177	0.5209	0.0595	0.3276	0.1847	<b>0.9201</b>					
Safety	0.1260	0.2755	0.1804	0.2052	0.2453	0.3639	0.1710	0.2156	0.0334	0.1872	0.3171	0.1000	0.3496	0.3698	0.1115	0.1902	<b>0.8985</b>				
NdSafe	0.2889	0.2956	0.5795	0.2921	0.2936	0.3751	0.3389	0.6038	0.2763	0.2026	0.2519	0.5143	0.1527	0.3235	0.2635	0.4633	0.4353	<b>0.8600</b>			
NdAct	0.2779	0.2873	0.7521	0.2034	0.1541	0.4102	0.3414	0.5738	0.3013	0.2039	0.1951	0.5280	0.0525	0.3811	0.1949	0.6592	0.1511	0.4604	<b>0.9458</b>		
Social	0.5035	0.4618	0.1806	0.4285	0.3057	0.3263	-0.0155	0.2532	0.1430	0.4554	0.5637	0.1959	0.3525	0.1970	0.2198	0.0634	0.2746	0.2012	0.1207	<b>0.7269</b>	
WL	0.1374	0.0401	0.2631	0.1803	0.1080	0.0529	0.2766	0.2901	0.4996	0.0968	0.0554	0.2389	-0.0090	-0.0392	0.1879	0.2093	0.0704	0.3176	0.1322	0.0969	<b>0.8946</b>

The structural model for the U.S. data was assessed and analyzed with SmartPLS (Version 2.0.M3). The path coefficients from the structural model are used to test the hypotheses. For each hypothesis, coefficients and their significance levels are tabulated in Table 20.

**Table 20. Statistical Support for Hypotheses for U.S. Sample**

Hypothesis	Coefficient	t-value	p-value	Supported	
1a	Social Use -> Loss of F2F Communications	-0.039237	0.576368	p > .05	NO
1b	Professional Use -> Loss of F2F Communications	0.108114	1.539171	p > .05	NO
2a	Entertainment Use -> Enjoyment	0.393423	6.723174	p < .01	YES
2b	Social Use -> Enjoyment	0.184712	3.142673	p < .01	YES
2c	Personal Utility Use -> Enjoyment	0.140103	1.993318	p < .05	YES
3a	Social Use -> <i>MDS Addiction</i>	-0.019024	0.24781	p > .05	NO
3b	Entertainment Use -> <i>MDS Addiction</i>	0.279264	3.883108	p < .01	YES
3c	Professional Use -> <i>MDS Addiction</i>	0.097339	1.265887	p > .05	NO
4a	Social Use -> Presenteeism	0.359994	5.599635	p < .01	YES
4b	Professional Use -> Presenteeism	-0.034326	0.496451	p > .05	NO
5a	Professional Use -> Productivity	0.03504	0.503424	p > .05	NO
5b	Personal Utility Use -> Productivity	0.036217	0.44568	p > .05	NO
5c	Personal Informative Use -> Productivity	0.302562	4.438463	p < .01	YES
5d	Financial Use -> Productivity	0.113258	1.568104	p > .05	NO
6a	Personal Utility Use -> Safety	0.317117	4.822449	p < .01	YES
7a	Personal Informative Use -> Knowledge	0.442896	5.935703	p < .01	YES
7b	Personal Utility Use -> Knowledge	0.128638	1.927039	p > .05	NO
7c	Professional Use -> Knowledge	0.033955	0.554766	p > .05	NO
7d	Health Use -> Knowledge	0.001154	0.018156	p > .05	NO
8a	Professional Use -> Work-Life Conflict	0.187921	2.724234	p < .01	YES
9a	Knowledge -> Physiological Needs	0.249765	4.013324	p < .01	YES
10a	Presenteeism -> Safety Needs	-0.064031	0.882309	p > .05	NO
10b	Knowledge -> Safety Needs	0.265575	3.803495	p < .01	YES
10c	Safety -> Safety Needs	0.361076	5.328905	p < .01	YES
11a	Presenteeism -> Love and Belonging Needs	-0.004187	0.068063	p > .05	NO
11b	Enjoyment -> Love and Belonging Needs	0.271164	4.083772	p < .01	YES
11c	<i>MDS Addiction</i> -> Love & Belong Needs	0.24091	3.341675	p < .01	YES
11d	Loss of F2F Comm -> Love & Belong Needs	0.165437	2.312322	p < .05	YES
12a	Productivity -> Esteem Needs	0.299272	5.424328	p < .01	YES
12b	Work-Life Conflict -> Esteem Needs	0.274837	4.175902	p < .01	YES
13a	Productivity -> Self Actualization Needs	0.219809	3.199578	p < .01	YES
13b	Knowledge -> Self Actualization Needs	0.233408	3.34487	p < .01	YES
13c	<i>MDS Addiction</i> -> Self Actualization Needs	0.270898	4.270563	p < .01	YES
14a	Physiological Needs -> QOL	0.143244	1.724606	p > .05	NO
14b	Safety Needs -> QOL	0.021954	0.378083	p > .05	NO
14c	Love & Belong Needs -> QOL	0.140361	2.021245	p < .05	YES
14d	Esteem Needs -> QOL	0.240143	2.579851	p < .05	YES
14e	Self-Actualization Needs -> QOL	0.312291	3.708347	p < .01	YES

## 7.4 Discussion

The research goal of this study was to investigate the role *MDS use* has on QOL.

The developed research model argues that levels of *MDS use* in certain domains will lead

to certain *effects of MDS use*. These *effects of MDS use* influence QOL through the mediating motivational needs constructs. The presentation of findings from these results is organized as follows. First, the relationships between *MDS use* and *effects of MDS use* are discussed, followed by relationships between *effects of MDS use* and motivational needs, and lastly we discuss how motivational needs relate to QOL.

#### **7.4.1 MDS Use and Effects of MDS Use**

Extending beyond the qualitative study, this quantitative research seeks to better understand how levels of *MDS use* in certain domains influences the outcomes called the *effects of MDS use*. The discussion will center on the *effects of MDS use* and which domains were influential.

##### ***7.4.1.a Change in Communications/Loss of Face to Face Communications***

Communication through digital methods such as text messaging can lead to misunderstanding because of the loss of non-verbal signals including eye contact and body language (Ochieng & Price, 2010). Levels of *MDS use* in the social and professional domain were proposed to influence “loss of face to face communications”. Neither hypothesis was supported suggesting that increased levels of use in these domains would not increase the likelihood that one prefers digital communications over face to face communications. Only 1% of explained variance in loss of face to face communications was contributed by these to domains. Research has shown that there has been a shift in the methods which we choose for communication moving towards a preference to less invasive and personable communications (Turkle, 2012). These findings tells us that increased use of MDS in the social and professional domains does

not lead to a preference to digital communications and therefore a loss of face to face communications in the U.S.

This finding poses two important questions for future research. First, what are the factors which lead individuals to prefer digital communications over face to face communications? Previous research shows that a preference for digital communications stems from the conveniences allowed by the technology in which communications are not restricted by time or location (C. Middleton & Cukier, 2006). Therefore, future research could focus on the communication capabilities provided by *MDS use* to measure their influence on communication preferences. When deciding upon communication methods, do the conveniences allowed through *MDS use* outweigh the visual cues associated with face to face communications?

It is also quite possible that the preference of digital communication methods stems from a psychological state in which a certain group of individuals feel more comfortable communicating and expressing themselves through digital communications. In a study comparing groups of individuals who preferred different methods of communications (phone conversations and texting), individuals who preferred texting were more socially anxious, and also more likely to express their true selves through digital methods (D Reid & Reid, 2007). Individuals who were socially anxious and preferred digital methods of communication described a feeling of achieving expressive and intimate communication using this medium. Some research suggests that face to face communications is best for creating and building relationships (Turkle, 2012) but this

may not always be the case. Future research should further explore this phenomenon and expand the possibility of other groups of individuals.

#### **7.4.1.b Enjoyment**

Thirty seven percent of the variance in Enjoyment was explained by levels of *MDS use* in the entertainment, social and personal utility domains. The social ( $\beta= 0.184$ ) and entertainment ( $\beta= 0.393$ ) domains were shown to be significant at the  $p <.01$  level and personal utility ( $\beta= 0.140$ ) was significant at the  $p <.05$  level. As expected *MDS use* in these three domains influences an individual's perceived enjoyment and provides support for hypothesis 2a, 2b, and 2c. These findings align with previous research on the ability of *MDS use* through the entertainment domain(Choi et al., 2007; Soh & Tan, 2008) and social domain (C. Middleton & Cukier, 2006; Sarker & Wells, 2003) to provide a perceived enjoyment. To our knowledge, *MDS use* in the personal utility domain is new to this research and our hypothesized relationship was significant showing a feeling of enjoyment from the ability to use MDS for personal utilitarian purposes.

#### **7.4.1.c MDS Addiction**

Levels of *MDS use* in the social, entertainment, and professional domains were proposed antecedents to *MDS addiction*. Together they accounted for about ten percent of the variance in *MDS addiction*. Only *MDS use* in the entertainment domain was significant ( $\beta= 0.279$ ;  $p\text{-value} < 0.01$ ) suggesting that increases of *MDS use* in the entertainment domain would make an individual more likely to find themselves addicted to MDS. This finding aligns with previous research suggesting a strong relationship

between activities in the entertainment domain such as playing online games and *MDS addiction* (Mehroof & Griffiths, 2010; Young, 2009).

*MDS use* in the social domain was not found to significantly influence *MDS addiction*. This finding contradicts some recent research which suggests a strong relationship to *MDS use* in the social domain and *MDS addiction*. Research suggests this relationship include different types of use in the social domain such as the use of social networking apps (Choudhary, Momin, & Kantharia, 2015; Church & de Oliveira, 2013), mobile email (Turel & Serenko, 2010), and texting (Donna Reid & Reid, 2004). Our findings do not find this relationship to be significant. While individuals might be heavy users of *MDS use* in the social domain that does not necessarily mean that they have a physiological dependency.

*MDS use* in the professional domain was also found to not significantly influence *MDS addiction*. This finding also contradicts previous research which suggests a relationship between *MDS use* in the professional domain and email addiction (C. Middleton & Cukier, 2006; Turel & Serenko, 2010). From the interviews, we discovered that individuals do feel a certain expectation to answer emails and conduct professional activities which sometimes led to similar traits of *MDS addiction*. Individuals suggested that *MDS use* in the professional domain sometimes negatively influenced their social life, interfered with other activities and led to arguments with friends or loved ones. From previous research and data from the interviews, we classified this expectation to conduct professional activities as *MDS addiction*. We believe that this is a different concept which should be further explored. Rather than being a physiological dependency

on *MDS use*, this expectation seems to be different from *MDS addiction*. Future studies should try to identify differences between these two concepts.

#### *7.4.1.d Presenteeism*

Presenteeism refers to an individual's perception of how accessible they are to others and how accessible they feel others are to them. Twelve and a half percent variance in presenteeism was explained by levels of *MDS use* in the social and professional domains. Only *MDS use* in the social domain was found to significantly influence presenteeism ( $\beta = .360$ ;  $p\text{-value} < 0.01$ ). This suggests that the more an individual uses their smartphone for social purposes the more likely they are to possess a feeling of presenteeism. Ayyagari et al. (2011) included presenteeism in their study on technostress in which they describe presenteeism as a technological characteristic that is simply provided by MDS. This means that simply having a mobile device provides an individual with presenteeism.

In order to further explore what influences presenteeism rather than agreeing with the idea that it is a static characteristic of *MDS use*, we argue that levels of use in certain life domains will influence an individual's perception of presenteeism. Findings suggest this is true for *MDS use* in the social domain but not the professional domain.

Interestingly, previous research on presenteeism focused solely on the professional domain (Ayyagari et al., 2011). Our findings agree with their suggestion that presenteeism in the professional domain is indeed more of a technological characteristic which is not influenced by *MDS use*. Future research in this area should further explore this phenomenon and test differences between individuals who are issued MDS and those

who choose to “bring your own device” (BYOD). Literature on BYOD suggests that *MDS use* on these devices differs from the ways employees use mobile devices which are supplied by their employers (Yun et al., 2012).

#### *7.4.1.e Productivity*

We hypothesized four relationships connecting levels of *MDS use* to productivity. The *MDS use* domains under investigation included the professional, personal utility, personal informative, and financial; accounting for sixteen percent of variance in productivity. Of these four only personal informative was shown to significantly influence productivity ( $\beta = 0.302$ ;  $p\text{-value} < 0.01$ ). Therefore, individuals feel they gain the most productivity out of information gained through their *MDS use*. *MDS use* provides individuals with an unprecedented amount of information. This finding suggests that individuals are using this information to make them more productive in their daily lives.

*MDS use* in the professional, personal utility and financial domains were not found to be significantly related to productivity. In regards to the personal utility and financial domains, we believe that *MDS use* is seen as a convenience rather than an increase in productivity. While activities through *MDS use* in these domains save time, they may not be viewed necessarily as making an individual more productive. The interviews and previous research (Choi et al., 2007) on these domains provide support to these findings. Further research might seek to better understand if there are other *MDS effects* related to productivity that should be considered, such as efficacy.

We were very surprised to find that *MDS use* in the professional domain was not significantly related to productivity. Previous studies have shown this relationship to be true (Brown & Palvia, 2015; C. Middleton & Cukier, 2006; Sarker & Wells, 2003). It is our belief that the expanded view of *MDS use* in the many different domains along with a more holistic view of the effects of MDS provides a deeper understanding into how MDS is being used in the professional domain. When reviewing the interview transcripts, we found that many describe the ability to communicate with their coworkers as a means to “keep up with what’s going on at work”. We also found that when they discussed items directly related to productivity such as sending emails and creating work related documents, they mentioned that they would rather use a laptop with a fully functional keyboard and mouse. This suggests that while the capabilities of *MDS use* have improved drastically, they still lack some capabilities needed to increase productivity in the professional domain.

#### *7.4.1.f Safety*

Levels of *MDS use* in the personal utility domain were hypothesized to influence the safety MDS effect. Use in the personal utility domain accounted for ten percent of the variance in the safety construct and was a significant predictor ( $\beta = 0.317$ ;  $p\text{-value} < 0.01$ ). There were a number of utility items such as the use of GPS and a flashlight represented in the professional utility domain which would increase ones feeling of safety. Again, to our knowledge, no research has explored *MDS use* in the personal utility domain. Therefore, this finding should provide useful knowledge for future

research such as trying to identify other *MDS effects* influenced by this domain which were not included in this study.

#### *7.4.1.g Knowledge*

Twenty eight percent of the variance in knowledge was explained by levels of *MDS use* in the personal informative, personal utility, professional, and health domains. Personal informative was the only significant contributor to knowledge ( $\beta = 0.442$ ;  $p$ -value  $< 0.01$ ). This finding supports the argument that levels of *MDS use* in the personal informative domain, such as searching the internet or keep up to date on recent news, will lead to an increase in knowledge. The increase in apps available through MDS have really added to accessibility of information as individuals can easily access the information they want without having to open up a mobile browser or search engine to find the information they are seeking (Garg & Telang, 2013). For example, using the ESPN app to find scores of your favorite team, or accessing Pinterest to find a recipe for dinner.

Increased levels of use in the personal utility, professional, and health domains were not shown to be significantly related to increases in knowledge. The personal utility domain may be viewed as providing utility rather than knowledge per se. Therefore, the personal utility domain is seen as more of a convenience rather than increasing an individual's knowledge. An increase in *MDS use* in the professional domain was also not found to be significantly related to knowledge. This suggests that employees are using other means to increase their knowledge. Lastly, the health domain was not shown to significantly influence the MDS effect of knowledge. This result might be due to the

novel nature of *MDS use* in the health domain. As *MDS use* in this domain continues to expand, we expect to see a significant finding in future studies.

#### **7.4.1.h Work-Life Conflict**

The construct of Work-life conflict suggests an imbalance in the amount of time spent in the work and life domains. Some researchers have referred to this phenomenon as spill over (Chesley, 2005). Levels of *MDS use* in the professional domain accounted for 3.5 percent variance in work-life conflict. The hypothesis that *MDS use* in the professional domain would influence work-life conflict was supported ( $\beta= 0.188$ ; p-value  $< 0.01$ ). This suggests that the more work related tasks an individual is engaged in, it would cause them to more likely experience work-life conflict. This finding aligns with other research on Work-life conflict (Brown & Palvia, 2015; C. A. Middleton, 2008; Yun et al., 2012)

### **7.4.2 Effects of MDS Use and Motivational Needs**

#### **7.4.2.a Physiological Need**

The hypothesized relationship between knowledge and physiological needs was found to be significant ( $\beta= .250$ ; p-value  $< 0.01$ ) accounting for 6.2% of variance in physiological needs. This finding suggests that knowledge gained from *MDS use* allows individuals' to help realize their physiological needs. Examples of physiological needs include oxygen, food, water, sleep, sex, physical health, and suitable temperatures which can best be described as biological or survival needs. Many, but obviously not all, of these needs are supported by MDS. We found *MDS use* in the personal informative

domain to be related to knowledge. Therefore, using MDS to inform one's self about physiological needs is shown to help them achieve those needs. For example, using one's smartphone to view the weather for upcoming week would allow them to plan accordingly in relation to how they will dress or if they should build a fire in their home.

#### **7.4.2.b Safety Needs**

The *MDS effects* of presenteeism, knowledge, and safety were hypothesized to influence an individual's motivational safety needs accounting for almost 25% of the variance. Research has shown that safety needs include concepts such as personal security, stability, investments, insurance, and financial security (Taormina & Gao, 2013). The *MDS effects* of knowledge ( $\beta = .266$ ;  $p\text{-value} < 0.01$ ) and safety ( $\beta = .361$ ;  $p\text{-value} < 0.01$ ) were shown to significantly influence safety needs. This suggests that increases in knowledge and safety from *MDS use* will help an individual increase their safety needs. The domain of personal informative was shown to influence knowledge suggesting that *MDS use* in the personal informative domain increases an individual's ability to achieve safety needs. The MDS effect of safety is significantly influenced by the personal utility domain leading to increases in safety needs. For example, an individual uses GPS through their *MDS use* in the personal utility domain which provides them with a sense of safety and allows the individual to realize safety needs. Presenteeism was not found to significantly influence safety needs. Safety needs encompass a wide range of concepts which do not relate to presenteeism such as investments, insurance, and financial security which may have led to this insignificant finding.

#### 7.4.2.c Love and Belonging Needs

After an individual realizes their safety needs they move on to the next level in Maslow's hierarchy of needs which are the love and belonging needs. The *MDS effects* of presenteeism, enjoyment, *MDS addiction*, and loss of face to face communications accounted for 22% of the variance in love and belonging needs. Three of the four *MDS effects* showed significant relationships. Enjoyment ( $\beta = .271$ ;  $p\text{-value} < 0.01$ ), *MDS addiction* ( $\beta = .241$ ;  $p\text{-value} < 0.01$ ), and loss of face to face communications ( $\beta = .165$ ;  $p\text{-value} < 0.05$ ) were significantly related to love and belonging needs. The domains of entertainment, social, and personal utility were all shown to significantly influence enjoyment. Examples from the interviews on the concept of enjoyment suggest that the ways individuals use MDS in these domains provides joy which they share with their family and friends. An example would be the ability to use MDS to stream a movie from the Netflix application onto the family television in order to enjoy a movie night together as a family. Presenteeism was found to not significantly influence the love and belonging needs. Therefore, simply having the ability to contact and be contacted by friends and family does not in itself increase an individual's love and belonging needs.

We proposed negative relationships between *MDS addiction* and love and belonging needs and loss of face to face communications and love and belonging needs. Both of these items showed positive significant relationships which contradicts what most previous research has suggested (Turel & Serenko, 2010; Turkle, 2012). This means that an increase in communicating through electronic methods available through MDS actually increases an individual's love and belonging needs. *MDS addiction* was

also shown to increase an individual's love and belonging needs. This finding advocates that while *MDS addiction* is thought to be “a physiological dependency which is manifested through excessive use” (Turel et al., 2011), there may be more awareness and decision making involved in extensive *MDS use*. This means that the more an individual perceives they are addicted to *MDS use* the more love and belonging needs they are satisfying by *MDS use*. Future studies should attempt to better understand the positive relationship between *MDS addiction* and love and belonging needs. Future research should also further investigate the nature of this positive relationship as it could be considered a reciprocal relationship.

#### *7.4.2.d Esteem Needs*

The *MDS effects* of productivity and work-life conflict accounted for almost 16% of esteem needs. Both productivity ( $\beta = .299$ ;  $p\text{-value} < 0.01$ ) and work-life conflict ( $\beta = .275$ ;  $p\text{-value} < 0.01$ ) were found to have positive significant relationships with esteem needs. Therefore, increases in productivity and or work-life conflict allow an individual to realize more of their esteem needs.

Esteem needs can be understood as a combination of how you view yourself and how others view you. As we hypothesized, increases in productivity and work-life conflict are shown to significantly increase esteem needs. The personal informative domain significantly increases productivity giving an individual the information needed to be more productive and therefore gain esteem needs. Work-life conflict was shown to be influenced by *MDS use* in the professional domain, which suggests that an increase in

*MDS use* in the professional domain provides an individual the ability to gain esteem needs and feel more confident in their abilities and their achievements.

#### *7.4.2.e Self-Actualization Needs*

Lastly, self-actualization needs were hypothesized to be influenced by productivity, knowledge, and *MDS addiction*. These three *MDS effects* account for 26% of the variance in self-actualization needs. Productivity ( $\beta = .220$ ;  $p\text{-value} < 0.01$ ), knowledge ( $\beta = .233$ ;  $p\text{-value} < 0.01$ ), and *MDS addiction* ( $\beta = .271$ ;  $p\text{-value} < 0.01$ ) were all shown to positively influence an individual's self-actualization needs. Agreeing with previous research on productivity (Tarafdar et al., 2007) and knowledge (Taormina & Gao, 2013), our findings suggest that these two *MDS effects* increase in individual's self-actualization needs.

To our knowledge, the relationship between *MDS addiction* and self-actualization needs has not been tested or discussed in previous literature. *MDS addiction* has a negative connotation in previous literature and is viewed as having a negative influence on individuals (Khang et al., 2012; Kwon et al., 2013; Turel & Serenko, 2010). Considering the amount of studies suggesting this conceptualization, we hypothesized a negative influence of *MDS addiction* on self-actualization needs. Results of our findings suggest the opposite. An increase in *MDS addiction* also increases an individual's realization of self-actualization needs.

### **7.4.3 Motivational Needs and QOL**

We hypothesized that all of Maslow's motivational needs would have positive relationships to QOL and the model shows that they accounted for fifty three percent of variance in QOL. The highest three motivational needs in Maslow's hierarchy were found to have significant relationships. Love and belonging needs ( $\beta = .140$ ;  $p\text{-value} < 0.05$ ), esteem needs ( $\beta = .240$ ;  $p\text{-value} < 0.05$ ), and self-actualization needs ( $\beta = .312$ ;  $p\text{-value} < 0.01$ ) were shown to significantly influence QOL. These findings serve as further evidence of the value of Maslow's Hierarchy of Needs theory. For the three significant relationships, we also found a continuous increase in coefficients as the motivational needs traveled up Maslow's hierarchy. Self-actualization was the most influential towards QOL, followed by esteem needs and then love and belonging needs.

Physiological needs and safety needs were not significantly related to overall QOL. First, we should consider Maslow's own discussion of lower level motivational needs and living in a modern society. Maslow suggests that in today's society, most individuals are not constantly motivated by physiological needs because these needs have always been met. He also suggests that in a stable society such as ours, we perceive items such as job security, the desire for a savings account, and various types of insurance to represent safety needs instead of more survival type suggestions which were first presented in his research. Either our society as a whole has already realized these two lower level needs and are focused on the higher level needs which were significant, or individuals are simply not using MDS to achieve these lower level needs. In other words,

capabilities provided through *MDS use* are not contributing, in any significant manner, to individuals realize their physiological and safety needs.

## 7.5 Summary Section

The findings suggest a great deal of support for the model as all dependent variables were found to have at least one significant relationship (with the exception of the *MDS effect* of loss of face to face communications). Therefore, the model shows support for the following conceptual relationships:

*MDS use -> Effects of MDS use*

*Effects of MDS use -> Motivational Needs*

*Motivational Needs -> QOL*

Results show good support for Maslow's Hierarchy of Needs theory in that three of the five motivational needs were found to have significant relationships to QOL. In today's society, it is understandable that most individuals are not concerned with physiological needs in regards to evaluating their QOL and while safety needs may be of concern, they were not found to significantly influence QOL. These findings also suggest that through mediation of MDS effect, *MDS use* in certain life domains have an influence on an individual's QOL.

The most interesting finding was how *MDS effects* such as work-life conflict and *MDS addiction*, which are considered to be negative, had positive influence on esteem and self-actualization needs. This finding changed our thinking about how these

concepts relate to QOL. Research has shown that increased levels of *MDS use* leads to *MDS addiction* (Mehroof & Griffiths, 2010; Turel et al., 2011) and work-life conflict (Brown & Palvia, 2015; C. A. Middleton, 2008; Yun et al., 2012) which are only discussed as having negative consequences on individuals lives. The study suggests quite the opposite consequence for *MDS addiction* and work-life conflict in which the choice to use MDS in these ways has positive outcomes such as helping individual's realize esteem needs and self-actualization needs.

We share the view of decision making by Newell, Shaw, & Simon (1958) that individuals are rational decision makers who gather information, consider decision outcomes, and make the most logical choice given the possible outcomes. It is believed that individuals engaging in *MDS use* that leads to *MDS effects*, such as work-life conflict and *MDS addiction*, are making rational decisions based on their current motivational needs. Maslow suggests that individuals will move on to higher motivational needs when the lower needs are satisfied. Therefore, individuals have moved beyond the love and belonging motivational needs and are more concerned with fulfilling their esteem or self-actualization needs when they display *MDS effects* of work-life conflict and *MDS addiction*, respectively. In other words, we believe that individuals are making a rational choice to engage in *MDS use* which increases their work-life conflict in order to help them achieve their esteem needs because they have already achieved their love and belonging needs. Accordingly, individuals who have already achieved their esteem needs will engage in *MDS use* which increases *MDS addiction* in order to help them realize their self-actualization needs. These findings contradict the negative consequences

associated with *MDS use* which are discussed in past research involving work-life conflict and *MDS addiction*.

This explanation seems to be very closely related to the self-regulation concept we discussed in Part I. Interviewees discussed how they would reach a point where they were so involved in their *MDS use* that it was causing either conflict between their work and life domains or they felt they were becoming addicted to their MDS. These effects led to arguments between the interviewees and their friends or family in which a behavioral change in their *MDS use* was deemed necessary. This suggests that, these individual's love and belonging needs were no longer being met and so they made changes to how they use their MDS, in order to focus more on their relationships with friends and family. Therefore, their love and belonging needs were no longer being met due to their extended *MDS use*, so they chose to limit their *MDS use*. They chose to self-regulate or limit their *MDS use*, which was positively influencing their esteem or self-actualization needs in order to focus on the lower level needs of love and belonging. This finding provides more support for Maslow's theory in regards to *MDS use* and how it influences QOL.

Future studies would seek to better understand the decision making process of why individuals choose to use MDS and ignore other responsibilities? The findings of our study suggest that these *effects of MDS use* have positive influences on motivational needs and QOL.

## **CHAPTER VIII**

### **PART III CULTURAL COMPARISON**

In order to better understand cultural differences, we ran separate models for the U.S. and India samples in order to compare path coefficients, statistical significance, and R<sup>2</sup> values. Measurement invariance is assessed to ensure that differences found between the U.S. and India models are caused by differences in nationality instead of other factors. The purpose of measurement invariance is to identify whether the measurement models of different groups of individuals are similar. To assess this, factor loadings across the U.S. and India models were compared. Factor loadings were similar across both data samples which provides evidence that the models are measuring the same constructs and are appropriate for comparison. These factor loadings are discussed in the following sections. Differences are explained using Hofstede's research on national cultural.

#### **8.1 Results India Survey**

We used the same survey instrument as Part II of the study in order to accurately capture the cultural differences in the research model.

##### **8.1.1 Participants**

The majority of respondents in the India sample were between the ages of 25-34 years of age with some representation from all age groups. There was also nearly an equal distribution for males and females in the India sample. All but one of the respondents was either single or married with twice the number of married individuals

completing the survey. Ninety eight percent of the individuals surveyed in India sample have at least some college education and with almost half of the respondents having master's level degrees or higher. There was a fairly even distribution of levels of household income. Incidentally, the Indian respondents were much more open to sharing this information than the Americans. The respondents were well representative of job roles except for administrative personnel and educators. Table 20 presents the demographic details from the India sample of 163 respondents.

**Table 20. Demographic Factors for India Sample**

<b>Demographic Item</b>	<b>Level</b>	<b>Number</b>	<b>Percent</b>
<b>Age</b>	18-24	11	7%
	25-34	112	69%
	35-44	32	20%
	45-54	3	2%
	55-64	4	2%
	65 +	1	1%
<b>Gender</b>	Male	94	58%
	Female	69	42%
<b>Marital Status</b>	Single	54	33%
	Married	108	66%
	Divorced	0	0%
	Living with another	1	1%
	Separated	0	0%
	Widowed	0	0%
	Other	0	0%
<b>Education</b>	Less than High School	0	0%
	High School or Equivalent	2	1%
	Vocational/Technical School	1	1%
	Some College	11	7%
	College Graduate	73	45%
	Master's Degree	67	41%
	Doctoral Degree	2	1%
	Professional Degree	7	4%
	Other	0	0%
<b>Income</b>	Rather Not Say	8	5%
	under \$19,000	30	18%
	\$20,000-\$39,999	6	4%
	\$40,000-\$59,999	33	20%
	\$60,000-\$79,999	26	16%
	\$80,000-\$99,999	29	18%
	\$100,000-\$150,000	19	12%
	Over \$500,000	12	7%
<b>Role</b>	Upper Management	7	4%
	Middle Management	80	49%
	Administrative Staff	0	0%
	Support Staff	44	27%
	Student	18	11%
	Educator	1	1%
	Other	13	8%

### *8.1.1.a Data Analysis*

Replicating the research process from Part II, the measurement and structural models were analyzed using PLS. The survey was carefully designed and implemented following the same procedures as described in the U.S. study to assure high validities and reliabilities as suggested by Bagozzi (2011) and Venkatesh & Brown (2013).

### **8.1.2 Measurement Model and Structural Model**

The India sample also exhibited high composite reliabilities for all reflective scales. The composite reliability scores exceeded 0.80 as shown in Table 21. While some composite reliabilities were slightly lower for the India sample and a couple were a little higher, they weren't any substantial differences. All composite reliability scores exceeded the recommended cutoff of 0.70, suggesting reliable measures.

<b>Table 21. AVE and Composite Reliability for U.S. Sample</b>		
	AVE	Composite Reliability
Enjoyment	0.5862	0.8091
Entertainment Use	0.6155	0.8645
Esteem Needs	0.6533	0.904
Financial Use	0.6343	0.8385
Health Use	0.6762	0.8923
Knowledge	0.6514	0.8482
Loss of Face to Face Communication	0.794	0.9204
Love and Belonging Needs	0.6623	0.8862
MDS Addiction	0.7063	0.9346
Personal Informative Use	0.5503	0.8292
Personal Utility Use	0.5516	0.8305
Physiological Needs	0.7062	0.9057
Presenteeism	0.6351	0.8743
Productivity	0.5406	0.8542
Professional Use	0.518	0.843
QOL	0.6142	0.8637
Safety	0.5495	0.8297
Safety Needs	0.621	0.8671
Self-Actualization Needs	0.6773	0.8935
Social Use	0.5107	0.8385
Work-Life Conflict	0.7401	0.9344

The India sample also exhibited high factor loadings as depicted in Appendix D. One item from the social domain *MDS use* was dropped from both models because the factor loading was too low in the India sample. AVE was also above 0.5 for all constructs as shown in Table 21. These values suggest that the India sample also exhibits convergent validity.

The square root of AVE for each construct was greater than the corresponding latent variable correlations for the India Sample. Table 22 presents latent variable correlations for our India sample. The square root of AVE are provided along the diagonal for all constructs.

As depicted in Appendix D, the factor loadings for each item exceeded cross loadings. The iterative process of refining our measures for both data samples proved to be a daunting task but we were satisfied to provide a survey instrument which captures how MDS is used across countries. These tests suggest that the India sample exhibits discriminant validity.

**Table 22. Latent Variable Correlations for India Sample**

	Enjoy	Entertain	NdEsteem	Fin	Health	Know	Lfzf	NdLove	Addict	Inform	Util	NdPhys	Present	Prod	Proff	QOL	Safety	NdSafe	NdAct	Social	WL		
Enjoy	<b>0.7656</b>																						
Entertai	0.2102	<b>0.7845</b>																					
NdEste	0.3636	0.3626	<b>0.8083</b>																				
Fin	0.3766	0.3299	0.3128	<b>0.7964</b>																			
Health	0.1919	0.5574	0.2592	0.4704	<b>0.8223</b>																		
Know	0.6397	0.0585	0.3395	0.3345	0.2043	<b>0.8071</b>																	
Lfzf	0.0407	0.4623	0.3763	0.2148	0.3316	0.0456	<b>0.8911</b>																
NdLove	0.4358	0.2874	0.7176	0.3187	0.1796	0.3508	0.2707	<b>0.8138</b>															
Addict	-0.0997	0.4972	0.3042	0.1592	0.3679	-0.0503	0.6125	0.1337	<b>0.8404</b>														
Inform	0.5381	0.2814	0.3779	0.4954	0.4254	0.4469	0.1508	0.4432	-0.0168	<b>0.7418</b>													
Util	0.4873	0.5098	0.4749	0.5657	0.5194	0.3678	0.3017	0.4918	0.1476	0.6471	<b>0.7427</b>												
NdPhys	0.1592	0.4344	0.4869	0.4132	0.5058	0.1241	0.4873	0.4007	0.4584	0.3055	0.4320	<b>0.8404</b>											
Present	0.5771	0.0033	0.2322	0.2939	0.1717	0.4412	-0.0408	0.3665	-0.2040	0.6101	0.4004	0.0423	<b>0.7969</b>										
Prod	0.6014	0.2119	0.5075	0.5139	0.3349	0.6790	0.1416	0.4939	-0.0056	0.6206	0.5557	0.2692	0.5056	<b>0.7353</b>									
Proff	0.3439	0.3261	0.3703	0.5042	0.4904	0.2848	0.3178	0.2860	0.2914	0.4514	0.4598	0.4452	0.2389	0.3979	<b>0.7197</b>								
QOL	0.3547	0.2974	0.5505	0.3587	0.2786	0.3781	0.2821	0.5035	0.2240	0.4078	0.3579	0.4298	0.3303	0.4279	0.2932	<b>0.7837</b>							
Safety	0.6631	0.1732	0.3299	0.3592	0.2112	0.6002	0.0797	0.3876	-0.1608	0.5387	0.4999	0.1120	0.6609	0.5648	0.2848	0.3231	<b>0.7413</b>						
NdSafe	0.3584	0.3140	0.5284	0.3215	0.3609	0.3278	0.4125	0.4843	0.2899	0.3430	0.4225	0.5430	0.2249	0.4436	0.4592	0.4233	0.4642	<b>0.7880</b>					
NdAct	0.3576	0.3317	0.7535	0.3374	0.2654	0.3780	0.3693	0.6687	0.2357	0.4000	0.4743	0.4662	0.2245	0.4598	0.2549	0.6421	0.3754	0.5471	<b>0.8230</b>				
Social	0.5798	0.3120	0.2600	0.4469	0.2874	0.4002	0.0863	0.3601	-0.1017	0.6600	0.5763	0.1784	0.4915	0.4720	0.3655	0.2756	0.5731	0.2732	0.2896	<b>0.7146</b>			
WL	-0.0586	0.4307	0.3745	0.1992	0.3467	-0.0041	0.4094	0.2407	0.5952	0.0845	0.1968	0.3757	-0.0607	0.0850	0.2829	0.1539	-0.0206	0.2852	0.2650	0.0399	<b>0.8603</b>		

The structural model for the India data was assessed and analyzed with SmartPLS (Version 2.0.M3). The path coefficients from the structural model are used to test the hypotheses. For each hypothesis, coefficients and their significance levels are tabulated in Table 23.

**Table 23. Statistical Support for Hypotheses for India Sample**

Hypothesis	Coefficient	t-value	p-value	Supported
1a Social Use -> Loss of F2F Communications	-0.034503	0.304904	p > .05	NO
1b Professional Use -> Loss of F2F Communications	0.330425	3.152359	p < .01	YES
2a Entertainment Use -> Enjoyment	-0.062621	0.726301	p > .05	NO
2b Social Use -> Enjoyment	0.449408	3.604832	p < .01	YES
2c Personal Utility Use -> Enjoyment	0.260243	1.985708	p < .05	YES
3a Social Use -> <i>MDS Addiction</i>	-0.35758	4.253437	p < .01	YES
3b Entertainment Use -> <i>MDS Addiction</i>	0.527111	6.479096	p < .01	YES
3c Professional Use -> <i>MDS Addiction</i>	0.250236	2.479504	p < .05	YES
4a Social Use -> Presenteeism	0.466517	3.874144	p < .01	YES
4b Professional Use -> Presenteeism	0.068436	0.529512	p > .05	NO
5a Professional Use -> Productivity	0.0408	0.360327	p > .05	NO
5b Personal Utility Use -> Productivity	0.167263	1.183452	p > .05	NO
5c Personal Informative Use -> Productivity	0.392801	3.260266	p < .01	YES
5d Financial Use -> Productivity	0.204115	1.898307	p > .05	NO
6a Personal Utility Use -> Safety	0.499899	6.629905	p < .01	YES
7a Personal Informative Use -> Knowledge	0.342253	2.526294	p < .05	YES
7b Personal Utility Use -> Knowledge	0.131072	0.696005	p > .05	NO
7c Professional Use -> Knowledge	0.098242	0.872965	p > .05	NO
7d Health Use -> Knowledge	-0.057524	0.386505	p > .05	NO
8a Professional Use -> Work-Life Conflict	0.282944	2.707348	p < .01	YES
9a Knowledge -> Physiological Needs	0.124147	1.388116	p > .05	NO
10a Presenteeism -> Safety Needs	-0.152298	1.562311	p > .05	NO
10b Knowledge -> Safety Needs	0.087552	0.695578	p > .05	NO
10c Safety -> Safety Needs	0.512307	4.06808	p < .01	YES
11a Presenteeism -> Love and Belonging Needs	0.209557	2.180295	p < .05	YES
11b Enjoyment -> Love and Belonging Needs	0.312872	3.233059	p < .01	YES
11c <i>MDS Addiction</i> -> Love & Belong Needs	0.07116	0.641633	p > .05	NO
11d Loss of F2F Comm -> Love & Belong Needs	0.222895	2.072726	p < .05	YES
12a Productivity -> Esteem Needs	0.479127	4.346278	p < .01	YES
12b Work-Life Conflict -> Esteem Needs	0.333783	3.229661	p < .01	YES
13a Productivity -> Self Actualization Needs	0.364013	2.058232	p < .05	YES
13b Knowledge -> Self Actualization Needs	0.143143	0.84465	p > .05	NO
13c <i>MDS Addiction</i> -> Self Actualization Needs	0.244946	2.637523	p < .05	YES
14a Physiological Needs -> QOL	0.138301	1.312891	p > .05	NO
14b Safety Needs -> QOL	0.021425	0.209613	p > .05	NO
14c Love & Belong Needs -> QOL	0.082365	0.697534	p > .05	NO
14d Esteem Needs -> QOL	0.064297	0.404951	p > .05	NO
14e Self-Actualization Needs -> QOL	0.46234	3.028238	p < .01	YES

## 8.2 Discussion

The research goal of this part of the study was to investigate the role *MDS use* has on QOL in India and then compare results to better understand cultural differences in regards to *MDS use* and QOL. In this section, we discuss results for the India sample and the discussion focuses on differences found in the India results as compared with findings from the U.S. sample in Part II.

The presentation of findings from results of the India sample is organized as follows. First, the relationships between *MDS use* and *effects of MDS use* are discussed, followed by relations between *effects of MDS use* and motivational needs, and lastly we discuss how motivational needs relate to QOL.

### 8.2.1 MDS Use and Effects of MDS Use

Following the study in Part II, this quantitative research seeks to better understand how levels of *MDS use* in certain domains influences the *effects of MDS use* for the India sample. The discussion will center on the *effects of MDS use* and which domains were influential.

#### 8.2.1.a Change in Communications/Loss of Face to Face Communications

Again, levels of *MDS use* in the social and professional domain were proposed to influence the MDS effect of loss of face to face communications. In the U.S. sample, neither of these hypotheses was supported and only 1% of explained variance in loss of face to face communications was contributed by these two domains. For the India sample, the social and professional domains explained 10% of the variance in loss of face to face communications and the professional domain was found to be significant ( $\beta = 0.330$ ;  $p$ -

value  $< 0.01$ ). This suggests that the more an individual uses their MDS in the professional domain, the more likely they are to prefer digital communications instead of the more traditional face to face communications. An area of concern with a preference to digital communications centers on the loss of non-verbal cues which often lead to misunderstandings and confusion. Research on communication methods agree that face to face communication is the best method in creating and maintaining lasting relationships (Newman & Scot Ober, 2012). India scores much lower in *individualism* than the U.S. and consists of a more closely integrated society where individuals feel like they are part of a group and will make decisions based on the interests of that group. The loss of face to face communications would be a major disruption in a collectivist type culture because the method of communication does not produce strong, long lasting relationships.

#### **8.2.1.b Enjoyment**

In India 37.4 % of the variance in Enjoyment was explained by levels of *MDS use* in the entertainment, social and personal utility domains as compared to the slightly less 37% from the U.S. data. Where all three domains were significant in the U.S. sample, only social ( $\beta = 0.449$ ; p-value  $< 0.01$ ) and personal utility ( $\beta = 0.260$ ; p-value  $< 0.05$ ) were found to be significant in the India sample. So the influence of *MDS use* in the entertainment domain was significant to enjoyment in the U.S. sample but not in the India sample. This suggests that activities such as watching videos, listening to music, and reading books were not found to be significant to the enjoyment construct. There does not seem to be a logical cultural explanation for this difference so instead, we propose

that this difference may be explained due to the developing nature of the country. In developing countries such as India, electricity and wireless signals are not always guaranteed or as strong as they might be in a more developed country. Therefore, the ability to stream music or Netflix might be hindered by the developing countries lack of a secure telecommunications infrastructure (Kauffman, 2005). Many of the items from *MDS use* in the entertainment domain require a secure wireless signal in order to be effective, therefore this could be the reason for the different finding between countries.

#### *8.2.1.c MDS Addiction*

Levels of *MDS use* in the social, entertainment, and professional domains were proposed antecedents to *MDS addiction* and accounted for 37% of the variance in the India study. This is much higher than the  $R^2$  value from the U.S. sample in which they accounted for only about 10% of the variance in *MDS addiction*. All three hypothesized relationships were significantly related to *MDS addiction* in the India data set. In the U.S. only levels of *MDS use* in the entertainment domain was significantly related to *MDS addiction* ( $\beta = 0.279$ ;  $p\text{-value} < 0.01$ ). In India, levels of *MDS use* in the entertainment domain had the highest coefficient ( $\beta = .527$ ;  $p\text{-value} < 0.01$ ), followed by the social domain ( $\beta = -0.258$ ;  $p\text{-value} < 0.01$ ), and lastly the professional domain ( $\beta = 0.250$ ;  $p\text{-value} < 0.05$ ). As hypothesized levels of *MDS use* in the entertainment and professional domains have a positive significant relationship with *MDS addiction*. The entertainment domain consists of playing games, listening to music, and watching online videos. In the interviews from India, there seemed to be a much larger presence of gaming as compared to the U.S. Future studies might seek to further expand the entertainment domain to

better understand what types of entertainment are significantly related to *effects of MDS use*.

*MDS use* in the professional domain was also found to be positively related to *MDS addiction*. This finding suggests that as the level of *MDS use* in the professional domain increases, perceived *MDS addiction* also increases. This relationship was insignificant in the U.S. study. In our discussion of the insignificant finding from the U.S., we suggested that many of the interviewees described an expectation to respond and reply to work related communications during non-working hours. This conceptualization suggests that the phenomenon of interest may not be *MDS addiction*, but a closely related concept with similar consequences as *MDS addiction*. The positive relationship found in India could also be explained as a cultural difference. It is expected that a country scoring lower in individualism would feel an even greater expectation to please the group rather than fulfilling individual's needs. Therefore, individuals from India would be more likely to engage in *MDS use* in the professional domain which leads to *MDS addiction* because they want to please their coworkers. On the contrary, individuals from the U.S. are more concerned with individual needs and might not be willing to sacrifice their personal agendas in order to satisfy needs of their coworkers. Future research would seek to better understand the phenomenon of an increased expectation created by *MDS use* and its relation to *MDS addiction*.

Another surprising finding from the India sample is that *MDS use* in the social domain was significantly negatively related to *MDS addiction*. This is a very interesting finding which suggests that the more an individual uses their phone for social purposes

the less likely they are to feel addicted to *MDS use*. While not significant, this relationship was also shown to be negative in the U.S. sample. Many of the items associated with *MDS addiction* are concerned with how *MDS use* interferes with an individual's relationships and activities. This finding suggests that *MDS use* in the social domain allows an individual the ability to connect with others in a way that creates a negative relationship with *MDS addiction*. We believe this stems from the social capabilities available through *MDS use*. Individuals have many methods to communicate with friends and family through *MDS use* and these cause the individual to feel less addicted to MDS. Many of the items measuring *MDS addiction* refer to the idea that due to *MDS use* an individual neglects important things such as relationships and is late to or misses activities. This significant negative relationship between *MDS use* in the social domain and *MDS addiction* provides support that increased levels of *MDS use* in the social domain will decrease the level of *MDS addiction* that is perceived by the individual. Further research would seek to better understand and test this relationship.

#### ***8.2.1.d Presenteeism***

Almost 25% variance in presenteeism was explained by levels of *MDS use* in the social and professional domains for the India sample, more than doubling the 12.5% from the U.S. sample. *MDS use* in the social domain was also found to significantly influence presenteeism ( $\beta = .466$ ;  $p\text{-value} < 0.01$ ) as compared to the U.S. ( $\beta = .360$ ;  $p\text{-value} < 0.01$ ). This suggests that the more an individual uses the smartphone for social purposes, the more likely he is to possess a feeling of presenteeism in both countries. Also, in both countries *MDS use* in the professional domain was shown to not be significantly related

to the MDS effect of Presenteeism. This aligns with previous research on presenteeism (Ayyagari et al., 2011) which suggests that in the professional domain, presenteeism is a technological characteristic which is not influenced by the level of use. This differs in the social domain which was found in both countries to be significantly related to presenteeism. These differences should be further explored along with the concept of connecting a personal device to a work related application such as email and how that might effect presenteeism.

#### *8.2.1.e Productivity*

Four relationships connecting levels of *MDS use* to productivity are hypothesized. The professional, personal utility, personal informative, and financial domains account for almost 46% of variance in productivity, compared to 16% in the U.S. Parallel results were found in the both data sets as only *MDS use* in the personal informative domain was shown to significantly influence productivity. This relationship was very similar across both countries with a significant relationship in India ( $\beta= 0.392$ ;  $p\text{-value} < 0.01$ ) as well as the U.S. ( $\beta= 0.302$ ;  $p\text{-value} < 0.01$ ). Therefore, in both countries, individuals feel they gain productivity from *MDS use* in the personal informative domain. Due to similarities in findings, our comments for the U.S. study are applicable for India as well.

#### *8.2.1.f Safety*

Levels of *MDS use* in the personal utility domain were hypothesized to influence the safety MDS effect. In India, use in the personal utility domain accounted for 25% (U.S. was 10%) of the variance in the safety construct and was a significant predictor ( $\beta= 0.499$ ;  $p\text{-value} < 0.01$ ) compared to the U.S. ( $\beta= 0.317$ ;  $p\text{-value} < 0.01$ ). Therefore, there

is a shared view that levels of *MDS use* in the personal utility domain positively increase an individual's sense of safety in both countries. Due to similarities in findings, once again our earlier comments are applicable to India.

#### **8.2.1.g Knowledge**

In the India sample, almost 22% of the variance in knowledge (U.S. 28%) was explained by levels of *MDS use* in the personal informative, personal utility, professional, and health domains. Just like in the U.S. sample, personal informative was the only significant contributor to knowledge ( $\beta= 0.342$ ;  $p\text{-value} < 0.01$ ) as compared to the U.S. ( $\beta= 0.442$ ;  $p\text{-value} < 0.01$ ). Of the four hypothesized relationships, in both countries the only significant relationship was between levels of *MDS use* in the personal informative domain and knowledge. This suggests that levels of *MDS use* in the personal informative domain, such as searching the internet or keep up to date on recent news, increases an individual's knowledge.

#### **8.2.1.h Work-Life Conflict**

Levels of *MDS use* in the professional domain accounted for 8% variance (U.S. 3.5%) in work-life conflict. The hypothesis that *MDS use* in the professional domain influences work-life conflict was supported in both India ( $\beta= 0.283$ ;  $p\text{-value} < 0.01$ ) and in the U.S. ( $\beta= 0.188$ ;  $p\text{-value} < 0.01$ ). This suggests that the more an individual engages in professional related activities through the use of MDS the greater likelihood of them experiencing work-life conflict.

## 8.2.2 Effects of MDS Use and Motivational Needs

### 8.2.2.a Physiological Need

In the India sample, the hypothesized relationship between knowledge and physiological needs was found to be insignificant ( $\beta = .124$ ;  $p\text{-value} > 0.05$ ) and only accounted for 1.5% variance. This relationship was significant in the U.S. sample ( $\beta = .250$ ;  $p\text{-value} < 0.01$ ) and accounted for 6.2% of variance in physiological needs. This finding suggests that knowledge gained from *MDS use* in the U.S. allows individuals' to help realize their physiological needs better than in India. Therefore *MDS use* in the personal informative domain is not as useful in India to helping provide physiological needs. Examples of physiological needs include oxygen, food, water, sleep, sex, physical health, and suitable temperatures which can best be described as biological or survival needs. While *MDS use* in the personal informative domain is useful in providing knowledge in India, that knowledge does not help individuals obtain their physiological needs. This finding suggests that the relationship between knowledge and other motivational needs might need to be explored in future studies.

### 8.2.2.b Safety Needs

The *MDS effects* of presenteeism, knowledge, and safety are hypothesized to influence an individual's motivational safety needs and account for 23% (U.S. 25%) of the variance. The *MDS effect* of presenteeism was found to be insignificant in both countries. Knowledge was also found to be insignificant in the India sample ( $\beta = .088$ ;  $p\text{-value} > 0.05$ ) where it was significant in the U.S. ( $\beta = .266$ ;  $p\text{-value} < 0.01$ ). The *MDS effect* of safety was found to be significantly related to safety needs in both India ( $\beta =$

.512; p-value < 0.01) and in the U.S. ( $\beta = .361$ ; p-value < 0.01). In India, increases in the MDS effect of safety (knowledge and safety in the U.S.) help an individual realize their safety motivational needs. The safety MDS effect measures how an individual perceives their safety is effected by the use of MDS and as expected, this is positively related to the safety motivational needs of an individual. Increases in knowledge do not increase safety needs in India even though we found this relationship to be significant in the U.S. *MDS use* in the personal informative domain was shown to be positively related to knowledge but this knowledge is not being used to increase safety needs. In other words, knowledge gained from *MDS use* in the personal informative domain does not help an individual in providing safety needs such as personal security, stability, investments, insurance, and financial security (Taormina & Gao, 2013).

### **8.2.2.c Love and Belonging Needs**

The *MDS effects* of presenteeism, enjoyment, *MDS addiction*, and loss of face to face communications accounted for 28% (U.S. 22%) of the variance in love and belonging needs. Three of the four *MDS effects* showed significant relationships from the India sample. Presenteeism ( $\beta = .209$ ; p-value < 0.05), enjoyment ( $\beta = .312$ ; p-value < 0.01), and loss of face to face communications ( $\beta = .223$ ; p-value < 0.05) were significantly related to love and belonging needs. In comparing the two countries, two differences are shown in relation to *effects of MDS use* and love and belonging needs. These differences include; in India, presenteeism was shown to significantly influence love and belonging needs and *MDS addiction* was not shown to be significantly related to love and belonging needs. *MDS use* in the social domain is positively related to

presenteeism. Therefore, in India *MDS use* in the social domain positively influences an individual's love and belonging needs through the mediating variable, presenteeism. In the U.S. sample none of these relationships were significant, suggesting that presenteeism is more prevalent in India and stems from increased levels of *MDS use* in the social domain. Also, in India, levels of *MDS use* in the social, entertainment, and professional domains are antecedents to *MDS addiction*, which is not positively related to love and belonging needs. This relationship was positive and significant in the U.S. sample suggesting that *MDS addiction* does not influence the love and belonging needs in India.

#### **8.2.2.d Esteem Needs**

The *MDS effects* of productivity and work-life conflict accounted for almost 37% (U.S. 16%) of esteem needs. Both productivity ( $\beta = .479$ ;  $p\text{-value} < 0.01$ ), and work-life conflict ( $\beta = .334$ ;  $p\text{-value} < 0.01$ ), were found to have positive significant relationships with esteem needs. Therefore increases in productivity and or work-life conflict allow an individual to realize more of their esteem needs. As we hypothesized increases in productivity and work-life conflict are shown to significantly increase esteem needs. These finding was shared between both data samples and thus our previous comments apply.

#### **8.2.2.e Self-Actualization Needs**

Lastly, self-actualization needs were hypothesized to be influenced by productivity, knowledge, and *MDS addiction*. These three *MDS effects* account for 28% (U.S. 26%) of the variance in self-actualization needs. Productivity ( $\beta = .364$ ;  $p\text{-value} < 0.01$ ), and *MDS addiction* ( $\beta = .245$ ;  $p\text{-value} < 0.01$ ) were shown to positively influence

an individual's self-actualization needs in India. The knowledge MDS effect was not significant in the India sample ( $\beta = .143$ ;  $p\text{-value} > 0.05$ ). All three *effects of MDS use* were shown to be significantly related to self-actualization needs in the U.S. As expected productivity increases an individual's self-actualization needs. Again we hypothesized a negative influence of *MDS addiction* on self-actualization with results similar to those in the U.S. data set. This means that an increase in *MDS addiction* has a positive influence on an individual's ability to realize their self-actualization needs. Knowledge gained through *MDS use* in the personal informative domain does not assist individuals in realizing their self-actualization needs in India. This suggests that while knowledge is gained from *MDS use* in the personal informative domain, this knowledge does not influence an individual's self-actualization needs.

### **8.2.3 Motivational Needs and QOL**

As was discussed in Part II, we hypothesized that all of Maslow's motivational needs would have positive relationships to QOL and the model shows that, in the India sample, the motivational needs accounted for 44% (U.S. 53%) of variance in QOL. Only the self-actualization needs construct ( $\beta = .245$ ;  $p\text{-value} < 0.01$ ) was shown to have a significant relationship to QOL. In the U.S., the highest three motivational needs in Maslow's hierarchy were found to have significant relationships. This finding suggests that the influence of MDS on self-actualization needs is the only motivational need that is significantly related to QOL in India. It is quite possible that *MDS use* is not as influential in developing countries as their motivational needs are somewhat different than those in developed countries. For example, Maslow discusses how perceptions of

hunger may be much different depending on the nature of the society. Therefore, in a lesser developed country, hunger might represent a migraine headache and strong stomach pains waiting on the one meal a day that an individual can afford, whereas in a more developed country hunger is represented by a mid-morning snack because one's stomach is growling a little between meals. Future research should try to better explore differences in these needs and how the influence of *MDS use* changes depending on the economic status of the country.

### **8.3 Summary Section**

While some differences in significant hypotheses were found, for the most part, the research model demonstrates many more similarities than differences between the two countries. In comparing the coefficients and significance of the relationships, only one hypothesis showed a reversal in sign and eleven of the thirty eight hypotheses showed a change in significance. Table 24 below presents findings from both countries, highlighting different significance findings.

**Table 24. Comparative Statistical Support for Hypotheses**

Hypothesis		U.S. Sample		India Sample	
		Coefficient	Supported	Coefficient	Supported
1a	Social Use -> Loss of F2F Communications	-0.039237	NO	-0.034503	NO
<b>1b</b>	<b>Professional Use -&gt; Loss of F2F Communications</b>	<b>0.108114</b>	<b>NO</b>	<b>0.330425</b>	<b>YES</b>
<b>2a</b>	<b>Entertainment Use -&gt; Enjoyment</b>	<b>0.393423</b>	<b>YES</b>	<b>-0.062621</b>	<b>NO</b>
2b	Social Use -> Enjoyment	0.184712	YES	0.449408	YES
2c	Personal Utility Use -> Enjoyment	0.140103	YES	0.260243	YES
<b>3a</b>	<b>Social Use -&gt; MDS Addiction</b>	<b>-0.019024</b>	<b>NO</b>	<b>-0.35758</b>	<b>YES</b>
3b	Entertainment Use -> MDS Addiction	0.279264	YES	0.527111	YES
<b>3c</b>	<b>Professional Use -&gt; MDS Addiction</b>	<b>0.097339</b>	<b>NO</b>	<b>0.250236</b>	<b>YES</b>
4a	Social Use -> Presenteeism	0.359994	YES	0.466517	YES
4b	Professional Use -> Presenteeism	-0.034326	NO	0.068436	NO
5a	Professional Use -> Productivity	0.03504	NO	0.0408	NO
5b	Personal Utility Use -> Productivity	0.036217	NO	0.167263	NO
5c	Personal Informative Use -> Productivity	0.302562	YES	0.392801	YES
5d	Financial Use -> Productivity	0.113258	NO	0.204115	NO
6a	Personal Utility Use -> Safety	0.317117	YES	0.499899	YES
7a	Personal Informative Use -> Knowledge	0.442896	YES	0.342253	YES
7b	Personal Utility Use -> Knowledge	0.128638	NO	0.131072	NO
7c	Professional Use -> Knowledge	0.033955	NO	0.098242	NO
7d	Health Use -> Knowledge	0.001154	NO	-0.057524	NO
8a	Professional Use -> Work-Life Conflict	0.187921	YES	0.282944	YES
<b>9a</b>	<b>Knowledge -&gt; Physiological Needs</b>	<b>0.249765</b>	<b>YES</b>	<b>0.124147</b>	<b>NO</b>
10a	Presenteeism -> Safety Needs	-0.064031	NO	-0.152298	NO
<b>10b</b>	<b>Knowledge -&gt; Safety Needs</b>	<b>0.265575</b>	<b>YES</b>	<b>0.087552</b>	<b>NO</b>
10c	Safety -> Safety Needs	0.361076	YES	0.512307	YES
<b>11a</b>	<b>Presenteeism -&gt; Love and Belonging Needs</b>	<b>-0.004187</b>	<b>NO</b>	<b>0.209557</b>	<b>YES</b>
11b	Enjoyment -> Love and Belonging Needs	0.271164	YES	0.312872	YES
<b>11c</b>	<b>MDS Addiction -&gt; Love &amp; Belong Needs</b>	<b>0.24091</b>	<b>YES</b>	<b>0.07116</b>	<b>NO</b>
11d	Loss of F2F Comm -> Love & Belong Needs	0.165437	YES	0.222895	YES
12a	Productivity -> Esteem Needs	0.299272	YES	0.479127	YES
12b	Work-Life Conflict -> Esteem Needs	0.274837	YES	0.333783	YES
13a	Productivity -> Self Actualization Needs	0.219809	YES	0.364013	YES
<b>13b</b>	<b>Knowledge -&gt; Self Actualization Needs</b>	<b>0.233408</b>	<b>YES</b>	<b>0.143143</b>	<b>NO</b>
13c	MDS Addiction -> Self Actualization Needs	0.270898	YES	0.244946	YES
14a	Physiological Needs -> QOL	0.143244	NO	0.138301	NO
14b	Safety Needs -> QOL	0.021954	NO	0.021425	NO
<b>14c</b>	<b>Love &amp; Belong Needs -&gt; QOL</b>	<b>0.140361</b>	<b>YES</b>	<b>0.082365</b>	<b>NO</b>
<b>14d</b>	<b>Esteem Needs -&gt; QOL</b>	<b>0.240143</b>	<b>YES</b>	<b>0.064297</b>	<b>NO</b>
14e	Self-Actualization Needs -> QOL	0.312291	YES	0.46234	YES

There were only four significance differences in the tested relationships between levels of *MDS use* and *effects of MDS use* (a total of twenty hypotheses). Two of these hypotheses involve levels of use in the professional domain. In both cases, the professional domain was found to be significant in the India study where they were not significant in the U.S. sample. This might suggest that the level of *MDS use* in the professional domain has more influence on individuals in India. India's culture is known as being low in individualism suggesting that individuals consider needs of the group when making decisions and build stronger more lasting relationships. Therefore, employees in India may be more committed to relationships with coworkers and feel a stronger expectation to respond to emails or conduct other work activities outside of the normal work environment. This level of expectation would increase *MDS use* in the professional domain and would also influence the hypotheses regarding *MDS effects*. This could explain why levels of *MDS use* in the professional domain seem to be more influential in India.

Five of the eleven differences in significant hypotheses were located in the relationships between *effects of MDS use* and motivational needs. Of these five differences, three were measuring the relationship of knowledge to a motivational need. In all three hypotheses, the India data suggests that knowledge was not a significant contributor to motivational needs. In comparison, all three of these hypotheses were significant in the U.S. This finding suggests that knowledge gained through *MDS use* does not influence the motivational needs of individuals in India. Following Maslow's logic described earlier, we believe that the motivational needs for India are somewhat

different due to the developing nature of the country. Therefore, knowledge gained through *MDS use* might not be as effective in these countries in regards to satisfying motivational needs.

Lastly, only self-actualization needs were found to be significantly related to QOL in India as compared to love and belonging, esteem and self-actualization for the U.S. sample. This difference coupled with the large number of increases in insignificant relationships between *effects of MDS use* and motivational needs in the India sample, suggests that *MDS use* in India is not as influential on QOL as it is in the U.S. due to economic and cultural differences found between the two countries. Future research should further explore this phenomenon.

## CHAPTER IX

### DISCUSSION

#### 9.1 Contributions

There are several contributions of this research agenda. In Part I, we identify how individuals are currently using their MDS to accomplish tasks in different life domains. Understanding how individuals are currently using their MDS will foster many new avenues of future research in order to better understand how MDS is currently being used in both the U.S. and India. Our domain classification for *MDS use* includes these seven domains; professional, financial, entertainment, social, personal utility, personal informative, and health. Providing this classification helps future researchers by providing a framework to cast future findings and extend the framework when newer domains are revealed. This research also has practical implications for developers who are constantly searching for new markets for app development. Findings on how individuals are currently using their MDS provides potential life domains in which *MDS use* is not being utilized, therefore providing new markets for app developers. For example, the domain in our study which was underrepresented was the health domain. While this is a growing market, there seems to be a need to increase awareness of products and promote the usefulness of the devices and applications available.

We also identify in Part I, the *effects of MDS use* that individuals are experiencing. While some of these are represented in previous studies, to our knowledge,

no one has attempted to provide a holistic view of the *effects of MDS use*. *Effects of MDS use* which emanated from the qualitative study are loss of face to face communications, enjoyment, *MDS addiction*, presenteeism, productivity, safety, knowledge, and work-life conflict. Further research should seek to add constructs to this list and further test relationships associated with these *MDS effects*.

In Part II of the study, we developed hypotheses to better understand how *MDS use* influences QOL. Using Maslow's Hierarchy of Needs theory, we relate *effects of MDS use* and motivational needs to QOL. This multi method research study allowed us to create measures of different levels of *MDS use* and *effects of MDS use* which can be used in other studies. Results from the quantitative studies show support for the research model and provide a good test of Maslow's hierarchy of needs theory, as data was collected from multiple countries. While there has been more attention lately to research on the negative *effects of MDS use* (Tarafdar et al., 2015; Turel et al., 2011; Yun et al., 2012), this study provides some answers as to why individuals continue to immerse themselves into their MDS.

In testing the model, we find support for the hierarchy of motivational needs as described by Maslow (1943). We now better understand how negative effects such as *MDS addiction*, work-life conflict, and a loss of face to face communications are surprising positively related to motivational needs which are higher up in the hierarchy than love and belonging needs from Maslow's theory. In other words, individuals are continuing to engage in MDS even though they might know of these negative effects because they are motivated by esteem and self-actualization needs which are being

realized through *MDS use*. The concept of self-regulation emanated from Part I and relates to this phenomenon. As individuals begin to focus extensively on esteem needs or self-actualization needs they spend less time satisfying their love and belonging needs. Interviewees discussed that they would reach a breaking point where they had to make a decision to either change the settings on their phone so that it was less intrusive or invoke personal restrictions for times during the day in which they allowed themselves to engage in *MDS use*.

Lastly, Part III of the study explores the influence national culture has on the constructs and the research model. Our explanation of the differences in *MDS use* and *effects of MDS use* in the U.S. and India provides better understanding on how national culture influences the way individuals use this technology. Culture has long been a topic of discussion and disagreement when trying to apply Maslow's Hierarchy of needs. It is argued that this theory is 'ethnocentric' (Hofstede, 1984). In other words, some believe this theory only works for certain cultures due to the structure of the hierarchy. Hofstede (1984) argues that Maslow's theory will work for individualistic cultures but not for others. This could explain the differing results we found in the two data sets because Hofstede argues that the hierarchy will not hold in collectivist cultures. Hofstede's argument is somewhat strengthened by the research as the strength of the relationships between motivational needs and QOL for the two countries showed different results.

The overall contributions of this multi method research project provide both new and enhanced knowledge about *MDS use* and QOL and fills important gaps in research on this persuasive technology.

## 9.2 Limitations

While every attempt was made to conduct this research in the most effective and comprehensive manner, we acknowledge that all research has limitations. The choice in research methods comes with a tradeoff in breadth and depth of data collected. Our initial qualitative research is conducted to obtain rich examples of *MDS use* and effects of MDS from interviews. By conducting a mixed-method study we evaluate data from both qualitative and quantitative methods in order to triangulate results. Some argue that qualitative data is not generalizable and others argue that quantitative methods miss the ‘real story’ (Venkatesh & Brown, 2013). By incorporating mixed methods, we are able to capture the richness of the qualitative data and test hypotheses and research models from the quantitative study.

Results from the online survey data may involve a self-selection bias which might be skewed towards those who are willing to complete an online survey. As with most survey methodologies, this study collects data from one point in time. Therefore, the results depend on the ability of respondents to rate their past experiences. For example, asking respondents to evaluate their level of *MDS use* in the entertainment domain requires them to recollect in retrospect their previous usage. Although this is a limitation, a longitudinal study requires more time than is possible for a dissertation and may not be feasible given the nature of the research.

Next, while we feel our view of MDS (smartphones) more appropriate due to its portability, this view limits the generalizability of the findings to other forms of MDS such as tablets and laptops which are capable of accessing the internet through mobile

providers. Future studies might incorporate these types of MDS as they also represent a growing market. Another limitation is that while the research model captures the most important elements for the qualitative findings, it is not exhaustive and could possibly benefit from the addition of more constructs. We understand that there are limitations to all research and hope that future research can build on the findings and provide additional support to the research model.

## CHAPTER X

### CONCLUSION

In this research, we sought to better understand how *MDS use* in different life domains influences QOL. We explored *MDS use* in a multitude of life domains and the *effects of MDS use* in the qualitative study in Part I. A new framework was developed to better understand how MDS is used in different life domains. These domains include: professional, financial, entertainment, social, personal utility, personal informative, and health. We also established the *effects of MDS use* including constructs of; loss of face to face communications, enjoyment, *MDS addiction*, presenteeism, productivity, safety, knowledge, and work-life conflict. Using Maslow's hierarchy of motivational needs to connect *MDS effects* and QOL we developed a model to better understand how *MDS use* influences QOL. A quantitative survey was developed to test this model and data was collected from the United States and India in order to compare differences across groups. While differences were discussed, the findings suggest similar results from the U.S. and India and provide support for the usefulness of the research model.

Contradicting much of the literature on the negative effects of work-life conflict and *MDS addiction*, our findings suggest that individuals are motivated by certain needs and make rational decisions based on realized motivational needs. While work-life conflict and *MDS addiction* might have negative influence on relationships with friends

and family, continued use of MDS leading to these behaviors was shown to be positively related to esteem and self-actualization needs, respectively. Findings also suggest that cultural differences paired with economic dissimilarities between the U.S. and India influence the relationships between *MDS use* and QOL. The influence of *MDS use* seems to be less influential in achieving motivational needs and increasing QOL of individuals from India as compared to the U.S.

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**APPENDIX A**  
**SURVEY INSTRUMENT**

<b>Survey Instrument Items</b>	
<i><b>MDS USE</b></i>	<p><b>Please indicate the frequency at which you participate in the following statements. I use my mobile device to:</b></p> <p>[never, rarely, sometimes, often, almost always]</p>
<b>Construct</b>	<b>Items</b>
Professional Domain  adapted from (Wakefield & Whitten, 2006)	access work documents search for work related information access and update my work calendar communicate with professional contacts using social media send work related text messages make work related phone calls send work related emails
Financial Domain  Based on insight from qualitative data	interact with my online banking application * pay bills shop for various products or services * save money on purchases by comparing prices or using coupons check on stock investments make a reservation (such as transportation, movie, restaurant, golf) *
Entertainment Domain  Based on insight from qualitative data	Play games * listen to music watch entertaining videos entertain others stream video to my television read entertaining books *
Social Domain  Based on insight from qualitative data	make personal phone calls to friends or family send emails to friends or family send text messages to friends or family communicate with friends or family through social media play online games with friends or family * share pictures with friends and family
Personal Utility	travel to personal locations using GPS * take photos * access and update my personal calendar wake me up in the mornings *

Based on insight from qualitative data	<p>keep reminders (such as a grocery list)</p> <p>do calculations on my phone's calculator</p> <p>see in the dark with my phone's flashlight</p>
<p>Personal Informative</p> <p>Based on insight from qualitative data</p>	<p>find useful information on the internet *</p> <p>keep up to date on the most recent news *</p> <p>check the score or find information about my favorite sports *</p> <p>browse the internet to gain knowledge I need</p> <p>view a restaurant menu online</p> <p>keep up to date with political news</p> <p>check the weather</p>
<p>Health</p> <p>Based on insight from qualitative data</p>	<p>track some type of fitness activity</p> <p>track my diet and nutrition</p> <p>search for information concerning my physical well-being</p> <p>get medical advice</p>
<b><i>Effects of MDS USE</i></b>	<b>Please indicate the extent to which you agree or disagree with the following statements:</b>
<p>Presenteeism</p> <p>adapted from (Ayyagari et al., 2011)</p>	<p>The use of my mobile device enables others to reach me at all times.</p> <p>My mobile device makes me accessible to others.</p> <p>The use of my mobile devices enable me to be in touch with others.</p> <p>My mobile device enables me to access others anytime.</p>
<p>Safety</p> <p>Based on insight from qualitative data</p>	<p>I feel safer when I have my mobile device with me.</p> <p>Generally speaking, my mobile device gives me a sense of safety.</p> <p>My mobile devices provides me with emergency responsiveness.</p> <p>Overall, my mobile device has given me a sense of increased safety.</p>
<p>Productivity</p> <p>adapted from (Tarafdar et al., 2007)</p>	<p>enables me to accomplish tasks more quickly</p> <p>improves the quality of my tasks</p> <p>makes it easier to complete my tasks</p> <p>enhances my effectiveness in completing tasks</p> <p>allows me to complete more tasks</p>
<p>Enjoyment</p> <p>adapted from (Kwak, Choi, &amp; Lee, 2014)</p>	<p>I have fun interacting with my mobile device.</p> <p>Using my mobile devices provides me with a lot of pleasure.</p> <p>I enjoy using my mobile device.</p>
<p>Knowledge</p> <p>Based on insight from qualitative data</p>	<p>I gain knowledge from using my mobile device.</p> <p>My mobile device increases my understanding of things I want to learn more about.</p> <p>I feel more knowledgeable when I have my mobile device with me.</p> <p>When I don't know something I use my mobile device to educate myself.</p>
Work-Life Conflict	<p>The demands of my work interfere with my home and family life.</p> <p>The amount of time my job takes up makes it difficult to fulfill family responsibilities.</p>

<p>adapted from (Netemeyer .et al. 1996)</p>	<p>Things I want to do at home do not get done because of the demands my job puts on me.</p> <p>My job produces excessive strain that makes it difficult to fulfill family duties.</p> <p>Due to work-related duties, I have to make changes to my plans for family activities.</p>
<p><i>MDS Addiction</i></p> <p>adapted from (Turel et al., 2011)</p>	<p>I sometimes neglect important things because of my interest in my mobile device My social life has sometimes suffered because of me interacting with my mobile device.</p> <p>Using my mobile device has sometimes interfered with other activities.</p> <p>I feel agitated when I don't have my mobile device with me. I am sometimes late for engagements because I am interacting with my mobile device.</p> <p>Arguments have sometimes arisen because of the time I spend on my mobile device</p>
<p>Loss of Face to Face Communication</p> <p>Based on insight from qualitative data</p>	<p>I would rather communicate with others through my mobile device than face to face I prefer communicating through my mobile device than in person</p> <p>I prefer texting and instant messaging to face-to-face communication</p>
<p><b>Motivational Needs</b></p>	<p><b>Please indicate the extent to which you agree or disagree with the following statements: "My smartphone has enhanced my satisfaction with"</b></p>
<p>Physiological Needs</p> <p>adapted from (Taormina &amp; Gao, 2013)</p>	<p>the food that I eat every day.</p> <p>many aspects of my physical health.</p> <p>the amount of exercise I get to keep me healthy</p> <p>the amount of sleep I get to feel refreshed</p>
<p>Safety Needs</p> <p>adapted from (Taormina &amp; Gao, 2013)</p>	<p>how secure I am in my house/apartment</p> <p>my financial security</p> <p>my personal safety</p> <p>how safe I am from dangers in the environment</p>
<p>Love and Belonging Needs</p> <p>adapted from (Taormina &amp; Gao, 2013)</p>	<p>the quality of the relationships I have with my friends</p> <p>the love I receive from my spouse/partner</p> <p>the friendship I share with my colleagues</p> <p>the emotional support I receive from my friends</p>
<p>Esteem Needs</p> <p>adapted from (Taormina &amp; Gao, 2013)</p>	<p>how much other people respect me</p> <p>how highly other people think of me</p> <p>the recognition I receive from various people</p> <p>how much respect I have for myself</p> <p>how positive I feel about myself as a person</p>

Self-Actualization Needs adapted from (Taormina & Gao, 2013)	<p>feel that I am completely self-fulfilled.</p> <p>live life to the fullest.</p> <p>live up to all my capabilities.</p> <p>be the person I always wanted to be.</p>
<b>QOL</b>	<b>Please indicate the extent to which you agree or disagree with the following statements:</b>
QOL adapted from (Ed Diener et. al, 2009)	<p>In most ways, my life has come closer to my ideal since I started using a smartphone.</p> <p>The conditions of my life have improved because of my smartphone use.</p> <p>I have been more satisfied with my life thanks to my smartphone.</p> <p>So far, my smartphone has helped me get the important things I want in my life.</p>
* items dropped due to low cross loadings in either the U.S. or India	

## APPENDIX B

### SUMMARY OF HYPOTHESES (BROWN & PALVIA, 2015)

<b>Summary of Proposed Hypotheses (Brown &amp; Palvia, 2015)</b>	
<b>Hypotheses (<math>\beta</math>, p-value).</b>	<b>Supported?</b>
H1a: Mobile device usage (work related while at work) will be positively related to productivity.(0.287, < 0.05)	<i>Yes</i>
H2a: Mobile device usage (work related while at home) will be positively related to productivity. (0.061, > 0.05).	<i>No</i>
H3a: Mobile device usage (personal usage while at work) will be negatively related to productivity. (-0.183,> 0.05)	<i>No</i>
H1b: Mobile device usage (work related while at work) will be positively related to employer expectations. ( 0.065,> 0.05)	<i>No</i>
H2b: Mobile device usage (work related while at home) will be positively related to employer expectations.(0.349,< 0.01),	<i>Yes</i>
H3b: Mobile device usage (personal usage while at work) will be negatively related to employer expectations. (-0.092, > 0.05)	<i>No</i>
H4: Flexibility will be positively related to employer expectations. (0.343, < 0.01).	<i>Yes</i>
H5: Productivity will be positively related to employer expectations. (0.143, < 0.05).	<i>Yes</i>
H6: Mobile device usage (work related while at home) will be positively related to work-life conflict(0.301, < 0.01)	<i>Yes</i>
H7: Employer expectations will be positively related to work-life conflict(0.157, < 0.05)	<i>Yes</i>

## APPENDIX C

### DEMOGRAPHIC INFORMATION

U.S. Demographic Information from Qualitative Study										
# of Dependent Minors	Age Range	Current household Income	Daily time spent on Device	Education Level	Employment Status	Marital Status	Personal Device	Race	Satisfaction with USE	Sex
None	45-54	over 150k	3-4	Some College	Full Time	Married	YES	White	Too Much	Female
2	25-34	100k-150k	1-2	College Graduate	Full Time	Married	NO	White	Too Much	Female
2	35-44	100k-150k	1-2	College Graduate	Full Time	Married	NO	White	Satisfied with Amount	Male
None	55-64	100k-150k	1-2	Some College	Full Time	Married	YES	White	Satisfied with Amount	Female
1	45-54	50k-75k	1-2	High School or Equivalent	Full Time	Married	YES	Hispanic	Not Enough	Female
2	25-34	75k-100k	>4	College Graduate	Full Time	Married	YES	White	Too Much	Female
None	65+	75k-100k	<1	College Graduate	Retired	Divorced	YES	White	Too Much	Female
None	65+	100k-150k	1-2	Doctoral Degree	Retired	Widowed	YES	Hispanic	Satisfied with Amount	Female
None	18-24	50k-75k	3-4	College Graduate	Full Time	Married	YES	Asian	Too Much	Male
None	25-34	100k-150k	3-4	Master's Degree	Full Time	Married	YES	White	Too Much	Male
3	25-34	100k-150k	1-2	College Graduate	Full Time	Married	NO	African American	Satisfied with Amount	Female
2	35-44	100k-150k	1-2	College Graduate	Full Time	Married	YES	White	Not Enough	Male
None	18-24	40k-50k	3-4	College Graduate	Full Time	Living with another	YES	Asian	Too Much	Female
2	45-54	over 150k	3-4	College Graduate	Full Time	Married	YES	White	Too Much	Male
None	65+	100k-150k	3-4	Vocational/Technical School	Retired	Married	YES	White	Too Much	Male
None	25-34	100k-150k	>4	Master's Degree	Full Time	Single	YES	White	Too Much	Male
1	35-44	50k-75k	>4	Vocational/Technical School	Full Time	Living with another	YES	White	Too Much	Female
None	25-34	40k-50k	1-2	College Graduate	Full Time	Single	YES	White	Satisfied with Amount	Female
None	25-34	50k-75k	3-4	College Graduate	Full Time	Single	YES	White	Too Much	Male
None	55-64	Rather Not Say	3-4	College Graduate	Full Time	Married	NO	White	Too Much	Male
None	55-64	20k-30k	1-2	Some College	Part Time	Divorced	YES	White	Satisfied with Amount	Female
2	25-34	75k-100k	1-2	College Graduate	Full Time	Married	YES	White	Satisfied with Amount	Male
None	45-54	100k-150k	3-4	Master's Degree	Full Time	Married	YES	White	Satisfied with Amount	Female

### India Demographic Information from Qualitative Study

# of Dependent Minors	Age Range	Current household Income	Daily time spent on Device	Education Level	Employment Status	Marital Status	Personal Device	Race	Satisfaction with USE	Sex	India
None	25-34	50k-75k	>4	Master's Degree	Full Time	Married	YES	Asian	Satisfied with Amount	Male	India
None	25-34	40k-50k	1-2	Master's Degree	Full Time	Single	YES	Asian	Too Much	Male	India
2	35-44	75k-100k	>4	Master's Degree	Full Time	Married	YES	Asian	Satisfied with Amount	Male	India
2	35-44	Rather Not Say	<1	Master's Degree	Full Time	Married	YES	Asian	Satisfied with Amount	Male	India
2	25-34	50k-75k	>4	Master's Degree	Part Time	Married	YES	Asian	Satisfied with Amount	Female	India
2	35-44	50k-75k	3-4	Doctoral Degree	Full Time	Married	YES	Asian	Too Much	Female	India
1	55-64	75k-100k	3-4	College Graduate	Full Time	Married	NO	Unassigned	Not Enough	Male	India
2	45-54	75k-100k	>4	Master's Degree	Full Time	Married	NO	Asian	Too Much	Male	India
None	25-34	10k-20k	>4	Master's Degree	Full Time	Married	YES	Asian	Satisfied with Amount	Female	India
None	55-64	under 10k	3-4	Master's Degree	Full Time	Married	YES	Asian	Not Enough	Female	India
1	45-54	over 150k	>4	College Graduate	Full Time	Married	YES	Asian	Satisfied with Amount	Male	India

# APPENDIX D

## LOADINGS AND CROSS LOADINGS

Table 18. Loadings and Cross Loadings for U.S. Sample

	Addict	Enjoy	Entertain	Fin	Health	Inform	Know	LF2F	NDEst	NDLove	NDPhys	NDSafe	NDSelf	Present	Prod	Prof	QOL	Safety	Social	Util	WL
Addict1	<b>0.8814</b>	-0.1094	0.3814	0.1006	0.2886	-0.091	-0.0621	0.5261	0.2777	0.1102	0.43	0.2127	0.206	-0.2674	-0.0474	0.2109	0.2178	-0.2265	-0.1044	0.0736	0.5245
Addict2	<b>0.8441</b>	-0.1142	0.3954	0.1356	0.2861	-0.018	-0.0951	0.5196	0.276	0.1219	0.4532	0.2965	0.1792	-0.1715	-0.0473	0.2434	0.1565	-0.1437	-0.1398	0.0695	0.569
Addict3	<b>0.8603</b>	-0.1193	0.4003	0.1526	0.2756	0.0272	0.0427	0.5531	0.206	0.158	0.4106	0.2151	0.247	-0.1765	0.0365	0.1988	0.2166	-0.1073	-0.1163	0.0951	0.5857
Addict4	<b>0.661</b>	0.1008	0.4353	0.1815	0.3507	0.1062	0.1404	0.4164	0.1377	0.0947	0.2247	0.2451	0.1729	0.0149	0.1244	0.2949	0.1797	0.1219	0.087	0.2815	0.2183
Addict5	<b>0.9043</b>	-0.156	0.4334	0.1033	0.3668	-0.076	-0.1198	0.5314	0.2538	0.0598	0.406	0.1966	0.1912	-0.2656	-0.0553	0.2001	0.1817	-0.2625	-0.1124	0.0767	0.5217
Addict6	<b>0.8681</b>	-0.0817	0.4579	0.1333	0.2949	-0.0217	-0.1287	0.5279	0.3133	0.1246	0.37	0.289	0.1897	-0.1472	-0.0231	0.3183	0.1786	-0.1625	-0.1025	0.1621	0.5402
Enjoy1	-0.0733	<b>0.7884</b>	0.1648	0.2127	0.1144	0.4306	0.5123	-0.0314	0.1986	0.3099	0.0109	0.222	0.2342	0.3994	0.4598	0.2169	0.2342	0.4714	0.4965	0.3269	-0.0395
Enjoy2	-0.0268	<b>0.7047</b>	0.2289	0.4041	0.2268	0.3776	0.431	0.1072	0.3756	0.3758	0.2689	0.3486	0.3327	0.4429	0.444	0.3503	0.3698	0.5236	0.3841	0.4238	0.0094
Enjoy3	-0.1289	<b>0.8004</b>	0.0878	0.2466	0.0984	0.4259	0.524	0.0175	0.2596	0.3135	0.0849	0.2512	0.2528	0.4815	0.4754	0.221	0.2088	0.5258	0.449	0.3667	-0.1048
Entertain1	0.2638	0.2569	<b>0.7404</b>	0.2696	0.3418	0.1862	0.0465	0.2259	0.2663	0.2599	0.2755	0.2392	0.2607	0.0755	0.2013	0.1716	0.1794	0.1455	0.2545	0.3622	0.1954
Entertain2	0.3407	0.2177	<b>0.7297</b>	0.2363	0.3872	0.306	0.0558	0.251	0.2583	0.2107	0.2167	0.2523	0.2782	0.0473	0.2745	0.1814	0.1769	0.1584	0.3686	0.4628	0.2578
Entertain3	0.4911	0.0798	<b>0.8267</b>	0.2935	0.5498	0.1818	0.0418	0.4852	0.2934	0.2333	0.4262	0.2468	0.2377	-0.0591	0.1202	0.3419	0.2716	0.0818	0.1848	0.4327	0.4387
Entertain4	0.4284	0.1426	<b>0.8354</b>	0.2379	0.4413	0.2175	0.0418	0.4408	0.317	0.2078	0.4148	0.2504	0.2727	-0.0263	0.0961	0.298	0.2874	0.169	0.1964	0.345	0.4151
Fin1	0.1557	0.2826	0.2853	<b>0.8425</b>	0.4097	0.391	0.276	0.1856	0.2873	0.2552	0.359	0.2956	0.3168	0.2552	0.4502	0.4075	0.3083	0.2986	0.3294	0.447	0.2625
Fin2	0.0768	0.3088	0.1367	<b>0.7834</b>	0.3083	0.3544	0.188	0.1035	0.1774	0.1728	0.2857	0.2346	0.2162	0.2269	0.371	0.3881	0.1719	0.2479	0.267	0.3293	0.1314
Fin3	0.1413	0.3129	0.3554	<b>0.7612</b>	0.3988	0.4379	0.3296	0.2182	0.273	0.3286	0.3373	0.233	0.2649	0.2184	0.401	0.4096	0.3671	0.309	0.3869	0.5691	0.068
Health1	0.4056	0.1696	0.5007	0.3433	<b>0.8137</b>	0.3147	0.1147	0.3242	0.2466	0.1439	0.4418	0.2683	0.2221	0.0897	0.219	0.4204	0.1646	0.0994	0.2066	0.4209	0.382
Health2	0.3131	0.1426	0.4816	0.3943	<b>0.8488</b>	0.3408	0.1257	0.2563	0.2577	0.1951	0.4823	0.3298	0.1822	0.1668	0.2651	0.4776	0.2055	0.1428	0.2035	0.4563	0.3266
Health3	0.2698	0.1818	0.4666	0.4446	<b>0.9114</b>	0.4127	0.2465	0.2701	0.1915	0.1301	0.4034	0.3221	0.2562	0.1726	0.3428	0.395	0.2868	0.2758	0.2959	0.456	0.317
Health4	0.412	0.1056	0.5399	0.3802	<b>0.7012</b>	0.2976	0.025	0.427	0.2695	0.2524	0.5178	0.3189	0.2329	0.0841	0.2063	0.4497	0.3125	0.117	0.1945	0.4663	0.454
Inform1	-0.0408	0.3124	0.1564	0.3519	0.275	<b>0.73</b>	0.2259	0.1103	0.2772	0.3302	0.2973	0.225	0.3409	0.4338	0.4122	0.3482	0.3136	0.3685	0.475	0.4302	0.0422
Inform2	-0.1809	0.4677	0.1341	0.3595	0.2331	<b>0.7887</b>	0.445	-0.0548	0.156	0.2214	0.0933	0.1696	0.1681	0.4544	0.4947	0.2710	0.1677	0.4336	0.5719	0.4198	-0.0752
Inform3	0.1903	0.3656	0.339	0.3597	0.4069	<b>0.6342</b>	0.2092	0.346	0.3554	0.3639	0.3227	0.3225	0.3538	0.3956	0.3893	0.3801	0.3813	0.3194	0.3319	0.5423	0.1794
Inform4	0.0421	0.4292	0.2422	0.4056	0.3786	<b>0.8025</b>	0.3865	0.1288	0.3666	0.4252	0.2551	0.3254	0.3684	0.5192	0.5248	0.3175	0.3895	0.4561	0.5406	0.5528	0.141
Know1	-0.0478	0.5505	0.019	0.3062	0.16	0.4202	<b>0.8238</b>	0.0057	0.2763	0.2424	0.0584	0.2459	0.2766	0.391	0.5808	0.2717	0.3895	0.497	0.3808	0.2614	-0.0407
Know2	-0.1115	0.4317	-0.0172	0.2512	0.0734	0.3535	<b>0.7442</b>	0.0013	0.1897	0.2534	0.0389	0.2328	0.2621	0.4004	0.5479	0.1687	0.2853	0.5372	0.315	0.2606	-0.0021
Know3	0.0222	0.5583	0.1241	0.2552	0.244	0.317	<b>0.8495</b>	0.093	0.3419	0.3453	0.1871	0.3087	0.3672	0.2926	0.5238	0.2915	0.3603	0.4349	0.281	0.3598	0.0287
LF1	0.5067	0.1014	0.4104	0.2228	0.3521	0.1912	0.0879	<b>0.8955</b>	0.3723	0.2636	0.4169	0.3796	0.3654	0.0013	0.1809	0.2904	0.2247	0.0915	0.0962	0.3468	0.3928
LF2	0.5804	0.0139	0.4108	0.2005	0.2657	0.151	0.013	<b>0.8886</b>	0.3607	0.249	0.4587	0.3806	0.3559	-0.0396	0.1113	0.3173	0.2441	0.0652	0.1007	0.2435	0.4096
LF2f3	0.5502	-0.0169	0.4156	0.1401	0.263	0.041	0.0171	<b>0.889</b>	0.2559	0.2028	0.4243	0.3357	0.2487	-0.0796	0.0767	0.23	0.2944	0.0528	0.0217	0.2035	0.2151
NdEst1	0.2443	0.3501	0.2892	0.2393	0.2082	0.3175	0.2776	0.3098	<b>0.8183</b>	0.564	0.3431	0.4359	0.6726	0.1474	0.4086	0.281	0.4081	0.2974	0.2793	0.3805	0.3635
NdEst2	0.2792	0.3364	0.2821	0.2546	0.2111	0.3231	0.3397	0.3146	<b>0.8017</b>	0.4989	0.3904	0.5034	0.5535	0.1811	0.4315	0.3024	0.4781	0.2574	0.1997	0.3834	0.2959
NdEst3	0.2671	0.272	0.3487	0.231	0.2492	0.3053	0.2367	0.2765	<b>0.8091</b>	0.5398	0.4332	0.3614	0.5405	0.1262	0.4003	0.3161	0.3916	0.1673	0.1647	0.3487	0.3241
NdEst4	0.2265	0.2402	0.2515	0.2857	0.2171	0.2511	0.2399	0.2991	<b>0.7936</b>	0.6333	0.3911	0.3868	0.6106	0.2226	0.3745	0.2834	0.4047	0.2616	0.2058	0.4081	0.291
NdEst5	0.123	0.2656	0.2941	0.255	0.1673	0.3241	0.2709	0.3178	<b>0.8182</b>	0.6651	0.4113	0.4376	0.6645	0.2567	0.4309	0.3126	0.5294	0.3224	0.2003	0.3985	0.244
NdLove1	0.1067	0.4124	0.2297	0.2626	0.1625	0.4233	0.3215	0.2402	<b>0.6163</b>	<b>0.8779</b>	0.3529	0.4128	0.5837	0.326	0.4726	0.2599	0.427	0.3266	0.3168	0.4063	0.2161
NdLove2	0.1852	0.1916	0.1733	0.2051	0.0392	0.2795	0.1892	0.2184	<b>0.5286</b>	<b>0.6991</b>	0.2323	0.3283	0.5288	0.151	0.2982	0.0913	0.3107	0.1792	0.1373	0.2345	0.115
NdLove3	0.1111	0.4127	0.2474	0.289	0.1435	0.4177	0.3021	0.1924	0.6196	<b>0.853</b>	0.3197	0.3663	0.5333	0.3321	0.4436	0.2321	0.3971	0.3298	0.3529	0.4733	0.1945
NdLove4	0.0632	0.3598	0.2715	0.2715	0.2057	0.3096	0.3055	0.2347	0.5733	<b>0.8189</b>	0.3762	0.4564	0.5426	0.3434	0.3732	0.3048	0.4809	0.3981	0.3233	0.4452	0.1804
NdPhys1	0.5145	0.0658	0.3891	0.2559	0.3947	0.1548	0.0907	0.5253	0.4152	<b>0.2867</b>	0.48	0.4239	0.3759	0.2632	0.1113	0.3614	0.3373	0.007	0.0858	0.2263	0.3606
NdPhys2	0.3194	0.2065	0.3778	0.3755	0.4365	0.3427	0.1609	0.3393	0.3732	<b>0.3247</b>	<b>0.8387</b>	0.4581	0.3648	0.1172	0.2588	0.3252	0.3796	0.1317	0.2344	0.3902	0.2865
NdPhys3	0.4409	0.1265	0.4207	0.3777	0.4861	0.2613	0.1048	0.4098	0.438	<b>0.3678</b>	<b>0.871</b>	0.5074	0.4104	0.0304	0.228	0.4062	0.3748	0.1144	0.1451	0.4182	0.3333
NdPhys4	0.2876	0.1207	0.2732	0.3663	0.3773	0.2482	0.1254	0.3867	0.4244	0.3635	<b>0.8501</b>	0.4328	0.4198	0.0203	0.2908	0.4077	0.3494	0.1209	0.1188	0.3976	0.2917
NdSafe1	0.1645	0.3034	0.203	0.2067	0.1988	0.2661	0.3228	0.292	0.4154	0.3996	0.4048	<b>0.8207</b>	0.4569	0.2214	0.3758	0.3218	0.3904	0.3997	0.2443	0.3451	0.1317
NdSafe2	0.3843	0.1767	0.4115	0.2901	0.4442	0.2583	0.1442	0.4016	0.4	0.2593	<b>0.6976</b>	0.3703	0.3703</								

## Loadings and Cross Loadings for India Sample

	Addict	Enjoy	Entertain	Fin	Health	Inform	Know	LF2F	NDEst	NDLove	NDPhys	NDSafe	NDSelf	Present	Prod	Prof	QOL	Safety	Social	Util	WL
Addict1	<b>0.8814</b>	-0.1094	0.3814	0.1006	0.2886	-0.091	-0.0621	0.5261	0.2777	0.1102	0.43	0.2127	0.206	-0.2674	-0.0474	0.2109	0.2178	-0.2265	-0.1044	0.0736	0.5245
Addict2	<b>0.8441</b>	-0.1142	0.3954	0.1356	0.2861	-0.018	-0.0951	0.5196	0.26	0.1219	0.4532	0.2965	0.1792	-0.1715	-0.0473	0.2434	0.1565	-0.1437	-0.1398	0.0695	0.569
Addict3	<b>0.8603</b>	-0.1193	0.4003	0.1526	0.2756	0.0272	0.0427	0.5531	0.2706	0.158	0.4106	0.2151	0.247	-0.1765	0.0365	0.1988	0.2166	-0.1073	-0.1163	0.0951	0.5857
Addict4	<b>0.661</b>	0.1008	0.4353	0.1815	0.3507	0.1062	0.1404	0.4164	0.1377	0.0947	0.2247	0.2451	0.1729	0.0149	0.1244	0.2949	0.1797	0.1219	0.087	0.2816	0.2183
Addict5	<b>0.9043</b>	-0.156	0.4334	0.1033	0.3668	-0.076	-0.1198	0.5314	0.2538	0.0598	0.406	0.1966	0.1912	-0.2656	-0.0553	0.2001	0.1817	-0.2625	-0.1124	0.0767	0.5217
Addict6	<b>0.8681</b>	-0.0817	0.4579	0.1333	0.2949	-0.0217	-0.1287	0.5279	0.3133	0.1246	0.37	0.289	0.1897	-0.1472	-0.0231	0.3183	0.1786	-0.1625	-0.1025	0.1621	0.5402
Enjoy1	-0.0733	<b>0.7884</b>	0.1648	0.2127	0.1144	0.4306	0.5123	-0.0314	0.1986	0.3099	0.0109	0.222	0.2342	0.3994	0.4598	0.2169	0.2342	0.4714	0.4965	0.3269	-0.0395
Enjoy2	-0.0268	<b>0.7047</b>	0.2289	0.4041	0.2268	0.3776	0.431	0.1072	0.3756	0.3758	0.2689	0.3486	0.3327	0.4429	0.444	0.3503	0.3698	0.5236	0.3841	0.4238	0.0094
Enjoy3	-0.1289	<b>0.8004</b>	0.0878	0.2466	0.0984	0.4259	0.524	0.0175	0.2596	0.3135	0.0849	0.2512	0.2528	0.4815	0.4754	0.221	0.2088	0.5258	0.449	0.3667	-0.1048
Entertain1	0.2638	0.2569	<b>0.7404</b>	0.2696	0.3418	0.1862	0.0465	0.2259	0.2663	0.2599	0.2755	0.2392	0.2607	0.0755	0.2013	0.1716	0.1794	0.1455	0.2545	0.3622	0.1954
Entertain2	0.3407	0.2177	<b>0.7297</b>	0.2363	0.3872	0.306	0.0558	0.251	0.2583	0.2107	0.2167	0.2523	0.2782	0.0473	0.2745	0.1814	0.1769	0.1584	0.3686	0.4628	0.2578
Entertain3	0.4911	0.0798	<b>0.8267</b>	0.2935	0.5498	0.1818	0.0418	0.4852	0.2934	0.2333	0.4262	0.2468	0.2377	-0.0591	0.1202	0.3419	0.2716	0.0818	0.1848	0.4327	0.4387
Entertain4	0.4284	0.1426	<b>0.8354</b>	0.2379	0.4413	0.2175	0.0418	0.4408	0.317	0.2078	0.4148	0.2504	0.2727	-0.0263	0.0961	0.298	0.2874	0.169	0.1964	0.345	0.4151
Fin1	0.1557	0.2826	0.2853	<b>0.8425</b>	0.4097	0.391	0.276	0.1856	0.2743	0.2552	0.359	0.2956	0.3168	0.2552	0.4502	0.4075	0.3083	0.2986	0.3294	0.447	0.2625
Fin2	0.0768	0.3088	0.1367	<b>0.7834</b>	0.3083	0.3544	0.188	0.1035	0.1784	0.1728	0.2857	0.2346	0.2162	0.2269	0.371	0.3881	0.1719	0.2479	0.357	0.3293	0.1314
Fin3	0.1413	0.3129	0.3554	<b>0.7612</b>	0.3988	0.4379	0.3296	0.2182	0.273	0.3286	0.3373	0.233	0.2649	0.2184	0.401	0.4096	0.3671	0.309	0.3869	0.5691	0.068
Health1	0.4056	0.1696	0.5007	0.3433	<b>0.8137</b>	0.3147	0.1147	0.3242	0.2466	0.1439	0.4418	0.2683	0.2221	0.0897	0.219	0.4204	0.1646	0.0394	0.2066	0.4209	0.382
Health2	0.3131	0.1426	0.4816	0.3943	<b>0.8488</b>	0.3408	0.1257	0.2563	0.2577	0.1951	0.4823	0.3298	0.1822	0.1668	0.2651	0.4776	0.2055	0.1428	0.2035	0.4563	0.3266
Health3	0.6988	0.1818	0.4666	0.4446	<b>0.9114</b>	0.4127	0.2465	0.2701	0.1915	0.1301	0.4034	0.3221	0.2562	0.1726	0.3428	0.395	0.2688	0.2758	0.2959	0.456	0.2317
Health4	0.412	0.1056	0.5399	0.3802	<b>0.7012</b>	0.2976	0.025	0.427	0.2695	0.2524	0.5178	0.3189	0.2329	0.0841	0.2063	0.4497	0.3125	0.117	0.1945	0.4663	0.454
Inform1	-0.0408	0.3124	0.1564	0.3519	0.275	<b>0.73</b>	0.2259	0.1103	0.2772	0.3302	0.2973	0.225	0.3409	0.4388	0.4122	0.3482	0.3136	0.3685	0.475	0.4302	0.0422
Inform2	-0.1809	0.4677	0.1341	0.3595	0.2331	<b>0.7887</b>	0.445	-0.0548	0.156	0.2214	0.0933	0.1696	0.1681	0.4544	0.4947	0.2715	0.1677	0.4336	0.5719	0.4198	-0.0752
Inform3	0.1903	0.3656	0.339	0.3597	0.4069	<b>0.6342</b>	0.2092	0.346	0.3554	0.3639	0.3227	0.3225	0.3538	0.3956	0.3893	0.3801	0.3813	0.3194	0.3319	0.5423	0.1794
Inform4	0.0421	0.4292	0.2422	0.4056	0.3786	<b>0.8025</b>	0.3865	0.1288	0.3686	0.4252	0.2551	0.3254	0.3684	0.5192	0.5248	0.1715	0.3895	0.4561	0.5406	0.5528	0.141
Know1	-0.0478	0.5505	0.019	0.3062	0.16	0.4202	<b>0.8238</b>	0.0057	0.2763	0.2424	0.0584	0.2459	0.2766	0.391	0.5808	0.2177	0.2638	0.497	0.3808	0.2614	-0.0407
Know2	-0.1115	0.4317	-0.0172	0.2512	0.0734	0.3535	<b>0.7442</b>	0.0013	0.1897	0.2534	0.0389	0.2328	0.2621	0.4004	0.5479	0.1687	0.2853	0.5372	0.315	0.2606	-0.0021
Know3	0.0222	0.5583	0.1241	0.2552	0.244	0.317	<b>0.8495</b>	0.093	0.3419	0.3453	0.1871	0.3087	0.3672	0.2926	0.5238	0.2915	0.3603	0.4349	0.281	0.3598	0.0287
LF2f1	0.5067	0.1014	0.4104	0.2228	0.3521	0.1912	0.0879	<b>0.8955</b>	0.3723	0.2636	0.4169	0.3796	0.3654	0.0013	0.1809	0.2904	0.2247	0.0915	0.0962	0.3468	0.3928
LF2f2	0.5804	0.0139	0.4108	0.2005	0.2657	0.151	0.013	<b>0.8886</b>	0.3607	0.249	0.4587	0.3806	0.3559	-0.0396	0.1113	0.3173	0.2441	0.0652	0.1007	0.2435	0.4096
LF2f3	0.5502	-0.0169	0.4156	0.1401	0.263	0.041	0.0171	<b>0.889</b>	0.2559	0.2028	0.4243	0.3357	0.2487	-0.0796	0.0767	0.323	0.2944	0.0528	0.0217	0.2035	0.2715
NdEst1	0.2443	0.3501	0.2892	0.2393	0.2082	0.3175	0.2776	0.3098	<b>0.8183</b>	0.564	0.3431	0.4359	0.6726	0.1474	0.4086	0.281	0.4081	0.2974	0.2793	0.3805	0.3635
NdEst2	0.2792	0.3364	0.2821	0.2546	0.2111	0.3231	0.3397	0.3146	<b>0.8017</b>	0.4989	0.3904	0.5034	0.5535	0.1811	0.4315	0.3024	0.4781	0.2754	0.1997	0.3834	0.2959
NdEst3	0.2671	0.272	0.3487	0.231	0.2492	0.3053	0.2367	0.2765	<b>0.8091</b>	0.5398	0.4332	0.3614	0.5405	0.1262	0.4003	0.3161	0.3916	0.1673	0.1647	0.3487	0.3241
NdEst4	0.2265	0.2402	0.2515	0.2857	0.2171	0.2511	0.2399	0.2991	<b>0.7936</b>	0.6333	0.3911	0.3868	0.6106	0.2226	0.3745	0.2834	0.4047	0.2616	0.2058	0.4081	0.291
NdEst5	0.213	0.2656	0.2941	0.255	0.1673	0.3241	0.2709	0.3178	<b>0.8182</b>	0.6651	0.4113	0.4376	0.6645	0.2567	0.4309	0.3126	0.5294	0.3224	0.2003	0.3985	0.244
NdLove1	0.1067	0.4124	0.2297	0.2626	0.1625	0.4233	0.3215	0.2402	0.6163	<b>0.8779</b>	0.3529	0.4128	0.5837	0.326	0.4726	0.2599	0.427	0.3166	0.3168	0.4063	0.2161
NdLove2	0.1852	0.1916	0.1733	0.2051	0.0392	0.2795	0.1892	0.2184	0.5286	<b>0.6991</b>	0.2323	0.3283	0.5288	0.151	0.2982	0.0913	0.3107	0.1792	0.1373	0.2345	0.14
NdLove3	0.1111	0.4217	0.2474	0.289	0.1435	0.4177	0.3021	0.1924	0.6195	<b>0.853</b>	0.3197	0.3663	0.5333	0.3321	0.4436	0.2321	0.3971	0.3298	0.3529	0.3733	0.1955
NdLove4	0.0632	0.3598	0.2715	0.2715	0.2057	0.3096	0.3055	0.2347	0.5733	<b>0.8138</b>	0.3762	0.4564	0.5426	0.3434	0.3732	0.3048	0.4809	0.3901	0.3233	0.4452	0.2184
NdPhys1	0.5145	0.0668	0.3891	0.2559	0.3947	0.1548	0.0097	0.5253	0.4052	0.2867	<b>0.8</b>	0.4229	0.3739	-0.0432	0.1113	0.3614	0.3373	0.307	0.0858	0.2263	0.3606
NdPhys2	0.3194	0.2065	0.3778	0.3755	0.4365	0.3427	0.1609	0.3393	0.3732	0.3247	<b>0.8387</b>	0.4581	0.3648	0.1172	0.2588	0.3252	0.3796	0.1317	0.2344	0.3902	0.2865
NdPhys3	0.4409	0.1265	0.4207	0.3777	0.4861	0.2613	0.1048	0.4098	0.438	0.3678	<b>0.871</b>	0.5074	0.4104	0.0304	0.228	0.4062	0.3748	0.1144	0.1451	0.4182	0.3333
NdPhys4	0.2876	0.1207	0.2732	0.3663	0.3773	0.2482	0.1254	0.3867	0.4244	0.3635	<b>0.8501</b>	0.4328	0.4198	0.0203	0.2908	0.4077	0.3494	0.1209	0.1188	0.3926	0.2917
NdSafe1	0.1645	0.3034	0.203	0.2067	0.1988	0.2661	0.3228	0.292	0.4154	0.3996	0.4048	<b>0.8207</b>	0.4569	0.2214	0.3758	0.3218	0.3904	0.3997	0.2443	0.3451	0.1317
NdSafe2	0.3843	0.1767	0.4115	0.2901	0.4442	0.2583	0.1442	0.4016	0.4	0.2593	<b>0.6976</b>	0.3703	0.3703	0.0152	0.2523	0.2036	0.3734	0.1876	0.1834	0.2382	0.4003
NdSafe3	0.1599	0.4055	0.1261	0.2408	0.1957	0.2554	0.3286	0.2335	0.3966	0.3819	0.2835	<b>0.8034</b>	0.4099	0.2696	0.4222	0.3608	0.2422	0.4519	0.2333	0.3221	0.0976
NdSafe4	0.245	0.2303	0.2873	0.2917	0.3417	0.3036	0.2157	0.3945	0.457	0.4654	0.4813	<b>0.8236</b>	0.4793	0.1717	0.3346	0.3801	0.3343	0.3936	0.1956	0.411	0.3135
NdSelf1	0.2278	0.3398	0.2513	0.3059	0.2262	0.3289	0.388	0.2995	0.6636	0.5522	0.3655	0.4508	<b>0.8428</b>	0.2079	0.4057	0.2412	0.5233	0.2868	0.2272	0.4088	0.2513
NdSelf2	0.2349	0.3033	0.2938	0.2166	0.2254	0.3259	0.3524	0.2822	0.6076	0.5167	0.393	0.4324	<b>0.7956</b>	0.2479	0.4085	0.1824	0.5357	0.2985	0.2005	0.3573	0.175
NdSelf3	0.1413	0.2233	0.2695	0.2727	0.1913	0.3611	0.2672	0.2													

## APPENDIX E

### IRB APPROVAL QUALITATIVE STUDY

**From:** UNCG IRB

**Date:** 12/16/2014

**RE:** Notice of IRB Exemption

**Exemption Category:** 2.Survey, interview, public observation

**Study #:** 14-0509 **Study Title:** The Impact of Mobile Data Services on Individual Quality of Life

This submission has been reviewed by the IRB and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

#### **Study Description:**

This exploratory study will seek to better understand how individuals use their mobile devices and the positive and negative effects associated with use. Interviews using convenient samples will be used to increase our understanding on how *MDS use* influences QOL. This qualitative analysis will be used to: refine the domains of use suggested by previous literature (Choi et al., 2007; Cummins, 1996; Felce & Perry, 1995; Felce, 1997), by reducing and consolidating the number of domains, and developing items for *MDS use* in each domain. We are also interested to uncover what effects (both positive and negative) individuals perceive with *MDS use* in order to develop a holistic understanding of the phenomenon. A pre-test of the semi-structured interview questions will be conducted on four individuals to assess their understandability and functionality.

#### **Investigator's Responsibilities**

Please be aware that any changes to your protocol must be reviewed by the IRB prior to being implemented. Please utilize the most recent and approved version of your consent form/information sheet when enrolling participants. The IRB will maintain records for this study for three years from the date of the original determination of exempt status.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at [http://policy.uncg.edu/research\\_data/](http://policy.uncg.edu/research_data/).

CC:

Prashant Palvia, Info Sys and Supply Chn Mngmt

## APPENDIX F

### IRB APPROVAL QUANTITATIVE STUDY

**From:** UNCG IRB

**Date:** 7/21/2015

**RE:** Notice of IRB Exemption

**Exemption Category:** 2.Survey, interview, public observation

**Study #:** 15-0333

**Study Title:** The Impact of Mobile Data Services on Individual Quality of Life.

This submission has been reviewed by the IRB and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

#### **Study Description:**

A survey methodology will be used to add empirical support to previous research that suggests that *MDS use* influences QOL. Items regarding *MDS use* and *effects of MDS use* are derived from a previous qualitative study ([14-0509](#)) and related to previous literature in order to measure the constructs. Maslow's Hierarchy of Needs, MDT, and QOL measures will be adapted from previous studies to help us better understand how MDS influences overall Quality of Life

#### **Investigator's Responsibilities**

Please be aware that any changes to your protocol must be reviewed by the IRB prior to being implemented. Please utilize the most recent and approved version of your consent form/information sheet when enrolling participants. The IRB will maintain records for this study for three years from the date of the original determination of exempt status.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at [http://policy.uncg.edu/research\\_data/](http://policy.uncg.edu/research_data/).

CC:

Prashant Palvia, Info Sys and Supply Chn Mngmt