

CAN IT HURT PRODUCTIVITY?

AN INVESTIGATION OF IT ADDICTION

Research-in-Progress

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Abstract

While IT is generally found to augment productivity, recent evidence indicates that excessive and compulsive usage of IT is likely to have some adverse consequences. Given the prevalence of IT addiction, it becomes increasingly important to study this phenomenon. We seek to investigate the adverse effects of IT addiction, especially on productivity, in work settings. We propose a model showing that two types of factors (related to individual differences and technology features) could have an impact on addictive IT use, which in turn will affect work productivity. A quantitative cross-sectional design will be used to test the model; as needed, survey instruments will be developed and/or validated. Our study will contribute to the IS discipline by proposing a model of IT addiction to identify and explain its significant antecedents and impacts. For managers, the findings will help understanding the formation of addictive IT behaviors and their effects.

Keywords: IT addiction, work productivity, antecedents, IT impact

Introduction

In its various forms, technology has penetrated into practically all aspects of our lives and its use is on the rise. The Internet-user population has increased to more than five times its size in 2000 and now includes almost one third of the world's population (Alexander 2011). Currently, more than 45% of U.S. mobile users have smartphones (Nielsen Report, 2012) and social networking websites have become so prevalent that 54% of the people in North America are using Facebook (Facebook Newsroom, 2013). On average, they spend 7.7 hours on the site each month (Statisticbrain.com 2012). The soaring use of technology recently has raised much public concern over excessive and unregulated information technology-use (IT) behaviors. In fact, recent research has shown that excessive dependency on IT use can be problematic and likely could lead to undesirable outcomes and serious challenges for individuals, organizations and even societies (LaRose, Lin & Eastin 2003; Shapira et al. 2003; Yellowlees & Marks 2007; Seah & Cairns 2008; Mehroof & Griffiths 2010) when it becomes addictive (Turel, Serenko & Bontis 2011). Recent research estimates the prevalence of pathological Internet use to be between 0.7% and 11% in the United States, China, South Korea, Greece, Norway and Iran (Ghassemzadeh, Shahraray & Moradi 2008; Kim et al. 2006; Rendi, Szabó & Szabó 2007; Siomos, Dafouli, Braimiotis, Mouzas & Angelopoulos 2008). In young users, these behaviors were found to be associated with academic failure, sleep deprivation and psychological health issues such as severe depression and loneliness (Billieux, Van der Linden & Rochat 2008; Young 1998).

Although in an organizational context IT generally was found to augment productivity and contribute to performance, excessive and compulsive IT-use can have a major negative effect on employees' work. Recent research shows that the excessive use of certain IT tools (e.g. Internet, email and social media) for non-work related purposes such as personal email exchange, adult web surfing, online games, chatting and online shopping behaviors has increased during the last few years (Chak & Leung 2004), which can lead to the loss of billions of dollars for businesses (Stewart 2000). Statistics show that personal online presence can take up to 25% of employees' time, leading to a U.S. \$54 billion deficit due to decreased productivity (Adschiev 2000; Woon et al. 2004).

Given the prevalence of IT addiction and its serious effects on the well-being of individuals, there is an increasing need to study problematic IT use and understand the severity of adverse outcomes tied to such behaviors. The aim of our study is to investigate the adverse effects of IT addiction, especially on productivity in work settings. In order to better understand IT addiction, we look at its potential determinants and examine their relationship with IT addiction. A thorough review of the literature on IT addiction and technology dependency in different disciplines led to the identification of two key types of antecedents (individual-related and technology-related factors) and four categories of consequences (interpersonal/social relationships, occupational outcomes, psychological status and physical well-being). We then develop a model to study IT addiction and its significant adverse effects in the work environment, most particularly on work productivity. To test the model, a cross-sectional survey was designed using new tools and/or existing measures for the constructs. The proposed model contributes to extant theories of IT addiction and to practice by explaining the determinants of addictive IT-related behaviors and their consequence on work productivity.

Literature Review

IT addiction

The concept of addiction has been rooted in psychology and mental health research where it often has been referred to as a type of substance use that either serves to produce pleasure or to escape from internal discomforts (Goodman 1990). Addiction has been defined as a "loss of control over a behavior with associated adverse consequences" (Potenza 2006). Addictive behaviors usually follow a recurring pattern (e.g. using drugs and alcohol) where an individual experiences failure to abandon the use of a substance in spite of significant negative outcomes (Goodman 1990; Beard 2005; Young 1996; Caplan 2006). Although initially used as a label for substance abuse (Rachlin 1990), the concept of addiction has been extended to a broader context to embed non-substance related behaviors such as gambling, gaming and shopping (Elliott 1994; Davis & Claridge 1998; Wilson 1991; Blanco et al. 2001; Becona et al. 1996; LaRose 2002).

With the proliferation of information and communication technologies and the rising level of users' technological skills, the average amount of technology use has increased dramatically. Consequently, there is an increase in user dependency on technology. Statistics and reports all confirm patterns of excessive technology use in both young people and adults (Pempek, Yermolayeva & Calvert 2009; Thompson 2011; Scott 2012). Drawing from extant definitions of addiction, IT addiction has been defined as the "user's psychological state of maladaptive dependency on IT use that is manifested through the obsessive-compulsive pattern of IT-seeking and IT-use behaviors that take place at the expense of other important activities" (Xu, Turel & Yuan 2011, p. 321). IT addiction can occur in many forms including Internet addiction (Byun et al. 2009; O'Reilly 1996; Widyanto & Griffiths 2006; Young 1996; Young 2008), online gambling (Griffiths 2003), mobile email (Turel & Serenko 2010), online shopping (LaRose & Eastin 2002), online auctions (Turel et al. 2011), online gaming (Ng & Wiemer-Hastings 2005), smartphone addiction (Lapointe, Boudreau-Pinsonneault & Vaghefi 2013; Park & Lee 2011), etc. Similar to substance addiction, IT addiction has at least three essential elements that distinguish it from other IT-related behaviors: 1) it embeds excessive repetition 2) attempts to cease IT usage usually fail, and 3) it continues despite significant negative outcomes (Goodman 1990, 2007; Porter & Kakabadse, 2006; Potenza, 2006).

To understand the complex nature of behavioral dependency, researchers (mainly in the psychology and mental health disciplines) have looked at the different characteristics of behaviors associated with IT addiction, referring to them as symptoms through which addictions become disclosed. In this stream, Goldberg (1996) discussed withdrawal, craving, tolerance and negative life consequences as symptoms of Internet addiction. Griffiths (1998) studied salience and mood changes as additional characteristics. A review of this literature reveals the importance of seven core characteristics of IT addiction (see Table 1). Together, these characteristics illustrate the complex nature of the addiction construct and can be used to properly measure it.

Table 1: Characteristics of Addiction		
Characteristics	Definition	Studies
Salience	The technology dominates a user's thoughts and behaviors	Armstrong, Phillips, & Saling 2000; Griffiths & Dancaster 1995; Griffiths 1998; Mehroof & Griffiths 2010; Turel et al. 2011
Conflict	"The use of technology conflicts with other tasks, which impairs normal functioning"	Griffiths 2000; Lemmens, Valkenburg & Peter 2009; Serenko et al. 2009; Turel et al. 2008
Relapse	"A user is unable to voluntarily reduce the use of the technology"	Armstrong et al. 2000; Chou & Ting 2003; Serenko et al. 2009; Young 1999; Beard 2005
Preoccupation	Excessive levels of use, craving or feeling tension or arousal while using it	Lemmens et al. 2008; LaRose et al. 2003; Beard 2005; Young 1999, 2004
Tolerance	Increasingly large doses of activity are needed to achieve the same effect	Ng & Wiemer-Hastings 2005; Byun et al. 2009; Wan & Chiou 2006; Chou & Ting 2003; Serenko et al. 2009; Turel et al. 2009
Sense of Withdrawal	Negative emotions arise if a person cannot use the technology	Murali & George 2007; Waters 2005; O'Reilly 1996; Porter & Kakabadse 2005; Shapira et al. 2000; Turel et al. 2011
Mood Modification	Using the technology offers thrill and relief	O'Reilly 1996; Shapira et al. 2000; Mehroof & Griffiths 2010; Widyanto & Griffiths 2006; Young 2004; Ferraro, Caci, D'Amico & Blasi 2006; Greenfield 1999; Lemmens et al. 2009

Determinants of IT addiction

Despite the fact that information systems (IS) scholars have just recently begin to pay attention to this phenomenon, addiction (in different forms) has been studied in reference disciplines (e.g. psychology and healthcare) for more than a decade. This literature partially has examined primary antecedents that play a role in the emergence of addictive and dependent behaviors of technology use (Armstrong et al. 2000; Byun et al. 2009). Initially, some argued that IT only provides wider access to known addictive objects (Griffiths 1996); they focused on the known factors that stimulate general types of addiction (e.g. gambling and sexual behavior) and examined their effects in the context of technology use. Similar to

research on drug addiction, others studied socio-demographic factors (e.g. age, economic status, education, race and gender) and their relevance to IT addiction (Griffiths, Davies & Chappell 2004; Shotton 1991; Young 1996, 1998). For instance, Young (1996, 1998) found that middle-aged women are statistically more prone to Internet addiction. Yet, the results of follow-up surveys imply that the main pathological users of the Internet are, in fact, males (Morahan-Martin & Schumacher 1997; Griffith 1999), or anyone with access to a computer and the Internet (O'Reilly 1996, Armstrong et al. 2000). The discrepancies in these findings motivated researchers to look more broadly for other determinants of addiction.

Individual-related factors: Besides demographic factors, significant attention has also been paid to determinants of addiction that are rooted in personality and individual differences. Classic addiction research focused on personality traits (e.g. extraversion) and dysphonic moods (e.g. depression, stress) and tried to determine their roles in developing substance/non-substance addiction (Marlatt et al. 1988; DeJong et al. 1993; Kreek 1992; Nelson-Zlupko, Kauffman & Dore 1995). Extending these concepts, researchers similarly studied the role of personality differences in excessive IT use, especially excessive online behaviors and Internet addiction (Young 1996; Young & Rogers 1998). For example, Griffiths and Dancaster (1995) proposed that high-strung users with a *Type A* personality, who experience greater physiological reactivity in challenging situations, are more prone to addiction. Caplan (2002, 2006) examined how problematic Internet use (PIU) is rooted in the psychosocial well-being of users and found that depression, loneliness, shyness and low self-esteem, combined with social anxiety, could create a desire for excessive online interaction. In these cases, IT use was perceived as a good way to evade face-to-face interactions that can provoke social anxiety, a tendency that is reinforced by the lack of avoidance mechanisms in users (Murali & George 2007). More recently, the results of a qualitative study by Lapointe et al. (2013) indicate that some traits such as fear of rejection, need for approval, anxiousness and stress could help differentiate between addicts and non-addicts. While there has been an increase in studies that examine individual differences, more work is needed (specifically in the IS discipline) to provide additional evidence supporting previous findings in the context of IT addiction (Byun et al. 2009).

Technology-related factors: Although the research on personality traits and addiction is dominant, there is growing interest in the potential influence of technology on IT addiction; that is, IT can be addictive due to its features and the opportunities it provides for individuals. Shaffer (1996) stressed this role in an early study and asserted that the capacity of the Internet to connect computers and people and provide an infinite amount of information can stimulate and excite individuals to engage in heavy usage. This approach to studying addiction is particularly common in gaming literature; many researchers have studied the nature of videogames by comparing them with other types of addiction. For instance, Fisher and Griffiths (1995) compared the structural elements of videogames and slot machines and argued that their common features (e.g. a rapid span of play, a requirement of concentration and response to stimuli) could partly explain why certain videogames are addictive.

In a review study, Wood et al. (2004) developed a framework of the psycho-structural features of videogames covering a wide range of game types and features that make games interesting to users. King et al. (2010) tried to expand this framework using findings from the literature on gambling and interviews with those who had excessive game-playing habits. The results showed that five features of games contribute to the development of addictive behaviors: social features, control features, narrative and identity features, reward and punishment features, and presentation features.

Consequences of IT addiction

In general, technology use brings numerous benefits for individuals and firms (increased productivity, facilitation of processes and tasks, improved decision making, entertainment, etc.). Although these advantages generally outweigh the disadvantages, excessive technology use has a dark side that could have a detrimental effect on users' personal and professional lives. Similar to the literature on determinants, the discussion of the consequences of IT addiction has been scattered. In order to study these factors, we build upon Murali and George's (2007) study and extend their framework to the context we examine. As such, we identify four categories of impacts: interpersonal/social relationships, occupational outcomes, psychological status, and physical well-being.

Interpersonal/social relationships: IT addiction undermines an individual's social life and is usually associated with difficulties such as a lack of communication with others, relationship conflicts and

marital discord (O'Reilly 1996; Goldberg 1996; Young 2004). These difficulties are rooted in the conflict characteristic of addiction, which means that as individuals spend a significant amount of time using technology, they have less time and limited opportunity for other activities such as social interaction. An early study by Young and Rodgers (1998) showed that computer addicts tend to have a schizoid lifestyle and are content with long-enduring social isolation. In another study, Young (2004) showed that new communication technologies created a base for the development of extended online relationships and could lead to cyber-affairs or online sexual relationships.

Occupational outcomes: Technology addiction also influences individual performance and efficiency. In most cases, unregulated use of technology limits the time and energy required for valued work activities (Armstrong et al. 2000). This results in lapses in and impairments of productivity (Davis et al. 2002), academic failure, excessive financial debt and job termination (O'Reilly 1996; Young 1999; Beard 2005; Nalwa & Anand 2003). Organizational studies showed that employees with Internet access often spend a considerable amount of time on non-work-related online activities such as sending personal emails, surfing the web, playing games and engaging in online gambling or shopping (Beard 2005; Murali & George 2007). The resulting distractions and/or procrastination have been linked with decreased work productivity and performance (Davis et al. 2002).

Psychological status: Traditionally, addiction has been studied via its association with the psychological well-being of individuals and has been blamed repeatedly for the "development or exacerbation of psychological problems" (Beard 2005, p. 7) such as low social competency, aggression, distress and severe depression (Morrison & Gore 2010; Shapira et al. 2003; Van der Aa et al. 2009; Young & Rodgers 1998; Hur 2006). Psychological problems occur due to users' dependency on technology. When positive emotions (such as excitement) are experienced continually as a result of IT use, users continuously crave more use. However, increasing usage will not satisfy users' desires indefinitely. At some point, the feeling of enjoyment will become saturated so that usage will no longer create a pleasant feeling. The frustration caused by this creates psychological problems. Psychological disorders have also been identified as determinants of addiction (e.g. depression and loneliness). An explanation for this could be the fact that the relationship between psychological factors and IT addiction is partly incremental and follows a recursive process; that is, IT addiction could create psychological problems and the increase in such disorders could lead to more serious addiction (Davis 2001; Caplan 2002; Kim, LaRose & Peng 2009). As this cycle continues to recur, addictive behaviors as well as psychological problems become reinforced throughout the process so that the consequences of the first cycle become the antecedents of the next one (Gilles, Turk & Fresco 2006).

Physical well-being: Substance addiction generally has been studied due to its potential effect on physical well-being. Although less significant, physical problems caused by IT addiction are notable as well (Young 1999). The prolonged use of technology and lack of physical activity can bring about many physical problems including fatigue, lack of sleep (Lapointe et al. 2013; Young 2004; Khan 2008; James & Drennan 2005; Jenaro et al. 2007), backache, neck pain, eyestrain, and carpal/radial tunnel syndromes (Shotton 1991; Young 1998, 1999).

Theoretical Framework

In this study, we aim to explore the impacts of IT addiction, especially in the workplace. Building on the literature in psychology and IS, we propose a model to explain how IT addiction develops and results in reduced productivity. Based on our review of the literature, we propose a model to show how IT addiction can have destructive effects on the work-related productivity of users.

The impact of IT addiction on productivity

In the IS literature, there is a long-standing body of knowledge based on studies of the effects of new technologies on productivity and performance. This research generally has shown that IT can contribute to organizations and work environments by improving information and knowledge in the firm (Huber 1990), changing business processes (Grover et al. 1998), and providing a sustained strategic advantage for the firm (Piccoli & Ives, 2005). In an organizational context, productivity is the extent to which IT improves the user's output per unit of time (Brynjolfsson & Yang 1996; Torkzadeh & Doll 1999; Weick 1990).

Although in most cases the use of IT has been found to improve business processes and facilitate communication, excessive dependency to IT usage can have major adverse effects. Previous research shows that compulsive usage of IT for non-productive purposes such as personal email exchanges, adult web surfing, online games, chatting and online shopping behaviors has increased during the last few years (Chak & Leung 2004). In these cases, technology functions as a tool for convenience, entertainment or simply spicing up the workday (Woon et al. 2004). Such behaviors can transform to losses of billions of dollars for firms. Recent research has therefore paid particular attention to these negative side effects of excessive and addictive IT use. For example, Turel et al. (2011) argued that addiction to BlackBerry email (provided by firms) can have negative effects on organizational commitment, productivity and turnover. Similarly, Lapointe et al. (2013) surveyed smartphone usage among students and found that smartphone addiction conflicts with users' daily life activities and decreases productivity for more than half of the respondents who exhibited addictive behaviors, and even for normal users. Their results also show that the negative effect on productivity is stronger for addicts who display *excessive* smartphone dependency. The loss in productivity resulted from the heavy reliance on technology and ongoing distractions caused by smartphones.

As employees utilize IT, they can become deeply engaged in it, which is generally considered a positive behavior (Turel & Serenko 2012). However, the use of IT for non-work related purposes (usually for entertainment and enjoyment) can create a feeling of gratification and a craving that leads to more use of the technology to the point of addiction and IT dependency. Addictive use of IT at work will conflict with other important professional activities. As described earlier, IT addiction is a behavior that is difficult to end and which continues to exist despite its negative outcomes. Accordingly, despite the inability to spend time and effort on productive tasks in the organization, employees continue their excessive and non-productive IT usage, at the cost of reduced productivity. Therefore, we argue that the addictive use of IT systems within an organization will lead to reduced work productivity for employees.

H1: IT addiction is negatively related to work productivity.

Antecedents of IT addiction

Although the literature in psychology has examined the role of individual differences that influence users' behaviors, sufficient proof of this relationship does not yet exist and there is no overarching theory that explains the role of these factors, specifically within the context of IT addiction (Byun et al. 2009; Engelberg & Sjöberg 2004). We reviewed the literature on the personality and trait factors associated with various technology addictions. Special attention was paid to the psychological determinants that could be important regarding the features that exist in information and communication technologies as well as the opportunities these tools provide to individuals. As earlier research has shown, particular individual differences (such as disorders) can indeed be related to work impairments (Lim, Sanderson & Andrews 2000).

Individual-related factors: Our review shows that extant research on individual differences generally has examined three types of factors: thoughts about self, dysphonic moods, and the degree of sensation-seeking. Accordingly, we discuss three individual-related factors that can be associated with addictive IT behaviors and work productivity: self-esteem, depression and impulsivity.

Self-esteem: Self-esteem is referred to as the basis for self-identity and individual evaluation (Greenberg, Lewis & Dodd 1999). Individuals with low self-esteem mostly recognize negative appraisals and often interpret information according to their negative self-evaluations (Swann 1996). They also suffer from a lack of social skills and the inability to build proper social connections. In order to escape from negative feelings or withdraw from the stress caused by social interactions, individuals with low self-esteem tend to engage in excessive behaviors and online activities (Marlatt et al. 1988; Hirschman 1992; Armstrong et al. 2000). Also, the feeling of control that comes with the use of technology and the ability to acquire status and recognition in the online world is a reason for a higher propensity toward dependency on IT (Turel et al. 2011; Brody 1996).

Depression: Due to its interactive and hedonic characteristics, IT can be used to relieve negative feelings that users might be undergoing. Such feelings can manipulate self-regulation so that users economize on the mental effort required to control IT use behaviors (Larose 2003; Bandura 1991). Over the long term, deficient self-regulation leads to excessive and out-of-control IT usage. IT can also provide anonymous

online interaction and eliminate the social influence of face-to-face interaction. Individuals with depression also feel anxious and awkward when making social interactions. Due to its communicative capabilities and anonymous features, IT and online connections is being overly used by these individuals as a way to overcome the challenges that can exist in real-life encounters (Young 1996; Kaiser et al. 1984; Treem & Leonardi 2012).

Impulsivity: Impulsivity is defined as the tendency toward quick reactions to internal or external triggers with a disregard for the potential negative effects of the response (Potenza 2006). Extant literature shows that impulsivity is broadly related to hasty decision-making, impatience regarding delayed rewards, and impaired control of behavior (Goodman 2008). Individuals who seek higher levels of stimulation are more prone to unregulated levels of usage and addictive behaviors as they utilize technology to gratify their sensation-seeking desires (Shaffer 1996; Armstrong 2000). For instance, Cao et al. (2007) studied Internet addiction in Chinese adults and found that addicts were more impulsive compared to the control group. Billieux et al. (2008) replicated the results in the context of mobile phone dependency.

H2a: Low self-esteem is positively related to IT addiction.

H2b: Depression is positively related to IT addiction.

H2c: Impulsivity is positively related to IT addiction.

Technology-related factors: Compared to other determinants of IT addiction (such as individual differences), technology per se has been less studied. However, evidence shows that the IT artifact can cause addictive IT behaviors because differences between technologies (that lie within the same category of IT) can explain why behaviors vary. For instance, the results of a study by Ng and Wiemer-Hastings (2005) show that advances in 3D graphics and virtual representation are reasons why game players show addictive behaviors toward particular games (e.g. adventure, action and strategy) (Barnett & Coulson 2010; Liu & Peng 2009).

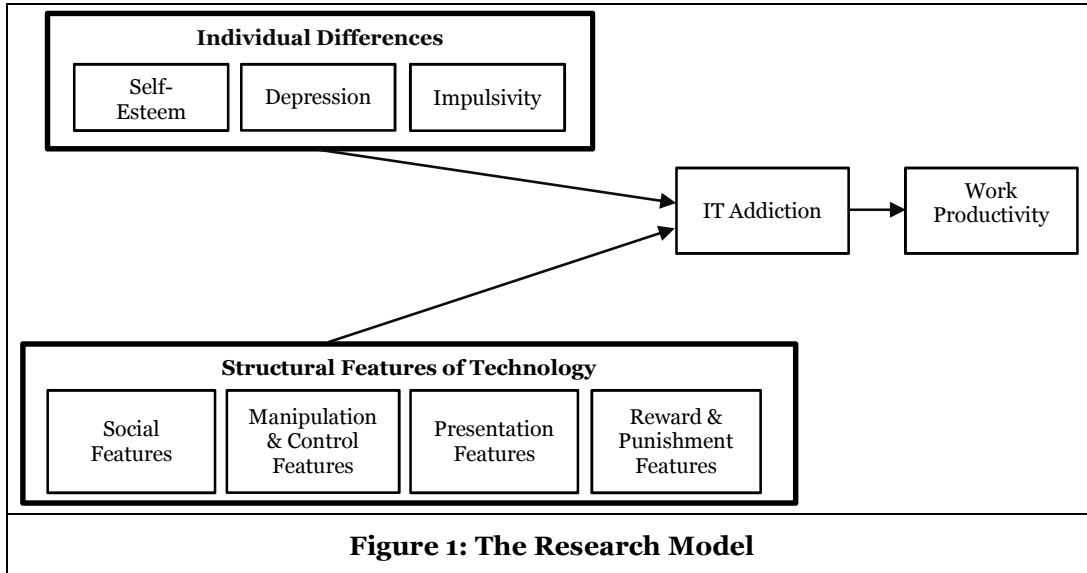
Although it is important to study the features of technology, there is no one theory that provides an overview of what makes technology addictive. To examine these factors, we borrow from gaming and gambling literature to study the *structural characteristics of the technology*. As found in previous works, the common characteristics of videogames and gambling (e.g. incremental reward, group approval) partly explain why some players show problematic behaviors (Brown 1989; Johansson & Gotestam 2004). Both activities share common elements and features, such as incremental reward and opportunity for group approval through competition (Fisher & Griffiths, 1995).

A similar argument can be made, stating that games and IT (in general) intrinsically share many basic key elements. For instance, similarly to games, information systems are supported by software capabilities and generally equipped by sound and graphics features that make it interesting to users. Also, games and IT (including social media) can both provide various communicative tools (e.g. voice calls, conference calls, forums, blogs) that are important for communication and provide a virtual environment to improve social relationships and recognition within a community. Despite these commonalities, it is important to note that IT tools and social media technologies are more pervasive and accessible for all types of users; an average user is more likely to develop addictive behaviors related to IT or social media use. Based on the commonalities and differences that exist within these two contexts, we expect that structural features of IT also play an important role in the development of addictive IT behaviors.

Extending the frameworks from Wood et al. (2004) and King et al. (2010) to a broader context, we examine four main structural factors that can lead individuals to use IT excessively. *Social features* are the capabilities that create a sense of belonging and social recognition within the users' community and invite users to interact, exchange and communicate easily with each other. Examples are support networks, leaderboard charts and institutional features. *Manipulation and control features* provide the basis from which users control the properties of a system and create a feeling of dominance over a system. *Reward and punishment features* are the gains (or losses) that motivate users to use a system more frequently and prompt them to learn a system in order to maximize the benefit they obtain from its features. Finally, *presentation features* refer to the external look and pleasurable experience IT provides for users, which are mainly assessed using the sound and graphic features of the system interface. We omitted narrative and identity features from the study because they address only game storytelling and the identity of game players.

- H3a: The quality of social features is positively related to IT addiction.*
H3b: The quality of manipulation and control features is positively related to IT addiction.
H3c: The quality of reward and punishment features is positively related to IT addiction.
H3d: The quality of presentation features is positively related to IT addiction.

Figure 1 illustrates our model and its proposed relationships.



Proposed Methodology

In order to assess the model, we chose a quantitative study design. Like other studies done on IT addiction (e.g. Turel & Serenko 2012; Xu et al. 2012), we will test our model using a cross-sectional survey. Due to the broad occurrence of the IT addiction phenomenon, it is impossible for a single study to examine IT addiction in general (Turel et al. 2012). Thus, we focus on addiction to social media networks at the individual level of analysis. Social media refers to any technology (e.g. website, application) that allows social interaction between users. With the recent advent of social media tools (e.g. Facebook, Twitter, and Instagram), these networks increasingly serve as an essential media channel for personal communications, academic research, information exchange, and entertainment, with over a billion users at present (Byun et al., 2009; Aboujaoude, 2010). These communicative technologies provide a new form of web community and online network, which allows people to interact, share interests and do social activities without the need for face-to-face meeting. The adoption of social media is increasing at a fast pace. For instance, according to official statistics, 54% of North Americans are now profiled on Facebook, as part of its massive user network (Facebook.com 2012). A recent report by Technorati indicates that three million blogs are created every month (Bullas, 2012). Social media users are generally active and on average, a third of them check their website at least once a day (Correa, Hinsley, & de Zúñiga, 2010). Additional evidence also shows that social media use has the potential to be addictive (Corbel, 2008; Turel & Serenko, 2012).

The sample frame for this study includes white-collar employees who 1) have access to the Internet at work, 2) enrolled in a major social media network (Facebook) 3) use it at least once a week for personal non-work related purposes while at work. The access could be via different means such as private/work-provided PCs, smartphones or tablets. We chose Facebook because 1) it is the largest social network website with over 1 billion active users, and 2) Facebook addiction has been shown to exist and affect users' lives (Andreassen et al., 2012; Rogers, 2013). Drawing on prior studies done in a similar context of IT addiction (Turel et al., 2011), between 250 to 300 surveys (or 10 times the number of items in the most complex construct) is the minimum required to provide sufficient power to test the hypothesis and model. Since our aim is to explain and predict IT addiction and its impact, we will use structural equation modeling techniques to analyze our data (Gefen et al., 2000). In addition, since we are collecting data on a

negative social phenomenon, we will measure social desirability using Marlowe-Crowne's social desirability scale (Ridgway et al., 2008).

To develop the survey instrument, we will use the existing measures for self-esteem (Coopersmith Self-Esteem Inventory), depression (Center for Epidemiological Studies Depression Scale), and impulsivity (Barratt Impulsiveness Scale 11; Steinberg et al. 2012), and productivity (Doll and Torkzadeh 1999). We will follow a multidimensional approach to study IT addiction because 1) IT addiction is a broad and complex construct and embeds several behavioral characteristics (that we discussed above) 2) there is no accepted measurement for IT addiction or social media addiction (Byun et al., 2009, Turel et al., 2009), Therefore, we argue that a combination of different components scales related to addictive social media use can better reflect the nature of this construct. Based on the literature review, we identified three domains for social media addiction: internet addiction (Shapira et al., 2003; Armstrong et al., 2000), online game addiction (Lemmens et al., 2010) and computer addiction (Charlton & Danforth 2010).

To develop measures for technology-related factors, we will follow guidelines by Wood et al. (2004). First, we will use various social networks and compare them to other relevant types of addiction (games, shopping) in order to identify the key features of social media that influence the tendency of individuals to increase usage. Additional items will be added; we will ask panel members to identify new items and categorize them into specific clusters. Finally, we will confirm the categories and factors using the panel of experts and the Delphi method. Feedback from scholars and practitioners as well as a round of pilot testing will help us verify the final pool of items. A survey will be administered to employees using the tailored design method (TDM) approach. To analyze data, we intend to use appropriate structural equation modeling techniques (e.g. PLS).

Expected Contributions

By integrating the extant literature on the drivers and consequences of IT addiction, our study will make important contributions to both research and practice. While scholars have studied several positive (e.g. adoption, use, habit) and negative (e.g. resistance, abuse, sabotage) types of IT behaviors, the IT addiction phenomenon has just gained attention and, with a few exceptions (e.g. Turel et al 2011), there is not much theory explaining the development of these behaviors and their potential consequences on user's well-being or business's performance. To our knowledge, there is also no study that specifically looks at the negative effect of social media addiction with regard to productivity at work. This is an important area of study since the use of social media in firms is increasing at an incredible pace. On the one hand, managers hope that social media will help organizations by facilitating interactions and improving organizational processes (Treem & Leonardi 2012), since they enable new ways of communication different from old communicative tools. On the other hand, excessive use of social media for non-related work purposes can impede the potential benefits that are expected by organizations who provide access to the Internet and social networks.

Our study contributes to theories of IT addiction by proposing a model of IT addiction and its effect on productivity in the work environment. This work streamlines the literature on IT addiction and examines its main determinants. It sheds light on individual traits that influence the formation of addictive behaviors and helps answer the question of why some users with certain personality types are more likely to develop addictive behaviors. It also helps understanding the technology characteristics that can instigate users to spend excessive time with a technology.

In addition, our findings will provide a roadmap to identify addictive IT behaviors and point out their antecedents, which will help in controlling these behaviors and avoiding negative outcomes in work settings. Also, the results can be helpful for developers and software companies. The implications on the characteristics of technology that are addictive can potentially be used in order to develop software and hardware technologies that easily appeal to a wide range of users and secure positive long term engagement with them.

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