

**Date: 07-31-2022**

## **Digital and Non-Digital Distractions for IT Professionals' Remote Work**

**Makoto Nakayama**

*DePaul University, mnakayama@cdm.depaul.edu*

**Charlie Chen**

*Appalachian State University, chench@appstate.edu*

**Yoris A. Au**

*Georgia Southern University, yau@georgiasouthern.edu*

### **Abstract**

The pandemic has forced many firms to adopt remote work practices. However, recent surveys show that remote work productivity is mixed. Primary negative factors against productivity are digital and non-digital distractions at home. Considering that IT professionals heavily rely on digital devices, how is their remote work productivity affected by digital and non-digital distractions? The survey data from 60 IT professionals shows that IT professionals' productivity is not significantly affected by digital distractions compared to those in their office work. On the other hand, non-digital distractions at home lower their productivity. However, their work/life goal commitment counters distractions at home. Implications and future research agendas are discussed.

**Keywords:** Digital distraction, non-digital distraction, remote work, work performance, distraction-conflict theory, self-determination theory, goal commitment

DOI: 10.17705/3jmwa.000076

Copyright © 2022 by Makoto Nakayama, Charlie Chen, and Yoris A. Yu

## **1. Introduction**

The COVID-19 pandemic has dramatically increased the extent of remote work practice worldwide. According to the 2021 Upwork survey (Ozimek, 2021), nearly 60% of U.S. workers work from home, and 41% are fully remote workers. When it comes to productivity, the 2021 Owl Labs survey (Owl Labs, 2021) notes that those remote workers are as productive or more than when they work in the office. However, a 2021 study by the University of Chicago (Gibbs, Mengel, & Siemroth, 2021) reports that remote work productivity declined by 8-19%, especially among women and workers with children at home. In other words, distraction at home may hurt remote work performance.

Besides distractions at home, digital distraction is prevalent. A recent survey shows that 21% of working hours are used for entertainment, news, and social media and 40.1% of the respondents multitask with communication tools for checking email and IM, on average, every 6 minutes (MacKay, 2019). At the same time, one-third of us continue working while on vacation as digital technology use changes the way we work (Buchanan, Kelley, & Hatch, 2016). Reliance on digital devices can be a double-edged sword. They enable work by removing the constraints of office presence and work hours. At the same time, they allow access to non-work communication and online enjoyment during work – a source of unsought distractions.

How is IT professionals' productivity of remote work affected by digital and non-digital distractions? Previous studies (e.g., Bailey, Leonardi, & Barley, 2012; Hafermalz & Riemer, 2021) indicate that remote work performance generally depends on the type of work. The work of IT professionals heavily depends on accessing digital devices regardless of work locations. The study then posits that their digital distractions at work are not significantly different from those at home. However, non-digital distractions at home are a significant factor in the work performance of IT professionals at home. Furthermore, the study hypothesizes that the higher the degree of goal commitment, the higher the remote work performance of IT professionals.

To examine the hypotheses, we collected data in 2021 from alumni of an IT college who engage in remote work as IT professionals for two days or more every week. The analysis of a survey questionnaire from 60 IT professionals shows that remote work performance is positively associated with the extent of goal commitment at work and in life. In addition, the level of their digital distractions is positively associated with their mobile phone dependency but negatively so with age. While digital distractions were not a factor in their performance, those IT professionals were negatively affected by non-digital distractions at home.

The structure of the paper is as follows. We first review the extant studies on digital distraction and then present our hypotheses, followed by the research method and results. Finally, we discuss research implications and conclusions.

## **2. Literature Review**

Past studies on digital distraction are seen predominantly in educational settings. For example, the extent of digital distraction is alarming among college students as reading from screens has become increasingly commonplace, and younger generations like to multitask (Liu, 2021). Szpunar, Moulton, and Schacter (2013) reviewed studies before 2013 and summarized “the prevalence of attentional lapses and mind wandering in the classroom and during online learning” (p. 5). More recent studies include Duncan, Hoekstra, and Wilcox (2012), Dobler (2015), Hart Barnett (2017), Chen, Nath, and Tang (2020), and Huang, Zhang, Burtch, Li, and Chen (2021). Studies that focus on business and remote work settings started appearing relatively recently (e.g., Hafermalz & Riemer, 2021; Rosen & Samuel, 2015; Sciandra & Inman, 2016; Wrycza & Maślankowski, 2020).

There are four categories of findings and observations of the extant studies: (i) pervasiveness, (ii) consequences, (iii) causes and contributing factors, and (iv) solutions of digital distraction. First, the phenomenon of digital distraction is commonplace in our lives. Berthon and Pitt (2019) note, “Simply, we live in an age of digital distraction” (p. 132). A recent study by Pew Research Center shows that 85% of US adults go online at least once and that 31% say they are almost constantly online. University students used their digital devices nine times during daily classes for non-class purposes, according to a 2018/19 survey conducted by (McCoy, 2020). Chief consequences of distraction are inattention (Szpunar et al., 2013), reduced attention span (Hanin, 2021), incomplete note-taking (Flanigan & Titsworth, 2020), and poor academic performance (Duncan et al., 2012) in the school settings.

Studies noted a variety of distraction causes and contributing factors. They include distracting websites such as YouTube (Belo, Ferreira, & Telang, 2014); excessive dependence on social network sites and social games (Kwon, So, Han, & Oh, 2016); overuse of digital devices coupled with forms of anxiety that border on obsession or compulsion - FOMO (fear of missing out), FOBO (fear of being offline), and nomophobia (fear of being out of mobile phone contact) (Rosen & Samuel, 2015); anxiety, escapism, and distraction by others' cyberslacking (Taneja, Fiore, & Fischer, 2015); attentional impulsiveness, internet addiction, and habitual technology use (Chen et al., 2020); habitual digital device use (Sciandra & Inman, 2016); and digital device dependence and even mere presence of the digital device (Hanin, 2021). Among college students, the top four sources of digital distractions are constant social networking, instant messages, alerts, and email temptation (Liu, 2021).

Regarding solutions to minimize distractions, Rosen and Samuel (2015) proposed the strategic use of digital tools by systematically turning away from the information stream that digital devices give us. Although multitasking is commonly seen as a way to improve efficiency, people multitasking frequently perform poorly in organizing thoughts and screening irrelevant information (Agrawal, Sahana, & De', 2017). Thus, Agrawal et al. (2017) recommend stopping to multitask, turning off notifications, and limiting visits to time-inducing websites. Other suggestions include time pressure to accomplish tasks (Wu & Xie, 2018), mindfulness as remembering and returning to activities and tasks at hand (Berthon & Pitt, 2019), and not using digital devices (Aaron & Lipton, 2018). Biedermann, Schneider, and Drachsler (2021) examined the outcomes of 16 publications on 28 digital self-control interventions – for instance, apps and browser extensions to block certain apps and websites, and to enhance self-awareness of distraction through visualizing device usage statistics. The effectiveness of those digital self-control interventions is limited if they solely rely on self-awareness of distraction.

While most extant studies do not offer a theoretical framework, Nicholson, Parboteeah, Nicholson, and Valacich (2005) applied the distraction-conflict theory (Baron, 1986), which focused on the impact of others' presence as a source of arousal. However, whether the distraction-conflict theory is applicable or not remains to be seen, given the theory was proposed well before the digital era.

This study examines the applicability of the distraction-conflict theory in the context of digital distraction. However, this theory does not address the factors for bringing in a source of arousal, one of which is digital device use. Then, we apply a psychological theory that can explain the motivations that remote workers allow themselves to be distracted by digital and non-digital distraction sources.

### **3. Hypotheses**

This paper focuses on the impact of digital distraction in the context of remote work. We define digital distraction as unintended, unplanned, or undesired interruption of work at hand through digital device uses.

Today's global, distributed IT development environment routinely demands IT professionals to engage in work outside of both their office space and the usual 9-5 work hours. Thus, digital distractions are deemed not significantly different between work and home for IT professionals. However, non-digital distractions may pose a challenge for them. The counterforce to those distractions is their commitment to achieving goals. The self-determination theory (Ryan & Deci, 2000; Ryan, Deci, Vansteenkiste, & Soenens, 2021) posits three psychological needs – autonomy, competence, and relatedness – play roles in one's psychological well-being and autonomous motivation. Remote workers need to feel in charge of their professional activities (autonomy), advance their professional knowledge and skills (competency), and experience the sense of being connected to colleagues (relatedness). Thus, we posit the level of one's goal commitment increases remote work performance. Work-life balance is often considered a personal issue (Emslie & Hunt, 2009). However, the absence of work-life balance or conflict can often cause poor job performance (Yasbek, 2004), decreased employee satisfaction, and organizational commitment (Talukder, 2019). Therefore, it is imperative to investigate employees' work performance by simultaneously considering their personal life and work factors. The global pandemic is reshaping the work-life balance issues because many employees need to work from home remotely. The dramatic changes create urgent business continuity and work-life balance challenges. Many companies now need to manage the remote work performance of employees by developing a remote-friendly working environment, digital working norms, new work-life balance policies, and productive collaboration systems (Gigauri, 2020).

With working environmental shifts, employees have more flexibility and time to value their personal life as much as their job performance. For instance, many employees can now manage the immediate duties of the family (e.g., chatting with children, cycling outdoors, eating, and helping with homework) during the family's Golden Hours (12:30-13:00) on working days (Leanai, 2022). Work-life balance is highly related to an employee's psychological well-being and overall sense of harmony in life (Clark, 2000). People with high work/life goal commitment are committed to fulfilling their duties in family and workplace roles and

related goals. With the time saved for commuting and the advantage of attending to the immediate needs of family members, IT workers who have goal commitment in work and life are more likely to be motivated to complete tasks efficiently and productivity at home. Thus, we propose:

*H1: Remote work performance of IT workers is positively associated with the extent of goal commitment in work and life.*

Some organizations are open to employees working from home because they believe their employees are more productive and communicative when working from their comfort space/home zone. Other organizations consider that employees working from home may get distracted and become less productive. Although IT workers' remote work performance may vary among individuals, digital distraction could impact remote work performance differently. Digital distraction refers to the situation where people are distracted by a digital technology device, such as a smartphone, laptop, game console, while engaging in a primary task domain (e.g., completing a job-related task and homework before the deadline). When IT workers constantly attend to non-work urgency needs (e.g., text messaging, emailing, web surfing, social media, and playing games), their remote work performance could be negatively affected.

Many studies have shown the negative correlation between digital distraction and employee performance, productivity (Chen et al., 2020), self-regulation, and work engagement (Orhan, Castellano, Khelladi, Marinelli, & Monge, 2021). IT workers could experience more frequent digital distractions when working at home because it is easier for them to switch between job-related and non-job-related tasks constantly. Humans cannot multitask because their average screen time focus is 47 seconds (Kundal, 2020). IT workers need to perform multiple tasks on multiple devices constantly. As such, they are more likely to have a higher chance of digital distraction, causing them a higher cognitive workload, making more mistakes, and having decreased job performance. Thus, we propose:

*H2: Non-digital distraction at home negatively impacts IT workers' remote work performance to the extent they have non-work urgency needs.*

Millennials, now the largest generation in the workforce, have extensively used Internet technologies for non-work-related reasons while at work (Kim, 2018). Such cyberloafing activities are prevalent in the workplace because the boundary between work and non-work is becoming blurring with the prevalence of Internet technology (Lim & Teo, 2005). It is common for companies to implement Internet monitoring tools so that employees will not be distracted from streaming videos and non-work-related websites. Many studies have shown that these distracting activities are still prevalent in many workplaces despite these efforts. For instance, a study shows that employees spend an average of 2.09 hours out of 8 hours of workday surfing non-work-related sites (Martin, Brock, Buckley, & Ketchen Jr, 2010). Internet distractions have resulted in poor job performance, low morale, and resentment of the monitored employees.

Many IT employees are working remotely. Companies are utilizing alternative Internet monitoring tools to achieve the same purpose. For instance, some companies have implemented monitoring software on the company computer to track email activities (Kalantari, Put, & Decker, 2021) and productivity. Other companies leveraged project management apps to track the task completion rate and workload (B. Wang, Liu, Qian, & Parker, 2021). The alternative PM software can further provide social support and increase job autonomy. Although it may seem harder for companies to implement the same Internet monitoring tools in the workplace, this alternative monitoring software designed for remote work could be as effective as those traditional monitoring tools. Therefore, it is unlikely that remote work performance of IT workers could be affected more by cyberloafing activities than those workers at the workplace. Thus, we propose:

*H3: Digital distraction at home watching online videos and browsing non-work-related websites does not affect the remote work performance of IT workers compared to the same digital distraction at work.*

When users depend on smartphones, they often exhibit one or many of these symptoms: (1) excessive use in numerous calls and messages, (2) interference with daily routine activities, (3) a gradual increase in use to obtain the same satisfaction level, (4) need to upgrade the old functioning phone to a new model of phone, and (5) the increase of social anxiety without phone use is prohibited (Choliz, 2012). When people become dependent on smartphones, they often experience more distractions and interruptions in work life. Consequently, smartphone overuse can result in a loss of productivity for people (Duke & Montag, 2017). Digital nomads who do not have high levels of discipline and self-discipline can easily fall into the trap of smartphone dependence. As a result, distractions from non-work activities could become problematic when it starts interfering the time and attention the digital nomads need to spend on their work-related activities. Therefore, the higher the mobile phone dependency, the greater extent of digital distraction IT workers will experience when working remotely. In addition, the younger the remote workers, the more likely they depend on mobile phones, and consequently, they are distracted from their work. Thus, we propose:

H4: The extent of IT workers’ mobile phone dependency influences digital distraction at home.

While mobile phone dependence can be seen in any age group, a recent survey (Pew Research Center, 2021) shows that younger adults (18-29) rely on smartphones more than other adult age groups. Many studies have discovered this issue in people of younger age groups, including children (Park & Chung, 2015), college students (Hao et al., 2019), and adolescents (Rovithis et al., 2021). Indeed, the medical literature reports mobile phone addiction among adolescents and young adults (Choliz, 2012; Ozkan & Solmaz, 2015; Subramani Parasuraman, Yee, Chuon, & Ren, 2017). Therefore, we posit:

H5: The younger the IT worker, the more digital distraction is seen at home.

Our conceptual model is as follows.

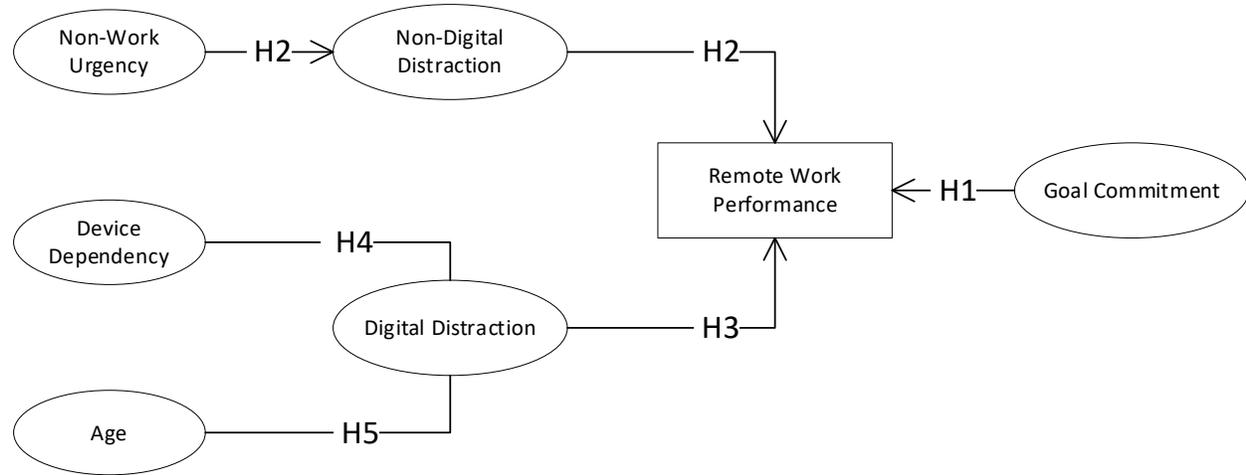


Figure 1. Conceptual Model

#### 4. Method

We collected data in 2021 with a survey questionnaire to alumni of a mid-western university who took a graduate systems development course between 2011 and 2018. We contacted 691 alumni and asked them to participate in the survey with a \$3 Amazon.com gift card if they lived and worked full-time in the US and worked remotely at least two days/week in the past three months. We had 87 valid returns (an effective response rate of 12.6%). This study used the data from 60 of those whose work was IT, given the nature of remote work varies by work type (Hafermalz & Riemer, 2021).

Each variable was assessed with the 7-point Likert scale (1 - strongly disagree, and 7 - strongly agree). Remote Work Performance (RWP) was evaluated with the question, “I am as productive at home, compared to working at the office,” adapted from Y. Wang and Haggerty (2011). The constructs for Digital Distraction (DD) and Non-Digital Distraction (NDD) were adapted from Chen et al. (2020). DD was measured by the question form, “While working, I stop the task and [distraction source] more than I do at my office,” where the distraction sources were “read/write private email/text messages,” “visit social network sites,” and “view online videos (e.g., YouTube) and non-work-related website sites.” NDD used the question form, “While working at home, I [distraction source]” where the distraction sources are “frequently stop working and attend to my family/pet/household matters,” “take a break more often than I would at my office,” and “frequently do chores setting aside the work tasks I am having.” Device Dependency (DEP) was assessed with the question form, “I feel uncomfortable unless I have access to [device type] all the time,” where the device types were “mobile phone” and “PC/Mac/notebook/tablet device.” Those survey questions are shown in Appendix A.

We compared the first and second halves of DD, NDD, DEP, and RWP data items to test the sampling bias. We used the Kruskal-Wallis test with 10,000 Monte Carlo simulation samples. The results show that those measurement items’ first and second halves are not significantly different.

The profile of the survey respondents is summarized in Table 1 below.

**Table 1. Respondent Profile**

Gender	Age	Remote Work Frequency
male (60.0%)	20-29 (15.0%)	2-3 days/week (10.0%)
female (38.3%)	30-39 (55.0%)	4-5 days/week (60.0%)
other (1.7%)	40-49 (23.3%)	6-7 days/week (30.0%)
	50 or above (6.7%)	

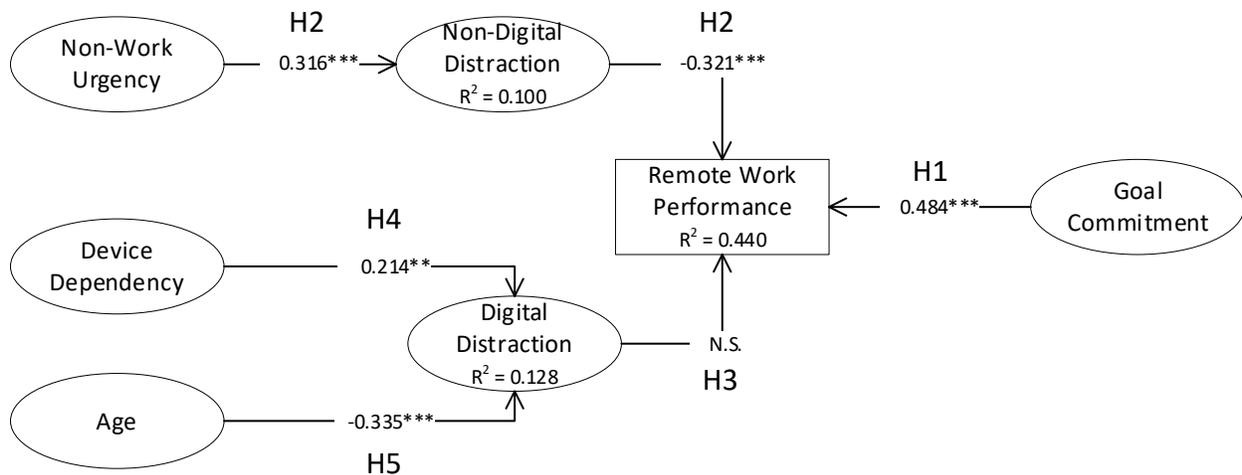
**5. Results**

We chose SmartPLS 3 (Ringle, Wende, & Becker, 2015) for statistical analysis. The variables for distractions, device dependency, and non-work urgency are formative since each of them depends on different distraction sources, devices, and urgency reasons, respectively. There was only one statistically significant measurement item for each of those variables, however; those statistically significant measurement items are “view online videos (e.g., YouTube) and non-work-related website sites” for digital distraction (DD), “frequently stop working and attend to my family/pet/household matters” for non-digital distraction (NDD), and “mobile phone” for device dependency (DEP). As a reference, the model has the standardized root mean square residual (SRMR) of 0.00 and the Bentler-Bonett index or normed fit index (NFI) of 1.00 (Henseler, Hubona, & Ray, 2016). The correlations among the variables are shown in Table 2. The results of the PLS analysis are given in Figure 2.

**Table 2. Variable Correlations**

	Age	DEP	DD	NDD	NWUN	RWP	GCM
Age	1						
Device Dependency (DEP)	0.211	1					
Digital Distraction (DD)	-0.290	0.143	1				
Non-Work Distraction (NDD)	-0.142	-0.198	0.299	1			
Non-Work Urgency Needs (NWUN)	-0.192	-0.109	0.178	0.316	1		
Remote Work Performance (RWP)	0.219	-0.136	-0.337	-0.403	-0.123	1	
Goal Commitment (GCM)	0.158	-0.140	-0.189	-0.076	0.002	0.537	1

Construct reliability indicators such as Cronbach alpha and average variance extracted (AVE) were 1.00 since there was only one statistically significant measurement item for each variable.



Path-significance: \* ( $\alpha = .10$ ), \*\* ( $\alpha = .05$ ), \*\*\* ( $\alpha = .01$ ), n.s. (not significant)

**Figure 2. PLS Results**

The PLS results affirm all the hypotheses. **H1** (goal commitment positively impacting remote work performance of IT workers) is supported ( $\beta=0.484$ ,  $p=0.000$ ). This aligns well with the self-determination theory; the more commitment in life and work one has, the higher one's remote work performance. As expected, **H2** (non-digital distraction at home negatively impacting remote work performance) was also supported ( $\beta=-0.321$ ,  $p=0.000$ ). To the degree the remote workers felt non-work urgency needs, they were distracted by family matters, and then their work performance decreased. **H3** (digital distraction not affecting remote work performance) was affirmed since digital distraction was found non-significant. Finally, the results validate both **H4** (digital distraction depending on mobile phone dependency) with  $\beta=0.214$  and  $p=0.045$  and **H5** (the younger the remote worker, the more digital distraction) with  $\beta=-0.335$  and  $p=0.003$ . They confirm the implications of the previous studies' findings, as we discussed in the hypotheses section.

In addition, we compared the differences in digital and non-digital distraction between IT and non-IT workers and between male and female workers. The Mann-Whitney tests show that their differences were not significant concerning "view online videos (e.g., YouTube) and non-work-related website sites" for digital distraction (DD) and "frequently stop working and attend to my family/pet/household matters" for non-digital distraction (NDD). Thus, there were no significant differences in digital and non-digital distraction between genders and between IT and non-IT workers.

## 6. Implications

### 6.1. Theoretical implications

This study builds on distraction-conflict, self-determination, and work-life balance theories and expands them to the IS literature in six significant aspects. First, theoretical understanding of digital distraction and its specific impact on information systems workers remains limited (Chen et al., 2020). This study mainly focuses on the impact of digital distraction on the remote work performance of IT workers. All subjects who participated in this study were IT workers. Second, this study aims to understand how IT workers attempt to achieve the life-work balance when working from home. This study further divides remote work distractions into digital and non-digital distractions to provide insights into the issue. This classification enables us to compare their relative influence on remote work performance. Our study shows that non-digital distraction poses a more significant influence than a digital distraction on the remote job performance of IT workers at home. The current research on job distraction remains largely on general digital distraction. Our study offers a comparative view to enrich the current IS literature on digital vs. non-digital distraction. Third, the study confirms the central finding of the distraction conflict theory of social facilitation that the negative impact of the conflict between giving attention to a person and giving attention to a task can significantly impact job performance (Baron, 1986). It is not the presence of digital devices but the attentional conflict that can negatively affect IT workers' job performance (Sanders, 1981). Fourth, our research contributes to the literature by studying specifically IT professionals who work remotely. Our finding supports the hypothesis that digital distraction does not increase or reduce work performance at home relative to the office due to IT workers' more abundant access to digital devices regardless of their work location. Fifth, life/career goal commitment plays a determinative role in remote work performance. This finding confirms the importance of autonomy and competence as the motivators for high-quality forms of engagement. Our study further expands this finding of self-determination theory to the remote job engagement and performance of IT workers. Sixth, the higher degree of device dependence, the higher degree of digital distraction IT workers will experience. In the meantime, the younger the IT workers, the more likely they are to be distracted when working remotely. These two findings offer additional insights into extraneous and demographical factors affecting the digital distraction of IT workers.

### 6.2. Managerial implications

Our findings have important implications for IT workers and companies allowing them to work remotely. Companies that chose not to offer remote work options are experiencing higher turnover rates for skilled IT workers. In contrast, companies that embrace remote work options can better respond to the changing demands of their workforce, especially millennials and Gen Z (Robinson, 2022a). However, these companies are afraid that employee productivity and performance could be severely affected by digital and non-digital distractions when working from home. Although anecdotal, some employers claimed that projects took longer to complete with remote work, and problems that would generally take an hour to solve in the office now require a day or longer (Cutter, 2020). To a certain extent, this issue can be attributed to the non-digital distraction at home, which our study has uncovered to have a negative effect on remote work performance. This implies that workers need to take extra care in ensuring that they protect their work time by not allowing household or family matters to interfere with their work despite them being physically at home during work hours.

Our research model provides practitioners with a holistic perspective of digital vs. non-digital distraction to IT employees working at home. Non-digital distraction appears to have a detrimental effect on decreasing remote work performance. IT workers are less susceptible to the negative influence of digital distraction at home as they are used to the similar influence even working in the office. Companies adopting remote work practices can provide mini-seminar or training sessions to educate their remote IT workforce on protecting themselves from impromptu non-digital distractions, such as impromptu visits from friends, children, pets, or family. One major challenge for remote workers is background noise in their home environment (Logitech, 2022). Achieving a better work-life balance should not be at the expense of decreased remote work performance. Companies should take a proactive approach to help their remote IT workers avoid unnecessary non-digital distraction.

Reduced operating and office space costs are two significant benefits to companies advocating remote work practices (Lund, Madgavkar, Manyika, & Smit, 2020). Remote work can also be as effective as onsite work. However, this does not mean that IT workers are no longer necessary to never come to the office and meet the team for team projects requiring more interpersonal communication. Face-to-face (F2F) or collocation meeting in the same room enables osmotic communication where team members can hear conversations in the background and join in as necessary. Collocation effectively provides positive team support, improves team communication (Eccles, Smith, Tanner, Van Belle, & Van der Watt, 2010), and enables more efficient team autonomy (Hildenbrand, Geisser, Kude, Bruch, & Acker, 2008). For instance, successful project management relies on the F2F kickoff meeting, where the project team, project sponsors, and related stakeholders get together to establish common goals and the project's purpose. Conducting F2F meetings at some important events (e.g., milestones, project kickoff) throughout a project can further improve the degree of social interactions and job goal commitment (Kotlarsky & Oshri, 2005), thereby enhancing the job performance of remote workers. Thus, companies should try to optimize the design of hybrid work options to improve the project goal commitments of their IT workers. Furthermore, as discussed in the extant literature and revealed in this study, a strong goal commitment will counteract the negative impact on remote work performance, although this does not necessarily discount the need for workers to fend off all the unnecessary non-digital distractions.

IT employees are knowledge workers. A study shows that 60% of knowledge workers have switched to working from home during the global pandemic (Forrester Consulting, 2022). Even after the pandemic, most IT workers will continue to work from home in some capacity. The landscape shift signals the growing changes in business attitudes toward remote work. One key factor discouraging companies and their IT workers from embracing remote work is a potential distraction in their home working environment. This study provides a fresh perspective on dividing distraction into digital and non-digital distraction and provides empirical evidence on their impact on the remote work performance of IT workers.

## **7. Limitations and Future Research Agenda**

There are several limitations of this study. First, we focused on IT professionals in general. Since digital distraction depends on the types of work, future studies should investigate the impact of digital and non-digital distractions among, for instance, IT and non-IT professionals virtually "facing" clients such as remote relationship managers and tele-nurses (Hafermalz & Riemer, 2021) and professionals working under team-oriented vs. non-human-object-oriented work contexts (Bailey, Leonardi, & Barley, 2012). Second, the data were collected from graduates of IT-related master's programs in the Midwest of the US. Future studies should collect more data from professionals with different educational backgrounds in other regions or countries. Third, the study is based on the self-perception of remote workers' work performance. Future studies can use the objective measurements of work performance or the perspective of the supervisors of remote workers.

Remote work is expected to stay and will likely increase in the near future (Robinson, 2022b). As the results show the significant impact of non-digital distractions, future research should look into remote workers' family circumstances and work/life-style values. For example, assessing the research model based on children's ages at home and workers' work-life balance would be intriguing. Then, the question we should ask is perhaps not how to avoid inevitable non-digital "distractions" (e.g., care of sick infants, family emergencies) but how to cope with those "distractions" and yet to keep performing the professional tasks in the family environment. Similarly, might those who strongly desire promotions and leadership opportunities not be easily sidetracked by non-digital distractions?

## **8. Conclusion**

How is IT professionals' productivity in remote work affected by digital and non-digital distractions? The results show that they are negatively affected by non-digital distractions but not by digital distractions. In addition, the level of their commitment to goals in work and life is positively impacting remote work performance. That is, the professional aspiration of IT workers can

keep their focus on the tasks at hand - the finding consistent with the distraction conflict theory where the negative impact of the conflict between giving attention to a person and giving attention to a task can significantly impact job performance. As remote work appears to stay in the next few years, achieving a better work-life balance should not be at the expense of poor remote work performance. Managers of IT remote workers should communicate proactively with their remote IT workers and make them aware of their non-digital distractions. Finally, it should be reminded that the study finds the influence of digital distractions non-significant in relation to those at the office of IT workers. That is, the results do not tell us that digital distractions among IT professionals do not exist. Rather, we should accept the fact that there are distractions but that the spirit of professionalism can counterbalance those distractions.

## 9. References

- Aaron, L. S., & Lipton, T. (2018). Digital distraction: Shedding light on the 21st-century college classroom. In *Journal of Educational Technology Systems* (Vol. 46, pp. 363-378): SAGE Publications Sage CA: Los Angeles, CA.
- Agrawal, P., Sahana, H. S., & De', R. (2017). Digital distraction. *Proceedings of the 10th International Conference on Theory and Practice of Electronic Governance*.
- Bailey, D. E., Leonardi, P. M., & Barley, S. R. (2012). The lure of the virtual. *Organization science*, 23(5), 1485-1504.
- Baron, R. S. (1986). Distraction-Conflict Theory: Progress and Problems. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 1-40): Academic Press.
- Belo, R., Ferreira, P., & Telang, R. (2014). Broadband in school: Impact on student performance. *Management Science*, 60(2), 265-282.
- Berthon, P. R., & Pitt, L. F. (2019). Types of mindfulness in an age of digital distraction. In *Business Horizons* (Vol. 62, pp. 131-137): Elsevier.
- Biedermann, D., Schneider, J., & Drachler, H. (2021). Digital self-control interventions for distracting media multitasking - A systematic review. *Journal of Computer Assisted Learning*, 37(5), 1217-1231.
- Buchanan, J., Kelley, B., & Hatch, A. (2016). Digital workplace and culture.
- Chen, L., Nath, R., & Tang, Z. (2020). Understanding the determinants of digital distraction: An automatic thinking behavior perspective. *Computers in Human Behavior*, 104, 106195.
- Choliz, M. (2012). Mobile-phone addiction in adolescence: the test of mobile phone dependence (TMD). *Progress in health sciences*, 2(1), 33-44.
- Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human relations*, 53(6), 747-770.
- Cutter, C. (2020). Companies Start to Think Remote Work Isn't So Great After All. *Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/companies-start-to-think-remote-work-isnt-so-great-after-all-11595603397>
- Dobler, E. (2015). E-textbooks: A personalized learning experience or a digital distraction? In *Journal of adolescent & adult literacy* (Vol. 58, pp. 482-491): Wiley Online Library.
- Duke, É., & Montag, C. (2017). Smartphone addiction, daily interruptions and self-reported productivity. *Addictive behaviors reports*, 6, 90-95.
- Duncan, D., Hoekstra, A., & Wilcox, B. (2012). Digital devices, distraction, and student performance: Does in-class cell phone use reduce learning? In *Astronomy education review*.
- Eccles, M., Smith, J., Tanner, M., Van Belle, J.-P., & Van der Watt, S. (2010). Collocation impact on team effectiveness. *South African Computer Journal*, 2010(46), 3-13.

- Emslie, C., & Hunt, K. (2009). 'Live to work' or 'work to live'? A qualitative study of gender and work-life balance among men and women in mid-life. *Gender, Work & Organization*, 16(1), 151-172.
- Flanigan, A. E., & Titsworth, S. (2020). The impact of digital distraction on lecture note taking and student learning. In *Instructional Science* (Vol. 48, pp. 495-524): Springer.
- Forrester Consulting. (2022). Optimize Your Hybrid Workforce with Flexible Work-From-Home Policies and Monitors. Retrieved from <https://www.delltechnologies.com/asset/en-us/products/electronics-and-accessories/industry-market/dell-monitors-wfh-forrester-spotlight.pdf>
- Gibbs, M., Mengel, F., & Siemroth, C. (2021). Work from Home & Productivity: Evidence from Personnel & Analytics Data on IT Professionals. Retrieved from [https://bfi.uchicago.edu/wp-content/uploads/2021/05/BFI\\_WP\\_2021-56.pdf](https://bfi.uchicago.edu/wp-content/uploads/2021/05/BFI_WP_2021-56.pdf)
- Gigauri, I. (2020). Effects of Covid-19 on Human Resource Management from the Perspective of Digitalization and Work-life-balance. *International Journal of Innovative Technologies in Economy*(4 (31)).
- Hafermalz, E., & Riemer, K. (2021). Productive and connected while working from home: what client-facing remote workers can learn from telenurses about 'belonging through technology'. *European Journal of Information Systems*, 30(1), 89-99.
- Hanin, M. L. (2021). Theorizing Digital Distraction. *Philosophy & Technology*, 34(2), 395-406. doi:10.1007/s13347-020-00394-8
- Hao, Z., Jin, L., Li, Y., Akram, H. R., Saeed, M. F., Ma, J., . . . Huang, J. (2019). Alexithymia and mobile phone addiction in Chinese undergraduate students: The roles of mobile phone use patterns. *Computers in Human Behavior*, 97, 51-59.
- Hart Barnett, J. E. (2017). Helping Students with ADHD in the Age of Digital Distraction. In *Physical Disabilities: Education and Related Services* (Vol. 36, pp. 1-7): ERIC.
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems*, 116(1), 2-20.
- Hildenbrand, T., Geisser, M., Kude, T., Bruch, D., & Acker, T. (2008). Agile methodologies for distributed collaborative development of enterprise applications. Paper presented at the 2008 International Conference on Complex, Intelligent and Software Intensive Systems.
- Huang, N., Zhang, J., Burtch, G., Li, X., & Chen, P. (2021). Combating Procrastination on Massive Online Open Courses via Optimal Calls to Action. In *Information Systems Research: INFORMS*.
- Kalantari, S., Put, A., & Decker, B. D. (2021). Trackers in Your Inbox: Criticizing Current Email Tracking Practices. Paper presented at the Annual Privacy Forum.
- Kim, S. (2018). Managing millennials' personal use of technology at work. *Business Horizons*, 61(2), 261-270.
- Kotlarsky, J., & Oshri, I. (2005). Social ties, knowledge sharing and successful collaboration in globally distributed system development projects. *European Journal of Information Systems*, 14(1), 37-48.
- Kundal, N. (2020). What is the impact of digital distraction on remote employees and what can you do about it? Retrieved from <https://www.1e.com/news-insights/blogs/the-impact-of-digital-distraction-on-remote-employees/>
- Kwon, H. E., So, H., Han, S. P., & Oh, W. (2016). Excessive dependence on mobile social apps: A rational addiction perspective. In *Information Systems Research* (Vol. 27, pp. 919-939): INFORMS.
- Leanai, A. R., and Oige, A.G., (2022). Balancing work and care during the Covid-19 pandemic: A review of the Department of Children and Youth Affairs 'Golden Hour' Initiative. Retrieved from <https://www.gov.ie/en/publication/06ea2-balancing-work-and-care-during-the-covid-19-pandemic-a-review-of-the-department-of-children-and-youth-affairs-golden-hour-initiative/>

- Lim, V. K., & Teo, T. S. (2005). Prevalence, perceived seriousness, justification and regulation of cyberloafing in Singapore: An exploratory study. *Information & management*, 42(8), 1081-1093.
- Liu, Z. (2021). Reading in the age of digital distraction. *Journal of Documentation*, ahead-of-print(ahead-of-print). doi:10.1108/JD-07-2021-0130
- Logitech. (2022). 5 LESSONS LEARNED FROM REMOTE WORKING DURING THE PANDEMIC. Retrieved from <https://www.logitech.com/content/dam/logitech/vc/en/pdf/ebook-5-lessons-learned-from-working-during-pandemic.pdf>
- Lund, S., Madgavkar, A., Manyika, J., & Smit, S. (2020). What's next for remote work: An analysis of 2,000 tasks, 800 jobs, and nine countries. McKinsey Global Institute, 1-13.
- MacKay, J. (2019). The State of Work Life Balance in 2019: What we learned from studying 185 million hours of working time. In *RescueTime:blog*.
- Martin, L. E., Brock, M. E., Buckley, M. R., & Ketchen Jr, D. J. (2010). Time banditry: Examining the purloining of time in organizations. *Human Resource Management Review*, 20(1), 26-34.
- McCoy, B. R. (2020). Gen Z and digital distractions in the classroom: Student classroom use of digital devices for non-class related purposes. Retrieved from <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1118&context=journalismfacpub>
- Nicholson, D. B., Parboteeah, D. V., Nicholson, J. A., & Valacich, J. S. (2005). Using Distraction-Conflict Theory to Measure the Effects of Distractions on Individual Task Performance in a Wireless Mobile Environment. *Proceedings of the 38th Annual Hawaii International Conference on System Sciences*.
- Orhan, M. A., Castellano, S., Khelladi, I., Marinelli, L., & Monge, F. (2021). Technology distraction at work. Impacts on self-regulation and work engagement. *Journal of Business Research*, 126, 341-349.
- Owl Labs. (2021). state of remote work 2021. Retrieved from <https://owllabs.com/state-of-remote-work/2021/>
- Ozimek, A. (2021). How Remote Work is Changing Businesses Forever. Retrieved from <https://www.upwork.com/research/future-workforce-report>
- Ozkan, M., & Solmaz, B. (2015). Mobile addiction of generation z and its effects on their social lifes:(An application among university students in the 18-23 age group). *Procedia-Social and Behavioral Sciences*, 205, 92-98.
- Park, J.-A., & Chung, J.-N. (2015). A study on the effects of self-control and social support on the mobile phone dependence in elementary school students. *Korean Journal of Human Ecology*, 24(6), 769-781.
- Pew Research Center. (2021). Mobile Fact Sheet. Retrieved from <https://www.pewresearch.org/internet/fact-sheet/mobile/>
- Ringle, C. M., Wende, S., & Becker, J.-M. (2015). SmartPLS 3. In Boenningstedt: SmartPLS GmbH, <http://www.smartpls.com>. Boenningstedt: SmartPLS GmbH.
- Robinson, B. (2022a, March 4, 2022). 5 Steps to Manage Remote Staff and Ensure Company Success. *Forbes*. Retrieved from <https://www.forbes.com/sites/bryanrobinson/2022/03/04/5-steps-to-manage-remote-staff-and-ensure-company-success/>
- Robinson, B. (2022b). Remote Work Is Here to Stay and Will Increase Into 2023, Experts Say, 2022(March 12). Retrieved from <https://www.forbes.com/sites/bryanrobinson/2022/02/01/remote-work-is-here-to-stay-and-will-increase-into-2023-experts-say>
- Rosen, L., & Samuel, A. (2015). Conquering digital distraction. In *Harvard business review* (Vol. 93, pp. 110-113).
- Rovithis, M., Koukouli, S., Fouskis, A., Giannakaki, I., Giakoumaki, K., Linardakis, M., . . . Stavropoulou, A. (2021). Empathy and Mobile Phone Dependence in Nursing: A Cross-Sectional Study in a Public Hospital of the Island of Crete,

Greece. Paper presented at the Healthcare.

- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, 55(1), 68-78.
- Ryan, R. M., Deci, E. L., Vansteenkiste, M., & Soenens, B. (2021). Building a science of motivated persons: Self-determination theory's empirical approach to human experience and the regulation of behavior. *Motivation Science*, 7(2), 97-110.
- Sciandra, M., & Inman, J. (2016). Digital distraction: consumer mobile device use and decision making. In Available at SSRN 2439202.
- Subramani Parasuraman, A. T. S., Yee, S. W. K., Chuon, B. L. C., & Ren, L. Y. (2017). Smartphone usage and increased risk of mobile phone addiction: A concurrent study. *International journal of pharmaceutical investigation*, 7(3), 125-131.
- Szpunar, K. K., Moulton, S. T., & Schacter, D. L. (2013). Mind wandering and education: from the classroom to online learning. In *Frontiers in psychology* (Vol. 4, pp. 495): Frontiers.
- Talukder, A. M. H. (2019). Supervisor support and organizational commitment: the role of work-family conflict, job satisfaction, and work-life balance. *Journal of Employment Counseling*, 56(3), 98-116.
- Taneja, A., Fiore, V., & Fischer, B. (2015). Cyber-slacking in the classroom: Potential for digital distraction in the new age. In *Computers & Education* (Vol. 82, pp. 141-151): Elsevier.
- Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied psychology*, 70(1), 16-59.
- Wang, Y., & Haggerty, N. (2011). Individual virtual competence and its influence on work outcomes. In *Journal of Management Information Systems* (Vol. 27, pp. 299-334): Taylor & Francis.
- Wrycza, S., & Maślankowski, J. (2020). Social media users' opinions on remote work during the COVID-19 pandemic. Thematic and sentiment analysis. *Information Systems Management*, 37(4), 288-297.
- Wu, J.-Y., & Xie, C. (2018). Using time pressure and note-taking to prevent digital distraction behavior and enhance online search performance: Perspectives from the load theory of attention and cognitive control. In *Computers in Human Behavior* (Vol. 88, pp. 244-254): Elsevier.
- Yasbek, P. (2004). The business case for firm-level work-life balance policies: a review of the literature. Wellington, UK: Department of Labour (January).

## **Appendix A. Survey Questions**

Each variable was assessed with the 7-point Likert scale (1 - strongly disagree, and 7 - strongly agree).

### **Work Digital Distraction at Home (WDDH)**

- While working at home, I stop the task and read/write private email/text messages more than I do at my office.
- While working, I stop the task and visit social network sites more than I do at my office.
- While working, I stop the task and view online videos (e.g., YouTube) and non-work-related website sites more than I do at my office.

### **Non-Digital Distraction at Home (NDDH)**

- While working at home, I frequently stop working and attend to my family/pet/household matters.
- While working at home, I take a break more often than I would at my office.
- While working at home, I frequently do chores setting aside the work tasks I am having.

### **Remote Work Performance (RWP)**

- I complete tasks as efficiently at home, compared to working at the office.
- I am as productive at home, compared to working at the office.
- The quality of my task outcomes at home is as high as that at the office.

### **Device Dependency (DD)**

- I feel uncomfortable unless I have access to my mobile phone all the time.
- I feel uncomfortable unless I have access to my PC/Mac/notebook/tablet device all the time.

### **Non-Work Urgency Needs (NWUN)**

- I have non-work matters that constantly require my attention.

## Author Biographies



**Makoto Nakayama** is a professor of information systems in the Jarvis College of Computing and Digital Media at DePaul University. He holds a Ph.D. from University of California, Los Angeles and an MBA from University of Texas at Austin. His research interests include online consumer behaviors, text analyses on online consumer reviews, and business intelligence. His papers appeared in *Information & Management*, *Journal of Information Technology*, *Electronic Markets*, *Journal of Electronic Commerce in Organizations*, and proceedings of international conferences.



**Charlie Chen** is a professor of computer information systems at Appalachian State University. He received his Ph.D. in MIS at Claremont Graduate University. He loves doing research topics related to business analytics, project management, and supply chain management. His work has appeared in *Decision Support Systems*, *International Journal of Project Management*, *IEEE Transactions on Engineering Management*, *Behaviour and Information Technology*, *Communications of Association for Information Systems*, and *Journal of Global Information Technology Management*. Dr. Chen dedicates himself to being a transnational scholar and is a trip leader for study abroad programs in China, Japan, Spain, Thailand, and Taiwan.



**Yoris A. Au** is chair and associate professor of the Department of Enterprise Systems and Analytics at Parker College of Business, Georgia Southern University. He holds a Ph.D. in business administration with a concentration in information and decision sciences from the University of Minnesota. His research has been published in journals including *Journal of Management Information Systems*, *Information and Management*, and *Communications of the AIS*. He serves as a senior editor for *Electronic Commerce Research and Applications*.