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The Sustainability of Enterprise Mobility in Pandemic – Do Usage Location, Device Type and Device Ownership Matter?

Research-in-progress

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Abstract

With the trend of consumerization of IT and technology advancement, enterprise mobility or corporate mobile IT is becoming a necessity for companies to stay competitive and agile. This is especially the case during Covid-19 pandemic period, where employees usually have no choice but to use either their own mobile devices or devices provided by the company to complete daily tasks anytime and anywhere convenient for them. This study explores the effects of usage location (e.g., home/office), device type (e.g. smartphones, tablets, laptops) and device ownership (personal owned/company owned) on productivity and work-to-life conflict. A pilot test was conducted with 114 working employees, and a three-way MANOVA test was used to assess the effects. The results showed that there are significant differences in ownership and device in terms of their effects on work-to-life conflict and productivity; location, however, does not have the same effect on the two dependent variables.

Keywords Enterprise mobility, Pandemic, Productivity, Work-to-life conflict

1 Introduction

Enterprise mobility market has evolved considerably over recent years, and is expected to reach 2.2 billion USD by 2022 (ComputerWeekly 2017). Enterprise mobility is the deployment of mobile devices of all kinds, such as smart phones and tablets as well as related IT staff, infrastructure, network and applications by a company to better engage with customer, and drive productivity for internal business processes and employees (Patel 2014). The ubiquitous information technologies at work promoted various mobile IT policies like BYOD (Bring Your Own Device), CYOD (Choose Your Own Device), and COPE (Corporate Owned Personally Enabled), etc. (Hein 2019). These policies are implemented with an aim to guarantee employees to work with no constraints in terms of time, location, or the type of mobile devices used. The flexibility and efficiency through enterprise mobility can offer benefits such as increased productivity and decreased corporate cost, at the same time also bring challenges such as data security and privacy.

Though enterprise mobility has been a popular term in practice, little empirical research was done in IS literature to fully understand the phenomenon. The main stream of the extant literature focuses on enterprise mobility concepts (Barnes 2003), strategies (Basole 2007; Yucel 2017) and solutions (Patel 2014). Enterprise mobility is closely related to consumerization of IT and BYOD. In the BYOD literature, researchers also addressed management issues (e.g., Chen, et al. 2020), security risks (e.g., Palanisamy, et al. 2020), and intention to adopt BYOD (e.g., Weeger, et al. 2020). There are also researchers empirically investigated the consequences of consumerization of IT or BYOD on work related outcomes. For example, Niehaves et al. (2012) used case studies to reveal the relationship between IT consumerization and stress, motivation, and performance. Doargajudhur and Dell (2020) employed survey approach to explore the consequences of BYOD on work related outcomes. In their study, they called for future research to investigate the impact of BYOD on work-life balance, and the impact of different enterprise mobility approaches, and device type on the work related outcomes. Though efforts have been made to study the effect of consumerization of IT and BYOD, little attention was paid to research on enterprise mobile devices use with any location, type and ownership. In view of the scarcity of extant literature and in response to the call from Doargajudhur and Dell (2020), in this study, we aim to investigate the individual effect of usage location, device type and device ownership on two important enterprise mobility outcomes-productivity (from the positive perspective) and work-to-life conflict (from the negative perspective).

Covid-19 pandemic has a significant impact on enterprise mobility. It amplified the importance of connectivity, changed the face of work, and thus accelerated an already growing remote working trend (Critchley 2020). Today, enterprise mobility solution is no longer an opt-in requirement from the company, but a necessity for enterprise to survive. Companies have to quickly establish a clear and efficient enterprise mobility strategy to maintain business continuity (Purves 2020). Specifically, companies are relying on remote working and mobile computing to enable their employees to work securely and productively from anywhere convenient for them. The purpose of enterprise mobility is to ensure the continuity of work and guarantee the productivity of employees. Meanwhile, employees are also more exposed (than ever before) to an always-on and connected working environment, which significantly increase the possibility of work-to-life conflict. In sum, we believe both productivity and work-to-life conflict are important consequences of enterprise mobility, especially during the pandemic period. Enterprise mobility allows employees to do their jobs from anywhere using a variety of devices and applications. One of the biggest issues of enterprise mobility in practice now is about “device”-“where to use these devices, which type of devices, and which mobile device approach to follow”, become central considerations of the IT managers. In this paper, we would like to address the following research questions in the context of Covid-19:

- Are there any differences between three working locations (office/home/others) in terms of their impacts on productivity and work-to-life conflict?
- Are there any differences between different types of enterprise mobility devices (e.g., smartphones, tablets, laptops) in terms of their impacts on productivity and work-to-life conflict?
- Are there any differences between two device ownership (personal-owned/company-owned) in terms of their impacts on productivity and work-to-life conflict?
- What are the causal relationships between working locations, device type, and device ownership and productivity and work-to-life conflict?

2 Prior research

2.1 Mobile device usage location

Literature in Management and sociology has discussed the mobile device usage location and their impact on work and life. Bhumika (2020) described the situation of working from home during COVID-19 lockdown period. Employees' using their personal devices to work remotely is also known as telecommuting or telework (Bloom, et al. 2015). COVID-19 lockdown has forced employees to become teleworkers. In the study, she investigated the influence of telework on work-life balance, especially emotional exhaustion. Similarly, Palumbo (2020) investigated the side effects of working from home on work-life balance for public sector employees during pandemic period. His study implied that telecommuting from home has effects on remote workers to handle the interplay between work-related commitments and daily life activities. Last, Hill et al. (2003) compared the influence of three working venues (traditional office, virtual office, and home office) on aspects of work and life. Their study was conducted in a leading high-tech company, and during non-pandemic period. Today, during the pandemic time, besides the compulsory working from home policy due to lockdown or inconvenience to work from office, there are also a certain portion of employees who still choose to work from traditional office due to the unique job nature or inability to work from home. The present study intends to understand the differences when working from different locations during pandemic.

2.2 Device type

An exact investigation of mobile device type in the literature is rare. Sammer et al. (2013) is among the few studies that differentiated the first generation of enterprise mobility devices and the second generation of mobility devices. The first generation of computer devices includes traditional mobile phones (e.g., blackberry) and desktops, and the second generation is featured by more portable and intelligent devices such as smartphones, tablets, laptops and wearables. In this research, we borrowed the concept of mobile device classification from Steelman et al. (2016)'s study. The mobile devices and their corresponding functions are summarized in Table 1.

Enterprise mobility devices	Major functions
Smartphones	Connecting to organizational emails, calendars, and data access during work and home hours.
Tablets	Ease of access to documents for meetings and collaboration on the go.
Laptops	Full computing capabilities while traveling.
Desktops	Full computing power, but can be used to access organizational data safely via virtualization.
Wearables	Emergent technology for alerts, visualization and R&D for new consumer interactions.

Table 1. Mobile devices and functions (Steeleman, et al., 2016)

2.3 Device ownership

Practitioners have continuously discussed different approaches of enterprise mobility. The most common types include BYOD, CYOD, COPE, and COBO (Company Owned Business Only) (Hein 2019; Shahane 2020). While BYOD gives the largest amount of flexibility to the users, COBO has the strictest control over the usage. COBO devices are procured, provisioned, secured, and monitored by the company at all times, and for business purposes only. CYOD is similar with BYOD, but limited to a number of devices selected by the company, and COPE allows employees to use the company-owned devices for both business and personal usage. From the above description, we can simply classify the enterprise mobility approaches into two categories: personal-owned (like BYOD and CYOD) and company-owned (like COPE and COBO) devices.

Prior research has indicated that employees are more inclined to use personal-owned devices than company-owned devices. For example, Gartner Research (2016) showed that 39% of employees depend on their personal devices at workplace, whereas 10% of them were supported by organizational owned devices. The reasons to choose personal devices over company-owned devices are: more comfortable and familiar with their consumer tools, more efficient completion of tasks, more useful, powerful, fun, updated and faster (Doargajudhur and Dell 2020; Gökçe and Dogerlioglu 2019). Based on this, in the present study, we would like to investigate the differences between employees who are using personal-owned devices and those who are using company-owned devices to work during pandemic.

2.4 Productivity and work-to-life conflict

Productivity and work-to-life conflict are two important dependant variables in this research. Productivity is considered one of the major outcomes of using mobile technologies at the workplace. Niehaves et al. (2012) and Rege (2011), claimed that BYOD can increase the morale and satisfaction of employees and consequently boost their productivity. Similarly, based on conservation of resources theory, Richardson and Thompson (2012) verified that being connected to the workplace by mobile devices gives employees a sense of control and safety, therefore, they could freely arrange work schedules and increase productivity. Prior research discussed the negative effects of mobile device usage on work-to-life conflict. Based on the boundary theory, Niehaves et al. (2012) and Yun, et al. (2012) believed that mobile device usage blurred the boundaries between work and personal life, thereby creating a stressful environment for employees when they are performing their roles both at home and at work simultaneously. BYOD also engenders work-to-life conflicts due to the increased technocratic control of managers, extensification of work, as well as an overlapping between private life and work commitment (Palumbo 2020). This is especially true during pandemic period when people rely more on enterprise mobility solutions simply because of “no choice”. Under BYOD context, the two dependant variables have been frequently studied before, however, the causal relationship between device type, usage location, and ownership and the two dependant variables haven’t been tested in the general enterprise mobility literature.

To summarize, this paper is among the first to study the effect of different device use solutions of enterprise mobility on two important consequences of enterprise mobility. To our best knowledge, the study on usage location, device type and device ownership is scarce, especially during COVID-19 pandemic period, when investigating productivity and work-life balance is more paramount than ever before. Although there have been many practitioner studies on the similar subject, there is little empirical research into the phenomenon. This paper has the potential to fill in the gaps in the literature.

3 Theoretical foundation

Person-Environment fit model (P-E fit model) is the theoretical lens of the current research. The model is based on the premise that there is an equilibrium relationship between people and their environment, and when it is out of equilibrium, it results in strain (Cooper et al. 2001). The core concept of the P-E fit model is the degree to which the individual and environmental characteristics match, in terms of individual values vs. environment supplies and individual abilities vs. environment demand (Kristof-Brown et al. 2005). In the first case, values represent conscious desires held by the person and encompass preferences and interests. Back to our research, choosing usage location, device type and device ownership are the preferences of the individual employee, and when environment (e.g., company or home situation) allows him/her to work at the desired location (e.g., home) or choose the right device (e.g., personal-owned, smartphone), they will be more satisfied with the current job, and work more efficiently. On the contrary, when the environment does not provide the necessary supplies to satisfy the values of employees, stressors like work-to-life conflict may occur (Ayyagari et al. 2011). Regarding to the second occasion where individual’s abilities need to match the environment demand, if the company requests, and individual has the ability to use a certain type of mobile device (e.g., tablet owned by the company) to work, then the productivity will be automatically increased. On the other hand, if there is a misfit between ability and job demand, for example the job exceed an individual’s capability or if an individual’s capability are insufficient for the job demand, stress will occur. Many recent empirical research supported the above views (Williamson and Perumal, 2021, Lashani and Zacher, 2021). The present study does not use person-technology fit model-a specific type of P-E fit model as most previous IS researchers would do, as our research is more contextual oriented: it includes not only technology features (like device type), but also environmental situations (like home, office, personal-owned, and company-owned). Therefore, P-E fit model is the appropriate theory to support hypotheses and explain the phenomena of enterprise mobility decisions in the present study. Based on the literature discussions and P-E fit model, the relationships of the variables were demonstrated in Figure 1.

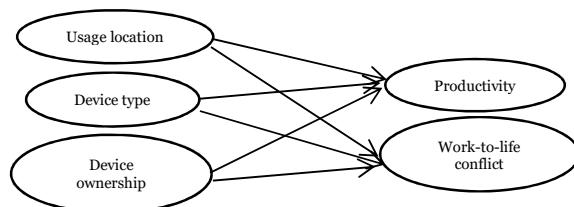


Figure 1: Research model

4 Research methods

Productivity is defined as how well an individual uses available enterprise mobility resources to contribute to organizational goals, and it is a combination of efficiency and effectiveness (Payne 2000). Work-to-life conflict is the inter-role conflict where the demands created by the job interfere with performing family-related responsibilities (Yun, et al. 2012). Measures of dependent variables are borrowed from the existing literature. Levels of independent variables were summarized in Table 2.

Categorical variables	Levels	Dependent variables
Usage location	Home Office Others	Productivity Work-to-life conflict
Device types	Smartphones Tablets Laptops Desktops Wearables	Productivity Work-to-life conflict
Device ownership	Personal-owned Company-owned	Productivity Work-to-life conflict

Table 2. MANOVA Analysis Variables

We intend to send the survey to knowledge workers who are most representable to use mobile devices for working purposes. Before the large-scale survey, the questionnaire was sent to 114 validated respondents for pilot test. A three-way MANOVA test was conducted to assess the three independent/categorical variables' influence on dependent variables. Due to the limitation of sample size, a structural equation modelling test was not able to be performed. The causality between IVs and DVs will have to be tested in the main study.

5 Preliminary findings

The data analysis results of three-way MANOVA demonstrated that there are significant differences between five types of enterprise mobility devices in terms of their impacts on productivity and work-to-life conflict (Wilks' Lambda, $p=0.033$); and there are significant differences between two device ownership approaches in terms of their impacts on productivity and work-to-life conflict (Wilks' Lambda, $p=0.031$). There are, however, no significant differences between three working locations (Wilks' Lambda, $p=0.183$). This means, the influences on productivity and work-to-life conflict are different depending on what kind of mobile devices employees are using during Covid-19. Working location however is not a key consideration for managers in allocation work. This provides much more flexibility when organizing work during Covid-19. The estimated marginal means test showed a slightly higher mean of laptops (2.764) on work-to-life conflict when comparing with smartphones and desktops; and a slightly higher mean of smartphones (3.451) on productivity compared with laptops and desktops. This means, using laptops is more likely to have work-life conflict and using smartphones is more likely to have productivity increase (though the difference is nuance). Similarly, the influences on productivity and work-to-life conflict are different depending on who owns the device. If the device is owned by him/herself, then it will have a higher impact on work-to-life conflict (estimated mean=2.765), and if the device is owned by company, it will have a higher impact on productivity (estimated mean=3.328). The combined results indicate that if a company would like to increase productivity, it would be ideal to provide company-owned smartphone. And if the device is a personal-owned laptop, the influence on work-to-life conflict will be the largest.

Effect	Value	F	Sig. P value
Ownership	0.933	3.601	0.031
Device	0.902	2.673	0.033
Location	0.941	1.573	0.183

Table 3. Wilks' Lambda of Multivariate test

Dependent Variable	IV: Device type	Mean	IV: Location	Mean	IV: Ownership	Mean
Work-to-life conflict	Smartphones	2.463	Home	2.674	Personal-Owned	2.765
	Laptops	2.764	Offices	2.710	Company-Owned	2.447
	Desktops	2.596	Others	2.000		
Productivity	Smartphones	3.451	Home	3.492	Personal-Owned	3.226
	Laptops	3.132	Offices	3.053	Company-Owned	3.328
	Desktops	3.302	Others	3.000		

Table 4. Estimated marginal means test

6 Conclusion

The purpose of enterprise mobility is to enhance productivity, but it also induces potential problem of work-to-life conflict. Academic research on the specific device arrangement of enterprise mobility is rare, especially during the pandemic period, when managing mobile workforce becomes more important. This paper explores the influences of device usage location, device type, and device ownership on productivity and work-to-life conflict. A pilot test was conducted to test the impacts of the independent variables. Future research will be done to test the proposed hypotheses with a larger sample size. Structural equation modelling approach will also be used to test the causality. The research results will bring immediate and actionable suggestions to enterprise mobility theory and practice.

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