UNIVERSITY OF KWAZULU-NATAL

SMARTPHONE USAGE OF EMPLOYEES AT AN I.T. FIRM

By

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DECLARATION

I, Tehseena Essack declare that:

(i) The research reported in this dissertation/thesis, except where otherwise indicated, is my original research.

(ii) This dissertation/thesis has not been submitted for any degree or examination at any other university.

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ABSTRACT

Smartphone usage may easily pervade a user's daily life and make it hard to imagine life without a smartphone. Smartphone applications have the potential to revolutionise the way tasks are performed including: communication and messaging, information retrieval and analysis, file management, scheduling and planning, social networking, navigation, media, eBooks/eMagazines, online shopping and finance management. Productivity may be improved with the use of smartphones but may be hindered by task switching, unnecessary features and distraction. The purpose of this study was to explore the smartphone usage of employees with the purpose of identifying: how do employees use smartphone applications in different environments, what factors drive employee smartphone usage, and how do employees perceive smartphone usage to affect their productivity. The employees at an IT firm were sampled as this study intended to assess usage in both working and personal contexts. Secondly, it is generally expected that the adoption of a new technology will stem from technologically inclined individuals. An adapted UTAUT framework was applied and data was collected using an online questionnaire. Key findings indicate that with the exception of file management, media and scheduling/planning, the applications were mostly used when away from home and work, then at home, and then at work. The applications used most were social networking, followed by communication and messaging, and then information retrieval and analysis. Usage was low for online shopping, eBooks/eMagazines and file management. There was agreement that technological determinism, effort expectancy, social influence, performance expectancy and facilitating conditions are factors that drive smartphone usage. Overall, smartphone usage appears to have improved perceived productivity. Furthermore, the main applications that lead to improved productivity are email, instant messaging and the web. There was agreement that personal organisation, multitasking, instant feedback, the ability to work at any time and place, and the ability to complete tasks in less time, influence smartphone usage for productivity. Surprisingly, there was significant disagreement that task switching and distraction due to games or social media reduces productivity. Overall, there were significant positive correlations between smartphone usage and the factors that drive smartphone usage, as well as smartphone usage and perceived productivity.

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CHAPTER 1: INTRODUCTION

"A smartphone, with its versatile connectivity and incredible computational capability, can easily become an indispensable part of a user's day" (Bain, Dey, Nelakuditi, & Choudhury, 2013, p. 19).

1.1 Introduction

Smartphone usage may easily pervade a user's daily life and make it hard to imagine life without a smartphone. A smartphone may be defined as a device that combines the functions of a mobile phone and portable computer.

Smartphones have changed the way tasks are performed (Oulasvirta, Rattenbury, Ma, & Raita, 2012). They are increasing in use, functionality and even outsell personal computers, thus making smartphones a relevant and current focus (Brown, McGregor, & Laurier, 2013; Kalkbrenner & McCampbell, 2011).

According to research conducted by Google (2013), South African smartphone penetration was 40%, a 25% increase from 2011. This was based on a national representative population over the age of 16, and therefore may not be a precise reflection. Google (2013) found that smartphones had become an indispensable part of the daily lives of South Africans. 68% of respondents used their smartphone daily over a period of 7 days and 78% did not leave their home without their smartphones (Google, 2013). Furthermore, 47% of respondents perceived that they had used their smartphone more than previously to access the Internet over the past 6 months (Google, 2013). The Mobility 2014 research study indicated that 51% of urban cell phone users in South Africa used mobile applications in 2013 (World Wide Worx, 2013a). Users are becoming increasingly reliant on their smartphones (Google, 2013).

Effective Measure (2014) found that smartphone owners are always looking out for new phones and that the technology adoption rate was high in the South African market. Smartphone penetration is expected to increase due to the increased availability of more affordable hardware, financing models that will allow consumers to purchase smartphones, a change in the structure of voice and data packages, overall lower rates, and the introduction of flat rate packages to make smartphone usage more cost-effective (KPMG South Africa, 2013).

The above suggests that smartphone usage is increasing in South Africa. Although research has been conducted on smartphone usage, limited research has been conducted in a South African context. The context, statement of purpose, and research questions are discussed below.

1.2 Context

This is an exploratory study using a survey-based case study strategy. The population to be researched are the employees at a South African IT firm. The sample will be limited to those employees that use smartphones. Employees were chosen because this study seeks to explore smartphone usage in both personal and working contexts. This is discussed further on in Chapter 3.

There are various types of smartphone applications. Google's (2013) study in South Africa found that the Internet was used the most (89%), followed by email (85%), social networking (83%), and then music (77%) and video (73%). Effective Measure (2014) also found instant messaging, email and then social networking to be the most performed activities by South Africans. The above indicates that email, instant messaging, the web and social networking are frequently used. The usage of these smartphone applications and others will therefore be explored in this study.

Google (2013) found that 97% of respondents use their smartphone at home, 84% at work, and 87% on-the-go. The above suggests that smartphone usage varies depending on the user's environment. This research will therefore explore the usage of the above applications in different environments (home, work, and away from home and work).

Various factors have been explored with regards to smartphone usage (Joo & Sang, 2013; Kalkbrenner & McCampbell, 2011; S. H. Kim, 2008; Negahban & Chung, 2014). This research will explore a combination of these factors plus additional factors to see if they are drivers of smartphone usage. These drivers can be categorised using the independent variables in the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, as explained in Chapter 2 (Venkatesh, Morris, Davis, & Davis, 2003). These include effort expectancy, performance expectancy, social influence, facilitating conditions, plus an additional variable, technological determinism.

Technology can be used to increase productivity, but after an optimal level is reached, overload can be experienced (Karr-Wisniewski & Lu, 2010). Disruptions on workflow and productivity have been extensively studied with regards to personal computers (Amy Karlson et al., 2010). However, limited research has been conducted pertaining to the effect of smartphone usage on productivity, especially in South Africa. Kalkbrenner & McCampbell (2011) found that people's productivity had increased with the use of smartphones, but they also found that smartphones can be laden with too many features which can be distracting. Lapointe, Boudreau-Pinsonneault, & Vaghefi (2013) found that just under half of the respondents in their study reported that smartphone usage had a negative impact on their productivity. The above studies looked at smartphone usage as a whole, but specific smartphone applications may have different effects.

This study will therefore look at the productivity implications when using the different types of smartphone applications. As the user can only subjectively measure productivity, this research will look at the employees' perceptions with regards to their improved or decreased productivity using their smartphone. Factors affecting smartphone usage for productivity will also be explored.

The statement of purpose and subsequent research questions can now be identified.

1.3 Statement of purpose

The purpose of this study is to explore the smartphone usage of employees.

This will be explored through various aspects related to employee smartphone usage, as identified in the above section. The outcomes of this research will seek to shed light on the usage of smartphone applications in different environments, factors that drive smartphone usage and productivity perceptions relating to smartphone usage.

1.4 Research questions

Research Question 1: How do employees use smartphone applications in different environments?

The first research question explores the employees' usage of the different types of smartphone applications at home, work, and when away from home and work.

Research Question 2: What factors drive employee smartphone usage?

The second research question explores factors that drive the smartphone usage of employees, including technological determinism, social influence, performance expectancy, effort expectancy and facilitating conditions.

Research Question 3: How do employees perceive smartphone usage to affect their productivity?

The final research question explores employees' perceptions with regards to smartphone usage and productivity. The productivity implications of specific smartphone applications will be considered first, followed by factors that may affect productivity.

Figure 1.1, below, illustrates how the research questions relate to smartphone usage. Smartphone usage is the central concept and stems from the usage of smartphone applications in different environments (RQ1). Factors that drive smartphone usage can effect smartphone usage (RQ2). Smartphone usage may also effect productivity (RQ3).

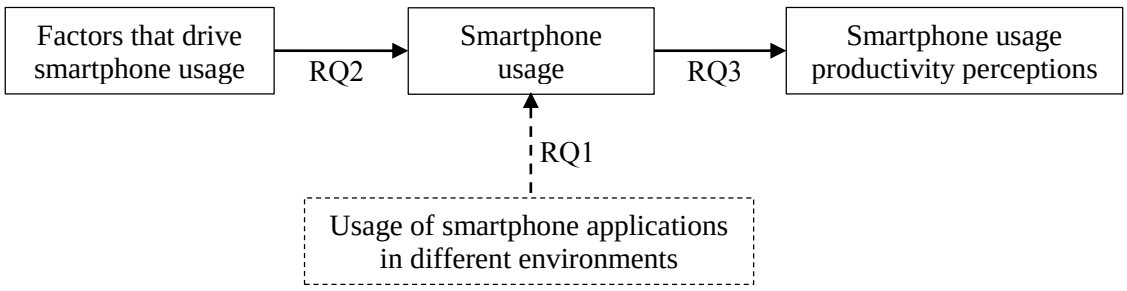

Figure 1.1 Smartphone usage research model

1.5 Overview of the study

The dissertation has been divided into five chapters: introduction, literature review, research methodology, findings and analysis, and conclusion.

Chapter 2 reviews relevant literature on the origin of the smartphone and smartphone features. This is followed by a discussion on smartphone usage in different environments and types of smartphone applications. Smartphone usage for productivity, with associated advantages and disadvantages, are thereafter considered. The theoretical framework, an adaption of the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh, et al. (2003), is also explained. Thereafter, various factors that drive smartphone usage are identified.

Chapter 3 elaborates on the research objectives that were introduced above. Research design and methodology are discussed in order to position this research. This includes the chosen research philosophy (positivism), research approaches (deductive and inductive), research strategies (case study and survey), research method (quantitative mono method) and time horizon (cross-sectional). Data collection methods, including sampling and the design of the research instrument, are explained. This is followed by data analysis methods, validity and reliability assessments, and ethical considerations.

Chapter 4 includes the findings and analysis. The chapter begins by explaining the response rate, the consistency and reliability of the data, and normality test results. Key demographic statistics to profile the respondents and the users' smartphone competency are then discussed. Current and intended usage of smartphone applications is thereafter explored, before studying usage in different environments, with the aim of answering RQ1. The drivers of smartphone usage are then explored with the aim of answering RQ2. The driver groups are compared to each other, as well as the respondents' age and experience. Finally, the perceived effect of smartphone usage on productivity is explored, in order to answer RQ3. This includes associated advantages and disadvantages of using smartphones for productivity.

Chapter 5 concludes the study highlighting key findings, limitations, recommendations, and suggestions for future research.

1.6 Conclusion

The purpose of this study is to explore the smartphone usage of employees. This chapter defined the research topic and justified the need for this research. The following three research questions were identified: how do employees use smartphone applications in different environments, what factors drive employee smartphone usage, and how do employees perceive smartphone usage to affect their productivity. An overview of the dissertation was also presented. The next chapter reviews related literature and establishes a suitable theoretical framework.

CHAPTER 2: LITERATURE REVIEW

"As smartphones become increasingly pervasive, we find ourselves at a key moment for both reflecting on this contemporary socio-technical shift, and examining the narratives of smartphone use as they are formed" (Harmon & Mazmanian, 2013, p. 1051).

2.1 Introduction

The aim of this chapter is to review current literature about smartphone usage. Research gaps to address this issue will be identified and thus justify the need for this research. As illustrated in Figure 1.1, there are three main areas that will be researched, namely: the usage of smartphone applications in different environments, factors that drive smartphone usage, and smartphone usage productivity perceptions.

This chapter begins with a brief review of the origin of the smartphone. Thereafter, a discussion ensues on smartphone features, smartphone usage in different environments and types of smartphone applications. The focus of the chapter then moves on to smartphone usage for productivity. Associated advantages and disadvantages are deliberated. This is followed by an appropriate theoretical framework to define this research. Factors that drive smartphone usage are then explored in more detail.

2.2 The origin of the smartphone

As the smartphone stems from the mobile phone, key mobile phone history will be presented in chronological order.

The first mobile phone call was made in 1973 by Martin Cooper using a device that weighed about 1 kilogram (A. Lee, 2013). In 1983 mobile phones were made commercially available (A. Lee, 2013). Voicemail was added in 1986 and the first text message was sent in 1992 (A. Lee, 2013).

Personal digital assistants (PDAs) were also created during this period and ultimately led to the development of the smartphone. PDAs were small portable computing devices that offered the same computing features as modern smartphones but lacked cellular integration (Kalkbrenner & McCampbell, 2011). Smartphones then originated combining the functions of a cell phone and mobile computer. The first smartphone, the IBM Simon, emerged in 1993 offering limited functionality like an address book, calendar, fax and email, in addition to phone calls (Kalkbrenner & McCampbell, 2011).

By 1996, Internet access had been added to mobile phones and in 1997 the first picture message was sent using a mobile phone (A. Lee, 2013). Smartphones had overtaken PDAs as a mobile device by 2004 (Shelly, Vermaat, Quasney, Sebok, & Freund, 2012). In 2007, VoIP was added to Wi-Fi phones and half of the world's population were using cell phones (Shelly, et al., 2012).

By 2008, smartphones had vastly improved with touchscreens, tactile feedback, e-mail, high-speed Internet access, digital photography, audio and video capture and reproduction, television reception, document editing and creation, removable storage, contactless payment, Bluetooth, WiFi, and GPS (Kalkbrenner & McCampbell, 2011; Kwon et al., 2013; Shelly, et al., 2012).

In light of the above, it is necessary to be able to differentiate between a cell phone and a smartphone. A cell phone is a mobile phone whereas a smartphone is a mobile phone with portable computer capabilities. In the next section, smartphone features will be discussed.

2.3 Smartphone features

The previous section presented key developments in the mobile phone field, thereby positioning the smartphone. Smartphone features will now be discussed and can be divided into hardware and software categories.

Hardware features may include mobile voice and data functions, Bluetooth, camera, compass, NFC (near field communication), GPS (Global Positioning System) and WiFi. Smartphones offer various input methods from physical keyboards, to touchscreens and voice input. Smartphones now have an increased battery life and can be accessed for longer periods. Smartphone screens are also increasing in size and this may make smartphones easier to use. The above features may drive smartphone usage or effect smartphone usage for productivity.

Software features include the operating system of the smartphone as well as smartphone applications. An operating system provides the smartphone interface and includes utility programs. Mobile operating systems include Android, Blackberry, iOS, Windows and Symbian. The operating system can affect the smartphones ease of use. This forms part of the drivers of smartphone usage, as discussed later on. An application is a software program that enables the user to leverage the software and hardware inside their mobile device to perform activities, for example watching videos (Striepe, 2013).

Smartphone applications are of two types, mobile based or Internet based (Striepe, 2013). Internet based applications are accessed via the web browser (Striepe, 2013). They are smartphone platform independent and there is no need to download updates (Striepe, 2013). Mobile based applications or native applications, on the other hand, provide access to mobile content designed specifically for the device (Tossell, Kortum, Rahmati, Shepard, & Zhong, 2012). They may

operate offline or require Internet access (Striepe, 2013). They may be factory installed or downloaded and installed by the user (Tossell, et al., 2012). The development of app stores by the various device manufacturers has resulted in the proliferation of applications. There are currently many free applications available to users as well as applications that may be purchased. Thus, users may tend to install applications just because they are available. This is related to unnecessary features, which is explored later on, because most applications may not be required or even used.

Smartphone applications can be location sensitive, they can be time critical, and they may be initiated/controlled by the recipient or user (Zhang, Guo, Wang, Chen, & Wei, 2011). Smartphone users can customise their smartphones for their own needs and purposes (Leshed, 2012). One of the most beneficial features is the ability to synchronise data stored on the smartphone, online and with other devices, as this reduces redundancy and the data is always available.

Smartphones provide various ways to receive information and communications in comparison to cell phones, pagers, or other mobile hand-held technologies (Kalkbrenner & McCampbell, 2011). Smartphones are emerging as the primary computing device for some users (Amy Karlson, Meyers, Jacobs, Johns, & Kane, 2009). It can be noted that the purpose of the smartphone is not to completely replace, but rather complement the current software and services that are used (Glover, 2012). For example, it may be easier to format a document on a PC but smartphones are convenient for editing and viewing documents when the user is away from a PC. On the hand, smartphones can completely replace certain activities like instant messaging and scheduling, depending on the user's preference.

Google (2013) indicated that smartphone penetration was 40% in South Africa. It was found that 78% of respondents do not leave the house without their smartphone (Google, 2013). Furthermore, 47% of respondents perceived that they had used their smartphone more than previously to access the Internet over the past 6 months (Google, 2013). The Mobility 2014 research study indicated that 51% of urban cell phone users in South Africa used mobile applications in 2013 (World Wide Worx, 2013a). The above suggests that smartphone usage is increasing in South Africa.

It is expected that smartphone penetration will continue to increase in South Africa. This is due to the increased availability of more affordable hardware, financing models that will allow consumers to purchase smartphones, a change in the structure of voice and data packages, overall lower rates, and the introduction of flat rate packages to make smartphone usage more cost-effective (KPMG South Africa, 2013).

As illustrated in the above discussion, smartphones appear to be useful device. Usage is also expected to increase. The next section turns to one of the key aspects of this research, which is smartphone usage in different environments.

2.4 Smartphone usage in different environments

As explained in the previous section, smartphones are ubiquitous, convenient, offer instant connectivity, personalisation and localisation (Zhang, et al., 2011).

The time spent utilising a smartphone varies greatly. Kalkbrenner & McCampbell (2011) found that 30.6% of respondents spent up to an hour on their smartphone, 40.8% between 1-2 hours, 12.2% between 2-3 hours, 12.2% between 3- 4 hours, and 4.2% more than 4 hours a day. It therefore appears that the majority of the respondents in the study spent under 2 hours a day. The time spent using a smartphone was also generally higher than the time spent using a cell phone (Kalkbrenner & McCampbell, 2011). In a study by Falaki et al. (2010), it was found that the popularity of an application was different for different times of the day. This means that application usage differs at different times of the day. For example, usage of instant messaging applications may be more after working hours than during working hours.

Smartphone application usage will vary from personal to work purposes, depending on the applicability of the application. Kalkbrenner & McCampbell (2011) found that smartphones were used by 44% for only personal purposes, 4% for only business purposes, and the remaining 52% for both. Usage will also vary depending on the accessibility to other devices. For example, if a user has immediate access to a personal computer, he/she may prefer to use the PC to edit documents, as it is easier to use due to the bigger screen and the ability to use a separate mouse and keyboard. However, if the user does not have access to a computer, he/she may use his/her smartphone as it is conveniently available. The above suggests that smartphone usage varies depending on the task and environment.

Google (2013) found that 97% used their smartphone at home, 87% on-the-go, and only 84% at work. Karikoski & Soikkeli (2013) found that non-voice applications interaction time was the most at home (53%) and then elsewhere (24%). Verkasalo (2009) also found that usage was the most at home (35.6 minutes), then on the move (18.6 minutes), and then in the office (14.5 minutes).

The above suggests that smartphones are used regularly. It appears that usage is the most at home, then away from home and work, and then at work. Usage of the different types of applications will therefore be explored in these three environments. In the next section, the various types of smartphone applications are explored.

2.5 Types of smartphone applications

By reviewing the literature, the following categories of smartphone applications have been identified. These include communication and messaging, information retrieval and analysis, file management, scheduling, collaboration and planning, social networking, navigation, media, eBooks and eMagazines, online shopping, and finance management (Amy Karlson, et al., 2010; Zhang, et al., 2011). These will be assessed in order to explore employee smartphone usage. Although games form another type of smartphone applications, they have been excluded, as they are mainly used for entertainment purposes.

Figure 2.1 Screenshot of a smartphone interface.

As can be seen illustrated in the above screenshot, Figure 2.1, smartphones offer many types of applications from the same device. Each of these categories will now be explored in more detail below.

2.5.1 Communication and messaging

Apart from conventional phone calls, SMS and MMS, smartphones offer additional communication methods (Karikoski & Soikkeli, 2013). Figure 2.2 demonstrates some of the communication and messaging capabilities of smartphones.

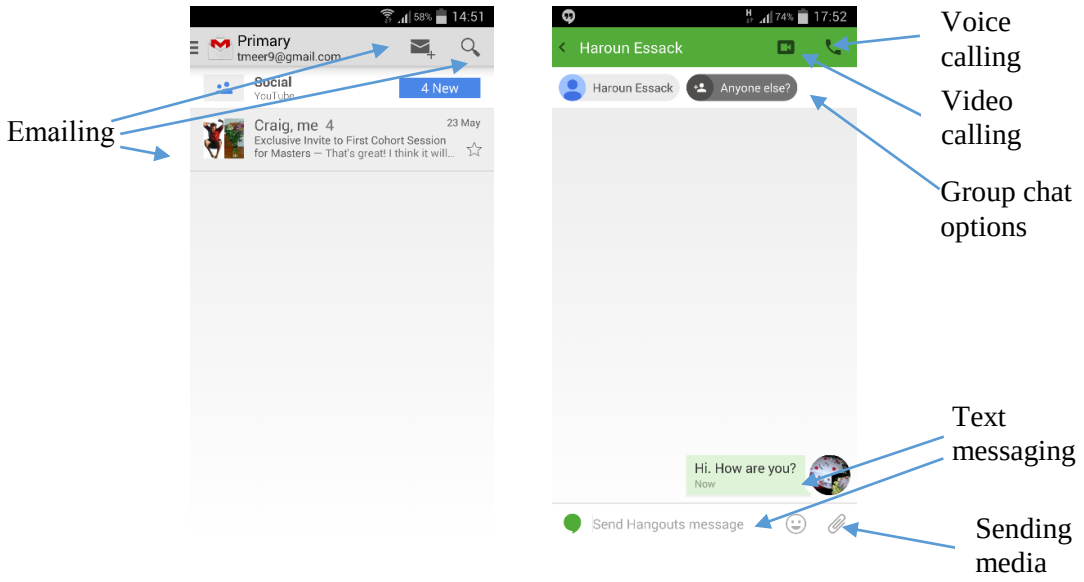

Figure 2.2 Screenshots of communication and messaging capabilities.

Email applications can be installed on a smartphone or accessed via the web browser. They are used to read, compose, or manage emails (Amy Karlson, et al., 2010). Previously, only computers could be used for this. In South Africa, 76% of emails were sent and received from a cell phone in 2013 (Buckle, 2014). Smartphones therefore appear to increase accessibility and efficiency as they can be used to synchronise mail. Smartphones may also be used as the primary emailing device by some users.

Instant messaging applications, like Whatsapp, BBM and Google Talk, are used to communicate with contacts in real time (synchronously). Instant messaging usage has grown in South Africa. Whatsapp usage increased from 26% in 2012 to 53% in 2013, and another 10% of cell phone users indicated that they would be using it the next year (World Wide Worx, 2013a).Video conferencing/VoIP applications can also be accessed via smartphones, providing virtual face-to-face or voice communication options.

2.5.2 Information retrieval and analysis

A smartphone web browser can be used to access mobile or desktop sites, and can be used to retrieve information as required (Amy Karlson, et al., 2010). Other smartphone applications can also be used to retrieve and analyse data. Weather, stock and currency updates would fall under this category. Previously, accessing the Internet was limited to computers. Users would not be able to quickly lookup information when they were away. Figure 2.3 shows an example of information retrieval and analysis capabilities.

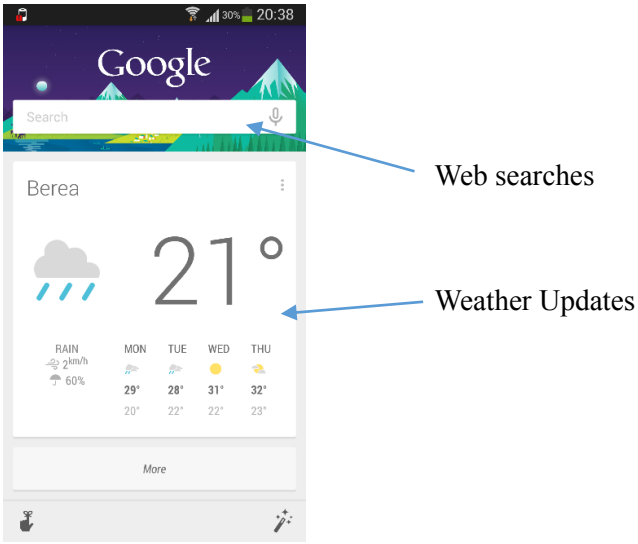

Figure 2.3 Screenshot of information retrieval and analysis capabilities.

Google (2013) found that 68% of respondents access the Internet every day from their smartphone. Smartphones can potentially increase accessibility and efficiency as information can be immediately retrieved when needed. For example, searching the web for a phone number that is urgently needed whilst travelling. News updates like load shedding notifications are also useful for planning purposes.

2.5.3 File management

Smartphones can be used to view, create and edit documents, spreadsheets and presentations. The management of files and applications is also supported (Amy Karlson, et al., 2010). Previously, this function was limited to desktop computers or notebooks.

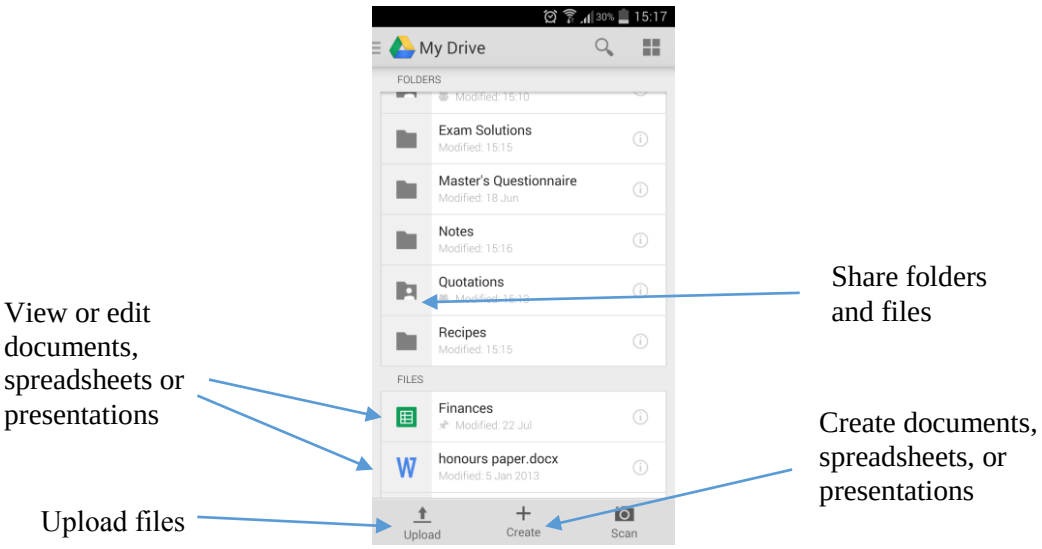

Figure 2.4 Screenshot of file management capabilities.

Users can access their files immediately whether it is stored locally on their smartphone or in the cloud. Local storage means that files and documents can only be viewed and edited from the device it is stored on. Therefore, users cannot access this information from another device without first copying it over. The cloud has improved this as files are now stored online, thus accessible from any device. Figure 2.4 illustrates an example of file management with cloud storage, using the Google Drive application.

Cloud storage has therefore greatly improved file management as files can be easily synchronised between devices and also shared (Jewell, 2011). Documents, spreadsheets and presentations can be created, viewed and edited from most devices. This has reduced duplication, redundancy and outdated versions. These applications can also be used to back up the data on the smartphone (Jewell, 2011). This may also reduce the need to print out documents, thus helping the environment.

2.5.4 Scheduling and planning

Smartphones have calendar and other scheduling applications. Events can be linked to other contacts' calendars for collaboration purposes. Various applications are also available to sync notes and to-do lists (Jewell, 2011). Scheduling and planning capabilities are illustrated below, in Figure 2.5.

Figure 2.5 Screenshot of scheduling and planning capabilities.

These tasks were previously done using diaries and calendars. Computers were also used, but were not always accessible due to their importability. Smartphones offer a solution to this issue. Calendars can be synced across all devices and reminders/notifications can be setup.

2.5.5 Social networking

There are smartphone social networking applications, like Facebook, Twitter and LinkedIn, to connect and interact with contacts (Karlson, et al., 2010). Although Facebook and Twitter are used for personal purposes, they can also be used for public relations and marketing purposes. LinkedIn, on the other hand, is primarily a professional networking tool.

In South Africa, mobile social networking grew by 47% in 2013 (Buckle, 2014). Social networking can be accessed via computers, but smartphones potentially improve interaction by allowing updates to be viewed and shared immediately. Figure 2.6 demonstrates an example of the various social networking capabilities using Twitter.

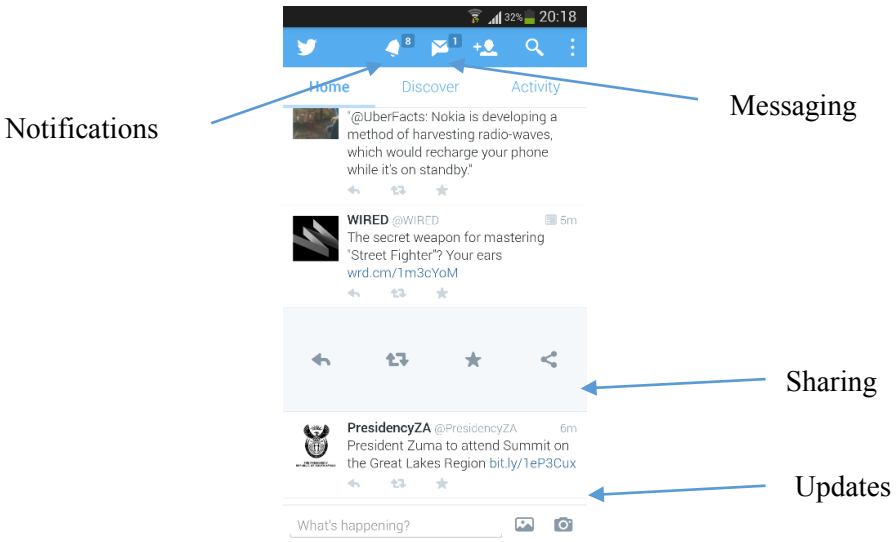

Figure 2.6 Screenshot of social networking capabilities

However, some research has pointed out that users can get addicted to social networking and constantly check for notifications, thereby reducing their productivity (Bain, et al., 2013). The effect of usage on productivity will also be explored in this study, as explained later on.

2.5.6 Navigation

Smartphones can be used to access navigation information, like maps, directions, traffic, and public transit schedules (Amy Karlson, et al., 2010). Figure 2.7 displays an example.

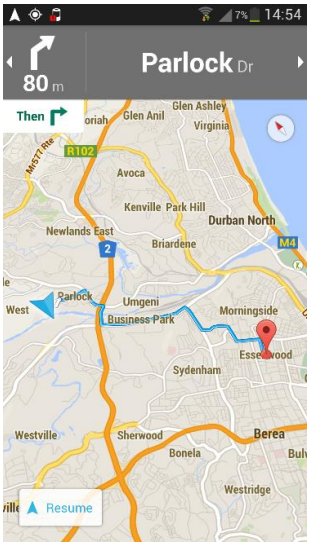

Figure 2.7 Screenshot of navigation capabilities.

Live navigation was previously only accessible via GPS devices, like Garmin and TomTom, although maps and directions could be found on the Internet via a computer. Smartphones allow navigation data to be accessed when needed and on the move.

2.5.7 Media

Smartphones can be used to play videos and recordings. They can also be used to capture photos as necessary (Amy Karlson, et al., 2010). Smartphones can be used to edit images. They also support the sharing of media (images, videos, and voices recordings) via Bluetooth, social media, Wi-Fi or instant messaging. Figure 2.8 illustrates the above.

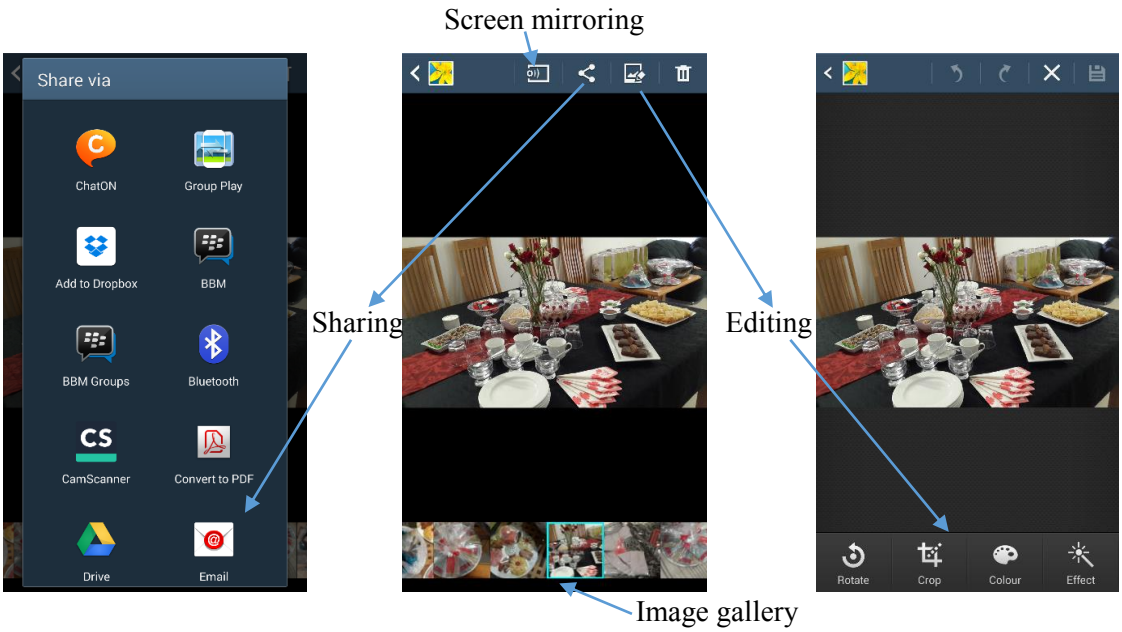

Figure 2.8 Screenshots of media capabilities

In the past different devices would be required to access different media functions. For example, a radio, CD player, and later on MP3 player was needed to listen to music. A separate device, camera, would be required to take pictures. With the introduction of computers, devices could then be connected. For example, photos could be transferred and then shared, but this was a 2 step process. Smartphones can potentially solve these issues as a single device can provide all these functions, as well as sharing capabilities.

2.5.8 eBooks and eMagazines

Smartphones can be used to read eBooks and eMagazines, as shown in Figure 2.9.

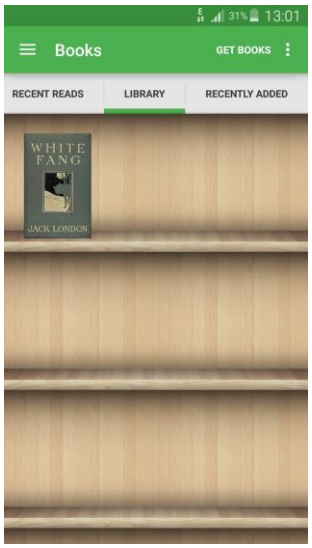

Figure 2.9 Screenshot of an application to access eBooks and eMagazines.

In the past users were limited to printed material. Computers could later on be used to read but smartphones enhanced this ability by providing another device that is portable and handheld, thus more comfortable for reading purposes. Reading material and bookmarks, etc. can also be synced to the computer. Smartphones allow eBooks and eMagazines to be accessed at any time and from anywhere.

2.5.9 Online shopping

Smartphones can also be used to browse, compare prices and shop online (Kalkbrenner & McCampbell, 2011). Figure 2.10 provides an example.

Figure 2.10 Screenshot of online shopping capabilities.

Previously it would be necessary to physically go to a shop to purchase items. Printed brochures would need to be examined and sales representatives relied on for information. Smartphones also enhances shopping in a physical store by allowing shoppers to instantly compare prices and look up product features. For example, shoppers can scan barcodes while shopping in a mall to get more information on the product. Google (2013) as well as Effective Measure (2014) found that 30% of respondents have made a purchase from their smartphone. Google (2013) also found that 89% of respondents have researched a product or service using their smartphone before deciding to buy it or not, and then purchasing it online via a computer or offline from a shop. Online shopping therefore allows the user to gather more information about the product in order to make a more informed decision. Purchasing online also requires less time and effort than physically going to a shop, allowing users to focus on other tasks.

2.5.10 Finance management

Smartphones can be used to manage and monitor finances. Online banking activities can be performed to make payments as well as transfer funds between accounts. These banking features are demonstrated in Figure 2.11.

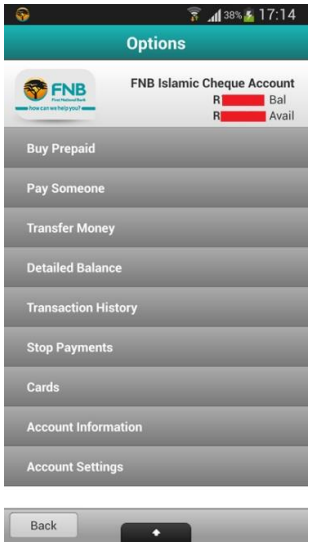

Figure 2.11 Screenshot of a finance management application

In the past banking was limited to branches, later on ATM, telephonic and electronic banking was implemented. Computers can be used for banking and finance management, but smartphones are more convenient as they are portable and thus always accessible. Users can also receive notifications of money being deposited/paid immediately on their smartphone via the app, email or SMS notifications, depending on how it has been set up.

Cell phone banking in South Africa increased from 28% in 2012 to 37% in 2013 and the usage of banking applications by banking customers also increased from 1% in 2012 to 9% in 2013 (World Wide Worx, 2013b). It was also found that about 20% of smartphone owners use their device for banking and finance related purchases (Effective Measure, 2014).

The next section looks at the effect of smartphone usage on productivity.

2.6 Smartphone usage for productivity

Over the years various tools, like diaries and calendars, have been employed for productivity purposes. With the dawn of the IT age, these tools transitioned into electronic devices. These days a single device can be used to perform many tasks and include desktop computers, laptops, tablets and smartphones. Smartphones support multiple forms of communication, are the most portable and easily accessible, making them an appropriate productivity tool (Kalkbrenner & McCampbell, 2011).

Smartphones can be used to manage events, tasks and information on a daily basis, and may increase productivity (Kalkbrenner & McCampbell, 2011; Leshed, 2012). A smartphone

application may be regarded as productive if it improves organisation, reduces the time required to complete a task, or allows users to work on the move.

As illustrated in Figure 2.12, technology can be used to increase productivity, but after an optimal level is reached, overload can be experienced (Karr-Wisniewski & Lu, 2010). Smartphone applications like games and social media can also lead to distraction, thereby reducing productivity (Kalkbrenner & McCampbell, 2011). Users therefore need to make efficient use of these tools in order to have a positive effect on their productivity (Leshed, 2012).

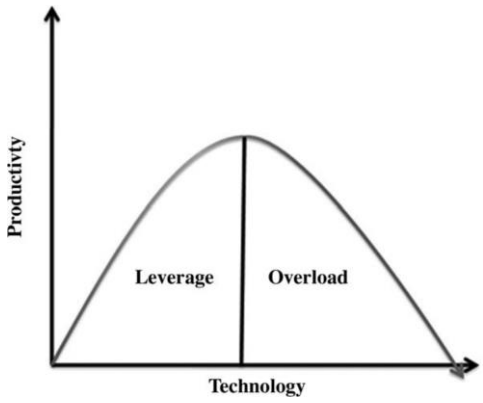

Figure 2.12 Technology overload and the law of diminishing marginal returns (Karr-Wisniewski & Lu, 2010).

Kalkbrenner & McCampbell (2011) found that 82% of respondents indicated an increase in productivity when utilising their smartphone, 16% were unaffected, and only 2% indicated that their productivity had decreased. On the other hand, Lapointe, et al. (2013) found that nearly half of the respondents in their study reported that smartphone usage had a negative impact on their productivity. Research by Dietel, et al. (2011) on mobile technology and meeting productivity indicated that users found that using mobile devices increased their personal productivity but lowered organisational productivity. These conflicting results therefore require a closer analysis of the productivity implications of specific types of smartphone applications, and not only of smartphone usage as a whole. Limited research has also been conducted in a South African context.

In the following two sections, the advantages and disadvantages of using smartphones for productivity are discussed. These will be also assessed in this study.

2.7 Advantages of using smartphones for productivity

The previous sections have discussed how smartphones can be used for productivity. The aim of this section is to discuss specific advantages in light of the literature reviewed. These advantages

include personal organisation, completing tasks in less time, working at anytime and anyplace, instant feedback, and multitasking.

2.7.1 Personal organisation

Smartphones can improve personal organisation via the various features offered (Leshed, 2012). These include scheduling/planning applications like calendars, notes, alarms and address books. Smartphones provide a convenient way to access these applications due to their portability. Reminders and notifications can also be setup. Böhmer, et al. (2013) found that there was a positive correlation between taking notes and setting reminders and to-dos during meetings.

2.7.2 Complete tasks in less time

Due to the features offered by the smartphone, users can complete tasks quicker and more efficiently. This means that the user can then focus on other tasks, hence improving their productivity. For example, automatic synchronization of data synchronises user's calendars, contacts and files across their devices. This reduces duplication and users do not have to manually input the data on each device, thus saving time. The user's accessibility to their data is also improved linked to Section 2.7.3, work at anytime and anyplace. For example, users can use their smartphones to update their calendars during meetings rather than afterwards, as a result completing tasks in less time.

2.7.3 Work at anytime and anyplace

Smartphones are easy to carry around and therefore allow users to use them at any time and any place (Disterer & Kleiner, 2013; Kalkbrenner & McCampbell, 2011). Mobile devices provide the ability to access emails when convenient, thus allowing tasks to be completed in more hours of the day (Dietel, et al., 2011). This is because mobile Internet access increases flexibility by allowing users to work at anytime and anyplace (Bertschek & Niebel, 2013). Smartphones now also have an increased battery life and this may lead to improved productivity as they can be accessed for longer periods. Finance management and file management applications also allow employees to work at anytime and anyplace improving productivity. Maps/transit information and eBooks/eMagazines can also be accessed when required. Although working anytime and anyplace is an advantage, this may lead to overcommitments and overload, as explained in Section 2.8.4.

2.7.4 Instant feedback

Instant feedback when using a smartphone can improve productivity. Smartphones provide users with instant access to news, information and contacts. Smartphones potentially improve

interaction by allowing social networking updates to be viewed and shared immediately. Users can search for information as and when required, as well as receive communications immediately. For example, users can use online shopping applications whilst shopping in store, to gather more information about the product. When driving, voice input can be utilised hands free. Therefore, users can make quick and informed decisions because of the instant feedback offered by their smartphone.

2.7.5 Multitasking

Smartphones allow users to multitask and this can improve productivity (Karr-Wisniewski & Lu, 2010). Multitasking allows users to complete more than one task at the same time. For example, in large meetings it may be more productive to complete other work on a smartphone than listen to presentations that are only vaguely related to one's job (Dietel, et al., 2011). The opposite may also occur, where smartphones can distract users from the meeting at hand. Google (2013) found that 92% of respondents use their smartphone while doing other things like watching TV (53%). On the other hand, multitasking is related to task switching which can be a disadvantage, as explained in Section 2.8.6.

2.8 Disadvantages of using smartphones for productivity

The previous section discussed the advantages of using smartphones for productivity. This section now looks at various disadvantages and includes unnecessary features, distraction, irrelevant information, overcommitments and overload, time wastage and task switching. These are discussed in more detail below.

2.8.1 Unnecessary features

Unnecessary features may be defined as extra features that do not have any productivity value to the user. Thus, potentially resulting in wasted time and reducing productivity. Therefore, features should only be added if they enhance productivity (Kalkbrenner & McCampbell, 2011; Karr-Wisniewski & Lu, 2010; Leshed, 2012). Although this can be linked to another disadvantage, time wastage, it is still necessary to examine it as a separate category. Some users may not perceive unnecessary features to be a disadvantage, but rather enjoy having many features at their disposal. This will explored in this study.

2.8.2 Distraction

Games or social networking can distract users whilst using their smartphone for productivity (Bain, et al., 2013; Kalkbrenner & McCampbell, 2011). Users can get addicted to social networking and constantly check for notifications (Bain, et al., 2013). This reduces their

productivity (Bain, et al., 2013). On the other hand, users may use social networking for work purposes like public relations and marketing. As such, users may not find this to be a disadvantage and will therefore be explored in this study. Other smartphone notifications, like instant messaging notifications, can also be a distraction. These are also linked to other disadvantages, like time wastage and task switching, and are explained below.

2.8.3 Irrelevant information

Irrelevant information given by the smartphone can also be a distraction. Context-aware sensing, for example Google Now, utilises the user's location, web searches, and preferences to automatically fetch information (Bain, et al., 2013). This may include the weather at the user's location or the distance from the user's home. This information may be irrelevant to the user at that time, therefore serving as an unnecessary distraction. Another form of irrelevant information may include advert supported free applications. These adverts either need to be closed resulting in wasted time or remain on a small section of the display which can be distracting. Irrelevant information can thus reduce productivity.

2.8.4 Overcommitments and overload

Users can take on more tasks as they can do more due to the features offered by their smartphones. This can lead to overcommitments and packed schedules, leaving users with no free time to relax (Leshed, 2012). This conflicts with the advantage, work at anytime and anyplace, and may in fact reduce their productivity. Users can also experience a feeling of information overload due to the amount of information accessible via their smartphone, thus reducing their productivity (Karr-Wisniewski & Lu, 2010; Leshed, 2012).

2.8.5 Time wastage

Apart from experiencing information overload, users can waste time looking through more information than is necessary, just because it is available. Users can also experience communication overload and waste time messaging as they are generally always accessible to their contacts via their smartphone (Karr-Wisniewski & Lu, 2010). These factors can reduce their productivity.

2.8.6 Task switching

As mentioned in the above advantages, smartphones provide the ability to multitask. However, users are not actually performing more than one task at the same time, but rather switching between tasks in rapid succession (American Psychological Association, 2006). As users switch between tasks, they will need to refocus their thoughts. Task switching can therefore cause up to

a 40% loss in a user's productive time (American Psychological Association, 2006). It is thus necessary to examine the effect of task switching on productivity as a separate category.

The next section presents a theoretical framework to explore the smartphone usage of employees.

2.9 Theoretical framework

The purpose of this study is to explore the smartphone usage of employees. A variety of models to explore the acceptance and usage of a technology are available.

One of the most widely used models is the Technology Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989). The Technology Acceptance Model looks at the perceived ease of use and usefulness of a technology that affects the attitude to use, behavioural intention to use and actual system usage. This model was later on extended into the Technology Acceptance Model 2 (TAM 2) which offered better analysis through the use of additional external variables, namely: subjective norm, image, job relevance, output quality, result demonstrability, experience and voluntariness (Venkatesh & Davis, 2000).

A variation of this model is the Unified Theory of Acceptance and Use of Technology (UTAUT) which examines the variables performance expectancy, effort expectancy, social influence and facilitating conditions, in conjunction with age, gender, voluntariness of use and experience, having an effect on behavioural intention and use behaviour (Venkatesh, et al., 2003).

Another applicable theory is the Theory of Planned Behaviour which indicates that individual behaviour is driven by behavioural intentions which are dependent on an individual's attitude toward the behaviour, the subjective norms, and the perceived ease of use of performing the behaviour (Ajzen, 1991).

The Task-Technology Fit theory is also related and states that IT will be used more and impact individual performance if the technology characteristics matches the task characteristics the user must perform (Goodhue & Thompson, 1995).

Although the above five models and theories were found to be suitable, they could not be used without first modifying them for the purpose of this research. Many studies have adapted the above models to study mobile and smartphone usage, and are now discussed. Kim (2008) extended TAM to include individuals' intention to use mobile wireless technology (MWT). Joo & Sang (2013) integrated TAM and the uses and gratifications (U&G) approach to investigate factors that influence adoption and use of smartphones. Zhou (2008) modified UTAUT to include contextual offering in order to examine mobile commerce user acceptance. Shi (2009) also modified UTAUT to research users' acceptance of smartphone online application software. H. S.

Lee, Kim, & Choi (2012) modified UTAUT to research factors affecting smartphone application acceptance, as well. Wu, Tao, & Yang (2007) also modified UTAUT to research 3G mobile communication users' behaviour. Yu (2012) also used an adapted UTAUT to examine factors affecting individuals to adopt mobile banking. Chao (2013) also adapted UTAUT to explore consumers' behaviour for using smartphone applications. Chao (2013) proved that UTAUT could generically measure smartphone applications. It can be noted that most of these studies were conducted in the last few years, suggesting the applicability of UTAUT.

TAM, TAM2, and the Theory of Planned Behaviour, amongst other models and theories, have already been integrated into UTAUT by Venkatesh, et al. (2003). Aldhaban (2012) reviewed literature and proposed a research model based on a modified UTAUT and partially integrated with the Task-Technology Fit theory to explore smartphone technology adoption. Aldhaban (2012) linked Task-Technology Fit to performance expectancy. This research will cover Task-Technology Fit as a part of performance expectancy. Taking all of the above into consideration, a modified UTAUT will provide the most suitable framework as it can be used to cover the relevant variables from TAM, TAM2, the Theory of Planned Behaviour, as well as the Task-Technology Fit theory, for the purpose of this research.

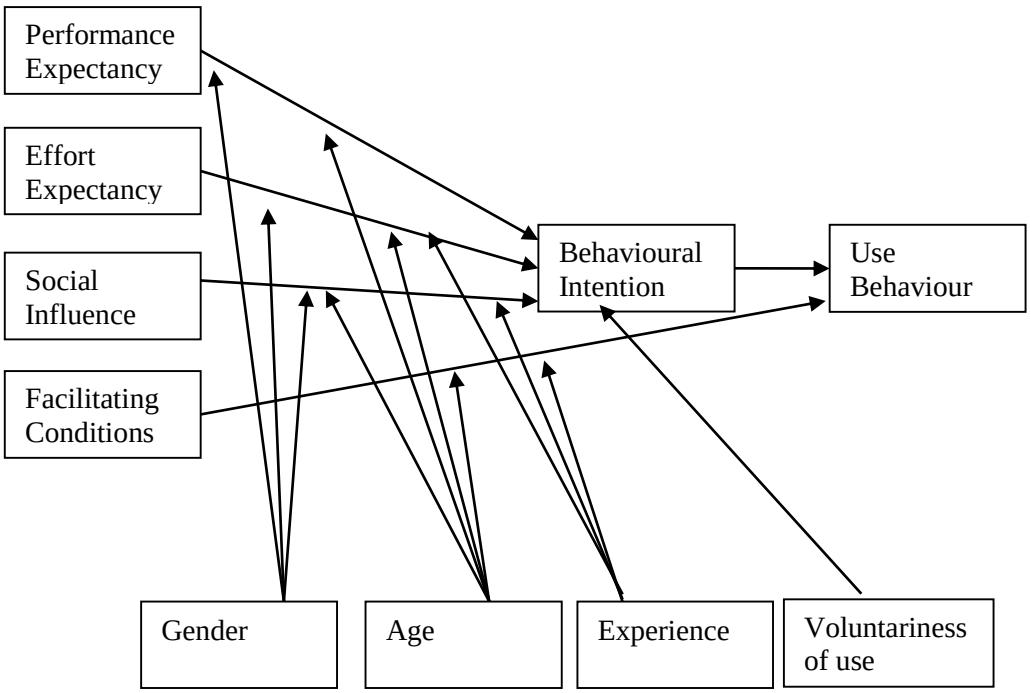

Figure 2.13 The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al., 2003)

The original Unified Theory of Acceptance and Use of Technology (UTAUT) is depicted in Figure 2.13, above (Venkatesh, et al., 2003). This model examines the acceptance and usage of a

technology using the dependent variables: behavioural intention and use behaviour. The UTAUT consists of four independent variables: performance expectancy, effort expectancy, social influence and facilitating conditions, that influence behavioural intention and use behaviour (Venkatesh, et al., 2003). There are also three moderating variables: gender, age, experience and voluntariness of use (the extent perceived that adoption is not mandatory) that affect the behavioural intention to use the application and usage behaviour (Venkatesh, et al., 2003).

"If the users find their mobile devices useful, they tend to imbricate [*sic*] them into their tasks and routines. As the mobile device integrates into the users routines, users tend to perceive a higher degree of fit between the functionalities of device and their needs" (Negahban & Chung, 2014, p. 78).

The above quote may refer to technological determinism, which states that technology has an effect on how users think, feel and act, and how society operates when moving from one technological age to another (McLuhan, 1962). It thus appears that technological determinism may affect smartphone usage. In fact, one of the causes of technological determinism may be the proliferation of applications mentioned earlier. Other factors are discussed in Section 2.10.5.

In a sense, technological determinism is opposed by social determinism. Social determinism means that social factors can change user behaviour rather than technological factors. Social determinism is already covered in UTAUT under the variable social influence, whereas the technological determinism perspective is not covered by any of the variables.

The original UTAUT therefore needed to be adapted to reflect the above. Technological determinism would affect a user's behavioural intention as well as use behaviour, and the relationships have been added to the model. The moderating variables (gender, age and experience) may also have an effect on this. The model has been adapted to reflect this.

The moderating variable voluntariness of use also does not affect this research as the usage of smartphone applications is completely voluntary. This variable has therefore been removed from the original UTAUT model.

The adapted Unified Theory of Acceptance and Use of Technology (UTAUT) is depicted in Figure 2.14 below and shall be used as the theoretical framework for this research.

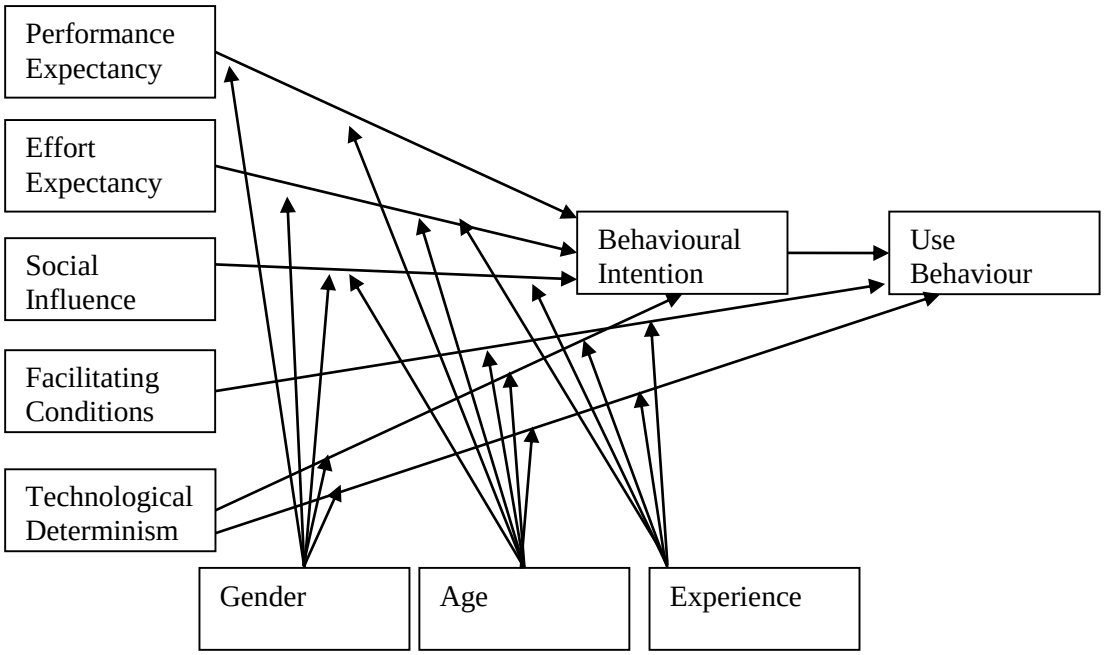

Figure 2.14 Adapted Unified Theory of Acceptance and Use of Technology (UTAUT)

This model is suitable as the variables can be used to explore the research questions, as explained below. The usage of smartphone applications in different environments must first be explored (**RQ1**). This is linked to the variable use behaviour. It is also necessary to explore the factors that drive smartphone usage (**RQ2**). This stems from the variables technological determinism, effort expectancy, performance expectancy, social influence and facilitating conditions. These variables are discussed in Section 2.10. The moderating variables age, gender and experience may also play a role on smartphone usage and will be explored. With regards to the perceived effect of smartphone usage on productivity (**RQ3**), productivity perceptions are external to the model and will be compared to the variable use behaviour.

Based on the adapted theoretical framework, the next section explores the drivers of smartphone usage in more detail.

2.10 Smartphone usage drivers

As explained in the previous section, smartphone usage is driven by technological determinism, effort expectancy, performance expectancy, social influence, and other facilitating conditions. These are discussed below.

2.10.1 Effort expectancy

Effort expectancy may be defined as the ease of use of using the system (Venkatesh, et al., 2003). This refers to the user's perceived effort expense when using the new technology (Zhou, 2008).

The following factors can be used to explore effort expectancy in relation to a smartphone:

- My smartphone's interface is easy to use (Joo & Sang, 2013; S. H. Kim, 2008; Negahban & Chung, 2014).
- My smartphone is easy to use due to its' physical design (eg. touch screen).
- My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.
- My smartphone is readily available to use when I need it.

2.10.2 Performance expectancy

Performance expectancy may be defined as the degree a user feels that the technology will help him/her improve job performance (Venkatesh, et al., 2003). This refers to the user's perceived performance improvement when using the new technology (Zhou, 2008).

The following factors can be used to explore performance expectancy in relation to a smartphone:

- I use a smartphone because of the many applications that are available.
- I use a smartphone because there is integration between my applications.
- My smartphone offers the ability to complete tasks quickly (Joo & Sang, 2013; Kalkbrenner & McCampbell, 2011; Suki & Suki, 2013).
- My smartphone offers the ability to complete tasks efficiently (Joo & Sang, 2013; S. H. Kim, 2008; Verkasalo, Lopez-Nicolas, Molina-Castillo, & Bouwman, 2010).
- My smartphone allows me to synchronise data online and between my devices.
- My smartphone provides easy access to the information I need (Joo & Sang, 2013; Kalkbrenner & McCampbell, 2011).

2.10.3 Social influence

Social influence may be defined as the perceptions that people who are important to the user think he/she should or should not use it (Venkatesh, et al., 2003). This means that the user's decision to use a technology will be affected by other people's opinions (Zhou, 2008).

The following factors can be used to explore social influence in relation to a smartphone:

- My smartphone enhances my image (Negahban & Chung, 2014).
- My friends/family think that I should use a smartphone (S. Y. Lee, 2014; Suki & Suki, 2013; Verkasalo, et al., 2010).
- My contacts also use a smartphone (Verkasalo, et al., 2010).

2.10.4 Facilitating conditions

Facilitating conditions may be defined as the user's belief that there are organisational and technical infrastructure to support the use of the system (Venkatesh, et al., 2003). This means that users have the skills, knowledge and monetary resources to use the technology (Zhou, 2008).

The following factors can be used to explore facilitating conditions in relation to a smartphone:

- I use a smartphone because there is Wi-Fi availability/low data cost.
- I use a smartphone because there are software/application updates available.
- I use a smartphone because applications are free or low-cost.
- My smartphone provides security for my data.
- My smartphone maintains my privacy and confidentiality.
- It is possible to backup my data on my smartphone.
- There is help and support available for my smartphone/applications.

2.10.5 Technological determinism

Technological determinism is a reductionist theory that states that technology has an effect on how users think, feel and act, and how society operates when moving from one technological age to another (McLuhan, 1962). The technological determinism driver was added to the UTAUT framework as justified in Section 2.9.

The following factors can be used to explore technological determinism in relation to a smartphone:

- I am encouraged to use my smartphone because of the many features it offers (Kalkbrenner & McCampbell, 2011).
- Because of the features offered by my smartphone, I have changed the way I complete tasks (Negahban & Chung, 2014).
- Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.
- Using my smartphone makes me feel efficient.
- I have a smartphone because I like to keep up with technology (Lopez-Nicolas, Molina-Castillo, & Bouwman, 2008).

2.11 Conclusion

The primary focus of this research is to explore the smartphone usage of employees. Literature indicated that there is an expected increase in smartphone penetration in South Africa, justifying the need for this research.

This chapter reviewed the origin of the smartphone and smartphone features. Smartphone usage in different environments like home and work were then discussed. Types of smartphone applications were also explored and include communication and messaging, information retrieval and analysis, file management, scheduling, collaboration and planning, social networking, navigation, media, eBooks and eMagazines, online shopping, and finance management applications.

Thereafter, the productivity implications of smartphone usage were considered. The results of previous research differed. Associated advantages includes factors like personal organisation, multitasking, completing tasks in less time, instant feedback and working at anytime and anyplace. Associated disadvantages includes factors like distraction, irrelevant information, unnecessary features, task switching, time wastage and overcommitments and overload.

Venkatesh, et al.'s (2003) UTAUT framework was thereafter adapted into an appropriate theoretical framework to define this research. The drivers of smartphone usage, namely technological determinism, effort expectancy, performance expectancy, social influence, and other facilitating conditions, were then explored in more detail.

In the next chapter the research methodology is discussed.

CHAPTER 3: RESEARCH METHODOLOGY

"If we knew what it was we were doing, it would not be called research, would it?" (as cited in Albert Einstein Site Online, n.d.).

3.1 Introduction

The previous chapter reviewed literature pertaining to smartphone usage, drivers of smartphone usage, and smartphone usage for productivity. Previous studies were also discussed, and the theoretical framework was explained. The aim of this chapter is to elaborate on the research objectives, as introduced in Chapter 1. Research design and methodology are used to position this research. Data collection and analysis methods, including sampling techniques and the research instrument are discussed. Validity and reliability of the data will be clarified, as well as ethical considerations.

3.2 Research objectives

As defined in Chapter 1, the purpose of this research is to explore the smartphone usage of employees. The research objectives will be achieved via three research questions, as explained below.

- The first research objective is to explore the employees' usage of the different types of smartphone applications at home, work, and when away from home and work. This forms research question one:

RQ1 How do employees use smartphone applications in different environments?

- The second research objective is to explore factors that drive the smartphone usage of employees, including technological determinism, social influence, performance expectancy, effort expectancy and facilitating conditions. This forms research question two:

RQ2 What factors drive employee smartphone usage?

- The third research objective is to explore employees' perceptions with regards to smartphone usage and productivity. The productivity implications of specific smartphone applications will be considered first, followed by factors that may affect productivity. This forms research question three:

RQ3 How do employees perceive smartphone usage to affect their productivity?

3.3 Research design and methodology

This section explores different types of philosophies, approaches, strategies, choices, time horizons, and techniques and procedures, in order to position this research. The research design and methodology are now explained using the layers of the research 'onion' depicted in Figure 3.1, below (Saunders, Lewis, & Thornhill, 2007).

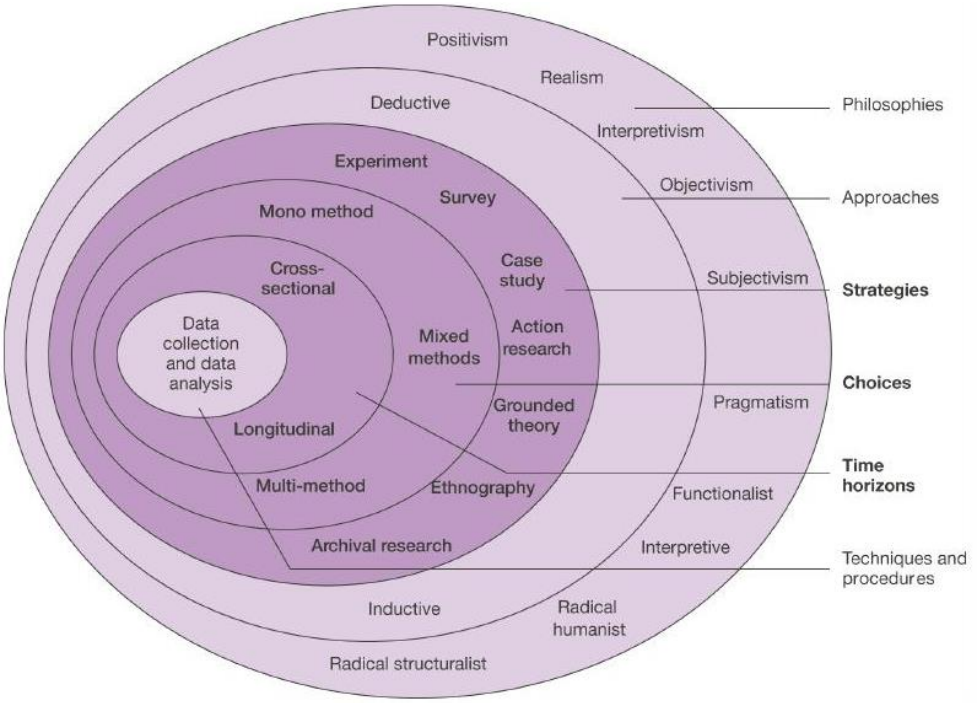

Figure 3.1 The research 'onion' (Saunders, et al., 2007)

3.3.1 Research philosophies

Research philosophy refers to the development and nature of knowledge (Saunders, et al., 2007). Figure 3.1 displays various research philosophies. The main philosophies are explained below.

- Positivism means working with an observable social reality using highly structured methodology and the end product can be law-like generalisations (Saunders, et al., 2007).
- Realism is a position taken that objects exist independently of the human mind (Saunders, et al., 2007). There are two types, namely critical realism and direct realism. Critical realism means that what is experienced are sensations and not the things directly, whereas direct realism means that what is experienced through the senses portrays the world accurately (Saunders, et al., 2007).

- Interpretivism means that it is necessary to understand the differences between humans in their role as social actors (Saunders, et al., 2007).
- Pragmatism is a position taken when the research question determines the research philosophy taken, arguing that it is possible to take both positivist and interpretivist positions. Pragmatism uses a practical approach by integrating different positions to collect and interpret data (Saunders, et al., 2007).

In light of the above, this research adopts a positivist philosophy where the paradigm assumes an objective stance and methods. Secondly, the data will be tested for relationships and is based on existing theory.

3.3.2 Research approaches

Research may follow a deductive and/or inductive approach. A deductive approach involves developing a theory and/or hypothesis and testing it, whilst an inductive approach involves collecting data and then developing a theory based on the data analysis (Saunders, et al., 2007).

This study combines the two. It is deductive in so far as it applies a modified UTAUT framework to help collect and analyse the data. The data collection and analysis methods are also more statistically based. However, it is also inductive as the actual results are based on the data collected and analysed. Furthermore, as this is an exploratory study, the findings are probable but not conclusive.

3.3.3 Research strategies

Before deciding on a research strategy, the purpose of the research needs to be identified. This stems from the research questions.

The following three purposes can be defined:

- Exploratory study: This is conducted to clarify a research problem or nature of the problem (Saunders, et al., 2007; Sekaran, 2006).
- Descriptive study: This is conducted to describe the characteristics of the variables being researched (Saunders, et al., 2007; Sekaran, 2006).
- Explanatory study: This is usually conducted to explain the relationship between variables (Saunders, et al., 2007). Sekeran (2006) refers to this as hypothesis testing.

As justified in the previous chapter, limited research has been conducted on the smartphone usage of employees in a South African context. This research will therefore be exploratory in nature with the aim of adding to the body of knowledge in order to gain a deeper understanding on what

smartphone applications are used in different environments, the drivers of smartphone usage, and the perceived effect of smartphone usage on productivity.

As the purpose of this study has been identified, an appropriate strategy or strategies can be selected.

The following strategies can be applied in research:

- An experiment studies casual links to see if a change in an independent variable changes another dependent variable (Saunders, et al., 2007; Sekaran, 2006).
- A survey involves structured data collection from a sizeable population (Saunders, et al., 2007).
- A case study is an empirical study of a phenomenon in real-life context using multiple sources of evidence (Saunders, et al., 2007; Sekaran, 2006).
- Action research involves management of change and collaboration between practitioners and researchers, and the results used in other contexts (Saunders, et al., 2007; Sekaran, 2006).
- Grounded theory develops a theory based on a series of observations and interviews, mainly applying an inductive approach (Saunders, et al., 2007).
- Ethnography describes and interprets the social world applying first-hand field study (Saunders, et al., 2007).
- Archival research analyses administrative records and documents as principle data sources (Saunders, et al., 2007).

This research applies a case study strategy combined with a survey strategy. It is a case study as the phenomenon, the smartphone usage of employees, is studied in a real-life context. A survey strategy is employed to collect quantitative data that can be analysed using descriptive and inferential statistics, in order to explore relationships between the variables, hence answer the research questions.

3.3.4 Research method choices

Before choosing a research method, the difference between quantitative and qualitative techniques needs to be understood. Quantitative techniques involve numerical data collection or analysis, for example questionnaires and statistics (Saunders, et al., 2007). Qualitative techniques, on the other hand, involve non-numerical data, for example interviews, and can also include pictures and video clips (Saunders, et al., 2007).

There are three options:

- A mono method is when only one data collection technique and corresponding analysis is performed. This means that the research is either quantitative or qualitative in nature (Saunders, et al., 2007).
- A multi-method is when more than one data collection technique is used with corresponding analysis procedures but they must all be either quantitative or qualitative in nature (Saunders, et al., 2007).
- Mixed methods can be of two types. Firstly, both quantitative and qualitative data collection techniques and corresponding analysis procedures can be applied, either in parallel or sequentially but are not combined (Saunders, et al., 2007). On the other hand, qualitative data collected can be quantified and quantitatively analysed, or quantitative data collected can be qualified and qualitatively analysed (Saunders, et al., 2007).

As this is only an exploratory study using a survey-based case study strategy, multiple methods were found not to be necessary. A mono method would serve as a suitable choice. Due to logistical, financial and time constraints a quantitative rather than qualitative data collection technique and corresponding analysis were chosen. This is discussed further on in the chapter.

3.3.5 Time horizons

A research phenomenon may be studied at a particular time known as a cross-sectional study or over a period of time known as a longitudinal study (Saunders, et al., 2007; Sekaran, 2006).

Due to time constraints this research is a cross-sectional study.

3.3.6 Techniques and procedures

Techniques and procedures refer to data collection and data analysis, and are discussed in the following sections.

3.4 Data collection

Data collection involves selecting an appropriate sample, as well as developing and administrating a research instrument

3.4.1 Sampling

Non-probability and convenience sampling were applied in this research, as it is a quick and inexpensive way of sampling the population. Non-probability sampling is a strategy applied when the population has no probabilities attached to being used as a sample (Sekaran, 2006). Convenience sampling is used to gather data from people conveniently available (Sekaran, 2006). H. S. Lee, et al. (2012) used convenience sampling to research factors affecting smartphone

application acceptance. Joo & Sang (2013) also applied convenience sampling to explore Koreans' smartphone usage.

Joo & Sang (2013) stated that although convenience sampling limits generalisation, they expected early adopters of the smartphone to have academic and practical implications. As explained earlier, this research is not about generalisability but rather about generating knowledge around smartphone usage. Therefore, convenience sampling is used in this research.

Bertschek & Niebel (2013) looked at the private attitude of respondents towards the use of smartphones as part of their study. 80% of respondents in ICT services indicated that they use or would use a smartphone in their leisure time in comparison to 64% of all the respondents together (Bertschek & Niebel, 2013). Thus, it was decided that individuals working in the IT field would be the most appropriate candidates for this research. It is also generally expected that the usage of a technology will stem from technologically inclined individuals. Although this may provide a natural bias, this research is only an exploratory study and further research would need to be conducted. Secondly, working individuals were chosen as smartphone usage needs to be assessed in both working and personal contexts.

The population to be researched included the employees at a South African IT firm. The firm is based in Durban and would prefer to remain anonymous. There were 87 employees. As the population was relatively small, it was decided that every employee that used a smartphone would be sampled in order to gather as many responses as possible. The respondents were to be contacted via email as the company could only provide the email addresses of the employees due to privacy reasons. Thus, the sample was further limited to 84 as there were no deliverable email addresses for the remaining 3 employees. Participation was voluntary and all participants were asked the same questions allowing for unbiased results.

3.4.2 Research instrument

A questionnaire was the research instrument chosen to collect data. A questionnaire is a written set of questions to which respondents record answers usually from defined alternatives (Sekaran, 2006). A questionnaire is an efficient form of data collection when it is known what is required and how to measure it (Sekaran, 2006). The researcher was therefore able to timeously and easily obtain responses from the sample using an online questionnaire as employed in other smartphone research studies by Böhmer, Saponas, & Teevan (2013), Kalkbrenner & McCampbell (2011), Kim (2008) and Negahban & Chung (2014).

Although questionnaires have many advantages, there are some issues associated with their use. Firstly, respondents are limited to choose between options, therefore other factors might be

missed. Capturing errors could also occur. The effect of these issues can be reduced and will be explained below.

The questionnaire can be viewed in Appendix A[1]. The variables identified in the literature were measured against the adapted UTAUT framework, described in Chapter 2, to answer the research questions. 5-point Likert scales ranging from strongly disagree to strongly agree as applied by Joo & Sang (2013) were used to measure attitudes and checkboxes/grids were used to select defined options. An open-ended question was also asked in each of the last three sections to allow the respondents to add other options and provide further comments. This reduces the chance of missing out factors as explained above.

The questionnaire was sectioned as follows:

Section A gathered demographic details as well as smartphone competency and usage details.

Section B explored smartphone usage using the application categories identified in Chapter 2. Although 10 categories were identified, it was necessary to subcategorise in order to determine the usage of important subcategories. Refer to Table 3.1 below. Usage was also tested in three different environments (home, work, away from home and work).

Categories	**Smartphone application number in questionnaire**		
Communication and messaging	1. Email	2. Instant Messaging	3. Video conferencing/VoIP
Information retrieval and analysis	4. Web	11.Weather/Stock/News Updates	
File management	8. File Management		
Scheduling and planning	6. Scheduling/planning		
Social networking	7. Social Networking		
Navigation	5. Maps/transit		
Media	10. Media		
eBooks and eMagazines	9. eBooks/eMagazines		
Online Shopping	12. Online Shopping		
Finance Management	13. Banking/Finance Management		

Table 3.1 Smartphone application categories.

Section C explored the drivers of smartphone usage. Table 3.2, below, shows the drivers in the questionnaire categorised as identified in Chapter 2.

[1] Although the questionnaire and other appendices refer to the words reliance and personal productivity, the research questions and analysis refer to usage and productivity to align more closely with the UTAUT framework's terminology.

Technological determinism	**Effort expectancy**	**Social influence**	**Performance expectancy**	**Facilitating conditions**
1.1 I am encouraged to use my smartphone because of the many features it offers.	1.6 My smartphone's interface is easy to use.	1.10 My smartphone enhances my image.	1.13 I use a smartphone because of the many applications that are available.	1.19 I use a smartphone because there is Wifi availability/low data cost.
1.2 Because of the features offered by my smartphone, I have changed the way I complete tasks.	1.7 My smartphone is easy to use due to its' physical design (eg. touch screen).	1.11 My friends/family think that I should use a smartphone.	1.14 I use a smartphone because there is integration between my applications.	1.20 I use a smartphone because there are software/ application updates available.
1.3 Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.	1.8 My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.	1.12 My contacts also use a smartphone.	1.15 My smartphone offers the ability to complete tasks quickly.	1.21 I use a smartphone because applications are free or low-cost.
1.4 Using my smartphone makes me feel efficient.	1.9 My smartphone is readily available to use when I need it.		1.16 My smartphone offers the ability to complete tasks efficiently.	1.22 My smartphone provides security for my data.
1.5 I have a smartphone because I like to keep up with technology.			1.17 My smartphone allows me to synchronise data online and between my devices.	1.23 My smartphone maintains my privacy and confidentiality.
			1.18 My smartphone provides easy access to the information I need.	1.24 It is possible to backup my data on my smartphone.
				1.25 There is help and support available for my smartphone/ applications.

Table 3.2 Smartphone usage drivers categorised.

As productivity can only be subjectively measured by the user, this research explored the user's perceptions with regards to their improved or decreased productivity using the smartphone. Section D explored the perceived productivity effect of each of the 13 identified types of applications. Factors affecting productivity, as identified in Chapter 2 were also assessed.

Table 3.3 below shows these factors categorised as advantages and disadvantages. Although these factors have been rated as advantages or disadvantages according to the literature, it must be noted that certain users may not perceive an advantage to be advantageous to them or a disadvantage to be disadvantageous to them. Therefore, the purpose of this study is to gather the users' perceptions on the following factors using a Likert agreement scale.

Advantages	**Disadvantages**
2.1 By using my smartphone, I have better personal organisation.	2.4 There are many unnecessary features on my smartphone which result in me wasting time.
2.2 By using my smartphone, I complete tasks in less time.	2.5 I am distracted by irrelevant information given by my smartphone.
2.3 By using my smartphone, I work more efficiently as I can work at any time and any place.	2.6 Being always accessible to contacts via my smartphone results in me spending a lot of time messaging.
2.7 The instant feedback I receive by using a smartphone has improved my personal productivity.	2.8 I waste time looking through more information than is necessary just because it is available via my smartphone.
2.10 By using my smartphone, I am able to multitask which increases my productivity.	2.9 I am distracted by games or social media whilst using my smartphone for other tasks.
	2.11 I find that multitasking with my smartphone wastes time as I need to constantly refocus.

Table 3.3 Factors affecting smartphone usage for productivity.

The questionnaire was created using a Google Form so that it could be electronically transmitted. This allowed the researcher to collect data timeously. Data capturing was automatic thus resolving the issue of capturing errors. A pilot test was run to ensure that there were no errors, ambiguity and discrepancies in both the questions and instructions, and to detect any missing factors/options.

An email containing the link to the online questionnaire was then sent out to the respondents.

3.5 Data analysis

The collected data was coded and imported into SPSS (Statistical Package for Social Sciences), where statistical tests were performed. Throughout, a p-value of 0.05 will be used to indicate significance.

Descriptive statistics, including means and standard deviations, will be used. The frequencies will be represented in tables or graphs. In order to test for significant trends in the data, inferential analysis will also be performed.

The following statistical tests are applied in this research, where applicable:

Chi-square goodness-of-fit-test: To test a categorical variable in order to test whether any of the response options were selected significantly more/less often than the others. The null hypothesis assumes that responses are selected equally.

Chi-square test of independence: To test whether a significant relationship exists between the two variables in a crosstabulation. A Fisher's exact test is used when conditions are not met.

Friedman Test: To compare the distributions of several related variables.

Kruskal-Wallis test: A non-parametric test used to compare three or more unmatched groups.

Pearson's (or Spearman's) correlation test: For a correlation between two ordinal variables.

Wilcoxon Signed Ranks test: A non-parametric test used to test the average score against the neutral score, which is 3 for the Likert scale questions in this research, in order to test for significant results.

The results are interpreted and the findings presented in the next chapter.

3.6 Validity and reliability

The questionnaire was pilot tested to ensure that there were no errors, ambiguity and discrepancies in both the questions and instructions. Participation was voluntary. The data is highly consistent and accurate as all administration and capturing of the questionnaire was automatic. This reduced capturing-time and mistakes whilst capturing. Data cleansing was performed to ensure that the questionnaires were fully completed and that there were no multiple entries.

Furthermore, correct and appropriate use of statistical tests were performed by a qualified statistician to ensure that assumptions were not violated. Cronbach's Alpha tests were run to

check for reliability and Kolmogorov-Smirnov Tests were run to check for normality, as explained in the next chapter.

3.7 Ethical considerations

This study complied with the ethical requirements of the School of Management, IT & Governance as well as the University of KwaZulu-Natal.

The research proposal, draft research instrument, letter of informed consent and a Gatekeeper's letter (obtained from the company to be researched) were submitted with an ethical clearance application form to the School's ethical clearance committee and approval was received, Appendix D.

Informed consent was obtained from each respondent and confidentiality of personal data was maintained. The responses were not used for any reason other than this specific study and were submitted to the School for archiving purposes.

3.8 Conclusion

This chapter delineated the research objectives. The research design and methodology was discussed in order to position this research. This includes the chosen research philosophy (positivism), research approaches (deductive and inductive), research strategies (case study and survey), research method (quantitative mono method) and time horizon (cross-sectional). The data collection process was explained including sampling and the research instrument. Non-probability and convenience sampling was applied and included the employees at an IT firm that used smartphones. An online questionnaire was used as the research instrument. The data analysis procedures were explained, and are based on relevant statistical tests. The validity and reliability of data was assessed and ethical consideration were complied with. The next chapter discusses the findings and analysis.

CHAPTER 4: FINDINGS AND ANALYSIS

"its [*sic*] nolonger [*sic*] a want these days its [*sic*] a need" (Anonymous respondent, personal communication, July 3, 2014).

4.1 Introduction

As explained in the previous chapters, the purpose of this study is to explore the smartphone usage of employees through the following three research questions:

- **RQ1** How do employees use smartphone applications in different environments?
- **RQ2** What factors drive employee smartphone usage?
- **RQ3** How do employees perceive smartphone usage to affect their productivity?

Findings and analysis are performed using the research questions in conjunction with the adapted Unified Theory of Acceptance and Use of Technology (UTAUT) framework, discussed in Section 2.9. A comparative analysis with Google (2013), Kalkbrenner & McCampbell (2011), Karikoski & Soikkeli (2013), and other studies is also performed.

The response rate, consistency and reliability of results will first be presented. This is followed by the key demographic statistics to profile the respondents. The findings and analysis are then presented sequentially in order to answer the research questions.

4.2 Response rate

The survey was run over a month to gather as many responses as possible. Although the survey was distributed to 84 employees as explained in Section 3.4.1, only 58 valid responses were obtained. This is because employees did not use smartphones and therefore could not be surveyed (as indicated by an employee) or employees were too busy to answer the survey (as indicated by another employee). Overall, a 69% response rate was achieved. This was better than expected as participation was voluntary.

4.3 Consistency and reliability

The collected data was coded, refer to Appendix B. As previously mentioned, data cleansing occurred, and duplicate and multiple entries were removed.

Sufficient data was collected to be able to perform the statistical tests. Throughout the analysis, any result with a p-value less than 0.05 was considered significant. 5-point Likert scales were employed and a test value of 3 was used to check for agreement or disagreement. With regards to the Likert scale questions, in order to achieve a confidence level of 95% with an acceptable

margin of error of .03, only 51 respondents would have been required. N=58, therefore this was met.

The independent variables in the adapted UTAUT framework (Figure 2.14) were tested using various drivers as illustrated in Table 3.2. The smartphone usage driver groups therefore needed to be tested to ensure that they were consistent measures. Cronbach's Alpha is a numerical coefficient to test the reliability of scales and the minimum acceptable level is 0.7 (Reynaldo & Santos, 1999). All the results (Appendix C) were >.7, indicating that internal consistency was achieved and the driver groups may be regarded as reliable.

All Pearson's correlation test results were positive. Relationships were analysed as follows: weak if 0<r<.4, moderate if .4<r<.7 and strong if .7<r<1.

4.4 Normality tests

Kolmogorov-Smirnov tests (Appendix C) were run to check for normal distribution in order to determine which tests should be used. The majority of questions were not normally distributed, therefore Wilcoxon signed ranks tests were used instead of t-tests. The Wilcoxon signed ranks tests were used to test the average score against the neutral score in order to test for significant agreement or disagreement.

4.5 Demographic statistics

There were 58 respondents and the demographic statistics are summarised in Figure 4.1, below. Gender and age are moderating variables in the adapted UTAUT framework (Figure 2.14) and may influence the other variables.

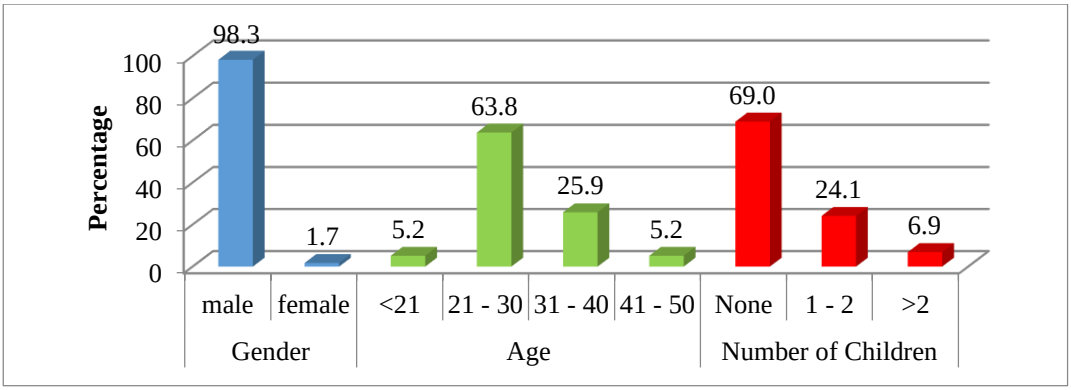

Figure 4.1 Summary of demographic statistics

As evident, the employees at the company were predominantly male. This is not unexpected as IT is a male-dominated field (Draus et al., 2014). Due to the large variance in male and female respondents, their differing responses cannot be accurately compared.

The majority of respondents were between the ages of 21 -30 (63.8%) and 31-40 (25.9%). Most of the respondents did not have children. 24.1% had 1-2 children and 6.9% had more than 2 children. A crosstabulation indicated that there was not a significant relationship between the number of children the respondent had and their average daily smartphone usage (Appendix C). This variable will therefore not be taken into account during analysis as it appears that it does not make a difference.

4.6 Smartphone usage and competency

The respondents smartphone usage and competency are summarised in Figures 4.2 and 4.3 respectively. Firstly, the time the user has been using a smartphone was measured, linked to the moderating variable experience in the adapted UTAUT framework (Figure 2.14). Their average daily usage was then measured and is linked to the dependent variable use behaviour in the adapted UTAUT framework (Figure 2.14). Results from a chi-square goodness-of-fit test (Appendix C) show that significantly more than expected users have been using their smartphone for more than 2 years (χ^2 (3, N=58) = 87.793, p<.0005) and use their smartphones for more than 4 hours a day (χ^2 (4, N=58) = 26.310, p<.0005). This was not really unexpected as the respondents in this study have an IT background, thus would be expected to use the latest technology.

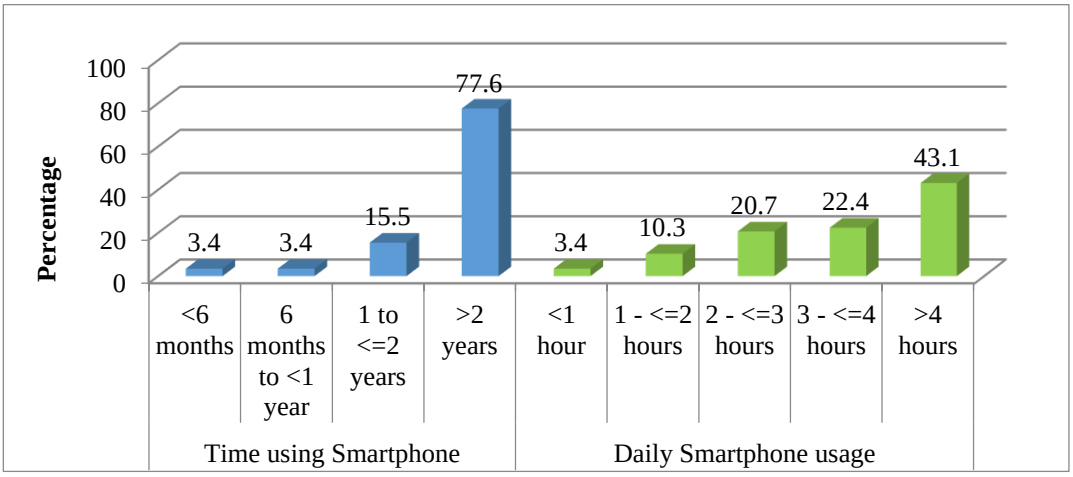

Figure 4.2 Summary of smartphone usage

Daily smartphone usage was overall higher than that found by Kalkbrenner & McCampbell (2011) where the majority (40.8%) only spent between 1-2 hours a day and only 4.2% of users utilised their smartphone for more than 4 hours a day. This may be because Kalkbrenner &

McCampbell's (2011) study was conducted a few years ago and smartphone capabilities have since been upgraded. The respondents in this study were also IT employees which may lead to higher usage.

Competency was also measured by asking the user if they knew how to use all/most/some features on their smartphone. This is linked to the moderating variable experience in the adapted UTAUT framework (Figure 2.14).

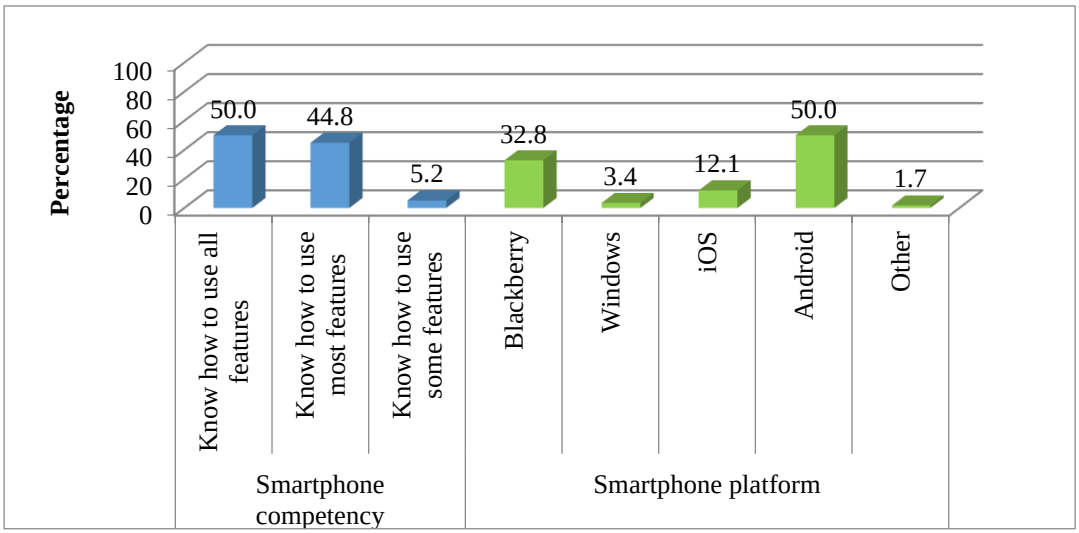

Figure 4.3 Summary of smartphone competency

Results from a chi-square goodness-of-fit test (Appendix C) showed that significantly fewer than expected indicated that they only knew how to use some of the features on their smartphone (χ^2 (2, N=58) = 20.931, p<.0005). This was not really unexpected as the respondents had an IT background and should know how to use most if not all of the features on their smartphone.

Interestingly, a crosstabulation indicated that there was not a significant relationship between smartphone competency and the length of time using a smartphone (Appendix C). This may be because smartphone applications are generally designed to be easy to use and practice would not be essential. The respondents also had an IT background and it is evident that the majority of the respondents knew how to use most if not all of the features on their smartphone. There also was not a significant relationship between smartphone competency and average daily smartphone usage (Appendix C). This may be because the smartphone is only used when required and therefore competency would not affect actual usage.

The majority of the respondents used smartphones on the Android and Blackberry platforms. This was not unexpected as smartphones using the iOS platform are more expensive. It can be noted that the user that indicated Other, used both Android and iOS smartphones.

As is evident, the majority of the respondents could use most, if not all of the features, on their smartphone. The majority of respondents (43.1%) also used their smartphones for over 4 hours a day. Smartphone application usage will now be assessed.

4.7 Smartphone application frequency of usage

The current frequency of usage is first explored. Intended future usage is thereafter assessed and the findings are then compared.

4.7.1 Current frequency of usage

The frequency of usage of smartphone applications is linked to the dependent variable use behaviour in the adapted UTAUT framework (Figure 2.14). This was assessed using 13 applications. Table 4.1, below, lists the frequency of usage of each application. The percentages that appear to be high are shown in red and thereafter discussed.

Application	Do not use	Less than once a month	At least once a month	At least once a week	At least once a day	Several times a day
1.1. Email	0%	3.4%	0%	3.4%	19%%	74.1%
1.2. Instant Messaging	0%	5.2%	0%	1.7%	22.4%	70.7%
1.3. Video Conferencing/VoIP	39.7%	19%	13.8%	15.5%	10.3%	1.7%
1.4. Web	1.7%	1.7%	1.7%	5.2%	20.7%	69%
1.5. Maps/transit	8.6%	22.4%	15.5%	29.3%	15.5%	8.6%
1.6. Scheduling/planning	13.8%	12.1%	5.2%	27.6%	15.5%	25.9%
1.7. Social Networking	6.9%	5.2%	5.2%	1.7%	20.7%	60.3%
1.8. File Management	13.8%	10.3%	20.7%	12.1%	20.7%	22.4%
1.9. eBooks/eMagazines	50%	10.3%	5.2%	17.2%	8.6%	8.6%
1.10. Media	5.2%	5.2%	5.2%	15.5%	22.4%	46.6%
1.11. Weather/Stock/News Updates	12.1%	10.3%	6.9%	10.3%	36.2%	24.1%
1.12. Online Shopping	46.6%	19%	15.5%	5.2%	5.2%	8.6%
1.13. Banking/Finance Management	19%	1.7%	13.8%	25.9%	25.9%	13.8%

Table 4.1 Frequency of usage of smartphone applications

With regards to communication and messaging applications, email and instant messaging were used by all the respondents. Frequency of usage was relatively the same between the two. A large majority (74.1% for Email and 70.1% for instant messaging) used the applications several times a day. It is not so surprising that the other communication and messaging application, video conferencing/VoIP, is used less frequently (not used at all by 39.7% of respondents). Possible

reasons are that they are not needed, they are less efficient than normal cellular voice calls, other contacts may not use them, slow Internet connections reduces the quality of the calls, or that they require more data and would therefore cost more to use than other communication applications.

As expected, the web and social networking are also frequently utilised, more than 60% used them several times a day. eBooks/eMagazines (50%) and Online Shopping (46.6%) were not used by many. It must be noted that usage is not expected to be high for all the applications as the purpose of applications differ, thus they may not be required all the time. For example, online shopping would only be used when the need arises and eBook/eMagazines may not be used by users on their smartphones due to the small screen size. Table 4.2 ranks the applications by the most used (6) to the least used (1). The means above 4, shown in red, indicate that the applications are used often, at least once a week.

Application	N	Mean	Std. Deviation
1.1 Email	58	5.60	.857
1.2 Instant Messaging	58	5.53	.959
1.4 Web	58	5.48	1.013
1.7 Social networking	58	5.05	1.561
1.10 Media	58	4.84	1.461
1.11 Weather/Stock/News Updates	58	4.21	1.704
1.6 Scheduling/planning	58	3.97	1.737
1.8 File management	58	3.83	1.728
1.13 Banking/Finance Management	58	3.79	1.652
1.5 Maps/transit	58	3.47	1.441
1.9. eBooks/eMagazines	58	2.50	1.789
1.3 Video Conferencing/VoIP	58	2.43	1.488
1.12 Online shopping	58	2.29	1.622

Table 4.2 Ranked current usage of smartphone applications

On average communication and messaging applications for email and instant messaging are used daily whilst video conferencing/VoIP are used less than once a month. Possible reasons were mentioned above. Overall, it appears that communication and messaging applications are the main applications. This was expected as the cell phone was primarily a communications device and then moved into the smartphone spectrum.

The web is also used daily. Again, this was expected as smartphones allow for instant access when away from other devices. Smartphones have also provided Internet access to many users that did not have other Internet connections at home.

Social networking is also used daily. Social networking is used to get the latest updates from contacts, businesses, celebrities, and any other news that interests a user. For some users social networking may be seen as keeping in touch with what is happening around them.

On average media and weather/stock/news updates were used at least once a week, but in fact 69% do use media daily and 60.3% do use weather/stock/news updates daily. Media may include taking pictures, watching videos or listening to music. This may not be required daily by some users as they have less time to spend on these activities due to work. Weather/stock/news updates may also not be required daily by some users as they can get this information from other sources, for example listening to the radio whilst travelling.

On average, the remaining applications were used at least once a month or less. Although this suggests that these applications are not useful to the users, it must be noted that this is the average. Some users do use them regularly whilst others do not, as evident in Table 4.1.

The current usage agrees with the findings of Falaki, et al. (2010) where communication formed 49% of total usage, followed by browsing (including social networking) at 12% and media at 9%. Usage differed slightly to the results of Google (2013) where the Internet (web) was used the most (89%), followed by email (85%), social networking (83%), and then music (77%) and video (73%). Rana et al. (2014) also found that smartphones are principally used for communication as social and communication applications covered 60% of total app usage. Effective Measure (2014) found that instant messaging, email and then social networking were the most performed activities by South Africans. In light of the above, there is agreement that email, instant messaging, the web and social networking are frequently used.

The standard deviations were relatively high (above 1 with the exception of email and instant messaging). This suggests that the respondents' frequency of usage is spread and therefore differs for the various applications. It is not surprising that the standard deviations were lower for email and instant messaging because communication is the main function of a smartphone. Hence, the frequency of usage of these two applications should not differ greatly.

Spearman's correlation tests were run to compare the usage of each application to age. The only significant relationship found was that there was a negative correlation between age and the usage of file management ($rho(N=58) = -.309$, $p=.018$)(Appendix C). This implies that older employees use file management less on their smartphones in comparison to younger employees. As explained in Chapter 2, file management has moved towards cloud storage. The cloud is still a new concept and this may be why older employees use file management less. Overall, age does not appear to influence usage. This agrees with the findings of The Mobility 2014 research study

of South Africans, where data usage only dropped above the age of 55 years but not significantly (World Wide Worx, 2013b).

In the next section, future intended usage is explored.

4.7.2 Future intended usage

Intended future usage of the application is linked to the dependent variable behavioural intention in the adapted UTAUT framework (Figure 2.14). The respondents were asked about their future intended usage and the results are listed in Table 4.3. The percentages that appear to be high are shown in red and thereafter discussed.

Application	Do not intend to use	Less than once a month	At least once a month	At least once a week	At least once a day	Several times a day
5.1 Email	0%	1.7%	1.7%	6.9%	13.8%	75.9%
5.2 Instant Messaging	1.7%	3.4%	3.4%	1.7%	15.5%	74.1%
5.3 Video conferencing/VoIP	27.6%	12.1%	3.4%	22.4%	10.3%	24.1%
5.4 Web	1.7%	3.4%	1.7%	12.1%	19%	62.1%
5.5 Maps/transit	10.3%	15.5%	17.2%	15.5%	17.2%	24.1%
5.6 Scheduling/planning	12.1%	5.2%	15.5%	15.5%	20.7%	31%
5.7 Social networking	8.6%	1.7%	8.6%	3.4%	32.8%	44.8%
5.8 File Management	12.1%	12.1%	19%	17.2%	15.5%	24.1%
5.9 eBooks/eMagazines	32.8%	8.6%	20.7%	10.3%	3.4%	24.1%
5.10 Media	3.4%	10.3%	8.6%	12.1%	25.9%	39.7%
5.11 Weather/Stock/News Updates	10.3%	8.6%	8.6%	19%	24.1%	29.3%
5.12 Online Shopping	37.9%	15.5%	6.9%	19%	3.4%	17.2%
5.13 Banking/Finance Management	12.1%	5.2%	12.1%	19%	17.2%	34.5%

Table 4.3 Frequency of intended usage of smartphone applications

Communication and messaging applications, email and instant messaging, are still intended to be used frequently and at a similar level. 75.9% indicated that they intend to use email several times a day and 74.1% indicated that they intend to use instant messaging several times a day, making email usage 89.7% daily and instant messaging 89.6% daily. Video conferencing/VoIP is indicated to increase to 34.4% daily, but is still low. Unexpectedly, a user indicated that they do not intend to use instant messaging in the future. This was not expected because generally application usage is expected to increase. It was also found that instant messaging was one of the most used applications in the previous section. In the following section, possible reasons will be explored.

Not surprisingly, the web is still intended to be used by 81.1% daily. The frequency of social networking usage has decreased but is still high at 77.6% daily. It appears that there is a shift from using the application several times a day to at least once a day, by some users. Possible reasons are explored in the following sections.

Some users still do not intend to use eBooks/eMagazines (32.8%) and online shopping (37.9%).

Table 4.4 ranks the average intended future usage from most (6) to least (1). The means above 4, shown in red, indicate that the applications are intended to be used often, at least once a week.

Application	N	Mean	Std. Deviation
5.1 Email	58	5.60	.836
5.2 Instant Messaging	58	5.48	1.128
5.4 Web	58	5.29	1.155
5.7 Social networking	58	4.84	1.542
5.10 Media	58	4.66	1.505
5.13 Banking/Finance Management	58	4.28	1.715
5.11 Weather/Stock/News Updates	58	4.26	1.660
5.6 Scheduling/planning	58	4.21	1.704
5.5 Maps/transit	58	3.86	1.701
5.8 File management	58	3.84	1.705
5.3 Video Conferencing/VoIP	58	3.48	1.967
5.9. eBooks/eMagazines	58	3.16	1.963
5.12 Online shopping	58	2.86	1.896

Table 4.4 Ranked intended usage of smartphone applications

On average email, instant messaging and the web are intended to be used daily. Social networking, media, banking/finance management, weather/stock/news updates and scheduling/planning are intended to be used at least once a week. The usage reasons would remain the same as explained in the above section. This suggests that these applications are the main applications and will be explored in the following sections. Although the remaining applications appear to have low intended usage, it can be noted again that certain users intend to use them regularly whilst others do not. In fact, maps/transit are used daily by 41.3% and file management are used daily by 39.6%. The standard deviation was relatively high (above 1 with the exception of email) suggesting that the respondents do not intend to use each application in the same way. This ties in with their current usage habits. In the next section, current and intended usage are compared.

4.7.3 Comparison

The average current usage and intended future usage is graphically compared in Figure 4.4, below.

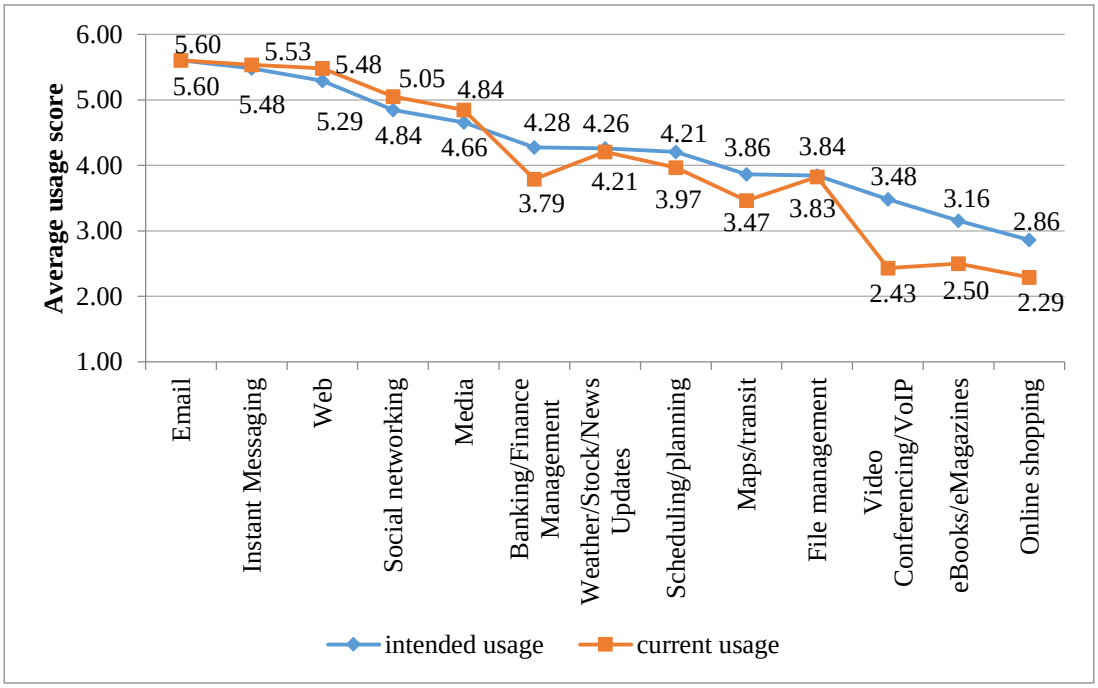

Figure 4.4 Average current and intended future usage of smartphone applications

Average usage is intended to increase, with the exception of instant messaging, the web, social networking and media. This may be because these applications are most likely used for personal activities so the respondents think that they should use them less, whereas the applications with an expected increase are more work or productivity related. Email usage is expected to remain the same. This may be because email is ubiquitous and users can access their email from various devices. Email access is not normally restricted via work computers, whereas access to social networks and general web applications may be restricted. Interestingly, the first five applications were ranked in the same order with regards to current and intended usage. This suggests that the respondents are finding these applications the most useful and will therefore continue using them.

Results from a Wilcoxon signed ranks test (Appendix C) indicated that there is a significant difference in intended usage for video conferencing/VoIP ($Z(N=58) = -4.097$, $p<.0005$), maps/transit ($Z(N=58) = -2.259$, $p=.024$), eBooks/eMagazines ($Z(N=58) = -2.915$, $p=.004$), online shopping ($Z(N=58) = -3.003$, $p=.003$), and banking/finance Management ($Z(N=58) = -2.298$, $p=.022$). Average banking/finance management and scheduling/planning usage is expected to increase from at least once a month to at least once a week. This may be because users are seeing the increased convenience of using their smartphones for these tasks. There is

also an expected increase in average video conferencing/VoIP and eBooks/eMagazines from less than once a month to at least once a month. However, usage is still expected to be low. Possible reasons for low video conferencing/VoIP usage was explained earlier and may be because they are not needed, they are less efficient than normal cellular voice calls, other contacts may not use them, slow Internet connections reduces the quality of the calls, or that they require more data and would therefore cost more to use than other communication applications. As explained earlier, eBook/eMagazines may not be used by many users on their smartphones due to the small screen size. Although the difference for maps/transit appears to be minor, there is an increase in daily usage from 24.1% to 41.3%. There appears to be a shift from weekly usage to daily usage, indicating that users are seeing the benefits of using these applications. The difference for online shopping also appears to be minor but there is an increase in total daily and weekly usage from 19% to 39.6%. Usage is still intended to be low by many users. However, online shopping is an activity that would only be used when the need arises, as mentioned previously.

Most of the other differences are minor but looking at social networking, average usage is intended to decrease from at least once a day to at least once a week. Various studies suggest that social networking can be a distraction and reduce productivity (Bain, et al., 2013; Kalkbrenner & McCampbell, 2011). Possible reasons are explored in the later relevant sections. In the next section smartphone usage in the different environments is explored in order to answer **RQ1**.

4.8 Smartphone application usage in different environments

The previous sections discussed the user's competency and frequency of usage leading up to **RQ1** how do employees use smartphone applications in different environments. The aim of this section is to now answer **RQ1** using those findings and the ones below, in order to be able to explore the degree of usage of each application in the three environments identified in Chapters 2 and 3:

- Home
- Work
- Away from home and work

The degree of usage is linked to the dependent variable use behaviour in the adapted UTAUT framework (Figure 2.14). The degree of usage was tested in each environment using a Likert scale ranging from 1-5, where 5 was the highest. The results are summarised in Table 4.5, below. The means in red indicate significant results.

Application	N	Average		Home		Work		Away from home and work	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1.Email	58	4.09	.997	4.09	1.204	3.84	1.587	4.34	1.117
2.Instant messaging	58	4.17	1.038	4.21	1.239	3.90	1.423	4.40	1.138
3.Video conferencing/VoIP	58	2.25	1.328	2.26	1.458	2.21	1.542	2.28	1.412
4.Web	58	3.88	1.055	3.84	1.348	3.64	1.483	4.16	1.182
5.Maps/transit	58	3.12	1.315	3.14	1.515	2.83	1.523	3.40	1.533
6.Scheduling/planning	58	3.13	1.352	3.21	1.496	3.12	1.557	3.05	1.561
7.Social networking	58	3.79	1.273	3.95	1.432	3.34	1.681	4.09	1.430
8.File management	58	2.94	1.268	3.03	1.337	2.84	1.519	2.95	1.444
9.eBooks/eMagazines	58	2.12	1.250	2.12	1.285	1.95	1.330	2.29	1.487
10.Media	58	3.40	1.202	3.74	1.250	2.91	1.502	3.55	1.465
11.Weather/stock/news updates	58	2.95	1.300	3.03	1.486	2.72	1.598	3.10	1.541
12.Online shopping	58	2.20	1.349	2.26	1.421	2.07	1.437	2.28	1.554
13.Banking/finance management	58	3.16	1.403	3.24	1.380	2.93	1.642	3.31	1.614

Table 4.5 Usage per environment

First, the usage in each environment will be discussed and then a comparative analysis will be performed.

4.8.1 Usage at home

A Wilcoxon signed ranks test (Appendix C) was run to test for significance of usage at home. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. A significant difference showed high usage if mean > 3 and low usage if mean < 3.

Results indicate that significant usage is evident on email ($Z(N=58) = -5.031$, $p<.0005$), instant messaging ($Z(N=58) = -5.238$, $p<.0005$), the web ($Z(N=58) = -4.082$, $p<.0005$), social networking ($Z(N=58) = -3.970$, $p<.0005$) and media ($Z(N=58) = -3.828$, $p<.0005$). These five applications were currently the most used and intended to be used, with either daily or weekly usage.

Furthermore, it is significantly shown that there is low usage of video conferencing/VoIP ($Z(N=58) = -3.505$, $p<.0005$), eBooks/eMagazines ($Z(N=58) = -4.123$, $p<.0005$) and online shopping ($Z(N=58) = -3.601$, $p<.0005$). These applications had the lowest current and intended future usage.

4.8.2 Usage at work

A Wilcoxon signed ranks test (Appendix C) was then run for the work environment. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. A significant difference showed high usage if mean > 3 and low usage if mean < 3.

Results showed that there was significant usage of email ($Z(N=58) = -3.708$, $p<.0005$), instant messaging ($Z(N=58) = -4.144$, $p<.0005$) and the web ($Z(N=58) = -2.728$, $p<.0005$). These three applications also had the highest intended usage. It appears that usage is not as high at work in comparison to at home.

Additionally, there was significantly low usage of video conferencing/VoIP ($Z(N=58) = -3.332$, $p<.0005$), eBooks/eMagazines ($Z(N=58) = -4.710$, $p<.0005$) and online shopping ($Z(N=58) = -4.296$, $p<.0005$). This was the same as the home environment.

4.8.3 Usage when away from home and work

A Wilcoxon signed ranks test (Appendix C) was run again to test for significant usage when away from home and work. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. A significant difference showed high usage if mean > 3 and low usage if mean < 3.

Results indicated that there was significant usage on email ($Z(N=58) = -5.868$, $p<.0005$), instant messaging ($Z(N=58) = -5.865$, $p<.0005$), the web ($Z(N=58) = -5.048$, $p<.0005$), maps/transit ($Z(N=58) = -1.978$, $p=.048$), social networking ($Z(N=58) = -4.377$, $p<.0005$) and media ($Z(N=58) = -2.695$, $p=.007$). These were the same applications as the home environment with the addition of maps/transit. A possible reason may be that maps/transit would most likely be used when travelling, that is when the user is away from home and work. The difference in usage will be discussed in the next section.

Also, there was significantly low usage on video conferencing/VoIP ($Z(N=58) = -3.432$, $p=.001$), eBooks/eMagazines ($Z(N=58) = -3.121$, $p=.002$), and online shopping ($Z(N=58) = -3.204$, $p=.001$).This was also found for the home and work environments agreeing with earlier findings that these applications are not always used.

4.8.4 Comparison

Average usage was the highest when away from home and work (M=3.32), followed by at home (M=3.24), and then at work (M=2.95). This differed to the findings of Google (2013) and Verkasalo (2009) where usage was the most at home, then when away from home and work, and

then at work. Average usage in the environments will differ per application, hence explored by application below.

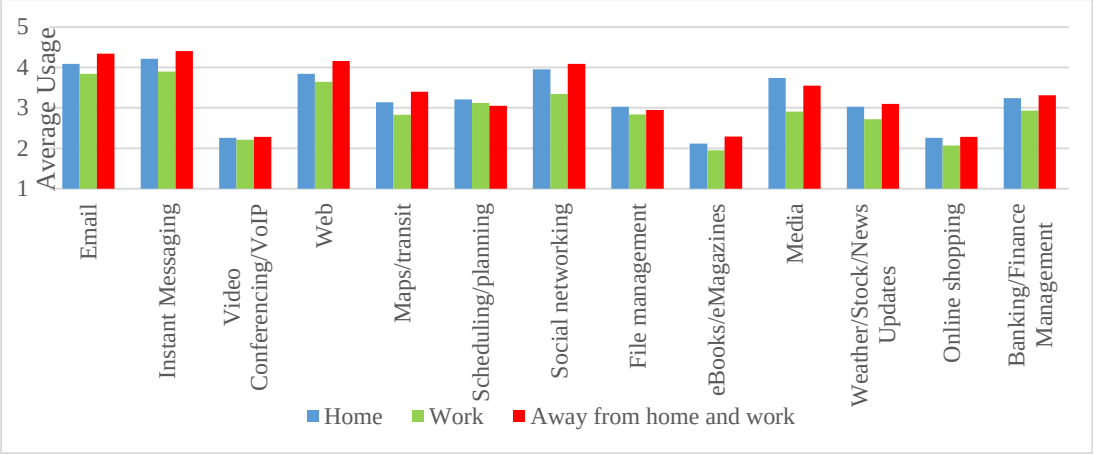

Figure 4.5 Average usage in each environment

Figure 4.5, above graphically compares the average usage in each environment. As can be seen, the average usage of each application is similar in each environment (less than 1 mean difference). With the exception of file management, media and scheduling/planning, the applications were mostly used when away from home and work, then at home, and then at work. Verkasalo (2009) found that instant messaging, email and the web were also used the most on the move, which is when away from home and work. These three applications were also the most used and intended to be used. Usage at work is a little lower for each application with the exception of scheduling/planning.

Further tests were necessary to determine significant differences in usage for each environment. Friedman tests (Appendix C) were first run to test if the usage means for the three environments were significantly different for each application. If the means were significantly different, Wilcoxon signed ranks tests (Appendix C) were run to test each pair (home with work, home with away from home and work, and work with away from home and work) individually to establish where the differences lie. The results are discussed below.

With regards to instant messaging, analysis shows that there is a significant difference in the average usage at home, at work, and when away from work and home ($\chi^2(2, N=58) = 8.592$, $p=.014$). Specifically, there is a significant difference in usage at work ($M=3.90$), and when away from home and work ($M=4.40$) ($Z(N=58) = -2.490$, $p=.013$). This was expected as instant messaging is more for personal communication and therefore usage would be less at work. Similarly, Karikoski & Soikkeli (2013) found that usage intensity was lower for IM/VoIP at the

office than elsewhere and home. Verkasalo (2009) also found that instant messaging was used the most on the move, that is when away from home and work.

In relation to maps/transit there is a significant difference in the average usage at home, at work, and when away from work and home ($\chi^2(2, N=58) = 8.650$, $p=.013$). Specifically, there is a significant difference in usage at work (M=2.83) and when away from work and home (M=3.40) ($Z(N=58) = -2.742$, $p=.006$). Furthermore, usage was only found to be significant when away from home and work. For respondents that are primarily based in an office, maps/transit would not generally be required at work and are most likely used when away from home and work. On the other hand, for respondents that travel to clients or suppliers, maps/transit would most likely be used for work. This may be a reason for the differing respondents as 35% of respondents indicated high usage at work.

An analysis of the social networking responses indicated that there was a significant difference in the average usage at home, at work, and when away from work and home ($\chi^2(2, N=58) = 16.980$, $p<.0005$). There was a significant difference in usage at work (M=3.34), and when away from home and work (M=4.09) ($Z(N=58) = -2.977$, $p=.003$). There was also a significant difference in usage at work (M=3.34) and home (M=3.95) ($Z(N=58) = -3.250$, $p=.001$). For many respondents social networking is primarily for personal purposes and usage is not encouraged at work, therefore usage should be significantly less at work. Ferreira & du Plessis (2009) highlighted some of the risks of social networking at work including bandwidth and storage consumption, privacy issues and security risks, as well as developing addictive behaviour which may reduce employee productivity. On the other hand, for some respondents social networking might be required for public relations or marketing purposes. This could be why 38% of respondents indicated high usage of social networking at work.

Analysis of media usage indicated that there was a significant difference in the average usage at home, at work, and when away from work and home ($\chi^2(2, N=58) = 25.653$, $p<.0005$). Specifically, there was a significant difference in usage at work (M=2.91) and when away from home and work (M=3.55) ($Z(N=58) = -3.522$, $p<.0005$). There was also a significant difference in usage at work (M=2.91) and home (M=3.74) ($Z(N=58) = -4.241$, $p<.0005$). This was the same as was found for social networking. It is not unexpected as media usage is generally for personal purposes, therefore usage would be significantly less at work. Karikoski & Soikkeli (2013) also found that usage intensity was lower for multimedia at the office than elsewhere and home.

There was also a significant difference in the average usage at home, at work, and when away from work and home ($\chi^2(2, N=58) = 7.125$, $p=.028$) with regards to weather/stock/news updates. This was unexpected as these updates would pertain to all environments and therefore usage

should not be significantly different. Furthermore, degree of usage was just below neutral, suggesting that smartphones are not highly used for these purposes. This agrees with usage statistics where the average current usage was just over at least once a week and there was also not much difference in intended usage. A possible explanation is that respondents may not require these updates at work. They may also be getting this information from other sources, for example watching the daily news on TV.

4.8.5 Other applications used

Respondents were further asked if there were any other applications that they used. Eight respondents indicated that there were no other applications. A respondent indicated yes but did not explain further. Another respondent indicated the Google Play store. This was not unexpected as app stores are used to find and download applications. Other respondents indicated picture editing, Bluetooth connections, email, 9GAG, Dropbox and cloud applications. These were already covered by the relevant application categories in the previous questions.

Interestingly, three respondents indicated that they used remote software, like TeamViewer and VNC, for remote support, control and file transfer. This might be expected with IT employees but may not be necessary for general users. One of the respondents indicated that he thought that remote software would be built into phones in the near future. This would be helpful for support purposes.

A respondent indicated that he used Internet tools like Speedtest.net to troubleshoot networks and another indicated that he used applications to check data bandwidth availability. This could fall under information retrieval and analysis applications and would also influence the facilitating conditions driver of smartphone usage. A respondent also indicated that he used third party applications to track mobile phones and vehicles via GPS. Again, the usage of these applications would depend on a person's job and may not be relevant to all users.

A respondent indicated that he used his iPad alternatively with his phone, whilst another indicated he used windows on his desktop, and another two used their laptops. This was expected as a smartphone does not necessarily replace all devices but may be used in conjunction to improve productivity (Glover, 2012). This is because certain tasks cannot be easily performed on a smartphone in comparison to a computer, due to the small screen size and keyboard, for example formatting a word document.

4.8.6 Answer to RQ1

The average degree of usage of the applications are depicted in Figure 4.6, using the application categories identified in Chapters 2 and 3.

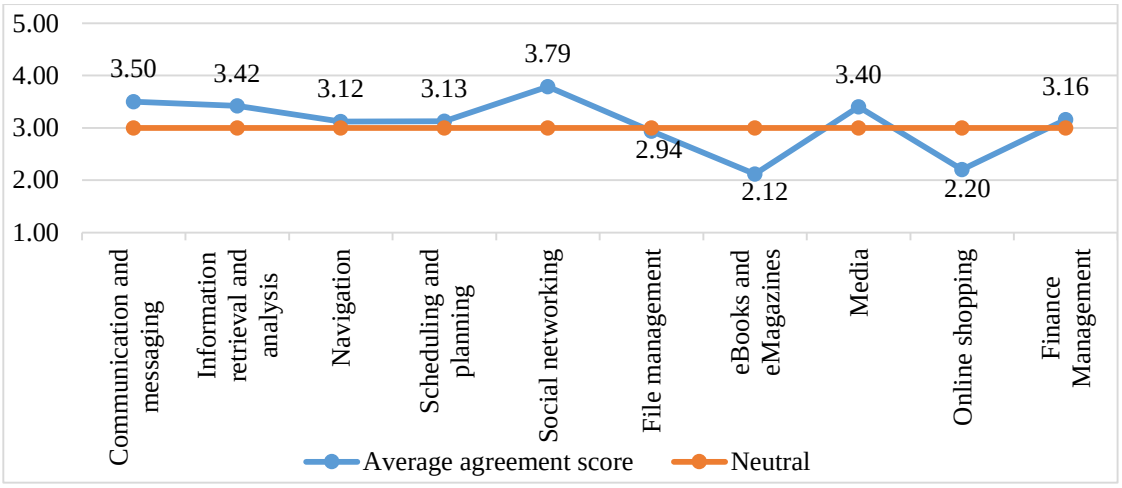

Figure 4.6 Average degree of usage of smartphone applications by category

The most used applications are social networking, followed by communication and messaging, and then information retrieval and analysis. Although it was found earlier that instant messaging and email were the most used, video conferencing/VoIP had low usage, thus bringing down the average for communication and messaging. It is still surprising that social networking scored the highest average degree of usage as future usage was expected to decrease. However, it must be noted that social networking is not significantly used in the work environment. Possible reasons were discussed above.

Social networking and communication and messaging applications allow users to keep in touch with their contacts which may be why usage is high for these applications. Research on contextual experience sampling of mobile application micro-usage also found that applications for people's social connections were most used (D. Ferreira, Goncalves, Kostakos, Barkhuus, & Dey, 2014). Another reason is that smartphones are more convenient for these purposes due to their portability and ease of use, in comparison to other devices. Information retrieval and analysis applications allow users to quickly search for information when required. Thus, users may use their smartphones due to its portability. Subsequently, it is expected that these applications would score high usage.

The average degree of usage of online shopping, eBooks/eMagazines and file management was below neutral but was only significantly low for online shopping and eBooks/eMagazines. Online shopping and eBooks/eMagazines also had the lowest intended usage. Possible reasons were explored above suggesting that these applications were only used when required or that the smartphone's small screen affected usage.

In answer to **RQ1** how do employees use smartphone applications in different environments, average usage was the highest when away from home and work (M=3.32), followed by at home

(M=3.24). Average usage at work was a little below neutral (M=2.95). The average usage of each application is similar in all the environments. Usage at work is a little lower for each application with the exception of scheduling/planning. This could be because respondents have access to other devices or do not require certain applications during working hours. With the exception of file management, media and scheduling/planning, the applications were mostly used when away from home and work, then at home, and then at work.

4.9 Drivers of smartphone usage

The aim of this section is to answer **RQ2** what factors drive employee smartphone usage. This section explores drivers of smartphone usage in conjunction with the independent variables in the adapted UTAUT theoretical framework (Figure 2.14). Likert scales, ranging from strongly disagree to strongly agree, were used to measure agreement with the 25 drivers identified in Chapter 2. These will be discussed in the relevant categories:

- Technological Determinism
- Effort Expectancy
- Social influence
- Performance Expectancy
- Facilitating Conditions

A comparative analysis of the drivers will thereafter be performed, followed by a comparison to usage and the moderating UTAUT variables of age and experience.

4.9.1 Technological determinism

Technological determinism was measured using the five drivers in Table 4.6. A Wilcoxon Signed Ranks Test (Appendix C) was run to test for significant agreement or disagreement. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. Results indicated that there was significant agreement (M >3) for all five drivers. This substantiates the addition of technological determinism to the UTAUT model.

Technological Determinism Drivers	N	Mean	Std. Deviation
1.1. I am encouraged to use my smartphone because of the many features it offers.	58	4.19	.945
1.2. Because of the features offered by my smartphone, I have changed the way I complete tasks.	58	3.88	.993
1.5. I have a smartphone because I like to keep up with technology.	58	3.79	1.196
1.4. Using my smartphone makes me feel efficient.	58	3.76	1.113
1.3. Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.	58	3.60	1.091

Table 4.6 Technological determinism drivers in descending order.

It is apparent that the main driver is 1.1 (the features offered by the smartphone) as 82.7% of respondents agreed, of which 44.8% strongly agreed. This driver was also rated second across all the drivers. This agrees with the findings in Section 4.10.3.2 where users do not find unnecessary features to reduce their productivity. The above is interesting and suggests that technological determinism does drive smartphone usage.

The agreement with drivers 1.2, 1.3, and 1.4 suggests that due to the smartphone's features, respondents have realised the advantages of using their smartphone to complete tasks that were previously completed using other devices. This could be because of the advantages discussed in Section 4.10.3.1 like personal organisation, multitasking, and the ability to work at anytime and anyplace. Driver 1.5 suggests that users feel that they should keep up with technology. As mentioned earlier, the technology adoption rate was found to be high in the South African market and smartphone owners were always looking out for new phones (Effective Measure, 2014).

4.9.2 Effort expectancy

With regards to effort expectancy, a Wilcoxon Signed Ranks Test (Appendix C) was run to test for significant agreement or disagreement. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. Results indicated that there was significant agreement (M >3) for all the four drivers in Table 4.7.

Effort Expectancy Drivers	N	Mean	Std. Deviation
1.6. My smartphone's interface is easy to use.	58	4.21	.789
1.9. My smartphone is readily available to use when I need it.	58	4.05	.981
1.7. My smartphone is easy to use due to its' physical design (eg. touch screen).	58	3.91	1.097
1.8. My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.	58	3.86	1.017

Table 4.7 Effort expectancy drivers in descending order.

The driver 1.6 (interface is easy to use) was the strongest driver across all the categories. 86.2% of users agreed with this. Results from a chi-square test of independence (Appendix C) show that there is a significant relationship between the operating system and this driver (Fisher's(N=58) = 26.431, p=.002). Specifically, significantly more than expected of: those using a Blackberry smartphone disagree strongly or are neutral; those using an iOS smartphone remain neutral; and those using an Android smartphone agree strongly that their smartphone's interface is easy to use. This suggests that respondents find Androids easy to use. Respondents were neutral with regards to iOS and therefore it is not evident whether these smartphones are easy to use or not. On the other hand, respondents disagreed or were neutral with regards to Blackberry smartphones, suggesting that Blackberry smartphones are not easy to use. The above suggests that the smartphone's interface may influence the ease of using the smartphone. The smartphone platform may also influence smartphone usage. This is explored in Section 4.9.9.

Drivers 1.9 (readily available to use when needed), 1.7 (physical design), and 1.8 (hardware capabilities) would also affect effort expectancy. For example, if a user cannot immediately use their smartphone when required, it would be frustrating and require more effort to use. If the smartphone does not have an ergonomically designed keypad, it can lead to typing errors and increased time and effort to correct them. If the smartphone has little memory or is slow, it would also waste time and require more effort to use.

4.9.3 Social influence

There was agreement (M >3) with all three drivers in Table 4.8 concerning social influence.

Social Influence Drivers	N	Mean	Std. Deviation
1.12. My contacts also use a smartphone.	58	3.97	.898
1.11. My friends/family think that I should use a smartphone.	58	3.24	1.144
1.10. My smartphone enhances my image.	58	3.05	1.161

Table 4.8 Social influence drivers in descending order.

A Wilcoxon Signed Ranks Test (Appendix C) was run to test for significance. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. Results indicated that there was only significant agreement for driver 1.12 (contacts also using a smartphone). Furthermore, this driver was ranked 8 across all the categories whereas the other two drivers were at the bottom. Driver 1.11(my friends/family think that I should use a smartphone) was ranked 23 and 1.10 (my smartphone enhances my image) was ranked 25. The large difference is because many respondents indicated neutral for these drivers (39.7% for 1.10 and 43.1% for 1.11). The above suggests that smartphones would allow the users to keep in contact with contacts that are using smartphones. For example, instant messaging applications like BBM can only be installed on smartphones and not cell phones. Earlier, it was also found that instant messaging applications were highly used.

4.9.4 Performance expectancy

A Wilcoxon Signed Ranks Test (Appendix C) was run to test for significant agreement or disagreement regarding the performance expectancy drivers. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. Results indicated that there was significant agreement (M >3) for all the six drivers in Table 4.9, below.

Performance Expectancy Drivers	N	Mean	Std. Deviation
1.18. My smartphone provides easy access to the information I need.	58	4.19	.805
1.13. I use a smartphone because of the many applications that are available.	58	4.09	.942
1.17. My smartphone allows me to synchronise data online and between my devices.	58	4.03	.936
1.14. I use a smartphone because there is integration between my applications.	58	3.90	.986
1.15. My smartphone offers the ability to complete tasks quickly.	58	3.83	.939
1.16. My smartphone offers the ability to complete tasks efficiently.	58	3.78	.974

Table 4.9 Performance expectancy drivers in descending order.

Driver 1.18 (my smartphone provides easy access to the information I need) was ranked third across all the categories. 84.5% of respondent agreed with this driver. This corresponds with earlier findings where the web was highly used. Interestingly, there were no significant relationships between drivers 1.15 (my smartphone offers the ability to complete tasks quickly) and 1.16 (my smartphone offers the ability to complete tasks efficiently) and smartphone competency and length of time using a smartphone. This is surprising as smartphone competency should influence a person's ability to complete tasks quickly and efficiently.

4.9.5 Facilitating conditions

With regards to facilitating conditions, there was agreement (M >3) with all the drivers, as evident in Table 4.10.

Facilitating Conditions Drivers	N	Mean	Std. Deviation
1.24. It is possible to backup my data on my smartphone.	58	4.00	1.026
1.25. There is help and support available for my smartphone/applications.	58	3.78	1.009
1.19. I use a smartphone because there is Wifi availability/low data cost.	58	3.50	1.232
1.23. My smartphone maintains my privacy and confidentiality.	58	3.50	1.203
1.21. I use a smartphone because applications are free or low-cost.	58	3.33	1.220
1.22. My smartphone provides security for my data.	58	3.33	1.205
1.20. I use a smartphone because there are software/application updates available.	58	3.22	1.155

Table 4.10 Facilitating conditions drivers in descending order.

A Wilcoxon Signed Ranks Test (Appendix C) was run to test for significance. The mean score was paired with the neutral score (3) to test whether the mean was significantly different from 3. Results indicated that agreement was significant with the exception of driver 1.20 (I use a smartphone because there are software/application updates available). This could be because the respondents do not feel that updates are important as a smartphone can operate without them, but overall there was still agreement with this factor. It can be noted that only driver 1.24 (it is possible to backup my data on my smartphone) was near the top of the list across all the drivers (7) whereas the others were near the bottom (16,19-22, 24). This suggests that the ability to backup data is very important to the users. This was expected as it can be very inconvenient if

data is lost and cannot be recovered. This can also reduce productivity as data would need to be recaptured.

4.9.6 Comparison

A Cronbach's Alpha test was run for each group and was found to be >.7 for all of them (Appendix C). This indicates that internal consistency was achieved and the items in each group can therefore be averaged to allow comparison. Table 4.11, below orders the groups of driver in descending order.

Drivers	N	Mean	Std. Deviation
Effort expectancy	58	4.01	.784
Performance expectancy	58	3.97	.791
Technological determinism	58	3.84	.828
Facilitating conditions	58	3.52	.900
Social influence	58	3.42	.878

Table 4.11 Groups of drivers in descending order.

A Wilcoxon Signed Ranks Test (Appendix C) was run and indicated that there was significant agreement on all five groups. The standard deviation was also low, below 1, for all of the factors which means that there was little difference in the respondent's answers. Effort expectancy is the main driver followed by performance expectancy. Social influence appears to have the lowest effect on usage. This is illustrated in Figure 4.7 and followed by a comparative discussion. The individual drivers that make up these groups were explained in the above sections.

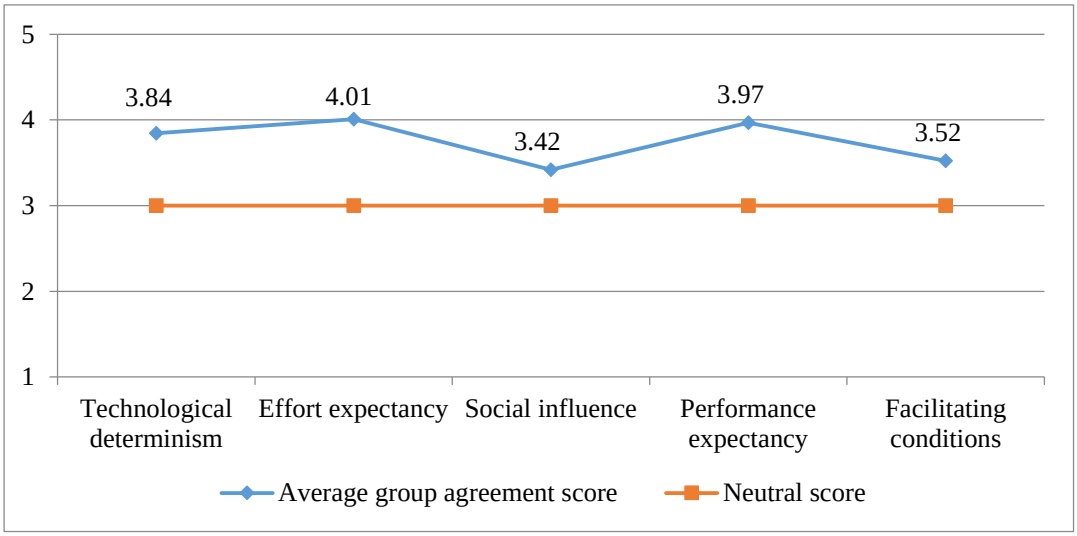

Figure 4.7 Drivers of smartphone usage

These results are similar to the findings of various mobile studies that employed a modified UTAUT. Chao (2013) found that performance expectancy, effort expectancy, social influence, and facilitating conditions influence consumer adoption of mobile applications. Zhou (2008) found that performance expectancy, facilitating conditions, and social influence significantly affected mobile commerce usage intention, and hence actual usage. Performance expectancy had a relatively large significant influence on usage intention. Effort expectancy significantly affected performance expectancy and thus indirectly affected usage intention. Wu, et al. (2007) also found that consumers agreed that performance expectancy, social expectancy, and facilitating conditions will increase the behavioural intention, which will increase the use behaviour of 3G mobile telecommunication services. Shi (2009), on the other hand, found that performance expectancy, effort expectancy and social influence were the main factors affecting behavioural intention to use smartphone online application software. H. S. Lee, et al. (2012) found that only the performance expectancy and effort expectancy of smartphone applications significantly influenced intention to use, hence usage.

The results are also similar to studies that used other models, reinforcing that these factors are drivers of smartphone usage. In Park, Kim, Shon, & Shim (2013) study on factors influencing smartphone use and dependency, the perceived usefulness (performance expectancy) mean was 3.98, perceived ease of use (effort expectancy) was 3.91 and motivation for social inclusion (social influence) was 3.71. Wang, Xiang, & Fesenmaier (2014) found that the following factors influence smartphone use for travel: extrinsic and intrinsic motivations, cognitive beliefs, situational facilitators, previous use of smartphones in travel, and the use of smartphones in everyday contexts. Ease of use and then usefulness were the main cognitive beliefs (Wang, et al., 2014). Research conducted by H.-W. Kim, Lee, & Son (2011) on smartphone app purchase determinants found that Usefulness was ranked the highest for information and productivity applications. Usefulness was also ranked higher than ease of use for all types of applications (H.-W. Kim, et al., 2011). Negahban & Chung's (2014) research on discovering determinants of users perception of mobile device functionality fit also found perceived ease of use and perceived usefulness to be the most significant factors.

In light of the above, it is suggested that effort expectancy and performance expectancy are the most important smartphone usage drivers but the other drivers also play a role. As defined earlier, effort expectancy is the ease of use of using the system (Venkatesh, et al., 2003). Various factors that affect effort expectancy were mentioned in Section 4.9.2. If an application is not easy to use, it would be counterproductive. Smartphone application creators therefore need to create clear interfaces, effective navigation and fast links to reduce the effort and time spent using the application (Zhou, 2008).

Performance expectancy is the degree a user feels that the technology will help him/her improve job performance (Venkatesh, et al., 2003). As found in Section 4.9.4, there was significant agreement with all the factors that related to performance expectancy. If an application does not provide easy access to the information required or does not help the user complete tasks quickly, usage can be affected.

Facilitating conditions may be defined as the user's belief that there are organisational and technical infrastructure to support the use of the system (Venkatesh, et al., 2003). This means that users need to take into account factors like the ability to backup data, data cost and availability, and the other factors mentioned in section 4.9.5, when using smartphone applications. Usage may be effected if the applications do not support these facilitating conditions.

Social influence may be defined as the perceptions that people who are important to the user think he/she should or should not use it (Venkatesh, et al., 2003). Various factors related to social influence are discussed in Section 4.9.3. Smartphone users start using applications based on other user's experiences or opinions. If users find an application useful, it is likely that they will advise their contacts to start using the applictaion. However, if users do not find an application useful, they will advise their contacts not to use the application. This will affect the usage of smartphone applications.

Technological determinism is a reductionist theory that states that technology has an effect on how users think, feel and act, and how society operates when moving from one technological age to another (McLuhan, 1962). Factors to access this were discussed in Section 4.9.1. There was significant agreement with all. This substantiates the addition of technological determinism to the UTAUT model. Users can start using their smartphone to complete tasks that were previously completed using other devices because of the features and potential advantages offered by the smartphone. Therefore, technological determinism can drive smartphone usage.

In light of the above, all of the factors appear to drive smartphone usage. Smartphone application creators therefore need to consider all the aforementioned factors when creating applications. Smartphone users also need to consider these factors when choosing to use an application or it may reduce their productivity. The effect of smartphone usage on productivity is explored in Section 4.10.

4.9.7 Drivers compared to usage

The above sections, explored factors that drive smartphone usage. As illustrated in the adapted UTAUT framework (Figure 2.14), these factors can effect behavioural intention and use

behaviour (usage). This section compares the driver groups and average usage in order to see if there is a relationship between the two.

Pearson's correlation test results (Appendix C) indicated that there were significant positive correlations between all the driver groups and average usage. Performance expectancy ($r(N=58) = .671$, $p<.0005$) had the highest relationship, followed by facilitating conditions($r(N=58) = .563$, $p<.0005$), technological determinism ($r(N=58) = .559$, $p<.0005$), social influence ($r(N=58) = .541$, $p=.001$) and effort expectancy ($r(N=58) = .512$, $p<.0005$). Most of the differences were minor. It is interesting that social influence had a higher correlation than effort expectancy since the social influence mean was the lowest, as can be seen in Figure 4.7. In addition, effort expectancy had the highest mean but was found to have the lowest correlation from the driver groups. This suggests that even though the users perceive certain drivers to have a higher effect, they may not actually be the main drivers.

It now appears that effort expectancy is not as important as the other drivers. This agrees with the findings of Wu, et al. (2007) where only effort expectancy did not significantly influence the behavioural intention to use 3G mobile communications. Yu (2012) indicated that users have more experience with technology than in prior years and this could be why the effect of effort expectancy has decreased. This means that users probably find their smartphone easy to use as they have experience. It was found earlier that 77.6% of respondents had been using a smartphone for over 2 years and a further 15.5% over a year. Earlier, it was explained that performance expectancy refers to the user's perceived performance improvement when using the new technology (Zhou, 2008). If an application does not do this, the application would be counterproductive. Thus, performance expectancy is expected to have the highest relationship with smartphone usage, as found above.

Further Pearson's correlation test results (Appendix C) indicated that there were significant positive correlations between all the driver groups and all the environments. Furthermore, there was a strong relationship between performance expectancy and average usage in the home environment ($r(N=58) = .710$, $p<.0005$). The remaining relationships were moderate in nature.

Overall, average usage at home had the highest correlations except for effort expectancy were usage when away from home and work was the highest. Average usage at work with the exception of social influence had lower correlations in comparison to the other environments. Smartphone usage at work may be lower because the user may be using a computer to complete tasks, whereas at home and away from home and work the user would use their smartphone. With regards to effort expectancy, usage is expected to be the highest when away from home and work as users would need to use their device quickly and effortlessly on the move.

Overall, the above discussion indicates that there is a significant relationship between the identified driver groups and average usage in all the environments. This suggests that the drivers could affect smartphone usage.

4.9.8 Drivers compared to future intended usage

The driver groups were also compared to future intended usage. Future intended usage can be linked to behavioural intention in the adapted UTAUT framework (Figure 2.14).

Pearson's correlation test results (Appendix C) indicated that there were significant positive correlations between all the driver groups and future intended usage. Performance expectancy ($r(N=58) = .642$, $p<.0005$) had the highest relationship, followed by technological determinism ($r(N=58) = .523$, $p<.0005$), facilitating conditions($r(N=58) = .480$, $p<.0005$), effort expectancy ($r(N=58) = .446$, $p<.0005$), and social influence ($r(N=58) = .412$, $p=.001$). Again, this differed as effort expectancy was indicated as the main driver as evident in Figure 4.7 above. However, as indicated in the previous section, users now have experience using smartphones. Therefore, the effort expectancy relationship is not expected to be as high. Performance expectancy includes ease of access to information, the ability to complete tasks quickly and efficiently, as well as the other factors mentioned previously. As such, it is expected to have the highest relationship to smartphone usage. All of the above suggests that the smartphone usage drivers may effect future intended usage.

4.9.9 Smartphone platform compared to usage

As mentioned in Section 4.9.2, the smartphone platform may also affect smartphone usage. This section compares the smartphone platform and usage.

As was noted earlier, one of the respondents indicated Other for smartphone platform and stated that they used both Android and iOS. The questionnaire only allowed for the selection of one smartphone platform, thus it was not known if the other respondents also used multiple devices. Based on this information, it was necessary to contact the respondent again and find out which device was his primary smartphone in order to run the statistical tests to compare usage and the smartphone platform.

Surprisingly, the respondent was not able to easily say which was his primary device due to the following factors. The respondent indicated that he used both smartphones equally for work purposes. He indicated that he used both to access data files, contacts, emails, shared repositories, KB articles, and the Internet. He further pointed out that the systems were interlinked via different backends, thus synchronised virtually live. The synchronisation capabilities of smartphones were mentioned in Chapter 2 and ties in with the performance expectancy driver 1.17 (my smartphone

allows me to synchronise data online and between my devices). The respondent used both devices to remotely access client's networks for support purposes. This was mentioned in Section 4.8.5 as an additional application that would depend on job requirements. The respondent then said that he currently tends to favour his Android as it has a bigger screen and certain third party applications "work" better on it although there are drawbacks. The bigger screen ties in with another effort expectancy driver, 1.7 (my smartphone is easy to use due to its' physical design), and the applications that "work" better tie in with the performance expectancy drivers mentioned in Section 4.9.4. The respondent indicated that his Android was his delegated work phone as all clients knew that phone number, whereas the other was private and not many work contacts knew that phone number. The respondent further felt that he used his iPhone more before the iOS8 upgrade as it had significantly modified the core system making it unstable. His iPhone had started freezing at times leading to him favouring his Android. This relates to effort expectancy drivers 1.6 (my smartphone's interface is easy to use) and 1.9 (my smartphone is readily available to use when I need it). Another factor that sometimes determined which smartphone the respondent used was the amount of data available on the smartphone, a facilitating conditions driver. In conclusion, the respondent could not provide a definitive answer on his primary smartphone but based on the above felt that it was Android. In light of this, tests were run based on the premise that the respondent used an Android smartphone, because for statistical purposes, the respondent could not be excluded or have two smartphone platforms.

A Kruskal Wallis Test indicated that there was a significant difference in total average usage for the different smartphone platforms ($\chi^2(3, N=58) = 8.181$, $p=.042$), specifically respondents using iOS indicated higher usage than those using Windows. Further analysis indicated that there was a significant difference in average usage at home ($\chi^2(3, N=58) = 7.877$, $p=.049$), again respondents using iOS indicated higher usage than those using Windows. With regards to the different applications, there was a significant difference in average usage for email ($\chi^2(3, N=58) = 9.468$, $p=.024$). There was also a significant difference in average usage for scheduling/planning ($\chi^2(3, N=58) = 7.832$, $p=.050$) and online shopping ($\chi^2(3, N=58) = 9.034$, $p=.029$), where iOS users indicated higher usage than Blackberry users.

The above suggests that there is a difference in smartphone usage based on the smartphone platform used. This may be because of the different functionality offered by the different smartphone platforms/operating systems. It appears that smartphone usage is lower for Blackberry and Windows based smartphones. This agrees with earlier findings were respondents indicated neutral or disagreed that Blackberry interfaces were easy to use.

Effective Measure (2014) found that smartphone owners are always looking out for new phones and the technology adoption rate was high in the South African market. Users should therefore

take into consideration the features offered by the smartphone interface before purchasing. Certain smartphone platforms may not be easy to use or meet the functionality and performance requirements of the user. Thus, the smartphone platform may affect usage.

4.9.10 Drivers compared to respondents' age

As mentioned previously, UTAUT includes age as a moderating variable. An ANOVA was run and interestingly there were no significant differences in how the different age groups responded to the driver groups. This differed to Yu (2012) where effort expectancy was significantly higher for old respondents, social influence was noticeably higher for young respondents, and respondents between the ages of 30 and 50 had better facilitating conditions.

A possible reason could be that this study explored the drivers based on smartphone usage as a whole, whereas Yu (2012) only looked at mobile banking. This suggests that respondents answers may differ based on specific types of applications.

However, there were no significant differences across the age categories and the average usage of each application. There were also no significant differences across the age categories and the average usage per environment. This suggests that age does not make a difference.

On the other hand, none of the respondents in this study were old, that is above the age of 50. The majority of the respondents were between the ages of 21-30 (63.8%) and 31-40 (25.9%), thus of a similar age group. Therefore, average differences based on age group may not have been detectable.

4.9.11 Drivers compared to respondents' experience

UTAUT also includes experience as a moderating variable. This study assessed experience in two ways. Firstly, by the length of time the respondent had been using a smartphone and secondly by their indicated competency. This was discussed in Section 4.6.

An ANOVA was run and found that there were no significant differences between the length of time using a smartphone and the driver groups. Another ANOVA (Appendix C) was run against smartphone competency. The results showed that there were only significant differences between the mean scores of the three categories of smartphone competency for the facilitating conditions driver ($F(2,55) = 3.279$, $p=.045$). Post hoc tests specified that those who knew how to use all the features on their smartphone scored higher ($M=3.7044$, $SD =0.954$) than those who knew how to use most of the features on their smartphone ($M = 3.2308$, $SD = .730$) ($p=.048$). This means that there was greater agreement concerning the facilitating conditions drivers by those who had

better smartphone competency. This may be because only through experience will users realise the benefits of facilitating conditions like backup, security and WiFi availability.

As this study was conducted at an IT company, the respondents should have had IT experience. Other differences using experience as a moderator regarding the drivers may thus not have been discernable. On the other hand, J. Park, Yang, & Lehto (2007) found that Internet usage experience was not statistically significant with regards to mobile technology adoption. The above suggests that experience does not moderate the smartphone usage drivers apart from facilitating conditions.

4.9.12 Other smartphone usage drivers

Respondents were further asked if there were any other factors that effected their smartphone usage. Nine respondents indicated that there were no other factors. One respondent indicated that he used Opencall. Opencall is call tracking software that can be used for marketing and support. Factors that would affect the use of Opencall are not relevant to users in general.

A respondent stated that smartphones are no longer a want but a need. Another respondent indicated that his smartphone allows him to connect and share Bluetooth devices as well as connect to his Galaxy Gear 2, thus making it more convenient and fast.

4.9.13 Answer to RQ2

In answer to RQ2, what factors drive employee smartphone usage, there was significant agreement that all the groups of drivers (Technological determinism, Effort Expectancy, Social influence, Performance Expectancy, and Facilitating Conditions) affect smartphone usage. These were individually discussed above.

Effort expectancy was the main driver indicated by the respondents, followed by performance expectancy, technological determinism, facilitating conditions and social influence. This differed to comparison tests against average usage were the effect of effort expectancy was found to be the lowest. This may be because users probably do find their smartphones easy to use as they have prior experience. Performance expectancy had the highest relationship. When the drivers were compared to future intended usage, performance expectancy had the highest correlation again. Performance expectancy includes ease of access to information, the ability to complete tasks quickly and efficiently, as well as the other factors mentioned previously. As such, it is expected to have the highest relationship to smartphone usage. Moreover, the addition of technological determinism to UTAUT was substantiated. There was significant agreement with the factors related to technological determinism like users using their smartphone because of the features offered by it. Furthermore, there were significant positive correlations between all the

driver groups and average usage in all the environments. This suggests that there is a relationship between the drivers and smartphone usage.

It appears that the smartphone platform affects smartphone usage as certain smartphone interfaces were indicated not to be easy to use (effort expectancy). A comparison of the smartphone platform to usage found that iOS users indicated a higher degree of usage than Windows users. iOS users also indicated higher usage than Blackberry users for some applications. Users should therefore take into consideration the features offered by the smartphone interface before purchasing. Certain smartphone platforms may not be easy to use or meet the functionality and performance requirements of the user.

Furthermore, the moderating variables of age and experience did not significantly influence the above drivers. Gender could not be tested as there was only a single female respondent.

Smartphone application creators therefore need to take into account all these drivers when creating applications. Smartphone users also need to take them into account when choosing to use an application. For example, if an application is not easy to use (effort expectancy) or does not allow the user to complete a task quickly (performance expectancy), it may reduce their productivity. Smartphone usage for productivity is discussed in the next section.

4.10 Smartphone usage for productivity

The aim of this section is to answer **RQ3** how do employees perceive smartphone usage to affect their productivity. This section explores employees' perceptions with regards to smartphone usage and productivity. This section first looks at the perceived productivity effect of each application, then looks at the relationship between the usage and perceived productivity of each application, and finally factors affecting productivity are explored.

4.10.1 Perceived productivity

This section looked at the user's agreement on whether the smartphone applications had improved their productivity. A 5-point Likert scale, ranging from strongly disagree to strongly agree was employed.

Results from a Wilcoxon Signed Ranks Test indicated that there was significant agreement with regards to email ($Z(N=58) = -5.919$, $p<.0005$), instant messaging ($Z(N=58) = -5.686$, $p<.0005$), the web ($Z(N=58) = -5.552$, $p<.0005$), maps/transit ($Z(N=58) = -4.458$, $p<.0005$), scheduling/planning ($Z(N=58) = -4.233$, $p<.0005$), social networking ($Z(N=58) = -4.484$, $p<.0005$), media ($Z(N=58) = -4.193$, $p<.0005$), weather/stock/news updates ($Z(N=58) = -3.946$, $p<.0005$) and banking/finance management ($Z(N=58) = -4.534$, $p<.0005$).

On average, the usage of every application (M>3) with the exception of online shopping, appears to improve perceived productivity. Table 4.12 summarises the results.

Applications	N	Mean	Std. Deviation	Std. Error Mean
1.1 Email	58	4.28	.914	.120
1.2 Instant Messaging	58	4.17	.939	.123
1.4 Web	58	4.10	.968	.127
1.7 Social networking	58	3.95	1.206	.158
1.13 Banking/Finance Management	58	3.90	1.135	.149
1.10 Media	58	3.78	1.093	.144
1.5 Maps/transit	58	3.74	1.001	.131
1.6 Scheduling/planning	58	3.74	1.069	.140
1.11 Weather/Stock/News Updates	58	3.62	1.023	.134
1.8 File management	58	3.28	1.152	.151
1.3 Video Conferencing/VoIP	58	3.09	1.261	.166
1.9. eBooks/eMagazines	58	3.03	1.242	.163
1.12 Online shopping	58	2.88	1.285	.169

Table 4.12 Ranked perceived productivity of each application.

Not surprisingly, 84.5% agreed that email, 81.1% agreed that the web, and 79.3% agreed that instant messaging had improved their productivity, the standard deviation was also low (below 1) for these applications. The above suggests that these 3 are the main applications that are utilised for productivity. Kalkbrenner & McCampbell (2011) also found that respondents indicated email to be the most useful, followed by the web browser.

The purpose of applications differ and therefore may not be relevant for certain tasks or not even required on a daily basis, but rather when the need arises. Figure 4.8 categorises the perceived productivity of applications using the categories identified in Chapters 2 and 3. It is now evident that when categorised, communication and messaging applications, are not the highest. Although email and instant messaging were ranked as the most productive, the third application, video conferencing/VoIP is ranked much lower, thus reducing the average.

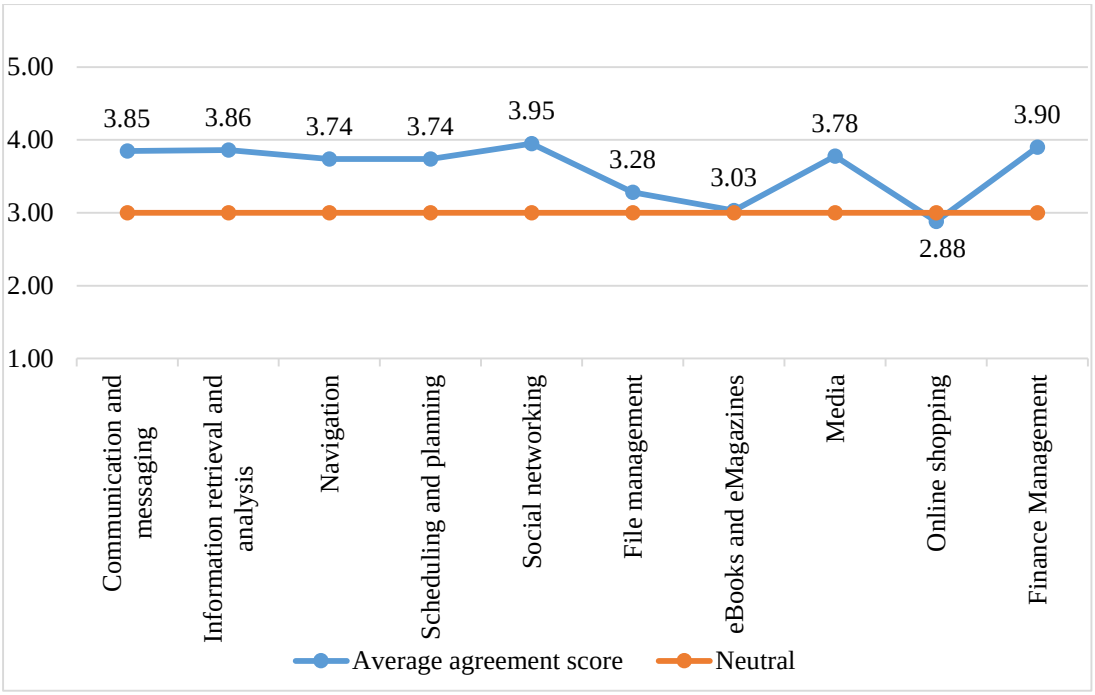

Figure 4.8 Perceived productivity of applications by category

It is interesting that social networking was ranked high (M=3.95) with regards to improved productivity as it was found earlier that usage is expected to decrease. It was also found that usage was higher at home and away from home and work, in comparison to work. This suggests that the usage of social networking applications is productive in non-work environments.

Finance management was also ranked high, it was found earlier that usage was at least once a month but was expected to increase to at least once a week. This suggests that users are realising the benefits of using these applications on their smartphones. It is not unexpected that usage is not higher than weekly because users may not need to make payments on a daily basis, whereas they would need to check emails daily.

There was disagreement that online shopping improves productivity (M=2.88). A possible reason may be that time can be wasted browsing through products and reviews. This also ties in with earlier findings where online shopping was the least used, in fact 46.6% did not use it at all. There was also little difference in future intended usage, which remained at less than once a month.

There were no significant differences between the age groups. This agrees with Kalkbrenner & McCampbell (2011) who found that there is little difference in perceived productivity increase and age.

Overall, smartphone usage appears to improve productivity with the exception of online shopping. This agrees with research conducted by Kalkbrenner & McCampbell (2011) where

60% indicated an increase in their productivity whilst using a smartphone, and a further 22% indicated that their productivity greatly increased.

4.10.2 Perceived productivity compared to usage

The applications' perceived productivity was compared with application usage at home, work, and away from home and work (the variable use behaviour in the adapted UTAUT framework). Pearson's correlation tests were run and results (Appendix C) indicate that there was significant positive correlations between improved productivity on every single application and usage at home, at work and when away from home and work.

Furthermore, there were strong relationships for banking/finance management($r(N=58) = .737$, $p<.0005$) and online shopping ($r(N=58) = .720$, $p<.0005$) when away from home and work. This may be because respondents can use another device for these activities at home and at work. For example, a PC would be easier to use due to the larger screen size. Users may not have access to another device and therefore would use their smartphone for these activities when away from home and work. There was also a strong relationship for social networking at home ($r(N=58) = .730$, $p<.0005$). This supports the inference made in the last section with regards to social networking.

The relationships were weaker for email ($r(N=58) = .266$, $p=.043$) and the web ($r(N=58) = .354$, $p=.006$) when away from home and work, as well as instant messaging at work ($r(N=58) = .394$, $p=.002$). This may be because instant messaging is used more for personal communication and therefore usage for productivity should be less at work.

The above suggests that the usage of all the assessed smartphone applications has improved productivity in all the environments. This was not expected with regards to online shopping as it was found that on average respondents indicated that usage did not improve productivity ($M=2.88$).

4.10.3 Factors affecting productivity

Eleven factors that may affect productivity were measured using 5-point Likert agreement scales. These factors are split into perceived advantages and disadvantages and the results are discussed.

4.10.3.1 Advantages

Results of a Wilcoxon Signed Ranks test (Appendix C) indicated that there was significant agreement with all of the factors. The advantages are ranked in Table 4.13 below.

Factors	N	Mean	Std. Deviation
2.1. By using my smartphone, I have better personal organisation.	58	3.88	.975
2.10. By using my smartphone, I am able to multitask which increases my productivity.	58	3.83	.958
2.3. By using my smartphone, I work more efficiently as I can work at any time and any place.	58	3.72	1.022
2.7. The instant feedback I receive by using a smartphone has improved my personal productivity.	58	3.72	1.056
2.2. By using my smartphone, I complete tasks in less time.	58	3.66	.983

Table 4.13 Advantages in descending order.

Personal organisation was the main factor. Personal organisation includes applications that help users plan and organise their time, for example calendars and to-do lists. Calendars can be shared thus improving scheduling and collaboration. Data can also be synchronised between devices thereby reducing duplication and improving accessibility (Jewell, 2011). This can improve productivity. It is surprising that personal organisation was ranked the highest as earlier it was found that usage was low for scheduling/planning applications, but was intended to increase to at least once a week. Usage should still be higher if personal organisation is the main factor. A reason for the differing responses concerning personal organisation and scheduling/planning application usage is that personal organisation may also include other applications like contact management. Respondents may find these other applications to be highly useful. It therefore appears that respondents perceive smartphones to improve personal organisation.

Multitasking was rated as the next advantage. This allows users to instant message with their contacts while surfing the web, for example. Multitasking is linked to task switching and will be compared in Section 4.10.3.3.

The next advantage was the ability to work at any time or place. This means that users can check emails while waiting for a meeting, for example. This allows users to be more productive instead of wasting time. Instant feedback was also perceived to improve productivity. Users can search for information as and when required, as well as receive communications immediately. Users can therefore make quick and informed decisions. The last advantage was that users can complete tasks in less time when using a smartphone, thus improving productivity as they can then focus on other tasks.

It must be noted that on average 27.9% of the respondents were neutral as evident in Figure 4.9, below. Therefore, these advantages could be ranked differently if respondents had taken a definite side. However, disagreement was low for all the factors.

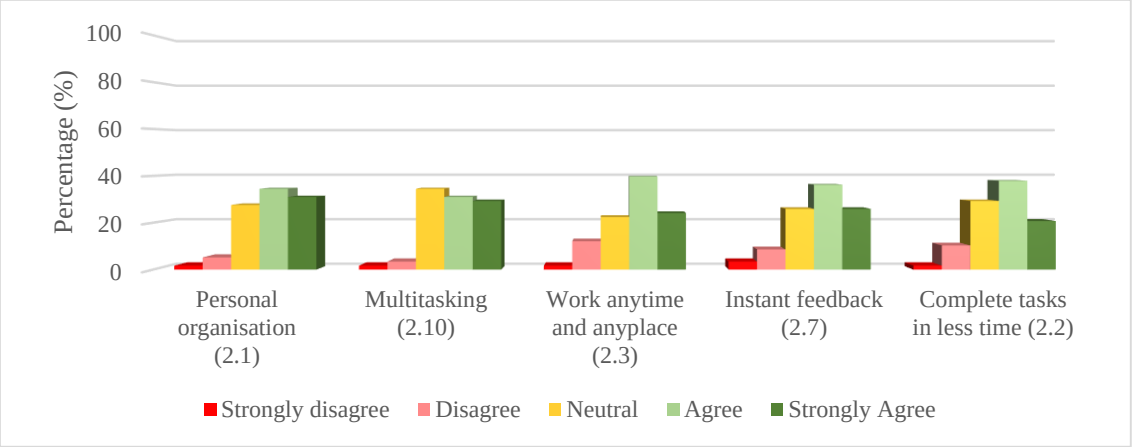

Figure 4.9 Advantages of smartphone usage for productivity

Smartphone competency was compared to 2.3 (By using my smartphone, I work more efficiently as I can work at any time and any place) and a Fisher's exact test (Appendix C) indicated that more than expected of those who knew how to use all the features on their smartphone strongly agreed and of those who knew how to use most of the features on their smartphone agreed. This is because efficiency when using a smartphone is affected by the user's competency. There was not a significant relationship between the length of time using a smartphone and 2.2 (By using my smartphone, I complete tasks in less time).

The users' effectiveness was then measured by comparing smartphone competency to factors 2.1, 2.2 and 2.10. A Chi-square test of independence found that there were no significant relationships.

4.10.3.2 Disadvantages

The disadvantages are ranked in Table 4.14, below. As evident the only disadvantage appears to be 2.6 as there was disagreement with the remaining factors, the means are below 3.

Factors	N	Mean	Std. Deviation
2.6. Being always accessible to contacts via my smartphone results in me spending a lot of time messaging.	58	3.34	1.117
2.4. There are many unnecessary features on my smartphone which result in me wasting time.	58	2.93	1.255
2.8. I waste time looking through more information than is necessary just because it is available via my smartphone.	58	2.93	1.212
2.5. I am distracted by irrelevant information given by my smartphone.	58	2.83	1.142
2.11. I find that multitasking with my smartphone wastes time as I need to constantly refocus.	58	2.62	1.121
2.9. I am distracted by games or social media whilst using my smartphone for other tasks.	58	2.60	1.138

Table 4.14 Disadvantages in descending order.

Results of a Wilcoxon Signed Ranks test (Appendix C) indicated that there was significant agreement with 2.6 (Being always accessible to contacts via my smartphone results in me spending a lot of time messaging) ($Z(N=58) = -2.190$, $p=.029$). This agrees with literature because being always connected can interrupt users from meaningful work (Shattell, 2010). Someone can also send a message at any time thus interrupting and interfering with the user's current thoughts (Shattell, 2010). This can reduce their productivity and leads to time wastage.

In the work environment for example, email would most often be work related and therefore not fall under time wastage, whereas instant messaging of a personal nature would be time wastage. On the other hand, instant messaging with contacts with regards to work would not be time waste. Messaging in this context would therefore most often refer to instant messaging that is not related to the current task. This disadvantage can be countered by logging off instant messaging applications or changing the status when busy. Smartphone notifications can also be limited to email and turned off for instant messaging and social networking during working hours.

Unexpectedly, there was significant disagreement with 2.9 ($Z(N=58) = -2.261$, $p=.024$) and 2.11 ($Z(N=58) = -2.364$, $p=.018$). This means that overall respondents do not regard these factors as disadvantages of smartphone usage for productivity. 53.5% of respondents disagreed that 2.9 (I am distracted by games or social media whilst using my smartphone for other tasks) reduces their productivity. This is contrary to literature which states that games and social media can be a distraction and thus reduce productivity (Bain, et al., 2013; Kalkbrenner & McCampbell, 2011). Interestingly, D. Ferreira, et al. (2014) found that users perceived social application notifications to be integral and had a reassuring effect. On the other hand, it was found that average usage of social networking applications is intended to decrease from at least once a day to at least once a

week. This could mean that respondents are actually finding them a distraction, but feel that they can control it (that is reduce usage). Factor 2.11 (task switching) is linked to factor 2.10 (multitasking) and will be compared in the next section.

There was also disagreement with factors 2.4, 2.5 and 2.8. Factor 2.4 (there are many unnecessary features on my smartphone which result in me wasting time) was indicated as a disadvantage in literature (Kalkbrenner & McCampbell, 2011; Karr-Wisniewski & Lu, 2010; Leshed, 2012). The respondents' disagreement suggests that users are in control of this factor and could be ignoring unnecessary features. This could be due to their IT background. On the other hand, looking at the drivers of smartphone usage it was found, in Section 4.9.1, that the respondents are encouraged to use their smartphone because of the many features it offers. In Section 4.9.4 it was also found that respondents agreed that they used a smartphone because of the many applications that are available. This suggests that users enjoy having many features/applications and do not find them unnecessary. This also substantiates the addition of the driver technological determinism to the original UTAUT framework.

In Section 4.9.4, users agreed that 1.18 (my smartphone provides easy access to the information I need) was a smartphone usage driver. This could be why there was disagreement with 2.8. (I waste time looking through more information than is necessary just because it is available via my smartphone) and 2.5. (I am distracted by irrelevant information given by my smartphone). Usage was also high for information retrieval and analysis applications and suggests that respondents are in control when utilising these applications.

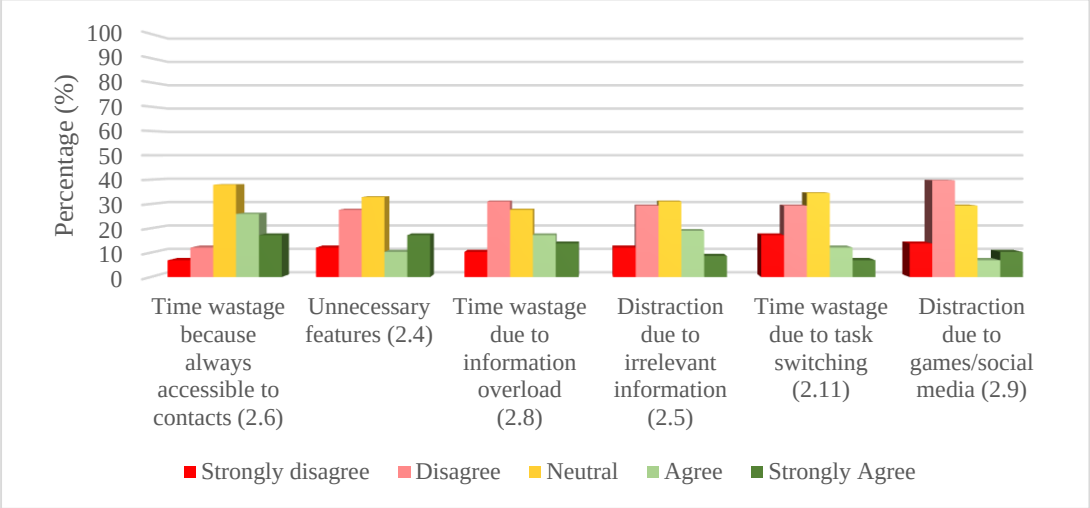

Figure 4.10 Disadvantages of smartphone usage for productivity

Overall, 32.2% of respondents were neutral with regards to the factors as can be seen in Figure 4.10. The standard deviation was also relatively high for all of the factors (above 1). This suggests that some of the factors may actually be disadvantages and ranked differently if respondents had taken a definite stance.

4.10.3.3 Comparison

As evident in Figure 4.11, there was agreement that all the identified advantages affect productivity. Surprisingly with the exception of 2.6, there was disagreement that the identified disadvantages affect productivity. This suggests that users do not perceive them to reduce their productivity. Therefore, the only detectable disadvantage was that there is time wastage due to being always accessible to contacts (2.6). This was explained above. On average, 30.73% of respondents were neutral with regards to these questions which could influence the results had they taken an agreement or disagreement stance.

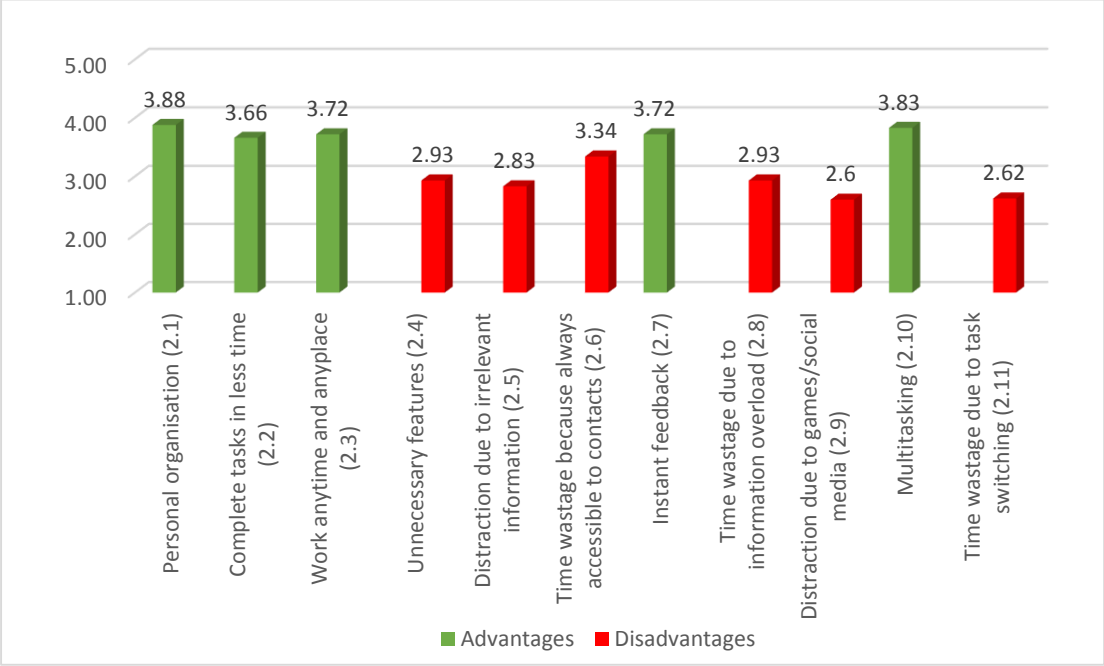

Figure 4.11 Factors affecting productivity

As explained earlier, factors 2.10 (multitasking) and 2.11 (task switching) are linked. A negative correlation was therefore expected as 2.10 tested the advantage and 2.11 tested the disadvantage. Although no correlation was found, there was agreement that multitasking improves productivity and disagreement that task switching reduces productivity. This suggests that the respondents do not find multitasking/task switching to reduce their productivity. This is contrary to the literature which suggests that time can be lost not gained (Karr-Wisniewski & Lu, 2010). This may be

because these respondents were able to maintain an effective balance whilst multitasking/task switching due to their IT background.

4.10.3.4 Other factors affecting productivity

Respondents were further asked if there were any other factors that affected their productivity. A respondent indicated that there were none and productivity had improved. Nine respondents indicated that there were no other factors as well. Other respondents indicated portability and instant messaging, this was already covered in previous questions.

4.10.4 Answer to RQ3

In answer to **RQ3,** how do employees perceive smartphone usage to affect their productivity, smartphone usage appears to have improved perceived productivity overall. Furthermore, the main applications that lead to improved productivity are email, instant messaging and the web. Interestingly, social networking was indicated to improve productivity, although usage was intended to decrease. This suggests that social networking may improve productivity in some environments, but not at work for example. There was disagreement that online shopping improves productivity, but usage was also low. There was significant agreement that personal organisation, multitasking, the ability to work at any time and any place, instant feedback and the ability to complete tasks in less time influence smartphone usage for productivity. There was also significant agreement that time wastage due to being always accessible to contacts reduces productivity. Therefore, this needs to be controlled. Surprisingly, there was significant disagreement that distraction due to games/social media and task switching reduces productivity.

4.11 Conclusion

This chapter presented the findings of the survey with the aim of answering the research questions. A 69% response rate was achieved and the data may be regarded as reliable. The majority of respondents were male and between the ages of 21-40. The majority of smartphone users had been using a smartphone for over 2 years and knew how to use most, if not all, of their smartphone features. They were thus competent users and 43.1% of respondents used their smartphone for more than 4 hours a day.

The analysis was completed sequentially using the three research questions. The adapted UTAUT framework, established in Figure 2.14, was used to explore the data and relationships. Figure 4.12, below, illustrates how the theoretical framework was applied and is explained in the following paragraphs.

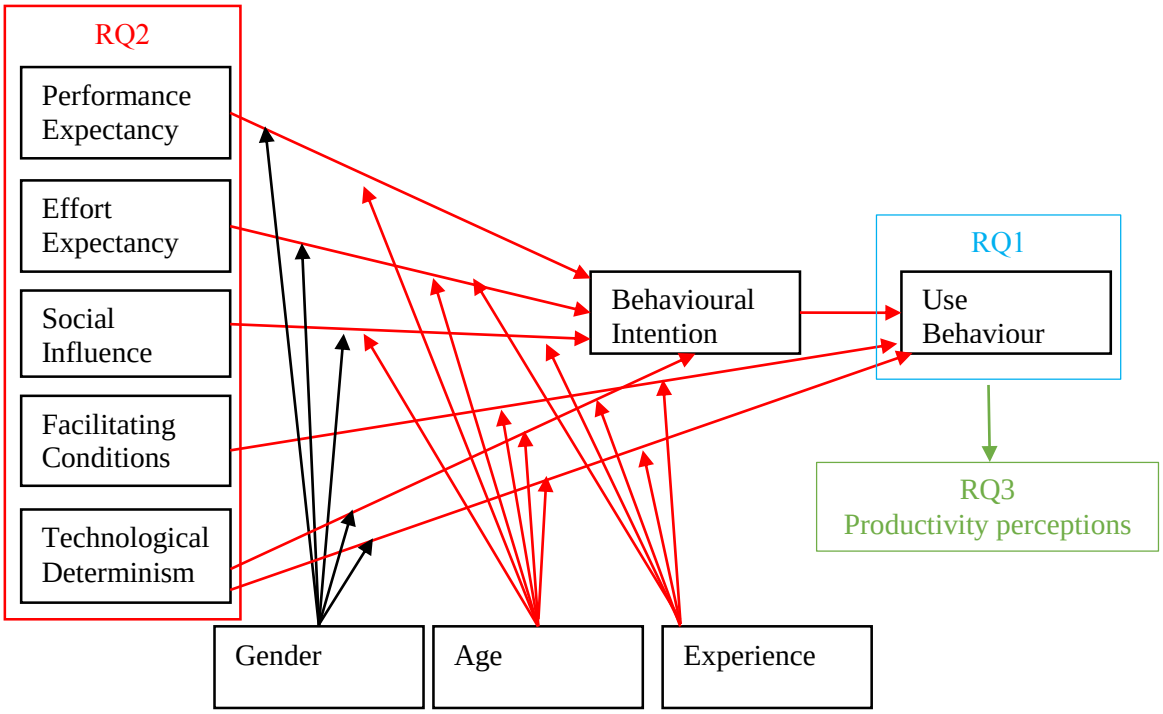

Figure 4.12 Application of theoretical framework

The usage of smartphone applications in the different environments was first explored (**RQ1**). This is linked to the variable use behaviour. Key findings indicate that with the exception of file management, media and scheduling/planning, the applications were mostly used when away from home and work, then at home, and then at work. The most used applications are social networking, followed by communication and messaging, and then information retrieval and analysis. Usage is low for online shopping, eBooks/eMagazines and file management. The average usage of each application is similar in all the environments. Usage at work is a little lower for all the applications with the exception of scheduling/planning. This may be because respondents have access to other devices or do not require certain applications during working hours.

It was then necessary to explore the factors that drive smartphone usage (RQ2). This stems from the variables technological determinism, effort expectancy, performance expectancy, social influence and facilitating conditions. There was significant agreement that all the drivers affect smartphone usage. Respondents ranked them as effort expectancy, followed by performance expectancy, technological determinism, facilitating conditions and social influence. Average usage and future intended usage comparison tests indicated otherwise, where performance expectancy was the highest. Performance expectancy includes ease of access to information and the ability to complete tasks quickly and efficiently, as such, it is expected to have the highest relationship to smartphone usage. Effort expectancy may have a lower relationship because users probably do find their smartphone easy to use as they have prior experience. Moreover, the addition of technological determinism to UTAUT was substantiated as there was significant

agreement with the factors related to it, such as users using their smartphone because of the features offered by it. Furthermore, there were significant positive correlations between all the driver groups and average usage in all the environments. This suggests that there is a relationship between the drivers and smartphone usage. As illustrated in Figure 4.12, the driver variables are related to behavioural intention and use behaviour. A comparison of the smartphone platform to usage found that iOS users indicated a higher degree of usage than Windows users. iOS users also indicated higher usage than Blackberry users for some applications. Users should therefore take into consideration the features offered by the smartphone before purchasing. Certain smartphone platforms may not be easy to use or meet the functionality and performance requirements of the user. The age and experience variables where also compared, as illustrated in Figure 4.12, but did not appear to play a role. As explained earlier, gender could not be accurately assessed as there was a large variance in male and female respondents.

The perceived effect of smartphone usage on productivity (**RQ3**) was finally explored and compared to the variable use behaviour. Overall, smartphone usage appears to have improved perceived productivity. Furthermore, the main applications that lead to improved productivity are email, instant messaging and the web. There was disagreement that online shopping improves productivity and usage was also low. There was significant agreement that personal organisation, multitasking, instant feedback, the ability to work at any time and any place, and the ability to complete tasks in less time influence smartphone usage for productivity. There was also significant agreement that time wastage due to being always accessible to contacts reduces productivity, and this therefore needs to be controlled. Surprisingly, there was significant disagreement that task switching and distraction due to games or social media reduces productivity. Overall, there were significant positive correlations between smartphone usage and the factors that drive smartphone usage, as well as smartphone usage and perceived productivity. The next chapter concludes this study.

CHAPTER 5: CONCLUSION

"Smartphone's, without a doubt, are the way of the future. With its pervasive acceptance and powerful functionality, is [*sic*] inevitably changing people's lives" (Shah & Dar, 2014, p. 187).

5.1 Introduction

Smartphones offer many benefits but at the same time, like any technological innovation, they also have drawbacks. Smartphones can be used to manage events, tasks and information on a daily basis (Kalkbrenner & McCampbell, 2011; Leshed, 2012). Various factors can influence smartphone usage including technological determinism, social influence, performance expectancy, effort expectancy and facilitating conditions. Although smartphones can help employees get organised, applications like gaming and social media can lead to distraction, thereby reducing productivity (Kalkbrenner & McCampbell, 2011). Employees therefore need to make efficient and effective use of these tools in order to have a positive effect on their productivity (Leshed, 2012).

Although research had been conducted on smartphone usage, limited research had been conducted on the smartphone usage of employees in a South African context. More specifically, exploring the usage of the various types of smartphone applications, factors that drive smartphone usage and the perceived productivity implications of smartphone usage.

This chapter concludes the study, starting with a summary and key findings. This is followed by limitations, recommendations and suggestions for future research.

5.2 Summary of the study

The dissertation began with an introduction to the topic, including the statement of purpose and research questions. The purpose of this study was to explore the smartphone usage of employees using three research questions: how do employees use smartphone applications in different environments, what factors drive employee smartphone usage, and how do employees perceive smartphone usage to affect their productivity.

A literature review on the key topics followed including smartphone application usage, factors that drive smartphone usage, and smartphones for productivity with related advantages and disadvantages. A theoretical framework was developed based on Venkatesh, et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) and augmenting it with technological determinism.

Thereafter, the research design and methodology was discussed in order to position this research. This includes the chosen research philosophy (positivism), research approaches (deductive and inductive), research strategies (case study and survey), research method (quantitative mono method) and time horizon (cross-sectional). The data collection process was explained including sampling and the research instrument. Non-probability and convenience sampling was applied and included the employees at an IT firm that used smartphones. An online questionnaire was used as the research instrument. The data analysis procedures were explained and were based on relevant statistical tests. The validity and reliability of data was also assessed and ethical consideration were complied with.

The previous chapter discussed the findings and analysis, sequentially answering the research questions. Key findings are now presented.

5.3 Key findings

The key findings are presented sequentially according to the research questions.

RQ1 How do employees use smartphone applications in different environments?

The first research objective was to explore the employees' usage of the different types of smartphone applications at home, work, and when away from home and work.

The average usage of each application is similar in all the environments. Usage at work is a little lower for each application with the exception of scheduling/planning. This could be because respondents have access to other devices or do not require certain applications during working hours. With the exception of file management, media and scheduling/planning, the applications were mostly used when away from home and work, then at home, and then at work.

The most used applications are social networking, followed by communication and messaging, and then information retrieval and analysis. Social networking and communication and messaging applications allow users to keep in touch with their contacts which may be why usage is high for these applications. Another reason is that smartphones are more convenient for these purposes due to their portability and ease of use, in comparison to other devices. Information retrieval and analysis applications allow users to quickly search for information when required. Again, users may use their smartphones due to its portability. Usage was low for online shopping, eBooks/eMagazines and file management. This may be because these applications were only used when required or that the smartphone's small screen affected usage.

RQ2 What factors drive employee smartphone usage?

The second research objective was to explore factors that drive the smartphone usage of employees, including technological determinism, social influence, performance expectancy, effort expectancy and facilitating conditions.

There was significant agreement that all the drivers, technological determinism, effort expectancy, social influence, performance expectancy and facilitating conditions, affect smartphone usage. Respondents ranked them as effort expectancy, followed by performance expectancy, technological determinism, facilitating conditions and social influence. Average usage and future intended usage comparison tests indicated otherwise, as performance expectancy was the highest. Performance expectancy includes ease of access to information and the ability to complete tasks quickly and efficiently, thus it is expected to have the highest relationship to smartphone usage. Effort expectancy may have a lower relationship because users probably do find their smartphone easy to use as they have prior experience. Moreover, the addition of technological determinism to UTAUT was substantiated. There was significant agreement with the factors related to it, such as users using their smartphone because of the features offered by it.

Furthermore, there were significant positive correlations between all the driver groups and average usage in all the environments. This suggests that there is a relationship between the drivers and usage. Age and experience do not appear to play a role. A comparison of the smartphone platform to usage found that iOS users indicated a higher degree of usage than Windows users. iOS users also indicated higher usage than Blackberry users for some applications. Users should therefore take into consideration the features offered by the smartphone before purchasing. Certain smartphone platforms may not be easy to use or meet the functionality and performance requirements of the user.

RQ3 How do employees perceive smartphone usage to affect their productivity?

The third research objective was to explore employees' perceptions with regards to smartphone usage and productivity.

Overall, smartphone usage appears to have improved perceived productivity. Furthermore, the main applications that lead to improved productivity are email, instant messaging and the web. Interestingly, social networking was indicated to improve productivity, although usage was intended to decrease. This suggests that social networking may improve productivity in some environments but not at work, for example. There was disagreement that online shopping improves productivity and usage was also low. There was significant agreement that personal

organisation, multitasking, the ability to work at any time and any place, instant feedback and the ability to complete tasks in less time influence smartphone usage for productivity. There was also significant agreement that time wastage due to being always accessible to contacts reduces productivity. Therefore, this needs to be controlled. Surprisingly, there was significant disagreement that distraction due to games/social media and task switching reduces productivity. On the other hand, it was found that the usage of social networking applications is intended to decrease from at least once a day to at least once a week. This could mean that respondents are actually finding them a distraction but feel that they can control it. The respondents may also have been able to maintain an effective balance whilst multitasking due to their IT background.

Overall, there were significant positive correlations between smartphone usage and the factors that drive smartphone usage, as well as smartphone usage and perceived productivity.

5.4 Limitations

Some of the limitations of this study includes the fact that this was an explorative study and therefore the results cannot be generalised. The majority of the respondents were male and there were only few older employees available to be surveyed. As this was a case study, corporate culture could also influence the results. Furthermore, the results of this research cannot be compared on an international level due to the different ICT infrastructure, economic, social and cultural factors eminent in developing countries like South Africa.

The pilot study was conducted with other individuals so as not to influence the sample and therefore items could have been missed. This was countered by including open-ended questions at the end of each of the sections. Some of the factors in the chosen theoretical framework, an adapted UTAUT, were found not to be relevant. The independent variables (effort expectancy, performance expectancy, social influence, facilitating conditions, and the added variable technological determinism) did cover the drivers of smartphone usage. The individual drivers to assess these groups were found to be consistent measures. On the other hand, the moderating variable gender could not be applied in this study as there was only one female respondent. Overall age and experience, the other moderating variables, were not found to have an effect. Many respondents indicated neutral on the scale questions. For more accurate results, respondents should be forced to take an agreement or disagreement stance. With regards to RQ3, user perceptions may not be an accurate indication of the respondents' productivity using the various types of applications. However, the factors assessed indicated that usage has not reduced productivity with the exception of time wastage due to being always accessible to contacts.

5.5 Recommendations

In light of this research, the following recommendations can be made. Although task switching appears not to affect the user's perceived productivity in this study, literature suggests that time can be lost not gained (Karr-Wisniewski & Lu, 2010). Users should therefore take this into consideration.

Accessibility to contacts was found to reduce productivity as time is lost due to messaging. This can be countered by logging off instant messaging applications or changing the status when busy. Smartphone notifications can also be limited to email and turned off for instant messaging and social networking during working hours.

It is expected that smartphone penetration will continue to increase in South Africa due to the increased availability of more affordable hardware, financing models that will allow consumers to purchase smartphones, a change in the structure of voice and data packages, overall lower rates and the introduction of flat rate packages to make smartphone usage more cost-effective (KPMG South Africa, 2013).

Businesses may also require employees to use these devices. The concept of BYOD (Bring Your Own Device) is gaining attention (Disterer & Kleiner, 2013). It is estimated that in 2016, 200 million of 350 million users will use their personal devices for work-related tasks (Disterer & Kleiner, 2013). It is thus advisable to make users more aware of the features and capabilities of their smartphones as it was found that overall smartphone usage improved the perceived productivity of the employees in this study.

Smartphone application creators need to ensure that their applications conform to the drivers of smartphone usage, especially effort expectancy and performance expectancy. This was also found in previous research but it is still important to mention (Chao, 2013; Shi, 2009). Smartphone users also need to consider this when choosing to continue using an application or it may reduce their productivity.

5.6 Suggestions for future research

This research was exploratory in nature and further research therefore needs to be undertaken. A wider sample needs to be assessed in order to be able to generalise results. This sample needs to assess females, the older population, as well as individuals that are less technologically inclined, in order to get a broader understanding on smartphone usage, factors that drive smartphone usage and the effect of smartphone usage on productivity. Another suggestion is to gather the respondent's job description as part of their demographic details as usage would differ for marketing and support positions, for example. This would allow for better analysis but was not

possible in this study. It is also suggested that respondents are forced to take an agreement or disagreement stance as many respondents indicated neutral. If possible, tests should also be conducted to measure actual productivity in comparison to perceived productivity. Other methods of collecting data can be employed, for example Brown, et al. (2013) used video analysis to explore mobile device usage. This method would provide more accurate results as it is not done post hoc.

5.7 Conclusion

The purpose of this study was to explore the smartphone usage of employees. In light of the research undertaken, it appears that application usage differs in different environments, various factors can drive smartphone usage, and smartphone usage may improve productivity. The limitations and recommendations mentioned above should be taken into consideration and further research conducted. In conclusion, productivity tools for smartphones are always evolving, users should keep up with these tools but at the same time stay in control of their priorities (Jewell, 2011). It is thus imperative that users strike the correct balance when utilising smartphones.

"Everything should be made as simple as possible, but not simpler." (as cited in Albert Einstein Site Online, n.d.).

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APPENDICES

Appendix A: Questionnaire

UNIVERSITY OF KWAZULU-NATAL

SCHOOL OF MANAGEMENT, I.T. AND GOVERNANCE

MCom (Information Technology) Research Project

Researcher: Ms Tehseena Meer (074 815 8965, tmeer@live.co.za)

Supervisor: Mr Craig Blewett (031 260 2161, blewett@ukzn.ac.za)

HSSREC Research Office: Ms P Ximba (0312603587)

9 June 2014

Dear Respondent,

I, TEHSEENA MEER a MCom (Information Technology) student, at the School of Management, I.T., and Governance, of the University of Kwazulu Natal. You are invited to participate in a research project entitled SMARTPHONE RELIANCE AND PERCEIVED PERSONAL PRODUCTIVITY. The aim of this study is to determine the drivers of smartphone reliance and smartphone relation to perceived personal productivity.

Through your participation I hope to understand what smartphone features are relied on for personal productivity, what are the drivers of smartphone reliance for personal productivity, and how does smartphone reliance affect the user's perceived personal productivity. The results of the survey are intended to contribute to the body of knowledge on smartphone usage, reliance and perceived personal productivity.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, I.T., and Governance, UKZN.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor at the numbers listed above.

The survey should take you about 15 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Tehseena Meer

Research Questionnaire:
Smartphone Reliance and Perceived Personal Productivity

Instructions:

- Please complete all sections.
- Select the relevant option(s).

Section A: Demographic Details

1. Gender:

Male		Female	

2. Age :

<21 years		21-30 years		31-40 years		41-50 years		>50 years	

3. How many children do you have?

0		1-2		>2	

4. How long have you been using your smartphone?

< 6 months		6 months to ≤ 1 year		1 to ≤ 2 years		> 2 years	

5. Indicate your level of smartphone competency.

I know how to use all of the features on my smartphone	
I know how to use most of the features on my smartphone	
I know how to use some of the features on my smartphone	

6. What is your average daily smartphone usage?

< 1 hour		1 to ≤ 2 hours		2 to ≤ 3 hours		3 to ≤ 4 hours		> 4 hours	

7. What is your smartphone platform?

Unsure		Blackberry		Windows		iOS		Android		Symbian	
Other:_____											

Section B: Usage and Reliance of Smartphone Features

1. How often do you use these smartphone applications?

Smartphone Applications	Do not use	Less than once a month	At least once a month	At least once a week	At least once a day	Several times a day
1.14. Email						
1.15. Instant Messaging						
1.16. Video Conferencing/VoIP						
1.17. Web						
1.18. Maps/transit						
1.19. Scheduling/planning						
1.20. Social Networking						
1.21. File Management						
1.22. eBooks/eMagazines						
1.23. Media						
1.24. Weather/Stock/News Updates						
1.25. Online Shopping						
1.26. Banking/Finance Management						

2. Indicate the degree of your reliance on the use of your smartphone **<u>at home</u>** for the following functions:
(where 1 = not at all reliant and 5 = extremely reliant)

Smartphone Applications	1	2	3	4	5
2.1. Email					
2.2. Instant Messaging					
2.3. Video conferencing/VoIP					
2.4. Web					
2.5. Maps/transit					
2.6. Scheduling/planning					
2.7. Social networking					
2.8. File Management					
2.9. eBooks/eMagazines					
2.10. Media					
2.11. Weather/Stock/News Updates					
2.12. Online Shopping					
2.13. Banking/Finance Management					

3. Indicate the degree of your reliance on the use of your smartphone **<u>at work</u>** for the following functions:
(where 1 = not at all reliant and 5 = extremely reliant)

Smartphone Applications	1	2	3	4	5
3.1. Email					
3.2. Instant Messaging					
3.3. Video conferencing/VoIP					
3.4. Web					
3.5. Maps/transit					
3.6. Scheduling/planning					
3.7. Social networking					
3.8. File Management					
3.9. eBooks/eMagazines					
3.10. Media					
3.11. Weather/Stock/News Updates					
3.12. Online Shopping					
3.13. Banking/Finance Management					

4. Indicate the degree of your reliance on the use of your smartphone **<u>when I am away from home and work</u>** for the following functions:
(where 1 = not at all reliant and 5 = extremely reliant)

Smartphone Applications	1	2	3	4	5
4.1. Email					
4.2. Instant Messaging					
4.3. Video conferencing/VoIP					
4.4. Web					
4.5. Maps/transit					
4.6. Scheduling/planning					
4.7. Social networking					
4.8. File Management					
4.9. eBooks/eMagazines					
4.10. Media					
4.11. Weather/Stock/News Updates					
4.12. Online Shopping					
4.13. Banking/Finance Management					

5. Indicate the frequency with which you intend to use the following applications in the future:

Smartphone Applications	Do not intend to use	Less than once a month	At least once a month	At least once a week	At least once a day	Several times a day
5.1. Email						
5.2. Instant Messaging						
5.3. Video conferencing/VoIP						
5.4. Web						
5.5. Maps/transit						
5.6. Scheduling/planning						
5.7. Social networking						
5.8. File Management						
5.9. eBooks/eMagazines						
5.10. Media						
5.11. Weather/Stock/News Updates						
5.12. Online Shopping						
5.13. Banking/Finance Management						

6. Do you use or rely on any other applications? If so, what are they and when?

_____
_____
_____
_____
_____

Section C: Drivers of Smartphone Reliance

1. Indicate your agreement/disagreement with the following statements:

Drivers	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.1. I am encouraged to use my smartphone because of the many features it offers.					
1.2. Because of the features offered by my smartphone, I have changed the way I complete tasks.					
1.3. Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.					
1.4. Using my smartphone makes me feel efficient.					
1.5. I have a smartphone because I like to keep up with technology.					
1.6. My smartphone's interface is easy to use.					
1.7. My smartphone is easy to use due to its' physical design (eg. touch screen).					
1.8. My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.					
1.9. My smartphone is readily available to use when I need it.					
1.10. My smartphone enhances my image.					
1.11. My friends/family think that I should use a smartphone.					
1.12. My contacts also use a smartphone.					
1.13. I use a smartphone because of the many applications that are available.					
1.14. I use a smartphone because there is integration between my applications.					
1.15. My smartphone offers the ability to complete tasks quickly.					

Drivers	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.16. My smartphone offers the ability to complete tasks efficiently.					
1.17. My smartphone allows me to synchronise data online and between my devices.					
1.18. My smartphone provides easy access to the information I need.					
1.19. I use a smartphone because there is Wifi availability/low data cost.					
1.20. I use a smartphone because there are software/application updates available.					
1.21. I use a smartphone because applications are free or low-cost.					
1.22. My smartphone provides security for my data.					
1.23. My smartphone maintains my privacy and confidentiality.					
1.24. It is possible to backup my data on my smartphone.					
1.25. There is help and support available for my smartphone/applications.					

2. Do any other factors cause your reliance on your smartphone? If yes, what?

_____
_____
_____
_____
_____
_____

Section D: Smartphone Reliance in relation to Perceived Personal Productivity

1. Indicate your disagreement/agreement that the following smartphone applications have improved your personal productivity:

Smartphone Applications	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.1. Email					
1.2. Instant Messaging					
1.3. Video conferencing/VoIP					
1.4. Web					
1.5. Maps/transit					
1.6. Scheduling/planning					
1.7. Social networking					
1.8. File Management					
1.9. eBooks/eMagazines					
1.10. Media					
1.11. Weather/Stock/News Updates					
1.12. Online Shopping					
1.13. Banking/Finance Management					

2. Indicate your agreement/ disagreement with the following statements on smartphone usage with regard to their effect on your personal productivity:

Factors	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.1. By using my smartphone, I have better personal organisation.					
2.2. By using my smartphone, I complete tasks in less time.					
2.3. By using my smartphone, I work more efficiently as I can work at any time and any place.					
2.4. There are many unnecessary features on my smartphone which result in me wasting time.					
2.5. I am distracted by irrelevant information given by my smartphone.					

Factors	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.6. Being always accessible to contacts via my smartphone results in me spending a lot of time messaging.					
2.7. The instant feedback I receive by using a smartphone has improved my personal productivity.					
2.8. I waste time looking through more information than is necessary just because it is available via my smartphone.					
2.9. I am distracted by games or social media whilst using my smartphone for other tasks.					
2.10. By using my smartphone, I am able to multitask which increases my productivity.					
2.11. I find that multitasking with my smartphone wastes time as I need to constantly refocus.					

3. Do you feel that there are any other smartphone factors that have affected your personal productivity? If so, what?

_____
_____
_____
_____
_____

Thank you for taking the time to participate in this survey.

Appendix B: Data Coding

Question Number	Codes
Section A	
1. Gender:	1 = male 2 = female
2. Age:	1 = <21 2 = 21 - 30 3 = 31 - 40 4 = 41 - 50 5 = >50
3. How many children do you have?	1 = 0 2 = 1 - 2 3 = >2
4. How long have you been using your smartphone?	1 = <6 months 2 = 6m - 1y 3 = 1-2 y 4 = >2y
5. Indicate your level of smartphone competency	1 = all features 2 = most features 3 = some features
6. What is your average daily smartphone usage?	1 = <1 hr 2 = 1-2 hrs 3 = 2-3 hrs 4 = 3-4 hrs 5 = >4 hrs
7. What is your smartphone platform?	1 = Unsure 2 = Blackberry 3 = Windows 4 = iOS 5 = Android 6 = Symbian 7 = Other
Section B	
1. How often do you use these smartphone applications?	1 = Do not use 2 = Less than once a month 3= At least once a month 4 = At least once a week 5 = At least once a day 6 = Several times a day
2. Indicate the degree of your reliance on the use of your smartphone at home for the following functions:	Scale 1-5, where: 1 = not at all reliant 5 = extremely reliant
3. Indicate the degree of your reliance on the use of your smartphone at work for the following functions:	Scale 1-5, where: 1 = not at all reliant 5 = extremely reliant

4. Indicate the degree of your reliance on the use of your smartphone when you are away from home and work for the following functions:	Scale 1-5, where: 1 = not at all reliant 5 = extremely reliant
5. Indicate the frequency with which you intend to use the following applications in the future:	1 = Do not intend to use 2 = Less than once a month 3 = At least once a month 4 = At least once a week 5 = At least once a day 6 = Several times a day
6. Do you use or rely on any other applications? If so, what are they and when?	Open-ended question
Section C	
1. Indicate your agreement/disagreement with the following statements:	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree
2. Do any other factors cause your reliance on your smartphone? If yes, what?	Open-ended question
Section D	
1. Indicate your disagreement/agreement that the following smartphone applications have improved your personal productivity:	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree
2. Indicate your agreement/disagreement with the following statements on smartphone usage with regard to their effect on your personal productivity:	1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree
3. Do you feel that there are any other smartphone factors that have affected your personal productivity? If so, what?	Open-ended question

Appendix C: SPSS Test Results

One-Sample Kolmogorov-Smirnov Test

		1.1 Email	1.2 Instant Messaging	1.3 Video Conferencing/VoIP	1.4 Web	1.5 Maps/ transit	1.6 Scheduling/planning	1.7 Social networking	1.8 File management	1.9. eBooks/e Magazines	1.10 Media	1.11 Weather/Stock/News Updates	1.12 Online shopping	1.13 Banking /Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	5.60	5.53	2.43	5.48	3.47	3.97	5.05	3.83	2.50	4.84	4.21	2.29	3.79
	Std. Deviation	.857	.959	1.488	1.013	1.441	1.737	1.561	1.728	1.789	1.461	1.704	1.622	1.652
Most Extreme Differences	Absolute	.420	.393	.228	.385	.179	.198	.332	.182	.299	.251	.283	.253	.205
	Positive	.322	.314	.228	.305	.156	.130	.272	.132	.299	.215	.146	.253	.144
	Negative	-.420	-.393	-.168	-.385	-.179	-.198	-.332	-.182	-.201	-.251	-.283	-.213	-.205
Kolmogorov-Smirnov Z		3.195	2.994	1.740	2.931	1.364	1.505	2.526	1.388	2.278	1.912	2.152	1.925	1.561
Asymp. Sig. (2-tailed)		.000	.000	.005	.000	.048	.022	.000	.042	.000	.001	.000	.001	.015

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		2.1 Email	2.2 Instant Messaging	2.3 Video Conferencing/VoIP	2.4 Web	2.5 Maps/ transit	2.6 Scheduling/planning	2.7 Social networking	2.8 File management	2.9. eBooks/e Magazines	2.10 Media	2.11 Weather/Stock/News Updates	2.12 Online shopping	2.13 Banking /Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.09	4.21	2.26	3.84	3.14	3.21	3.95	3.03	2.12	3.74	3.03	2.26	3.24
	Std. Deviation	1.204	1.239	1.458	1.348	1.515	1.496	1.432	1.337	1.285	1.250	1.486	1.421	1.380
Most Extreme Differences	Absolute	.311	.377	.272	.287	.166	.212	.320	.217	.257	.222	.166	.260	.172
	Positive	.224	.261	.272	.196	.145	.158	.231	.217	.257	.157	.153	.260	.138
	Negative	-.311	-.377	-.194	-.287	-.166	-.212	-.320	-.162	-.192	-.222	-.166	-.188	-.172
Kolmogorov-Smirnov Z		2.366	2.870	2.068	2.186	1.266	1.617	2.440	1.654	1.955	1.693	1.261	1.983	1.310
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.081	.011	.000	.008	.001	.006	.083	.001	.065

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		3.1 Email	3.2 Instant Messaging	3.3 Video Conferencing/VoIP	3.4 Web	3.5 Maps/ transit	3.6 Scheduling/planning	3.7 Social networking	3.8 File management	3.9. eBooks/e Magazines	3.10 Media	3.11 Weather/Stock/News Updates	3.12 Online shopping	3.13 Banking /Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	3.84	3.90	2.21	3.64	2.83	3.12	3.34	2.84	1.95	2.91	2.72	2.07	2.93
	Std. Deviation	1.587	1.423	1.542	1.483	1.523	1.557	1.681	1.519	1.330	1.502	1.598	1.437	1.642
Most Extreme Differences	Absolute	.370	.315	.300	.235	.195	.179	.234	.176	.348	.162	.204	.340	.191
	Positive	.233	.219	.300	.179	.195	.155	.194	.176	.348	.160	.204	.340	.191
	Negative	-.370	-.315	-.217	-.235	-.131	-.179	-.234	-.163	-.238	-.162	-.164	-.228	-.173
Kolmogorov-Smirnov Z		2.818	2.403	2.287	1.786	1.487	1.366	1.783	1.344	2.652	1.232	1.557	2.593	1.451
Asymp. Sig. (2-tailed)		.000	.000	.000	.003	.024	.048	.003	.054	.000	.096	.016	.000	.030

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		4.1 Email	4.2 Instant Messaging	4.3 Video Conferencing/VoIP	4.4 Web	4.5 Maps/ transit	4.6 Scheduling/planning	4.7 Social networking	4.8 File management	4.9. eBooks/e Magazines	4.10 Media	4.11 Weather/Stock/News Updates	4.12 Online shopping	4.13 Banking /Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.34	4.40	2.28	4.16	3.40	3.05	4.09	2.95	2.29	3.55	3.10	2.28	3.31
	Std. Deviation	1.117	1.138	1.412	1.182	1.533	1.561	1.430	1.444	1.487	1.465	1.541	1.554	1.614
Most Extreme Differences	Absolute	.394	.426	.265	.297	.214	.170	.359	.141	.256	.218	.184	.311	.215
	Positive	.279	.298	.265	.237	.148	.164	.261	.141	.256	.161	.155	.311	.183
	Negative	-.394	-.426	-.183	-.297	-.214	-.170	-.359	-.129	-.192	-.218	-.184	-.206	-.215
Kolmogorov-Smirnov Z		2.998	3.245	2.020	2.263	1.632	1.294	2.736	1.073	1.950	1.659	1.400	2.372	1.634
Asymp. Sig. (2-tailed)		.000	.000	.001	.000	.010	.070	.000	.200	.001	.008	.040	.000	.010

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		5.1 Email	5.2 Instant Messaging	5.3 Video Conferencing/VoIP	5.4 Web	5.5 Maps/ transit	5.6 Scheduling/planning	5.7 Social networking	5.8 File management	5.9. eBooks/e Magazines	5.10 Media	5.11 Weather/Stock/News Updates	5.12 Online shopping	5.13 Banking/Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	5.60	5.48	3.48	5.29	3.86	4.21	4.84	3.84	3.16	4.66	4.26	2.86	4.28
	Std. Deviation	.836	1.128	1.967	1.155	1.701	1.704	1.542	1.705	1.963	1.505	1.660	1.896	1.715
Most Extreme Differences	Absolute	.441	.418	.173	.350	.162	.196	.316	.148	.191	.246	.207	.216	.188
	Positive	.318	.323	.172	.270	.125	.146	.227	.121	.191	.186	.147	.216	.157
	Negative	-.441	-.418	-.173	-.350	-.162	-.196	-.316	-.148	-.168	-.246	-.207	-.163	-.188
Kolmogorov-Smirnov Z		3.358	3.185	1.315	2.669	1.234	1.496	2.406	1.124	1.458	1.872	1.576	1.647	1.428
Asymp. Sig. (2-tailed)		.000	.000	.063	.000	.095	.023	.000	.160	.028	.002	.014	.009	.034

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		1.1 Email	1.2 Instant Messaging	1.3 Video Conferencing/VoIP	1.4 Web	1.5 Maps/ transit	1.6 Scheduling/planning	1.7 Social networking	1.8 File management	1.9. eBooks/e Magazines	1.10 Media	1.11 Weather/Stock/News Updates	1.12 Online shopping	1.13 Banking /Finance Management
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.28	4.17	3.09	4.10	3.74	3.74	3.95	3.28	3.03	3.78	3.62	2.88	3.90
	Std. Deviation	.914	.939	1.261	.968	1.001	1.069	1.206	1.152	1.242	1.093	1.023	1.285	1.135
Most Extreme Differences	Absolute	.286	.259	.180	.268	.205	.216	.240	.198	.183	.219	.231	.169	.243
	Positive	.214	.189	.133	.177	.167	.135	.192	.198	.183	.131	.149	.169	.165
	Negative	-.286	-.259	-.180	-.268	-.205	-.216	-.240	-.147	-.179	-.219	-.231	-.124	-.243
Kolmogorov-Smirnov Z		2.178	1.974	1.367	2.039	1.564	1.647	1.824	1.509	1.397	1.669	1.758	1.291	1.852
Asymp. Sig. (2-tailed)		.000	.001	.048	.000	.015	.009	.003	.021	.040	.008	.004	.071	.002

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		2.1. By using my smartphone, I have better personal organisation	2.2. By using my smartphone, I complete tasks in less time	2.3. By using my smartphone, I work more efficiently as I can work at any time and any place	2.4. There are many unnecessary features on my smartphone which result in me wasting time	2.5. I am distracted by irrelevant information given by my smartphone	2.6. Being always accessible to contacts via my smartphone results in me spending a lot of time messaging	2.7. The instant feedback I receive by using a smartphone has improved my personal productivity	2.8. I waste time looking through more information than is necessary just because it is available via my smartphone	2.9. I am distracted by games or social media whilst using my smartphone for other tasks	2.10. By using my smartphone, I am able to multitask which increases my productivity	2.11. I find that multitasking with my smartphone wastes time as I need to constantly refocus.
N		58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	3.88	3.66	3.72	2.93	2.83	3.34	3.72	2.93	2.60	3.83	2.62
	Std. Deviation	.975	.983	1.022	1.255	1.142	1.117	1.056	1.212	1.138	.958	1.121
Most Extreme Differences	Absolute	.204	.223	.244	.202	.180	.190	.224	.193	.236	.203	.178
	Positive	.161	.161	.152	.202	.180	.190	.138	.193	.236	.203	.178
	Negative	-.204	-.223	-.244	-.125	-.146	-.189	-.224	-.121	-.160	-.183	-.167
Kolmogorov-Smirnov Z		1.557	1.701	1.860	1.540	1.367	1.449	1.704	1.467	1.801	1.545	1.355
Asymp. Sig. (2-tailed)		.016	.006	.002	.017	.048	.030	.006	.027	.003	.017	.051

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		Technological determinism	Effort expectancy	Social influence	Performance expectancy	Facilitating conditions
N		58	58	58	58	58
Normal Parameters[a,,b]	Mean	3.8448	4.0086	3.4195	3.9684	3.5222
	Std. Deviation	.82848	.78356	.87762	.79131	.90015
Most Extreme Differences	Absolute	.091	.116	.113	.096	.081
	Positive	.082	.108	.113	.096	.077
	Negative	-.091	-.116	-.099	-.087	-.081
Kolmogorov-Smirnov Z		.691	.886	.863	.732	.619
Asymp. Sig. (2-tailed)		.727	.413	.446	.657	.838

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		AR1	AR2	AR3	AR4	AR5	AR6	AR7	AR8	AR9	AR10	AR11	AR12	AR13
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.0920	4.1667	2.2471	3.8793	3.1207	3.1264	3.7931	2.9425	2.1207	3.4023	2.9540	2.2011	3.1609
	Std. Deviation	.99667	1.03779	1.32830	1.05538	1.31523	1.35196	1.27325	1.26759	1.24987	1.20227	1.29994	1.34923	1.40348
Most Extreme Differences	Absolute	.233	.237	.194	.151	.103	.124	.172	.099	.185	.112	.098	.240	.122
	Positive	.181	.211	.194	.144	.103	.108	.172	.099	.184	.092	.098	.240	.115
	Negative	-.233	-.237	-.174	-.151	-.101	-.124	-.164	-.071	-.185	-.112	-.080	-.187	-.122
Kolmogorov-Smirnov Z		1.772	1.807	1.481	1.154	.781	.947	1.307	.754	1.409	.854	.743	1.827	.926
Asymp. Sig. (2-tailed)		.004	.003	.025	.140	.575	.331	.066	.620	.038	.459	.638	.003	.358

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		avrelhome	avrelwork	avrelaway	AvUSAGE	AvINTENDUSAGE	TOTAVREL
N		58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	3.2401	2.9469	3.3223	4.0769	4.2944	3.1698
	Std. Deviation	.98141	1.16207	.98409	.92094	1.10435	.94375
Most Extreme Differences	Absolute	.069	.110	.049	.096	.061	.090
	Positive	.069	.110	.049	.066	.061	.090
	Negative	-.067	-.079	-.049	-.096	-.060	-.049
Kolmogorov-Smirnov Z		.529	.839	.377	.734	.466	.686
Asymp. Sig. (2-tailed)		.942	.482	.999	.654	.981	.734

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		1.1. I am encouraged to use my smartphone because of the many features it offers.	1.2. Because of the features offered by my smartphone, I have changed the way I complete tasks.	1.3. Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.	1.4. Using my smartphone makes me feel efficient.	1.5. I have a smartphone because I like to keep up with technology.	1.6. My smartphone's interface is easy to use.	1.7. My smartphone is easy to use due to its' physical design (eg. touch screen).	1.8. My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.	1.9. My smartphone is readily available to use when I need it.	1.10. My smartphone enhances my image.	1.11. My friends/family think that I should use a smartphone.	1.12. My contacts also use a smartphone.
N		58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.19	3.88	3.60	3.76	3.79	4.21	3.91	3.86	4.05	3.05	3.24	3.97
	Std. Deviation	.945	.993	1.091	1.113	1.196	.789	1.097	1.017	.981	1.161	1.144	.898
Most Extreme Differences	Absolute	.253	.221	.193	.207	.207	.259	.221	.209	.272	.207	.239	.257
	Positive	.196	.141	.193	.132	.156	.224	.161	.147	.167	.207	.239	.192
	Negative	-.253	-.221	-.159	-.207	-.207	-.259	-.221	-.209	-.272	-.189	-.192	-.257
Kolmogorov-Smirnov Z		1.924	1.682	1.467	1.573	1.573	1.970	1.683	1.593	2.072	1.580	1.818	1.955
Asymp. Sig. (2-tailed)		.001	.007	.027	.014	.014	.001	.007	.013	.000	.014	.003	.001

a. Test distribution is Normal.

b. Calculated from data.

One-Sample Kolmogorov-Smirnov Test

		1.13. I use a smartphone because of the many applications that are available.	1.14. I use a smartphone because there is integration between my applications.	1.15. My smartphone offers the ability to complete tasks quickly.	1.16. My smartphone offers the ability to complete tasks efficiently.	1.17. My smartphone allows me to synchronise data online and between my devices.	1.18. My smartphone provides easy access to the information I need.	1.19. I use a smartphone because there is Wifi availability/low data cost.	1.20. I use a smartphone because there are software/ application updates available.	1.21. I use a smartphone because applications are free or low-cost.	1.22. My smartphone provides security for my data.	1.23. My smartphone maintains my privacy and confidentiality.	1.24. It is possible to backup my data on my smartphone.	1.25. There is help and support available for my smartphone/ applications.
N		58	58	58	58	58	58	58	58	58	58	58	58	58
Normal Parameters[a,,b]	Mean	4.09	3.90	3.83	3.78	4.03	4.19	3.50	3.22	3.33	3.33	3.50	4.00	3.78
	Std. Deviation	.942	.986	.939	.974	.936	.805	1.232	1.155	1.220	1.205	1.203	1.026	1.009
Most Extreme Differences	Absolute	.257	.214	.194	.212	.228	.252	.175	.198	.158	.193	.170	.224	.226
	Positive	.166	.148	.190	.166	.159	.214	.175	.198	.158	.193	.161	.165	.154
	Negative	-.257	-.214	-.194	-.212	-.228	-.252	-.170	-.164	-.158	-.151	-.170	-.224	-.226
Kolmogorov-Smirnov Z		1.955	1.631	1.474	1.612	1.738	1.917	1.331	1.505	1.200	1.472	1.292	1.707	1.720
Asymp. Sig. (2-tailed)		.001	.010	.026	.011	.005	.001	.058	.022	.112	.026	.071	.006	.005

a. Test distribution is Normal.

b. Calculated from data.

3. How many children do you have? * 6. What is your average daily smartphone usage? Crosstabulation

Count

		6. What is your average daily smartphone usage?					
		<1 hour	1 - <=2 hours	2 - <=3 hours	3 - <=4 hours	>4 hours	Total
3. How many children do you have?	None	1	4	9	11	15	40
	1 - 2	1	1	3	2	7	14
	>2	0	1	0	0	3	4
Total		2	6	12	13	25	58

Chi-square goodness-of-fit-test results (smartphone usage and competency)

Test Statistics

	4. How long have you been using your smartphone?	5. Indicate your level of smartphone competency	6. What is your average daily smartphone usage?	7. What is your smartphone platform?
Chi-Square	87.793[a]	20.931[b]	26.310[c]	50.276[c]
df	3	2	4	4
Asymp. Sig.	.000	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 14.5.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.3.

c. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.6.

5. Indicate your level of smartphone competency * 4. How long have you been using your smartphone? Crosstabulation

Count

		4. How long have you been using your smartphone?				
		<6 months	6 months to <1 year	1 to <=2 years	>2 years	Total
5. Indicate your level of smartphone competency	Know how to use all features	1	2	7	19	29
	Know how to use most features	1	0	2	23	26
	Know how to use some features	0	0	0	3	3
Total		2	2	9	45	58

5. Indicate your level of smartphone competency * 6. What is your average daily smartphone usage? Crosstabulation

Count

		6. What is your average daily smartphone usage?					
		<1 hour	1 - <=2 hours	2 - <=3 hours	3 - <=4 hours	>4 hours	Total
5. Indicate your level of smartphone competency	Know how to use all features	0	3	4	8	14	29
	Know how to use most features	2	3	8	5	8	26
	Know how to use some features	0	0	0	0	3	3
Total		2	6	12	13	25	58

Wilcoxon signed ranks test results (intended usage and current usage)

	5.1 Email - 1.1 Email	1.2 Instant Messaging - 5.2 Instant Messaging	5.3 Video Conferencing/VoIP - 1.3 Video Conferencing/ VoIP	1.4 Web - 5.4 Web	5.5 Maps/transit - 1.5 Maps/transit	1.6 Scheduling/planning - 5.6 Scheduling /planning	5.7 Social networking - 1.7 Social networking
Z	.000[a]	-.257[b]	-4.097[b]	-1.358[b]	-2.259[b]	-1.208[c]	-1.753[c]
Asymp. Sig. (2-tailed)	1.000	.797	.000	.175	.024	.227	.080

	1.8 File management - 5.8 File management	5.9. eBooks/eMagazines - 1.9. eBooks/eMagazines	1.10 Media - 5.10 Media	5.11 Weather/Stock/News Updates - 1.11 Weather/Stock/News Updates	1.12 Online shopping - 5.12 Online shopping	5.13 Banking/Finance Management - 1.13 Banking/Finance Management
Z	-.684[c]	-2.915[b]	-.642[b]	-.208[b]	-3.003[c]	-2.298[b]
Asymp. Sig. (2-tailed)	.494	.004	.521	.835	.003	.022

Wilcoxon signed ranks test results (average reliance)

Test Statistics[c]

	threes - AR1	threes - AR2	threes - AR3	threes - AR4	threes - AR5	threes - AR6	threes - AR7	threes - AR8	threes - AR9	threes - AR10	threes - AR11	threes - AR12	threes - AR13
Z	-5.664[a]	-5.609[a]	-3.674[b]	-4.859[a]	-.707[a]	-.806[a]	-3.847[a]	-.339[b]	-4.331[b]	-2.410[a]	-.240[b]	-3.879[b]	-.743[a]
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.480	.420	.000	.735	.000	.016	.810	.000	.458

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Wilcoxon signed ranks test results (reliance at home)

	threes - 2.1 Email	threes - 2.2 Instant Messaging	threes - 2.3 Video Conferencing/ VoIP	threes - 2.4 Web	threes - 2.5 Maps/transit	threes - 2.6 Scheduling/ planning	threes - 2.7 Social networking
Z	-5.031[a]	-5.238[a]	-3.505[b]	-4.082[a]	-.646[a]	-1.361[a]	-3.970[a]
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.518	.173	.000

	threes - 2.8 File management	threes - 2.9. eBooks/ eMagazines	threes - 2.10 Media	threes - 2.11 Weather/Stock/ News Updates	threes - 2.12 Online shopping	threes - 2.13 Banking / Finance Management
Z	-.464[a]	-4.123[b]	-3.828[a]	-.339[a]	-3.601[b]	-1.148[a]
Asymp. Sig. (2-tailed)	.643	.000	.000	.735	.000	.251

Wilcoxon signed ranks test results (reliance at work)

	threes - 3.1 Email	threes - 3.2 Instant Messaging	threes - 3.3 Video Conferencing/ VoIP	threes - 3.4 Web	threes - 3.5 Maps/ transit	threes - 3.6 Scheduling/ planning	threes - 3.7 Social networking
Z	-3.708a	-4.144a	-3.332b	-2.728a	-.988b	-.576a	-1.308a
Asymp. Sig. (2-tailed)	.000	.000	.001	.006	.323	.565	.191

	threes - 3.8 File management	threes - 3.9. eBooks /eMagazines	threes - 3.10 Media	threes - 3.11 Weather/ Stock/News Updates	threes - 3.12 Online shopping	threes - 3.13 Banking /Finance Management
Z	-.539[b]	-4.710[b]	-.498[b]	-1.179[b]	-4.296[b]	-.337[b]
Asymp. Sig. (2-tailed)	.590	.000	.618	.239	.000	.736

Wilcoxon signed ranks test results (reliance when away from home and work)

	threes - 4.1 Email	threes - 4.2 Instant Messaging	threes - 4.3 Video Conferencing /VoIP	threes - 4.4 Web	threes - 4.5 Maps /transit	threes - 4.6 Scheduling/ planning	threes - 4.7 Social networking
Z	-5.868[a]	-5.865[a]	-3.432[b]	-5.048[a]	-1.978[a]	-.222[a]	-4.377[a]
Asymp. Sig. (2-tailed)	.000	.000	.001	.000	.048	.824	.000

	threes - 4.8 File management	threes - 4.9. eBooks/eMagazines	threes - 4.10 Media	threes - 4.11 Weather/Stock/News Updates	threes - 4.12 Online shopping	threes - 4.13 Banking/Finance Management
Z	-.253[b]	-3.121[b]	-2.695[a]	-.533[a]	-3.204[b]	-1.187[a]
Asymp. Sig. (2-tailed)	.800	.002	.007	.594	.001	.235

Friedman test and Wilcoxon signed ranks test results (reliance at home, work and away from home and work)

Instant Messaging

Test Statistics[a]

N	58
Chi-Square	8.592
df	2
Asymp. Sig.	.014

a. Friedman Test

Test Statistics[c]

	3.2 Instant Messaging - 2.2 Instant Messaging	4.2 Instant Messaging - 2.2 Instant Messaging	4.2 Instant Messaging - 3.2 Instant Messaging
Z	-1.818[a]	-1.195[b]	-2.490[b]
Asymp. Sig. (2-tailed)	.069	.232	.013

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Maps/Transit

Ranks

	Mean Rank
2.5 Maps/transit	2.02
3.5 Maps/transit	1.79
4.5 Maps/transit	2.19

Test Statistics[a]

N	58
Chi-Square	8.650
df	2
Asymp. Sig.	.013

a. Friedman Test

Test Statistics[c]

	3.5 Maps/transit - 2.5 Maps/transit	4.5 Maps/transit - 2.5 Maps/transit	4.5 Maps/transit - 3.5 Maps/transit
Z	-1.617[a]	-1.677[b]	-2.742[b]
Asymp. Sig. (2-tailed)	.106	.094	.006

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Social networking

Ranks

	Mean Rank
2.7 Social networking	2.07
3.7 Social networking	1.72
4.7 Social networking	2.21

Test Statistics[a]

N	58
Chi-Square	16.980
df	2
Asymp. Sig.	.000

a. Friedman Test

Test Statistics[c]

	3.7 Social networking - 2.7 Social networking	4.7 Social networking - 2.7 Social networking	4.7 Social networking - 3.7 Social networking
Z	-3.250[a]	-.728[b]	-2.977[b]
Asymp. Sig. (2-tailed)	.001	.467	.003

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Media

Ranks

	Mean Rank
2.10 Media	2.28
3.10 Media	1.62
4.10 Media	2.10

Test Statistics[a]

N	58
Chi-Square	25.653
df	2
Asymp. Sig.	.000

a. Friedman Test

Test Statistics[c]

	3.10 Media - 2.10 Media	4.10 Media - 2.10 Media	4.10 Media - 3.10 Media
Z	-4.241[a]	-1.069[a]	-3.522[b]
Asymp. Sig. (2-tailed)	.000	.285	.000

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Weather/stock/news updates

Ranks

		Mean Rank
2.11 Updates	Weather/Stock/News	2.11
3.11 Updates	Weather/Stock/News	1.80
4.11 Updates	Weather/Stock/News	2.09

Test Statistics[a]

N	58
Chi-Square	7.125
df	2
Asymp. Sig.	.028

a. Friedman Test

Test Statistics[c]

	3.11 Weather/Stock/News Updates - 2.11 Weather/Stock/News Updates	4.11 Weather/Stock/News Updates - 2.11 Weather/Stock/News Updates	4.11 Weather/Stock/News Updates - 3.11 Weather/Stock/News Updates
Z	-1.918[a]	-.210[b]	-1.845[b]
Asymp. Sig. (2-tailed)	.055	.834	.065

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

Spearman's correlation test result (age and current usage)

Correlations

			2. Age:	1.8 File management
Spearman's rho	2. Age:	Correlation Coefficient	1.000	-.309*
		Sig. (2-tailed)	.	.018
		N	58	58
	1.8 File management	Correlation Coefficient	-.309*	1.000
		Sig. (2-tailed)	.018	.
		N	58	58

*. Correlation is significant at the 0.05 level (2-tailed).

Wilcoxon signed ranks test results (drivers)

Test Statistics[b]

	threes - 1.1. I am encouraged to use my smartphone because of the many features it offers.	threes - 1.2. Because of the features offered by my smartphone, I have changed the way I complete tasks.	threes - 1.3. Because of the features offered by my smartphone, I enjoy completing tasks that were previously boring.	threes - 1.4. Using my smartphone makes me feel efficient.	threes - 1.5. I have a smartphone because I like to keep up with technology.	threes - 1.6. My smartphone's interface is easy to use.	threes - 1.7. My smartphone is easy to use due to its' physical design (eg. touch screen).	threes - 1.8. My smartphone's hardware capabilities (eg. processor speed, memory) makes it quick to use.
Z	-5.742[a]	-4.921[a]	-3.661[a]	-4.229[a]	-4.149[a]	-6.031[a]	-4.602[a]	-4.689[a]
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Test Statistics[b]

	threes - 1.9. My smartphone is readily available to use when I need it.	threes - 1.10. My smartphone enhances my image.	threes - 1.11. My friends/family think that I should use a smartphone.	threes - 1.12. My contacts also use a smartphone.	threes - 1.13. I use a smartphone because of the many applications that are available.	threes - 1.14. I use a smartphone because there is integration between my applications.	threes - 1.15. My smartphone offers the ability to complete tasks quickly.	threes - 1.16. My smartphone offers the ability to complete tasks efficiently.
Z	-5.297[a]	-.390[a]	-1.678[a]	-5.367[a]	-5.546[a]	-4.838[a]	-4.844[a]	-4.633[a]
Asymp. Sig. (2-tailed)	.000	.697	.093	.000	.000	.000	.000	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Test Statistics[b]

	threes - 1.17. My smartphone allows me to synchronise data online and between my devices.	threes - 1.18. My smartphone provides easy access to the information I need.	threes - 1.19. I use a smartphone because there is Wifi availability/ low data cost.	threes - 1.20. I use a smartphone because there are software/application updates available.	threes - 1.21. I use a smartphone because applications are free or low-cost.	threes - 1.22. My smartphone provides security for my data.	threes - 1.23. My smartphone maintains my privacy and confidentiality.	threes - 1.24. It is possible to backup my data on my smartphone.	threes - 1.25. There is help and support available for my smartphone/ applications.
Z	-5.365[a]	-5.965[a]	-2.778[a]	-1.526[a]	-1.973[a]	-2.104[a]	-3.097[a]	-5.056[a]	-4.459[a]
Asymp. Sig. (2-tailed)	.000	.000	.005	.127	.048	.035	.002	.000	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

7. What is your smartphone platform? * 1.6. My smartphone's interface is easy to use. Crosstabulation

Count

		1.6. My smartphone's interface is easy to use.				
		Strongly disagree	Neutral	Agree	Strongly agree	Total
7. What is your smartphone platform?	Blackberry	1	5	11	2	19
	Windows	0	0	2	0	2
	iOS	0	2	2	3	7
	Android	0	0	13	16	29
	Other	0	0	0	1	1
Total		1	7	28	22	58

Chi-square test of independence (operating system and interface easy to use)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	21.133[a]	12	.048	.072		
Likelihood Ratio	25.894	12	.011	.002		
Fisher's Exact Test	26.431			.002		
Linear-by-Linear Association	14.895[b]	1	.000	.000	.000	.000
N of Valid Cases	58					

a. 16 cells (80.0%) have expected count less than 5. The minimum expected count is .02.

b. The standardized statistic is 3.859.

Kruskal Wallis test (smartphone platform and average reliance per application)

		N	Mean	Std. Deviation
AR1	Blackberry	19	4.0000	.90948
	Windows	2	2.0000	.47140
	iOS	7	4.7619	.49868
	Android	30	4.1333	.98105
	Total	58	4.0920	.99667
AR2	Blackberry	19	4.0702	.89290
	Windows	2	2.5000	1.17851
	iOS	7	4.6190	.62148
	Android	30	4.2333	1.11469
	Total	58	4.1667	1.03779
AR3	Blackberry	19	1.9649	.95513
	Windows	2	1.5000	.70711
	iOS	7	2.8571	1.71979
	Android	30	2.3333	1.44371
	Total	58	2.2471	1.32830
AR4	Blackberry	19	3.6140	1.15611
	Windows	2	2.1667	.70711
	iOS	7	3.9048	1.39728
	Android	30	4.1556	.78165
	Total	58	3.8793	1.05538
AR5	Blackberry	19	2.8596	.93172
	Windows	2	2.5000	2.12132
	iOS	7	4.0476	1.32537
	Android	30	3.1111	1.43661
	Total	58	3.1207	1.31523
AR6	Blackberry	19	2.5614	1.06024
	Windows	2	2.5000	1.64992
	iOS	7	4.1429	1.18411
	Android	30	3.2889	1.41349
	Total	58	3.1264	1.35196

AR7	Blackberry	19	3.5789	1.29501
	Windows	2	1.0000	.00000
	iOS	7	4.3810	.78004
	Android	30	3.9778	1.15448
	Total	58	3.7931	1.27325
AR8	Blackberry	19	2.4912	1.24409
	Windows	2	1.6667	.47140
	iOS	7	3.5714	1.35693
	Android	30	3.1667	1.18984
	Total	58	2.9425	1.26759
AR9	Blackberry	19	1.6667	.79349
	Windows	2	1.0000	.00000
	iOS	7	2.6667	1.31937
	Android	30	2.3556	1.40315
	Total	58	2.1207	1.24987
AR10	Blackberry	19	3.0702	1.29852
	Windows	2	1.6667	.47140
	iOS	7	3.4286	1.25778
	Android	30	3.7222	1.03607
	Total	58	3.4023	1.20227
AR11	Blackberry	19	2.5965	1.10319
	Windows	2	2.5000	2.12132
	iOS	7	3.5238	.97861
	Android	30	3.0778	1.42146
	Total	58	2.9540	1.29994
AR12	Blackberry	19	1.7018	.83070
	Windows	2	1.5000	.70711
	iOS	7	3.5714	1.25778
	Android	30	2.2444	1.46722
	Total	58	2.2011	1.34923
AR13	Blackberry	19	2.8772	1.34353
	Windows	2	2.1667	1.17851
	iOS	7	3.9048	1.32936
	Android	30	3.2333	1.44145
	Total	58	3.1609	1.40348

Test Statistics[a,b]

	AR1	AR2	AR3	AR4	AR5	AR6	AR7	AR8	AR9	AR10	AR11	AR12	AR13
Chi-Square	9.468	6.193	1.739	6.926	5.209	7.832	7.472	7.203	6.829	7.093	3.528	9.034	3.993
df	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	.024	.103	.628	.074	.157	.050	.058	.066	.078	.069	.317	.029	.262

a. Kruskal Wallis Test

b. Grouping Variable: plat_Android

Kruskal Wallis test (smartphone platform and average reliance per environment)

		N	Mean	Std. Deviation
avrelhome	Blackberry	19	3.0000	.74975
	Windows	2	1.7308	.81589
	iOS	7	3.8901	.88918
	Android	30	3.3410	1.02483
	Total	58	3.2401	.98141
avrelwork	Blackberry	19	2.5506	.98951
	Windows	2	1.6923	.97907
	iOS	7	3.5824	1.23864
	Android	30	3.1333	1.16238
	Total	58	2.9469	1.16207
avrelaway	Blackberry	19	3.0000	.86877
	Windows	2	2.2692	.92468
	iOS	7	3.9231	.85080
	Android	30	3.4564	1.00274
	Total	58	3.3223	.98409
TOTAVREL	Blackberry	19	2.8502	.76767
	Windows	2	1.8974	.90655
	iOS	7	3.7985	.86807
	Android	30	3.3103	.95193
	Total	58	3.1698	.94375

Test Statistics[a,b]

	avrelhome	avrelwork	avrelaway	TOTAVREL
Chi-Square	7.877	7.136	7.705	8.181
df	3	3	3	3
Asymp. Sig.	.049	.068	.053	.042

a. Kruskal Wallis Test

b. Grouping Variable: plat_Android

Cronbach's Alpha (driver groups)

Technological determinism (Q1.1 – Q1.5)

Reliability Statistics

Cronbach's Alpha	N of Items
.832	5

Effort expectancy (Q1.6 – Q1.9)

Reliability Statistics

Cronbach's Alpha	N of Items
.815	4

Social influence (Q1.10 – Q1.12)

Reliability Statistics

Cronbach's Alpha	N of Items
.751	3

Performance expectancy (Q1.13 – Q1.18)

Reliability Statistics

Cronbach's Alpha	N of Items
.922	6

Facilitating conditions (Q1.19 – Q1.25)

Reliability Statistics

Cronbach's Alpha	N of Items
.893	7

Wilcoxon signed ranks test results (driver groups)

Test Statistics[b]

	threes - Technological determinism	threes - Effort expectancy	threes - Social influence	threes - Performance expectancy	threes - Facilitating conditions
Z	-5.558[a]	-5.820[a]	-3.433[a]	-5.895[a]	-3.927[a]
Asymp. Sig. (2-tailed)	.000	.000	.001	.000	.000

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

Pearson's correlation test results (driver groups to total average reliance)

Correlations

		TOTAVREL	Technological determinism	Effort expectancy	Social influence	Performance expectancy	Facilitating conditions
TOTAVREL	Pearson Correlation	1	.559**	.512**	.541**	.671**	.563**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	58	58	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson's correlation test results (driver groups to average reliance at home)

		avrelhome
avrelhome	Pearson Correlation	1
	Sig. (2-tailed)	
	N	58
Technological determinism	Pearson Correlation	.583**
	Sig. (2-tailed)	.000
	N	58
Effort expectancy	Pearson Correlation	.484**
	Sig. (2-tailed)	.000
	N	58
Social influence	Pearson Correlation	.516**
	Sig. (2-tailed)	.000
	N	58
Performance expectancy	Pearson Correlation	.710**
	Sig. (2-tailed)	.000
	N	58
Facilitating conditions	Pearson Correlation	.561**
	Sig. (2-tailed)	.000
	N	58

Pearson's correlation test results (driver groups to average reliance at work)

		avrelwork
avrelwork	Pearson Correlation	1
	Sig. (2-tailed)	
	N	58
Technological determinism	Pearson Correlation	.440**
	Sig. (2-tailed)	.001
	N	58
Effort expectancy	Pearson Correlation	.404**
	Sig. (2-tailed)	.002
	N	58
Social influence	Pearson Correlation	.494**
	Sig. (2-tailed)	.000
	N	58
Performance expectancy	Pearson Correlation	.515**
	Sig. (2-tailed)	.000
	N	58
Facilitating conditions	Pearson Correlation	.484**
	Sig. (2-tailed)	.000
	N	58

Pearson's correlation test results (driver groups to average reliance when away from home and work)

		avrelaway
avrelaway	Pearson Correlation	1
	Sig. (2-tailed)	
	N	58
Technological determinism	Pearson Correlation	.508**
	Sig. (2-tailed)	.000
	N	58
Effort expectancy	Pearson Correlation	.513**
	Sig. (2-tailed)	.000
	N	58
Social influence	Pearson Correlation	.460**
	Sig. (2-tailed)	.000
	N	58
Performance expectancy	Pearson Correlation	.615**
	Sig. (2-tailed)	.000
	N	58
Facilitating conditions	Pearson Correlation	.489**
	Sig. (2-tailed)	.000
	N	58

Pearson's correlation test results (driver groups to average intended usage)

Correlations

		INTENDUSAGE	Technological determinism	Effort expectancy	Social influence	Performance expectancy	Facilitating conditions
INTENDUSAGE	Pearson Correlation	1	.523**	.446**	.412**	.642**	.480**
	Sig. (2-tailed)		.000	.000	.001	.000	.000
	N	58	58	58	58	58	58

**. Correlation is significant at the 0.01 level (2-tailed).

ANOVA (driver groups and smartphone competency)

		N	Mean	Std. Deviation
Technological determinism	Know how to use all features	29	3.9586	.81832
	Know how to use most features	26	3.6846	.82399
	Know how to use some features	3	4.1333	1.02632
	Total	58	3.8448	.82848
Effort expectancy	Know how to use all features	29	4.1724	.69470
	Know how to use most features	26	3.7885	.81146
	Know how to use some features	3	4.3333	1.15470
	Total	58	4.0086	.78356
Social influence	Know how to use all features	29	3.5977	.87912
	Know how to use most features	26	3.1667	.82327
	Know how to use some features	3	3.8889	1.01835
	Total	58	3.4195	.87762
Performance expectancy	Know how to use all features	29	4.0862	.75674
	Know how to use most features	26	3.8013	.79445
	Know how to use some features	3	4.2778	1.10972
	Total	58	3.9684	.79131
Facilitating conditions	Know how to use all features	29	3.7044	.95369
	Know how to use most features	26	3.2308	.72964
	Know how to use some features	3	4.2857	1.11575
	Total	58	3.5222	.90015

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Technological determinism	Between Groups	1.293	2	.646	.940	.397
	Within Groups	37.831	55	.688		
	Total	39.123	57			
Effort expectancy	Between Groups	2.355	2	1.177	1.984	.147
	Within Groups	32.641	55	.593		
	Total	34.996	57			
Social influence	Between Groups	3.244	2	1.622	2.194	.121
	Within Groups	40.658	55	.739		
	Total	43.902	57			
Performance expectancy	Between Groups	1.416	2	.708	1.136	.329
	Within Groups	34.276	55	.623		
	Total	35.692	57			
Facilitating conditions	Between Groups	4.920	2	2.460	3.279	.045
	Within Groups	41.266	55	.750		
	Total	46.186	57			

Wilcoxon signed ranks test results (perceived personal productivity)

	threes - 1.1 Email	threes - 1.2 Instant Messaging	threes - 1.3 Video Conferencing/VoIP	threes - 1.4 Web	threes - 1.5 Maps/transit	threes - 1.6 Scheduling/planning	threes - 1.7 Social networking
Z	-5.919[a]	-5.686[a]	-.439[a]	-5.552[a]	-4.458[a]	-4.233[a]	-4.484[a]
Asymp. Sig. (2-tailed)	.000	.000	.661	.000	.000	.000	.000

	threes - 1.8 File management	threes - 1.9. eBooks/eMagazines	threes - 1.10 Media	threes - 1.11 Weather/Stock/News Updates	threes - 1.12 Online shopping	threes - 1.13 Banking/Finance Management
Z	-1.897[a]	-.226[a]	-4.193[a]	-3.946[a]	-.562[b]	-4.534[a]
Asymp. Sig. (2-tailed)	.058	.821	.000	.000	.574	.000

Pearson's correlation tests (perceived personal productivity and reliance in each environment)

		2.1 Email	3.1 Email	4.1 Email
1.1 Email	Pearson Correlation	.504**	.441**	.266*
	Sig. (2-tailed)	.000	.001	.043
	N	58	58	58

		2.2 Instant Messaging	3.2 Instant Messaging	4.2 Instant Messaging
1.2 Instant Messaging	Pearson Correlation	.572**	.394**	.444**
	Sig. (2-tailed)	.000	.002	.000
	N	58	58	58

		2.3 Video Conferencing/VoIP	3.3 Video Conferencing/VoIP	4.3 Video Conferencing/VoIP
1.3 Video Conferencing/VoIP	Pearson Correlation	.541**	.604**	.558**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

		2.4 Web	3.4 Web	4.4 Web
1.4 Web	Pearson Correlation	.470**	.454**	.354**
	Sig. (2-tailed)	.000	.000	.006
	N	58	58	58

		2.5 Maps/transit	3.5 Maps/transit	4.5 Maps/transit
1.5 Maps/transit	Pearson Correlation	.498**	.465**	.583**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

		2.6 Scheduling/planning	3.6 Scheduling/planning	4.6 Scheduling/planning
1.6 Scheduling/planning	Pearson Correlation	.495**	.683**	.587**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

		2.7 Social networking	3.7 Social networking	4.7 Social networking
1.7 Social networking	Pearson Correlation	.730**	.520**	.583**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

		2.8 File management	3.8 File management	4.8 File management
1.8 File management	Pearson Correlation	.643**	.606**	.431**
	Sig. (2-tailed)	.000	.000	.001
	N	58	58	58

		2.9. eBooks/eMagazines	3.9. eBooks/eMagazines	4.9. eBooks/eMagazines
1.9. eBooks/eMagazines	Pearson Correlation	.690**	.638**	.621**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

		2.10 Media	3.10 Media	4.10 Media
1.10 Media	Pearson Correlation	.522**	.426**	.594**
	Sig. (2-tailed)	.000	.001	.000
	N	58	58	58

			2.11 Weather/Stock/News Updates	3.11 Weather/Stock/News Updates	4.11 Weather/Stock/News Updates
1.11 Updates	Weather/Stock/News	Pearson Correlation	.539**	.471**	.571**
		Sig. (2-tailed)	.000	.000	.000
		N	58	58	58

		2.12 Online shopping	3.12 Online shopping	4.12 Online shopping
1.12 Online shopping	Pearson Correlation	.690**	.631**	.720**
	Sig. (2-tailed)	.000	.000	.000
	N	58	58	58

			2.13 Banking/Finance Management	3.13 Banking/Finance Management	4.13 Banking/Finance Management
1.13 Management	Banking/Finance	Pearson Correlation	.666**	.693**	.737**
		Sig. (2-tailed)	.000	.000	.000
		N	58	58	58

Wilcoxon signed ranks test results (factors effecting productivity)

	threes - 2.1. By using my smartphone, I have better personal organisation	threes - 2.2. By using my smartphone, I complete tasks in less time	threes - 2.3. By using my smartphone, I work more efficiently as I can work at any time and any place	threes - 2.4. There are many unnecessary features on my smartphone which result in me wasting time	threes - 2.5. I am distracted by irrelevant information given by my smartphone	threes - 2.6. Being always accessible to contacts via my smartphone results in me spending a lot of time messaging
Z	-4.938[a]	-4.178[a]	-4.367[a]	-.159[b]	-1.098[b]	-2.190[a]
Asymp. Sig. (2-tailed)	.000	.000	.000	.874	.272	.029

	threes - 2.7. The instant feedback I receive by using a smartphone has improved my personal productivity	threes - 2.8. I waste time looking through more information than is necessary just because it is available via my smartphone	threes - 2.9. I am distracted by games or social media whilst using my smartphone for other tasks	threes - 2.10. By using my smartphone, I am able to multitask which increases my productivity	threes - 2.11. I find that multitasking with my smartphone wastes time as I need to constantly refocus.
Z	-4.197[a]	-.293[b]	-2.261[b]	-4.788[a]	-2.364[b]
Asymp. Sig. (2-tailed)	.000	.769	.024	.000	.018

Crosstab

Count

		2.3. By using my smartphone, I work more efficiently as I can work at any time and any place					
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
5. Indicate your level of smartphone competency	Know how to use all features	0	4	7	6	12	29
	Know how to use most features	1	2	5	16	2	26
	Know how to use some features	0	1	1	1	0	3
Total		1	7	13	23	14	58

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	16.164[a]	8	.040	.067		
Likelihood Ratio	17.472	8	.026	.018		
Fisher's Exact Test	17.448			.007		
Linear-by-Linear Association	2.419[b]	1	.120	.130	.075	.026
N of Valid Cases	58					

a. 9 cells (60.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -1.555.

Appendix D: Ethical Clearance Approval Letter

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

21 October 2015

Ms Tehseena Meer (neé Essack) (212543442)
School of Management, IT & Governance
Westville Campus

Dear Ms Essack,

Protocol reference number: HSS/0222/014M
New project title: Smartphone usage of employees at an I.T. Firm

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 13 October 2015 has now been approved as follows:

- Change in Title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully

.....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Mr Craig Blewett
cc Academic Leader Research: Professor Brian McArthur
cc School Administrator: Ms Angela Pearce

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