Bring Your Own Device (BYOD) Adoption in South African SMEs

A Thesis submitted to the
Department of Information Systems
University of Cape Town

By
Akin-Adetoro Adedolapo
(AKNADE006)
Supervisor: Dr. Salah Kabanda

In partial fulfilment of the requirements for the
Master of Commerce degree in Information Systems
August 2016

DECLARATION

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the APA convention for citation and referencing. Each contribution to, and quotation in, this thesis from the work(s) of other people has been attributed, and has been cited and referenced.
3. This thesis is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
5. I acknowledge that copying someone else's assignment, essay or paper, or part of it, is wrong, and declare that this is my own work.

Signature(s) Signed by candidate Date …30/11/2016….

Full name(s) of student(s)

Akin-Adetoro Adedolapo

ACKNOWLEDGEMENTS

My foremost acknowledgement goes to the Almighty God for His grace, mercy and favour upon my life; without Him this thesis would not have been a success. I say thank you, Baba.

I appreciate sincerely the effort, support and love of my mum, Mrs Olayemi Adetoro, and siblings, Adedamola and Adedasola Akin-Adetoro. I am indeed grateful to you all.

Finally, I extend my gratitude to the Department of Information Systems, University of Cape Town, specifically my supervisor, Dr Salah Kabanda, for your guidance and tutelage throughout this study, and my course convener, Professor Michael Kyobe, for being a great teacher. I would also like to thank the Head of the Department, Prof Kevin Johnson, as well as other staff members and students, for their continuous support.

ABSTRACT

The advancement in technological development is now altering the conventional order in the diffusion of IT innovation from a top-down approach (organisation to employees) to a bottom-up approach (employees to organisation). This change is more notable in developed economies and has led to the Bring Your Own Device (BYOD) phenomenon which promises increased productivity for employees and their organisations. There have been several studies on the corporate adoption of BYOD but few have investigated the phenomenon from a small and medium enterprise (SME) perspective and from developing countries specifically.

This study investigated the BYOD phenomenon in South African SMEs. The goal was to identify contextual factors influencing BYOD adoption with the purpose of understanding how these factors shaped and reshaped by SME actions. The Perceived EReadiness Model (PERM) was adopted to unearth contextual BYOD adoption factors, while the Structuration Theory was adopted as the theoretical lens from which the social construction of the BYOD phenomenon was understood. The study adopted an interpretive stance and was qualitative in nature. Data was collected from SMEs using semi-structured interviews, and analysed using a thematic analysis approach.

The findings show that for BYOD to be adopted and institutionalized in an SME there needs to be organisational readiness in terms of awareness, management support, business resources, human resources, employees' pressure, formal governance, and technological readiness. Specifically, business resources, management support and technological readiness were perceived to be of the outmost importance to the success of BYOD. Environmental factors of market forces, support from industry, government readiness and the sociocultural factor are identified.

Findings from the structuration analysis reports the presence of rules and resources (structures) which SMEs draw upon in their BYOD actions and interactions. It provides understanding on the guiding structures such as "no training" and "no formal governance" within which BYOD meanings are formed, and actions such as allowing employees to use their devices to access organisational resources without the fear of security breaches and data theft, are enacted. While it is true that the successive adoption of ICTs in organisation depends on the availability of a conducive formal policy, findings in the study show that SMEs used their business resources and management support as

guiding structures of domination which were legitimized by internal informal verbal rules, lack of an institutional BYOD specific policy, minimal industry support; and the presences of social pressure.

PUBLICATIONS

Parts of this thesis have been accepted and published in publications. These include:

Akin-Adetoro A., & Kabanda S. (2015). Contextualizing BYOD in SMEs in developing countries. In Proceedings of the 2015 *Annual Research Conference on South African Institute of Computer Scientists and Information Technologists (SAICSIT)*, Stellenbosch, South Africa, September 28-30.

Akin-Adetoro A., & Kabanda S. (2016). Where are we with the BYOD? *In Proceedings of the 10th European Conference on Information Systems Management (ECISM)*, Evora, Portugal, September 8-9.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 Introduction

Small and medium enterprises (SMEs) are most times described as "the seeds of big businesses and the fuel of national economic engines" (Abor & Quartey, 2010, p. 218) in areas like job creation, income generation, poverty alleviation as well as economic innovation (Olawale & Garwe, 2010; Kongolo, 2010). The importance of SMEs in the global economy is paramount as they consist of 90% of all business enterprises (Mahemba & Bruijn, 2003). For example, in Ghana SMEs contribute approximately 70% of the gross domestic product (GDP) and they account for about 92% of businesses (Abor & Quartey, 2010). In the Republic of South Africa, SMEs make up 91% of all formal business entities, contributing between 51 and 57% of GDP and providing close to 60% of all employment in the country (Kongolo, 2010). Despite their role being qualified as important, SMEs still face challenges such as “lack of access to appropriate technology, limited access to international markets, the existence of laws, regulations and rules that impede the development of the sector, weak institutional capacity, lack of management skills and training, and most importantly finance” (Abor & Quartey, 2010, p. 218). To alleviate these challenges, several recommendations have been made including the adoption of information and communication technologies (ICTs), such as the use of mobile technologies to improve efficiency and competitiveness (Ongori & Migiro, 2009).

The influx of mobile devices in developing countries is changing the way SMEs operate, as these new technologies increase their productivity at a reduced cost of initial investment when compared to IT devices like desktop computers (Harris & Patten, 2014). Over the years, studies on mobile technologies have not only looked at the uses and benefits of mobile device alone but also the applicability of these devices to daily business activities, thereby theorizing new information technology (IT) innovations and phenomena. This study focuses on the contextual factors influencing SMEs to allow employees use their mobile devices for work purposes – a phenomenon known as bring your own device (BYOD)(Disterer & Kleiner, 2013). When compared to the traditional systems, BYOD has the potential to provide added benefits such as, although not limited to, autonomy, convenience, ease of use, business mobility, ease of adoption, employee satisfaction,

and increased productivity (Niehaves, Köffer & Ortbach, 2012; Hensema, 2013). With these benefits in mind, the adoption of BYOD by organisations is no longer a question of "if" but rather a question of "how" (Waterfill & Dilworth, 2014). Given the challenges SMEs face and the benefits implied by BYOD, it is important for SMEs to consider BYOD. However, there remains limited studies on BYOD, specifically in the context of developing countries and at the SME level (Kabanda & Brown, 2014). The goal of this study is therefore to examine contextual factors that influence BYOD adoption in South African SMEs with the intent of understanding how these contextual factors shape and reshape SMEs' actions. For this research, adoption is conceptualized as an act that involves the use of employees' devices for work related activities.

1.2 IT and Small and Medium Enterprises

Information Technology (IT) as defined by Apulu and Latham (2011) is "any technology that enables communication and the electronic capturing, processing and transmission of information". Such technologies include product and services such as desktop computers, laptops, handled devices, wired or wireless intranet, business productivity software such as editor and spreadsheet, enterprise software, data storage and network security (Ashrafi & Murtaza, 2008).These ITs have the ability to transform the way organizations conduct their businesses, particularly, SMEs who are far more disadvantage when it comes to resources (Johnston, Kabanda, Adams, & Davids, 2008). Over the years, SMEs have begun to take advantage of several contextual factors to leap frog over larger organizations that might be disadvantaged in this aspects when adopting information and communication technologies (Patten & Passerini, 2007). These factors include:

- **Structure:** SMEs are not limited by rigid and legacy IT infrastructure, hence, it is easier to adopt novel technologies.
- **Size:** SMEs are able to take advantage of the smaller, flexible and less bureaucratic size when implementing new technologies. They have fewer employees to take into account and train.
- **Processes:** Even though it is often informal, SMEs organizational processes are typically flexible and easily adaptable to new situations.
- **Workplace:** The modern workplace is such that employees are required to be able to work from anywhere and anytime. To achieve this, both the workplace and the workforce need an

up to date mobility capability which enhances communication with consumers. This leads to better consumer knowledge and ultimately business growth.

1.3 Small and Medium Enterprises in South Africa

According to the National Small Business Amendment Act of South Africa, an SME is "a separate and distinct business entity including cooperative enterprises and non-governmental organisations managed by one owner or more which, including its branches or subsidiaries if any is predominantly carried out in any sector or sub-sector of the economy mentioned in the schedule of size standards and can be classified as a SME by satisfying the criteria mentioned in the schedule of size standards". It is a business that employs between one and 250 people, depending on the sector it belongs to (National Small Business Amendment Act, 2003, 2).

SMEs are significant to South Africa as they foster development as well as economic growth. Sawyer, Pretorius & Oerlemans (2008) found that 53% of all organisations in South Africa do not have more than 100 employees, making the economy largely dominated by SMEs. It is estimated that SMEs in South Africa add up to 91% of formalized businesses, create about 60% of employment and contribute roughly 34% of the gross domestic product (GDP) (The Banking Association South Africa, 2015).

However, despite their commendable contributions, it is of note that SMEs in South Africa have one of the highest failure rates in the world, ranging between 70-80% (Fatoki & Smit, 2011). Olawale and Garwe (2010) have identified obstacles such as access to finance, investment in information technology, appropriate location, management skills, crime and corruption, labour, infrastructure and regulations, among others, as being factors that contribute to the high failure rate and prevent the growth of new SMEs in South Africa. The Banking Association of South Africa (2015) reported similar challenges but emphasized the lack of appropriate technology as a major contributor to low productivity in SMEs. The need for an appropriate technology has been associated to the positive development of SMEs (Abor & Quartey, 2010). Harris and Patten (2014) point out how the accelerated influx of mobile devices (laptop, tablet and smartphones) is changing the manner in which SMEs compete as these devices help to increase the productivity of their employees at a reduced cost which is affordable by SMEs. This is a positive move towards readiness for BYOD

adoption. Given that BYOD is associated with the use of mobile devices for business activities, it is paramount to investigate how BYOD manifests itself in South African SMEs.

1.4 Research Problem

Research on BYOD has been on a piecemeal basis, and empirical studies on the phenomenon in the context of developing countries are rare (Disterer & Kleiner, 2013; Akin-Adetoro & Kabanda, 2015). This is more so at the level of SMEs in the developing economies whose input has been identified as being significant to the development of their economies in areas like job creation, income generation, poverty alleviation as well as economic innovation (Olawale & Garwe, 2010; Kongolo, 2010). Madzima, Moyo and Abdullah (2014) report an increase in the use of personal mobile devices for work activities by South African employees. Findings by Cisco (2014) show that 63% of South African employees are allowed to use their personal mobile devices to access the organisational network. Although these results indicate a high usage of mobile devices within organisations, it is not clear what factors are facilitating this trend in South Africa. By bringing these factors into focus, organisations, particularly SMEs can best equip themselves on key areas to concentrate on as they prepare for and use BYOD. This identified gap in literature – that of limited studies identifying factors that influence the adoption of BYOD in the context of South Africa – sets the first research problem of the study.

As SMEs adopt and institutionalize BYOD, practices get enacted and routinized (Hardaker & Singh, 2011). Over time, as the use of the employees' devices become pervasive, these practices become integrated into the way of life of the organisation. In some cases, these practices challenge the status quo and become refined, and could also potentially lead to unintended consequences (Orlikowski & Iacono, 2000). Currently, practices that SMEs enact as a result of adopting and institutionalizing BYOD have not been investigated because the mainstream literature has tended to use a technological imperative perspective in examining BYOD (Ruch & Gregory, 2014). This technological stance, however, neglects the important social aspect of technology adoption. Understanding the interaction between SMEs and BYOD could assist in unpacking the micro and macro perspectives that lead to adoption in a social system. This identified gap in BYOD literature, of not acknowledging that BYOD has social implications, sets the second research problem for this study. The study therefore sets out to answer the following research questions:

1) What contextual factors influence the adoption of BYOD in SMEs?
2) How are these contextual factors shaping and consequently reshaping SMEs actions?

1.5 Underpinning Theory

This study takes an interpretive approach which supports the need to increase the understanding of a phenomenon within its contextual setting via the meaning assigned to it by participants (Orlikowski & Baroudi, 1991). In the context of this study, this paradigm does not only have the capability to provide insight into how internal and external factors influence the adoption of BYOD, but can also explain how these factors are socially produced and reproduced based on participants' views and knowledge of BYOD. This is important given that most studies in literature have predominantly taken a "technological imperative point of view", neglecting the social and environmental aspect (Ruch & Gregory, 2014, p. 13). Baskerville (2011) and Ruch and Gregory (2014) both suggest a more social approach in theorizing the BYOD phenomenon. They propose the use of the structurational theory as a promising lens through which to explore the influence that BYOD will have on the organisation, their structures and thus work life. In line with Baskerville (2011), Ruch and Gregory (2014), and Klesel et al. (2015), we also put forward the structurational theory as an appropriate avenue for a more fundamental understanding of BYOD, because the two most important concepts of the structurational theory, agency and structure, provide an opportunity to understand why and how BYOD comes about when knowledgeable SME employees and employers (agent) interact with constraining and enabling organisational and environmental influences (structures).

1.6 Overview of the thesis

The rest of the dissertation is organized as follows:

Chapter 2 presents related works on the BYOD phenomenon. The chapter discusses the emergence of BYOD, the benefits and challenges of BYOD to the workplace and the workforce, contextual factors that influence BYOD adoption in developing countries, and the conceptual framework related to the study.

Chapter 3 presents a discussion on the research design and methodology that was adopted in the study. This covers the research philosophy, research purpose and approach, research methodology, ethics and data analysis.

Chapter 4 attempts to provide answers to the research questions as well as address research objectives. It presents and discusses the research findings.

Chapter 5 concludes the study. It provides recommendations and future research works related to the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

For much of history, the adoption of technological innovations has often been characterized by a top-down approach where innovations are first adopted by organisations and then afterwards the individual users adopt them for private use (Disterer & Kleiner, 2013). A good example of this is the case of desktop computers which were formerly available only to large organisations. Factors such as the high cost of purchase and the lack of technical know-how made it practically impossible for early individual adoption. However, the advancement in technological development is now altering the conventional order in the diffusion of information technology (IT) innovation from a top-down approach (organisation to employees) to a bottom-up approach (employees to organisation) and this is changing the dynamics in the use of IT devices in organisations (Andriole, 2012). This process, induced by the consumerisation of IT (CoIT), is an important characteristic of BYOD (Mitrovic, Veljkovic, Whyte & Thompson, 2014).

The term "IT consumerisation" was first coined by Moschella, Neal, Opperman and Taylor (2004) who posit that the process of consumerising can be traced as far back to the evolution of computers, right from the invention of mainframe computers down to the invention of the microprocessor in the early 1980s. This progression illustrates the movement from a purely military and organisational research and design era to a more end-user consumer era. This has become more evident with the availability of more consumer-technological devices (laptop, tablets, mobile phone etc.) which are becoming more powerful and ubiquitous at one's disposal. The consumerisation of IT involves the use of personal IT resources (devices or software) for work-related purposes (Niehaves et al, 2012). It is mainly driven by the freedom to "…work and play anywhere and anytime" (Ortbach, Bode & Niehaves, 2013, p.7). This has resulted in the ongoing transformation in organisations where employees no longer depend on the devices supplied by the organisation for work activity, but rather they adopt and use their personally owned devices (Hensema, 2013). Three known strategies are at the heat of consumerisation of IT, they include: here is your own device (HYOD), choose your own device (CYOD), and bring your own device (BYOD) (Yin et al., 2014). The "here is your own device" (HYOD) is the traditional strategy whereby the organisation provides all the devices that are used by employees. The organisation has full control and they provide complete support

(installation, configuration, settings etc.) on all devices. The "choose your own device" CYOD strategy provides an employee with leverage to choose a device of preference from a range of devices that are bought and controlled by the organisation (Brodin, 2016). Finally, "bring your own device" (BYOD) is a strategy that involves employees providing their personal devices for work purposes. It is a strategy that is gradually replacing the traditional "here is your own device" (HYOD) concept where the organisation provides all IT devices in an organisation (Singh, 2012). According to Loose, Weeger and Gewald (2013, p. 2), BYOD is a service trend by an organisation "that allows employees to bring privately owned devices to the workplace, to connect them to the corporate network and to use them for business purposes". In so doing, organisations expects to cut down on costs associated with purchasing these devices and simultaneously improve employees' productivity. Kabanda and Brown (2014) interpret BYOD as "the use of a personal device to meet organisational needs, regardless of whether the organisational network is being accessed or not" (p. 7). They emphasize that for developing countries, the use of personal devices for work purposes is crucial given the contextual challenges SMEs face. For the purpose of this study, BYOD is defined as an emerging socio-technical phenomenon which involves employees using their personal mobile devices for work-related activities irrespective of whether it is dependent on or independent-of accessing the organisational network (Hopkins, Sylvester & Tate, 2013; Kabanda & Brown, 2014).

2.2 The Benefits of Bring Your Own Device (BYOD)

BYOD enables employees to be more autonomous in their work practices, enabling employees to become self-sufficient and independent when taking decisions that relate to the kind of mobile-technology tools and software that would enhance their convenience, satisfaction and ultimately productivity (Niehaves et al, 2012). For example, Dell and Intel (2011) have pointed out that six out of every ten employees take pleasure in working more if they are allowed to use their personal devices. Harris, Patten, Regan and Fjemestad (2012), reports how the new generation of employees directly or indirectly raise questions about having the independence to work with their preferred devices. Harris et al. (2012) further notes that employees that adopt BYOD generally sense their personal device and application as being easier to use and more intuitive when compared to those provided by their organisations. Such employees thus require less support and training from IT staffs (Brooks, 2012). This is due to the fact that the regular use of these private devices increases users'

level of familiarity and understanding, which in turn increases their competence as they become more capable of providing solutions to problems (Hensema, 2013).

From an organisational perspective, one of the most significant benefits of BYOD is improved mobility (Mitrovic et al., 2014) and ease of adoption because employees no longer have to use separate devices for private and work-related activities, as the personal device will take care of both. To the organisation, this means that the resources that would have been used for training of employees can now be diverted towards other areas of the business thereby saving cost. Research has indicated that about 80% of organisations that consent to the BYOD programme have noticed an increase in worker productivity (Trend Micro, 2012) as a result of employees using their personal devices to communicate with work from anywhere at any time. This provides an opportunity for organisations to capture productivity benefits on a large scale (Madzima et al., 2014).

2.3 Challenges of Bring Your Own Device (BYOD)

From an employee perspective, BYOD blurs the line that separates work and personally related activities (Niehaves et al., 2012). Managers tend to capitalize on this opportunity by increasing employees' tasks, knowing that employees are now inclined to work longer **(**Niehaves et al., 2012**).** This leads to an increase in employees' workload and in consequence employees' stress because employees can now be reached on their personal devices at any time (Singh, 2012).

BYOD has traditionally been linked to security concerns given employees access to organisational file and resources. This is risky as it exposes the organisation to security attacks (Putri & Hovav, 2014). In SMEs, where there is a lack of IT human resources, the adoption of BYOD is likely to compound the existing security issues that most SMES face (Madzima et al., 2014) such as: data exfiltration, malware attack, network intrusion, inconsistency of mobile devices and, most importantly, the lack of control over employees' devices. With BYOD, organisations experience an influx of different types of technological devices with different requirements. This raises the question of compatibility as not all employees' devices will be compatible with the norms of the organisation (Hensema, 2013). The influx of different types of devices also brings the problem of complexity, specifically in the designing of BYOD programme that would accommodate the disparities of various brands, devices, models and operating systems that employees would be

bringing in and still ensuring that it adapts well to the organisational IT and BYOD policy (Ackerman & Krupp, 2012; Smith & Forman, 2014).

2.4 Factors influencing the adoption of BYOD in developing countries

This section presents a review of SME-related BYOD literatures. The review findings are categorized into two main themes: organisational and environmental. The organisational factors describe organisational characteristics in terms of policies, infrastructure, security, privacy, human resources, awareness, management support and business resources as factors that affect the adoption and use of BYOD by SMEs. The environmental factors describe external characteristics such as market forces, supporting industries and government support as factors that affect the adoption and use of BYOD in SMEs. Detailed explanations of each factor are provided in the following sections.

2.4.1 Organisation factors that influence the adoption of BYOD

2.4.1.1 BYOD Policies

The successful adoption of BYOD depends on the availability of conducive BYOD policies (Singh, 2012). Most studies point to the need for policies aimed at BYOD use because SMEs lack clear BYOD policies and in most cases it is close to non-existence (Hensema, 2013). In the context of SMEs, management tends to overlook the development of BYOD policies, which in some cases creates unintended consequences as some employees feel taken advantage of because their personal devices are being utilized for work purposes without their explicit consent, and also without considering how the personal cost affects them (Kabanda & Brown, 2014). Governance, implemented through policies, has been recognized as a beneficial pre-emptive measure in relating and enforcing acceptable formal procedures and guidelines for the use of personally owned employees' devices for work-related activities in the organisation (Madzima et al., 2014). Waterfall and Dilworth (2014) state that, in the context of BYOD, the policy should address the people, process and technological effects of BYOD integration. However, setting up and implementing a BYOD policy is not an easy task for SMEs, not only because of the high cost of implementation (Mahmood, 2008) but because it is perceived as a "real headache" as a result of the complex requirements involved (Madzima et al., 2014, p. 1) such as catering for issues such as data

exfiltration, loss of employees' devices, loss or unauthorized distribution of data (data breach), misuse of policy, employees' technology welfare , mobile-device management and information privacy (Waterfill & Dilworth, 2014). All these issues call for organisational technology readiness and the availability of human expertise.

2.4.1.2 Technological readiness

Technology readiness is associated with the availability of technology infrastructure that is compatible with the use and adoption of BYOD; privacy, security, compatibility; and complexity of BYOD particularly in respect to alignment with legacy systems.

SMEs tend not to have appropriate technological infrastructure which is compatible with the use and adoption of BYOD. Although this is a challenge, Harris et al. (2012), indicates that SMEs lack of sophisticated infrastructure can be perceived as a positive because they "are not constrained by inflexible and legacy IT infrastructures technology, which makes it easier to adopt newer technologies" (p. 5). SMEs can now afford to become risk takers and experiment with newer technologies such as BYOD to bring them competitive advantage. However, on the same note, SMEs need to bear in mind the ICT technical resources required to implement and manage secure BYOD practices such as the mobile-device management (MDM) solution, which provides secure management of mobile devices. Most SMEs, however, tend to be financially constrained and are unable to have access to all infrastructural resources that necessitates the proper management of BYOD.

Although the ubiquitous capability (anywhere and anytime) of mobile devices has allowed SMEs to participate in the global market, this advantage comes at a severe risk to the information security of the SMEs' data and information. BYOD security concerns focus on data exfiltration, malware attack, network intrusion, inconsistency of mobile devices and, most importantly, the lack of control over employees' devices (Madzima et al., 2014; Putri & Hovav, 2014). According to Harris and Patten (2014), SMEs do not have the necessary know-how and resources to protect themselves; as such, they are faced with the predicament of whether to put in for 1) a more expensive highly secured technology; 2) for a less expensive lowly secured technology; 3) or hold off on the implementation of BYOD business mobility strategy in other to secure their organisation and customer data and information. Although there have been proposed solutions such as the mobile-device management

(MDM) solution, which provides the secure management of mobile devices, the associated costs of these solutions pose as barriers. The option of using cloud-based services has also been proposed but the challenge of security still remains, especially for public cloud-based services as data is no longer sitting with the SME but is managed by an external agent (Jadeja & Modi, 2012).

Privacy is generally perceived from two perspectives in literature: employee and organisation privacy. From the organisation's point of view, employee-owned devices cannot be trusted with organisational data and information as they are more susceptible to be compromised on these devices (Madzima et al., 2014). Hence, securing organisational information to forestall information and data-breach issues requires the organisation to monitor employees' personal devices (Lee et al., 2013), thereby creating a possibility of privacy infringement. This, however, becomes a dilemma for the organisation as they are caught in between mitigating organisational privacy issues as well as limiting the invasion on employees' privacy (Lee et al., 2013). In this case the employee's information and data is at risk.

However, from an organisational perspective, the ability of employees to remotely access company data on their mobile devices could lead to the dissemination of trade secrets, the sharing of sensitive organisational information with friends and family as well as the possibility of devices containing personal information getting misplaced or stolen (Smith & Forman, 2014). To mitigate the issue of privacy, SMEs are to have clear-cut BYOD polices which are free of ambiguity and easily understood by employees (Waterfill & Dilworth, 2014). This ensures that employees who opt in for BYOD do not nurture "unrealistic expectation" of privacy as regards the stored personal data and information on their device (Smith & Forman, 2014, p. 68). This however is a dilemma has SMEs perceive the creation of BYOD polices to be a "real headache".

2.4.1.3 Human Resource

Human Resource points to the need for SMEs to have readily available and accessible persons, with adequate experience and exposure to ICT and other skills, to adequately manage BYOD. This is because of the nature of BYOD: firstly it is a new paradigm shift that is still being learned in most organisations (Disterer & Kleiner, 2013); secondly because of the potential threats of security and privacy that arise as a result of its adoption (Madzima et al., 2014); thirdly because of the need to ensure the compatibility of BYOD to available legacy system; and finally, the fact that several

employees' mobile devices are not designed with organisational standards in mind (Madzima et al., 2014).

2.4.1.4 Awareness

Most studies have highlighted to the need for the continuous provision of training programmes, awareness and education on the implications of BYOD adoption in the organisation (Harris et al., 2012). The specific emphasis has been on educating users about the BYOD policy (Madzima et al., 2014), BYOD-related security risks (Qing, 2013), and delineating appropriate and inappropriate behaviours when users use mobile devices for work purposes (French et al., 2014). This is not surprisingly given the associated security and privacy risks associated with the practice. Harris and Patten (2014) corroborates these findings, indicating that there is still a major lack of mobile-device security awareness and training programmes in most organisations. However, French et al. (2014, p. 192) call for "reduced training costs" when the organisation decides on a BYOD strategy that will support its employees and secure its network.

2.4.1.5 Management support

Top management support is an organisational component that has often been considered by numerous studies as a key predictor of the adoption of IS innovations (Jeyaraj et al., 2006; Premkumar, 2003). It refers to having a clear-cut BYOD vision that is strategically anchored by the top management and leadership of an organisation. In SMEs, the business owner/manager belongs to top management and his/her backing is imperative for the adoption of BYOD to occur. There were consistent remarks in literature that management does not provide support in areas of employees' welfare and training with regard to the use of employees' personal devices for work-related activities (Singh, 2012; Twinomurinzi & Mawela, 2014). For example, in Tanzania it was reported that the majority of employees were dissatisfied about the daily mobile phone allowance not being adequate for performing business activities (Kabanda & Brown, 2014).

2.4.1.6 Business Resources

Business resources refer to the availability of a wide range of capabilities and most of the intangible assets of the organisation. It includes the openness of organisational communication, risk taking behaviour, existing business relationships, and funding to finance BYOD projects (Molla & Licker,

2005a). There was a recurring pattern amongst articles in the literature to report on the costs needed to finance BYOD adoption, and specifically hidden costs (Singh, 2012). There was an acknowledgement that BYOD did lend itself to organisational savings but it also presented financial implications in terms of strong technical support and governance. This is a challenge to SMEs given that they may not be able to implement mobile security measures as a result of being constrained by limited IT budgets (Harris & Patten, 2014). Although business resources involve other capabilities and intangible organisational assets such as organisational communication, risk-taking behaviour and existing business relationships, no report of such connection was found in BYOD literature, specifically in the context of developing countries. They mainly relate BYOD to the funds needed to finance BYOD projects.

2.4.2 Environmental factors that influence adoption of BYOD

2.4.2.1 Market Forces

Market forces refer to an organisation's business partners (Molla & Licker, 2005a). These include trading partners, suppliers and customers. There was limited reporting on the effect of customers, suppliers and trading partner's effect on BYOD adoption. The benefits of mobility, which BYOD brings, enable SME to transact with their trading partners at any location. Thus, although it is not a prerequisite for trading partners to allow for the conduct of BYOD, SMEs can adopt BYOD to successfully fulfil their business functions. Contextual findings by Kabanda and Brown (2014) show how employees were able to use their personal devices to transact with suppliers. Their findings show how trading partners can provide support and promote the use of BYOD in the developing country context.

2.4.2.2 Supporting Industries

Supporting industries pertain to the presence, development, service level and cost structure of support-giving institutions whose activities might affect the technology adoption initiatives of businesses in developing countries. There have been consistent remarks in literature which state that SMEs need to create policies to account for, manage and control the various devices employees may use. This is problematic as most SMEs are perceived to be less knowledgeable on policy creation and development (Madzima et al., 2014). They are also unaware of the implications of a privacy

breach and security-related issues (Harris & Patten, 2014). As such, supporting industries in the context of these challenges could include legally related advice and awareness programmes from legal practitioners on the implications of breaching such contracts; education and training programmes on how to develop and implement IT policies specific to BYOD. Harris and Pattern (2014, p. 106) advise SMEs to "find a suitable contract with one of the many providers at a reasonable cost; this could very well be the solution to their IT mobile device business security dilemma".

2.4.2.3 Government Support

In BYOD literature, no study explicitly indicated the role of government towards BYOD adoption in SMEs. However, recent study by Gustav and Kabanda (2016) in the context of South African financial institutions indicates that "a thorough readdress of environmental variables, specifically government regulations, industry competition and national ICT infrastructure, was necessary prior to BYOD adoption and implementation". It remains the mandate of government to ensure that policies that protect consumers and any transactions conducted electronically regardless of the device used are in place. Based on these policies, SMEs can now craft their policies with the guarantee that there is an overarching support and regulation from the institutional realm for the electronic conduct of transactions. There has been such support in South Africa as documented by Visagie (1997); however, this support needs to be supplemented with context-specific and current BYOD concerns of data security and privacy.

2.5 Conceptual framework

2.5.1 PERM Framework

This study posits itself in the context of the PERM (Perceived EReadiness Model) framework (Molla & Licker, 2005a). It has been used in several studies in developing countries and is therefore deemed appropriate for the investigation of contextual factors pertinent to BYOD. In examining adoption, PERM identifies two contextual construct, Perceived Organisational EReadiness and Perceived External EReadiness which comprise a number of successive factors (PERM factors). Perceived Organisational EReadiness (POER) audits the organisation's perception, comprehension, and

projection of a technology and its potential benefits and risks (innovation imperative attributes); the commitment of its managers (managerial imperative attribute); and the key organisational components, such as its resources, processes, and business infrastructure (organisational imperative attributes). The POER factors include awareness, human resources, business resources, technological resources, commitment and governance (Figure 1). Molla and Licker (2005a) define Perceived External EReadiness (PEER) as a representation of an organisation's assessment and evaluation of relevant external environmental factors such as the readiness of an organisation's business partners to allow for the adoption of the technology; the preparation of the nation state and its various institutions to promote, support, facilitate and regulate the adoption of the technology; the presence of support-giving institutions to ensure successful adoption. The PEER factors include government eReadiness, market forces eReadiness and supporting industries eReadiness (Figure 1).

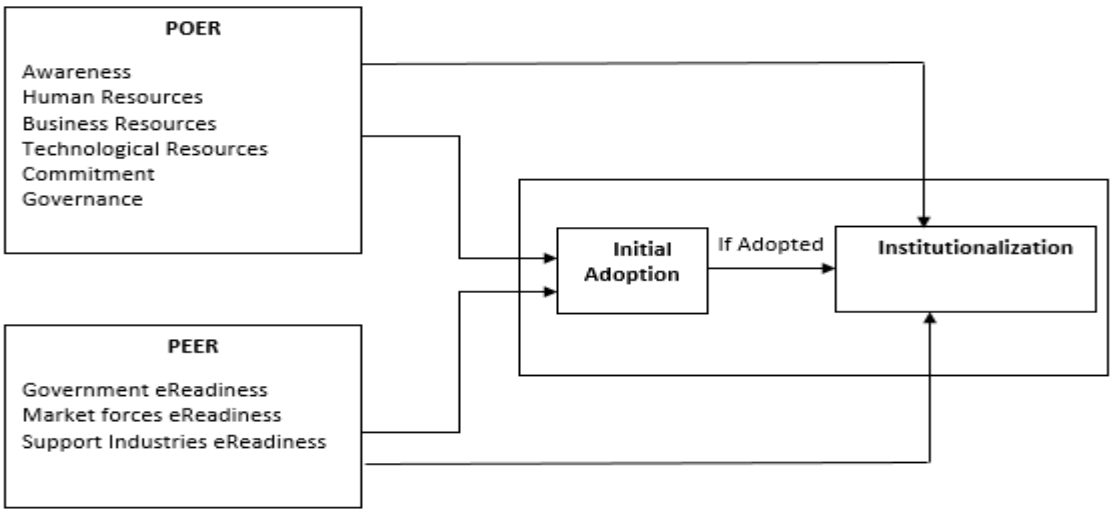


Figure 1: **Perceived EReadiness Model (Molla & Licker, 2005a)**

In arriving at the PERM framework, the appropriateness of various other frameworks and theories that underpin the study of an IT phenomenon such as the Technology, Organisation and Environmental framework (TOE) (Tornatzky & Fleisher, 1990) and the Diffusion of Innovations (DOI) (Rogers, 1995) were examined. The TOE was considered inappropriate because it has often been perceived as having "constructs in the adoption predictors are assumed to apply more to large organisations, where clients are sure of continuity and less complaints, than to SMEs" (Awa, Ojiabo & Emecheta, 2015, p. 80). The DOI was also considered unsuitable because of the "pro-innovation

bias that implies that an innovation should be adopted by all members of the social system and should be diffused rapidly" Rogers (2003, p. 134).

With PERM in mind, the factors identified as influencers of BYOD in SMEs were mapped to elements of PERM as shown in Table 1 (Akin-Adetoro & Kabanda, 2015).

PERM Factors		BYOD Factors	Description	Data Extract
POER - Organisation	Technology readiness	Privacy	Establishing trust between SMEs and their employees as regards the use of mobile devices within the enterprise.	"Once an enterprise loses control over its networks, through devices accessing its data through BYOD practice, it becomes automatically prone to a host of privacy and data security issues." – Madzima et al. (2014)
		Security	The ability of SMEs to be able to protect themselves from the imminent risks associated with the BYOD phenomenon.	"A common misconception among SME's is that their pre-existing security measures are sufficiently armed to protect their network "– Bell (2013)
		Infrastructure	The availability of appropriate IT infrastructure and resources to support the BYOD phenomenon in SMEs	"While large enterprises have the resources to implement emerging security recommendations for mobile devices, such as smartphones and tablets, SMEs often lack the IT resources and capabilities needed." –Harris and Patten (2014)
	Governance	Policies	They refer to the set of rules and principles guiding the use of employees' personal mobile devices for work related activities.	"There was also a neglect of policy formulation for BYOD from SME management" – Kabanda and Brown (2014)
	Business Resources	Cost	Capital required in financing technical support for BYOD in SMEs.	"… a SME is too small for volume license pricing or simply cannot afford the cost of a MDM solution" – Harris and Patten, (2014)
	Awareness	Training/ education	The knowledgeability of employees in terms of dealing with BYOD related issues.	'All employees should be educated about the vulnerabilities of these devices and the best practices for protection." – Harris et al. (2012)
	Human Resources	ICT expertise	The capability of SMEs in terms of possessing the necessary information technology know-how.	"A smaller company, such as a doctor's office, may use smartphones, tablets, and laptop devices, but often these offices lack information technology specialists to properly secure the devices."- Harris et al. (2012)
	Commitment	Top Management Support	Support and commitment for BYOD from organisational owners.	"The findings suggest that the laxity of employers in South Africa to deal with the BYOD phenomenon as an issue of strategic importance could result in considerable security challenges for organisational data" - Twinomurinzi and Mawela (2014)
PEER - Environmental	Market Forces	Customers, suppliers and Business partners	The ability of customers, suppliers and business partners to influence the use of BYOD by SMEs.	"The business does not have an MPESA account, but I do and the boss uses my account to pay for most of these business activities. Before having my phone, I didn't have any form of account and so I had to go to these suppliers with the money physically" – Kabanda and Brown (2014)
	Supporting Industries	Supporting Industries	The presence of institutions that can offer BYOD related assistance to SMEs.	"If a SME can find a suitable contract with one of the many providers at a reasonable cost, this could very well be the solution to their IT mobile device business security dilemma" – Harris and Patten (2014)

Table 1: Factors influencing BYOD adoption in SMEs (Akin-Adetoro & Kabanda, 2015)

These constructs allow for the investigation of contextual factors that affect SMEs in the adoption of BYOD. According to Avgerou (2001, p. 44), the issue of context for developing countries is of paramount importance when advocating for "technologies and organisational practices which were originally designed and proved useful in other socio-organisational contexts because their potential value, their fit in the local socio-organisational conditions and feasibility of use cannot be taken for granted". For example, in Pacific Asia, different work practices and cultures have been reported to induce specific context specific challenges for the` adoption of BYOD; which is also being augmented by the varying regulatory environment in that region (French et al., 2014). The fact that "technology and society do not develop along separate trajectories, but are involved in a constant process of co-production or mutual shaping…and the general tendency to regard technology as essentially linked to 'progress', without acknowledging the political nature of progress and how implicit social goals that underpin technology development are associated with particular interests and actors" (Russell, Vanclay & Aslin, 2010, p. 110) indicates that organisational and environmental factors are not adequate to explain the adoption of BYOD by SMEs in developing countries. It needs to be augmented with a theoretical lens that provides understanding on how SMEs behaviour and perception of BYOD influence and are simultaneously influenced by contextual organisational and environmental factors identified in Table 1. To unearth this understanding, this study adopts structuration theory as posited by Orlikowski (2000) which encompasses three components: the human agent, the technological artefact and the institutional properties of the organisation. Structuration theory in this study is used as a lens for interpreting how organisational and environmental factors shape and reshape SMEs' actions. In so doing, the study provides understanding of how SMEs practices affect and are affected by BYOD innovation. The adoption of this theory is firstly substantiated by its ability to provide substantial analytical advantage in extending the structuration perception to the adoption of BYOD in SMEs by understanding the recursive interplay between the agent and the structure (Hardaker & Singh, 2011). Secondly, structuration theory provides appropriate underpinning for the investigation of how organisational and institutional factors affect individual action and, thus, their adaptation to technologies (Chatterjee, Grewal & Sambamurthy, 2002). Thirdly, BYOD is a new technological innovation in SMEs in South Africa, and thus structuration theory provides the leeway of understanding the innovation process in a specific context (Jones, Wilikens, Morris & Masera, 2000). Fourthly, using

the PERM model alone limits the study in exploring and considering the complex macro and micro level perspectives that lead to adoption in a social system (Yang et al., 2003). Finally, the picking of structuration theory is salient, because only a few studies in literature have focused on the multi-level dimensions and frequent inconsistent links amid agency and structure in studies of innovation in SMEs (Edwards, Delbridge & Munday, 2005).

2.5.2 Structuration theory

Structuration theory was originally developed by Giddens (1984) as a sensitizing device for studying social phenomenon with the aim of providing understanding on how institutional practices are shaped and reshaped over time (Giddens, 1984). The main concern of structuration theory is the mutually dependent relationship between the agency and structure (Jones & Karsten, 2008). The concept of structure is defined as the set of rules and resources instantiated in practise by human actors (Orlikowski, 1992). The resources are of two kinds; authoritative resources which originates from the organisation of human agent activities; and allocative resources derived from the command over goods or material product (Goss & Lindquist, 1995). Consequently, rules are termed as procedures that are pertinent in the reproduction of social practices (Giddens, 1984). They assist individuals in making sense of reality and norms that guide social practices (Heracleous & Hendry, 2000). According to Giddens (1984), to become an agent involves the capability to act decisively, knowledgeably and reflexively, in the context of rules and resources. Thus, agents are neither self-directed nor machine-like bearers of stimulating effects of the environment; but rather, they make casual influences to their actions within a system of communal causation (Bandura, 1989). Whilst human agency is "strongly voluntaristic", it is yet enabled and constrained by properties of social structures (Jones & Karsten, 2008, p. 132; Montealegre, 1997).

In the field of information systems (IS), structuration theory has exhibited high reception in term of its application in research (Orlikowski 1992, 2000; Walsham 1993, 2002). Information systems are deemed to exist with a significant social context, and as a social theory, structuration should be pertinent in its application to any aspect of research examining the relationship between information systems and organisations (Jones & Karsten, 2008). More importantly, the use of structuration theory in information systems, has provided researchers with a theoretical understanding of the interplay that exist between user and information technology, thereby unpacking the inference of

these interactions and providing insights on methods of mitigating their consequences (Pozzebon & Pinsonneault, 2005). Jones and Karsten (2008) present a critical review of work on structuration theory and its use in the IS discipline. Findings from their review (331 papers) indicates that structuration theory has been used in the IS discipline in three broad aspects of (i) application of structuration concepts, (ii) development and application of an IS specific version of structuration theory (iii) and critical engagement with structuration theory. Thus study posits itself in the second category and follows Orlikowski (2000) approach which moves away from the view that structures are embodied in technologies, but rather enacted, as they (technologies) cannot embody structures because those are only instantiated in practice. Orlikowski (2000) proposes a structuration model, represented in Figure 2 for investigating the technology phenomena, which postulates that an agent's interplay with technology, is constantly being shaped and reshaped by properties which consist of the technological artefact, the "skills, power, knowledge, assumptions, and expectations about the technology and its use, influenced typically by training, communication, and previous experiences" (Orlikowski, 2000, p. 267).

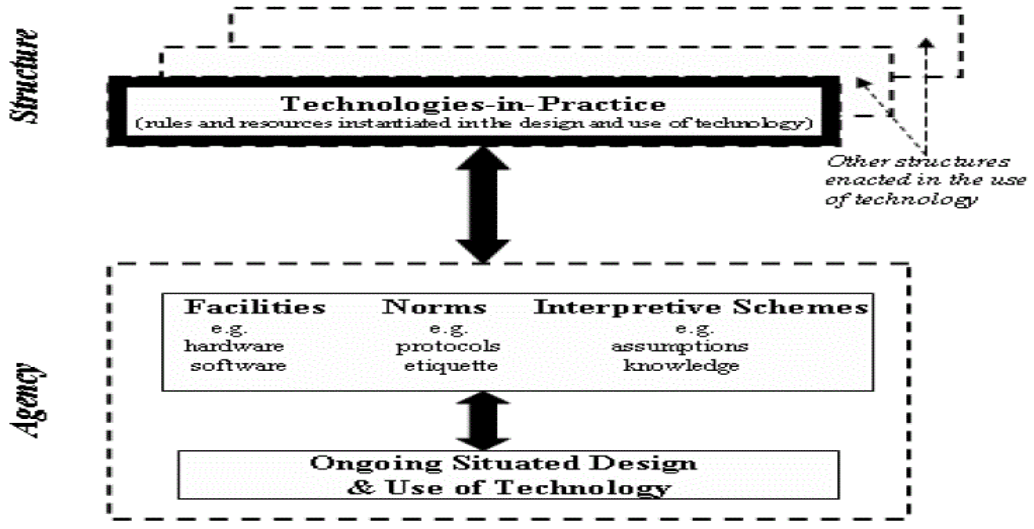


Figure 2: Enactment of technology in practice (Orlikowski, 2000, p. 269)

In operationalizing this theory in this study, the concepts of the structuration theory have been particularized to the outcome of BYOD literature review (organisational and environmental factors) to give a structurational view of BYOD. With this, the adoption of BYOD in SMEs can be

investigated with the intent of understanding how organisational and environmental factors shape and reshape SMEs actions.

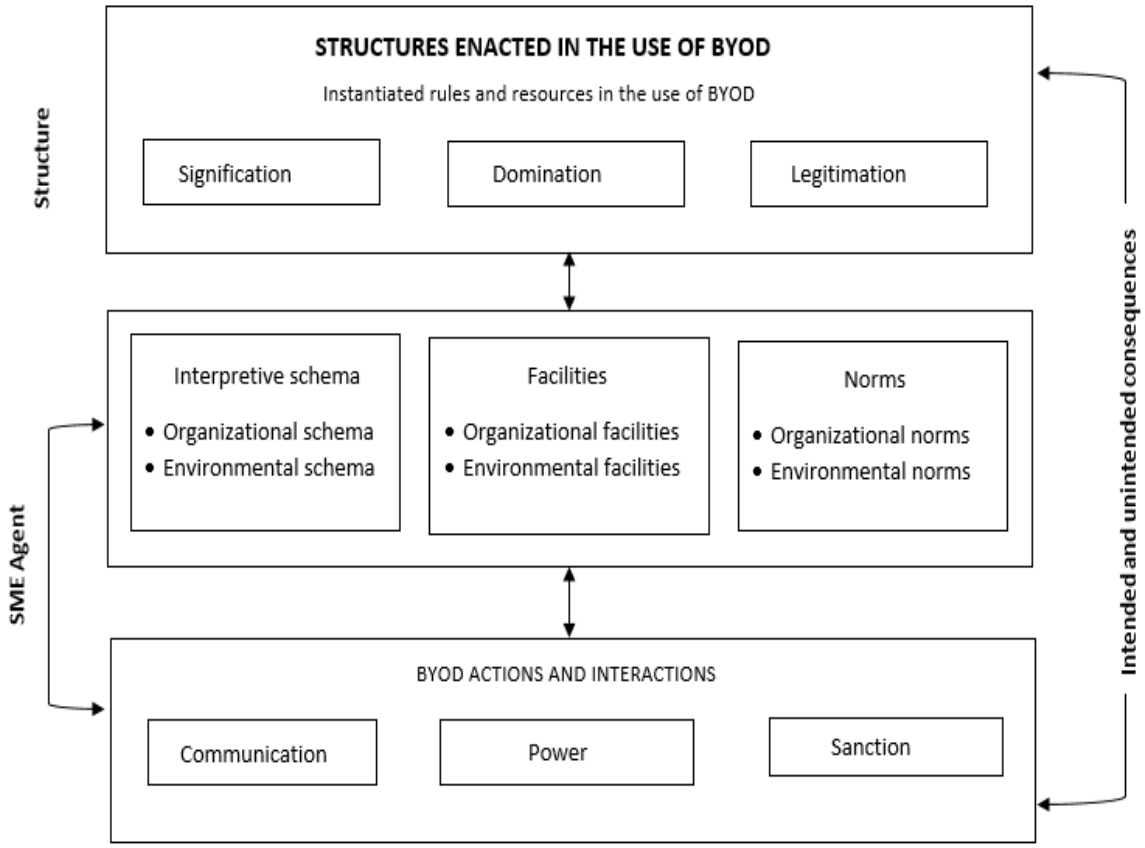


Figure 3: Structurational view of BYOD

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents the research methodological approach that was undertaken during this study. The goals of this study is to identify contextual factors influencing BYOD adoption with the intent of understanding how these contextual factors shape and reshape SMEs' actions. In order to arrive at the goal, the following research questions were asked:

1. What contextual factors influence the adoption of BYOD by SMEs? Literature suggests that the adoption of BYOD by SMEs depends on the contextual factors of the organisation and its environment (Chapter 2). Against this background, we seek to determine empirically what factors in relation to the organisational and environmental context of SMEs in South Africa, influences the adoption of BYOD.

2. How are these contextual factors shaping and consequently reshaping SMEs actions? "Technology and society do not develop along separate trajectories, but are involved in a constant process of co-production or mutual shaping…" (Russell et al., 2010, p 110). Against this background, this study seeks to understand the relationship between an SME as an organisation in its own right and the environment.

The rest of this chapter is arranged as follows: section 3.2 discusses the research philosophy, section 3.3 discusses the research purpose and approach, section 3.4 discusses the research methodology, section 3.5 discusses research ethics and section 3.6 discuses analysis.

3.2 Research Philosophy

According to Orlikowski and Baroudi (1991), research philosophy includes beliefs about the physical and social reality (ontology), beliefs about knowledge (epistemology and methodology) and beliefs about the relationship between knowledge and the empirical world. Ontology is concerned with the nature of reality (Saunders, Lewis & Thornhill, 2003) and the assumptions researchers have with regards to the manner in which the world works and the responsibility bound to particular views (Saunders et al., 2003). Ontology is associated with two views: objectivism and

subjectivism. Objectivism represents the view that social entities exist in reality external to social actors related to their existence, while subjectivism holds the view that social phenomena are constructed as a result of the perceptions and ensuing actions of social actors that are concerned with their existence (Saunders et al., 2003). Following the use of structuration theory as a lens, the ontological stance adopted for this study is subjectivism. This implies that the reality is not out there, but rather it is socially constructed by knowledgeable SME agents who are active participants in the creating and shaping their understanding of BYOD, based on their social context. This is important, given that most studies in developing counties have "been shaped with acute awareness of the relentless ICT and organisational innovation taking place in advanced economies of the world" (Avgerou, 2008, p. 135), and thus disregarding the significance of the socio-cultural aspects of developing countries.

Epistemology relates to what constitutes acceptable knowledge in a field of study (Saunders, Lewis & Thornhill, 2009) and it is divided into three categories: positivist, interpretive and critical studies. Positivist studies are grounded on the reality of *a priori* fixed relationships within phenomena which are characteristically examined by structured instrumentation (Orlikowski & Baroudi, 1991). Positivist research is usually deductive in nature with the assumption that reality is objectively given and can be described by quantifiable properties which are independent of the researcher and the research instrument (Myers, 2009). While positivist research assumes that all actors share the same meaning systems, an interpretive research believes that it is more likely that during social interactions, actors experience physical and social reality in different ways (Cavana, Delahaye & Sekeran, 2001). According to Klein and Myers (1999), information systems research can be categorised as interpretive if it is assumed that the knowledge of reality is socially constructed. By making use of interpretive research, information systems researchers can gain better insight on human thoughts and actions in a social and organisational context (Klein & Myers, 1999). According to Lee (1991), the methods proposed by natural sciences are both insufficient and unsuitable for examining social events. Critical studies seek to critique the status quo by bringing to light what are believed to be inherent structural contradictions within social systems, thus transforming these restrictive and alienating social conditions (Orlikowski & Baroudi, 1991). Their aim is to empower people towards creating a better world for themselves (Cavana et al., 2001). The critical research

and interpretive research are similar in many ways; however, rather than describing current beliefs and knowledge as in an interpretive study, critical research challenges those existing beliefs, assumptions and values that might be overlooked by the subjects themselves (Myers, 2009). This study follows the interpretive stance which is in line with the theoretical lens for this study. Both agree that the understanding and interpreting of a phenomenon can only be gained through social constructions such as language, shared meanings, documents, tools and other artefacts. Furthermore, this position offers the researcher the leeway to make multiple interpretations from the research problem, consequently giving a better understanding of the situation under study.

3.3 Research Purpose and Approach

Empirical studies on the BYOD phenomenon are limited, and in the context of SMEs and developing countries rare (Kabanda & Brown, 2014). Against this background, this study was exploratory and explanatory in nature. This study was considered as exploratory because it aims to gain insight into the BYOD phenomenon in SMEs, an area where little is still known (Hensema, 2013). The study was considered as explanatory because it aims to explain the adoption of the BYOD phenomenon in SMEs.

There are three different types of approaches to research, namely inductive, deductive and abductive (Alvesson & Skoldberg, 1994). The inductive method is used when the research begins with a detailed observation of the world and gradually moves towards theoretical ideas and generalization (Cavana et al., 2001). It is commonly adopted when there are few or no theories related to the field of study. The deductive method begins with a theoretical proposition, moving towards tangible empirical evidence (Cavana et al., 2001). This approach is commonly used when there are established theories related to the study. With the abductive approach, the research begins with empirical evidence as with the inductive approach but it does not reject theoretical pre-conception. In this study, there is a predefined framework and theory to guide the research process; hence a deductive approach was followed.

3.4 Research Methodology

Research methods can generally be classified into qualitative and quantitative methods. According to Saunders et al. (2009), quantitative methods are focused on numerals (numbers) and are "a good fit for deductive approaches, in which a theory or hypothesis justifies the variables, the purpose statement, and the direction of the narrowly defined research questions" (Borrego, Douglas & Amelink, 2009, p. 54). Quantitative research methods are broadly based on the ideals of positivism which seeks to quantify data and apply statistical analysis (Cavana et al., 2001).

Qualitative methods focus on the context in which the research is being conducted (Borrego et al., 2009). According to Cavana et al., (2001) qualitative research aims to uncover how humans construct meanings in their contextual settings, thereby revealing people's perceptions, values, beliefs, rules and interpretive schemes. Qualitative research methods were adopted for this research as the study aimed to provide understanding on how BYOD contextual factors shape and reshape SMEs actions.

3.4.1 Instrument Design

Following a qualitative research method, an instrument design was necessary. The research instrument was adapted from the PERM framework (Molla & Licker, 2005a; Molla & Licker, 2005b), and then particularized to suit structuration theory concepts of signification, domination and legitimation This was an important aspect of this study because "substantially stronger results may be obtained if researches particularize their research instrument "(McFarland & Hamilton, 2006, p 442). The research instrument was made up of open-ended questions to enable the researcher to observe, record and ask. The design of the research instrument (see Appendix A) was based on themes identified in Chapter 2. It is important to state that the instrument did not constrain the data collection process or regurgitate the same findings from literature; rather it merely served as a starting point to initiate and guide the data collection process. The research instrument consisted of four sections: interviewee demographic section, organisational question section, environmental question section and the closing question section (see Appendix A). The interviewee demographic section was used to capture background information about respondents. The organisational and environmental section consisted of organisational and environmental related questions used in

engaging participant in conversation about BYOD. The actual particularization of the structuration concept was done under the organisational and environmental section (see Appendix B). That is, for each factor, the PERM questions included the concepts (signification, domination and legitimation) of structuration theory. Finally, the closing section rounds up the interview process and provides the respondent with the opportunity to make clarifications from the researcher.

A pilot study was conducted before finalizing the research instrument. The pilot study involves pre-testing the research instrument on a small scale. This enables the researcher to identify problems and refine the data collection strategy (Yin, 2009). In ensuring the reliability, validity and clarity of the instrument, it was salient that the pilot study was conducted. The research instrument was piloted with two SME respondents and two information systems academics within the Faculty of Commerce at the University of Cape Town to ensure that the data and the data-collection process produced relevant data to achieve the aim and objectives of this study. After each pilot study, the following questions were answered (Bell, 2010, p. 151).

- How long did it take to conduct the interview? (Researcher)
- Were any of the questions unclear or ambiguous? If so, will you say which and why? (Respondent)
- Did you feel reluctant to answer any of the questions? (Respondent)
- In your opinion, has any important aspect of BYOD been omitted? (Respondent)
- Any comments? (Respondent)

Based on answers from the questions asked above, as well as results from the analysis of each transcribed pilot study session, the research instrument was evaluated and necessary changes made. For example, it was suggested to have a leading question for each section (organisational and environmental), after which supporting questions should follow to build upon responses.

3.4.2 Data Collection Technique

Following a qualitative approach, data was collected using qualitative semi-structured interviews. Interviews can be considered as one way of unpacking rich and complex information from an individual (Cavana et al., 2001). There are three types of interviews: structured interview, semi

structured interview and unstructured interview (Myers, 2009). Structured interviews involve the use of ordered prepared questions which are strictly applied during interviews. The semi-structured interview consists of pre-determined questions that are used without strict application; they provide the opportunity to explore new ideas based on responses from the interviewee. Unstructured interviews are informal as they apply very few prepared questions. This study used semi-structured interview approach because it provides an opportunity for flexibility during interviews. It is formal and still allows for improvisation as there is no strict adherence to the prepared question. This is necessary for instant feedback and follow-up during interviews so as to ensure consistency.

The target population for this study were SMEs located in Cape Town, a city that has organisations that are BYOD knowledgeable (Mitrovic et al., 2014). Recently, Cape Town has positioned itself as the ICT and innovation hub of South Africa. With projects such as the Cape Innovation and Technology Initiative, Bandwidth Barn and Silicon Cape Initiative, Cape Town is ranked first in South Africa on the list of the annual 2thinkKnow innovation cities' index for 2014 (2thinkKnow, 2015). Given that BYOD is new, Cape Town presents a good starting point from which rich investigation on BYOD in South Africa can commence.

Two non-probability sampling, namely purposive and snowballing sampling techniques were adopted. The purposive sampling was applied to select specific types of people who could provide useful information to aid the purpose of the research while the snowball sampling was applied to select new subjects based on the recommendation provided by initial subjects (Saunders et al., 2009). The research sample consisted of ten SMEs, five from the ICT industry, while the rest were spread across the health, engineering, financial and labour industries (see profile in Table 2). Each respondent was selected based on their knowledge and experience with BYOD. Although the sample size is small, it should be noted that this size was determined by the criterion saturation – that is, the point at which the same data was obtained repeatedly and no new data was likely to be obtained from the respondents (Thompson & Walker, 1998). Furthermore, sampling in qualitative studies accommodates small numbers given that the purpose is in making sense of the phenomena in depth and details, instead of quantifying the results (Miles & Huberman, 1994; Thompson & Walker, 1998).

Organization	Industry	Respondents
SME1	Health (Healthcare services and supplies)	SME1 manager
SME2	Engineering (Technical maintenance and support)	SME2 manager
SME3	Labour (Recruitment)	SME3 manager
		SME3 employee
SME4	ICT (Security and networking)	SME4 manager
		SME4 employee
SME5	ICT (Point of Sale systems)	SME5 manager
		SME5 employee
SME6	ICT (Software development)	SME6 manager
SME7	ICT (IT solutions) / Financial (Tax)	SME7 manager
		SME7 employee
SME8	Engineering (Engineering solutions and supplies)	SME8 manager
SME9	ICT (Design and modelling solutions)	SME9 employee
SME10	Financial (Auditing)	SME10 manager
		SME10 employee

Table 2: SME profile

Data collection commenced in February, 2016. Emails were initially sent to various SMEs in Cape Town requesting their participation; however the response rate was low. This meant that the researcher had to undertake a different approach which involved physically visiting business parks in Cape Town to inform more SMEs about this research, and requesting their permission to conduct interviews at their organisations. Physically visiting SMEs gave the researcher opportunity to pre-engage and establish rapport with SMEs. For SMEs that showed interest, contact details were exchanged and appointment dates were fixed. In total, 10 SMEs gave their consent to participate in this study and a total of 15 interviews were conducted between February and March 2016. A planned duration for each interview was set between 45 minutes to 90 minutes to ensure that each respondent was not pressurized to respond during the interview, thereby making sure that they supplied credible information. For each interview, digital voice recording and note taking were employed.

3.4.3 Research Validity and Reliability

Research validity and reliability is commonly related with quantitative studies which usually employ experimental methods grounded in the positivistic paradigm. The end result in this perspective is to make sure that the results obtained using a research instrument are truthful and consistent over time (Joppe, 2000). However, in a qualitative study, the end goal is the same – that is, both the validity and reliability are not viewed separately as they both ensure the credibility of a qualitative research (Golafshani, 2003). The credibility of the results allows for its extrapolation to similar situations or contexts. Therefore, in designing, analysing and judging the quality of a qualitative study, it is imperative for a qualitative researcher to also take both the research validity and reliability into consideration (Patton, 2002).

Trustworthiness is another term that can be used to describe the reliability and validity of a qualitative research study (Bashir et al., 2008). According to Krefting (1991), trustworthiness can be assessed based on the identification of four strategies, namely: credibility, generalizability, dependability and confirmability. These strategies are eminent for qualitative researchers in designing ways of improving the rigor of their study as well as providing readers with ways of evaluating the value of the findings of a qualitative research (Krefting, 1991). In ensuring that this research is trustworthy, the following methodological strategies were employed (Krefting, 1991).

a) Triangulation of data methods, which is based on the merging of multiple perspectives for the mutual confirmation of data. The data sources in this study were evaluated against each other to cross-check the data and interpretation. This strategy helped to minimize distortion from a single data source or from a biased researcher.
b) Comprehensive description of the exact research methods of data collection, analysis and interpretation. Providing such detailed description ensures that this study is repeatable.
c) Triangulation of multiple theoretical perspectives was also adopted. The Perceived E-Readiness Model (PERM) and structuration theory were involved in the interpretation of the BYOD phenomenon so to increase the credibility of results and overcome the weakness and inherent biases from single-theory studies.

3.5 Ethics

Ethics in research involves upholding moral principles in planning, conducting and reporting research findings (Myers, 2009). In ensuring that ethical considerations are fulfilled, the researcher made sure that SMEs were informed in advance of the purpose of the study. Permission to partake in this research was purely voluntary as consent was first obtained from the respective participant before any study was conducted. Key concepts were explained before data collection and all participants were enlightened on their freedom to opt out if at any point they felt uneasy with their participation or involvement with the research process. All information obtained during this research was kept confidential, and all participating SMEs were regarded as anonymous via pseudonyms when reporting findings from this study. Furthermore, this study conformed to the research ethics and requirements set by the IS department, Commerce Faculty, and the UCT Ethics Committee.

3.6 Analysis

This study adopted the thematic analysis approach in analysing the interview transcripts. The thematic approach involved subjecting the entire data corpus to a rigorous review process so as to identify, analyse and report patterns (themes) emerging from the data (Braun & Clarke, 2006). This study adopted the Braun and Clarke (2006) approach towards thematic analysis as shown in Table 3

Phase	Action	Description of Process
1	Familiarizing yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas
2	Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3	Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme
4	Reviewing themes and relationships	Checking if the themes work in relation to the coded extracts and the entire data set
5	Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells
6	Producing the report	Selection of vivid, compelling extract examples, analysis of selected extracts, relating back of the analysis to the research question and literature.

Table 3: **Phases of the thematic analysis (Braun & Clarke, 2006, p 87)**

Data analysis commenced by coding the data inductively. During this process, important highlights of the data were coded without associating any interpretation to it. The entire data-analysis process was recursive and reflexive. After the entire data was read repeatedly, themes were identified and refined. The research then took a deductive approach in assigning meanings to the themes by associating them to BYOD theoretical literature. Themes were grouped under organisation and environmental factors. The subsequent sections explain the process followed in generating the themes.

3.6.1 Familiarizing oneself with the data

Getting acquainted with the length and breadth of the data is the first step in qualitative data analysis. This was achieved by repeatedly listening to the audio recordings of the interviews to get an initial understanding of each interview session. This process was followed by a verbatim transcription of all verbal and sometimes nonverbal utterances into written text. The transcribed text was then checked against the audio recording to ensure the accuracy of the text. The process was salient as it informed the early stage of analysis.

After each interview was transcribed and typed in Microsoft Word, it was loaded into NVIVO Version 10 for further familiarisation. The NVIVO software was adopted because it assists in organizing, analysing and finding insights in qualitative data. This was then followed by reading and re-reading the entire data corpus to get conversant with all aspects of the data. During this process, the researcher began taking notes and documenting ideas. This process was completed in NVIVO and then the data was formatted into tables as presented in Table 4. The first column represents the unique respondent ID and the second column represents the actual statements made by the respondent.

Respondent	What influences your organisation in adopting BYOD? (Response)
SME7 (Manager)	Business mobility, moving around with your office is also very important. Being out of office but actually you are not out of the office because every communication can locate you wherever you are. I shouldn't be at the office to sit in meetings; we use our mobile devices to join webinar meetings
SME3 (Manager)	At the end of the day I want to create an environment where I do not need to have my employees in the office to be connected…
SME8 (Manager)	I think it is because it has just become the way people do business. I think it's just because everybody has a phone in their pocket all the time that is why they use it.

Table 4: **Data formatting into data tables**

3.6.2 Generating initial codes

After reading the data corpus repeatedly, the second phase began by generating initial codes from the data. This aimed at reducing the data into smaller units that appeared interesting to the researcher. This process was done manually by tagging and labelling selections of text within the data using the NVIVO 11 software. This process led to an initial code book as depicted in Table 5. For example, it was noticed how an employee (SME 9) complained about not having any BYOD policy by stating that the organisation *"... should bring in policy firstly and then also add it to your contract because it involves your personal device or the company must then supply me with a company phone that just for me...*" This respondent associated the availability of a formal policy as a requirement for using personal devices for work-related purposes. This became one of the initial themes labelled "*No formal BYOD policy*". Another example was the case of the SME 6. The manager complained about the status of technological development in South Africa. He stated, "*… In South Africa, we are actually left behind in terms of technology…even in Cape Town, which is the central hub of technology in South Africa, there is a huge shortage of ICT and ICT solution*s…" This also became another theme labelled "*Poor technological development in South Africa.*"

Initial Theme	Data Extracts
No formal BYOD policy	Yes, they should bring in policy firstly and then also add it to your contract because it involves your personal device or the company must then supply me with a company phone that just for me. (SME 9, employee) Maybe , it is something to look into, I haven't considered it, I haven't even thought about it at all, but now that you are saying it, I think there should be a formalized policy (SME 8, manager)
Lack of government policy that addresses the BYOD	There is no alignment between BYOD and what government introduce as an act…as an SME, you have to come up with your own policy and also your procedure on how to implement BYOD and how to regulate it within your particular company…POPI what it says is you are not allowed to share someone ID number, personal information without the consent of that person…But it doesn't drill down to cater for things like BYOD. The POPI act just helps to cater for a small portion of the BYOD. There are other aspects to it (SME 6, manager) I mean I have seen a lot of employees get fired because of Facebook. So there should be a policy on what a person is allowed to say on Facebook, and what a person is not allowed to say on Facebook. So that they know those lines before they get there, so maybe some legislation or a bit of guideline like the Labour Law Act. (SME 8, manager)
Poor technological development in South Africa	In South Africa, we are actually left behind in terms of technology…even in Cape Town, which is the central hub of technology in South Africa, there is a huge shortage of ICT and ICT solutions…(SME 6, manager) If you look at America, Iceland, Finland and the other guys, I have realized that they have got the speed and the technology that is government-driven. Government invests in the telecommunication industry. It is not happening here. We are sitting with crappy Internet lines that are very expensive. (SME 3, manager)
Government interest in ICT is political	I am sure when it is time for elections and political gains, yes they would show support, it is not their main priority. (SME 4, manager) I have read about what government promised to do, like the free Wi-Fi sitting public spaces but I haven't seen much. (SME 10, employee)
Government not interested in creating an ICT- savvy environment	Ideally, but you know the government, they don't worry much about that. Well, they have different interests than to provide people with a conducive IT environment. (SME 4, manager) Looking at our current government it is a high hope. For instance, like the budget speech, I can't remember once in the budget speech him mentioning anything about any IT environment going on, not that I can recall (SME 10, employee)

Table 5: **Extracts from initial code**

3.6.3 Searching for themes

A theme is a patterned response or meaning within a data set that captures something significant about the data in relation to the research question (Braun & Clarke, 2006). Following the coding of the entire data, this phase involves sorting codes that were repeatedly articulated and coded to describe the same thing into groups. These groups represented potential overarching themes in column1 of Table 6. Column 2 provides definition to each overarching theme; column 3 consists of sub-themes that emerged to form the overarching themes; while column 4 provides supporting data extracts for each sub-theme. For example, initial themes "*Poor technological development in South Africa*" and "*Lack of ICT skills development*" were analysed. Findings showed that these themes cohesively describe that the government is doing little or nothing with regard to technological infrastructural development as well as in ICT skills development. The initial themes were then grouped together to describe the overarching theme termed "*Lack of ICT skills and infrastructure development in South Africa*" in column 1.

Similarly, initial themes "*Government interest in ICT is political*", "*Government not interested in creating a ICT savvy environment*" and "*Government have more critical problems*" were analysed to all fit the overarching theme labelled "*Low level of ICT prioritization by government*". The use of this theme explains that the creation of an ICT-savvy environment is not a priority for government, as they have more pressing issues to deal with.

Theme	Description	Sub Theme	Data Extracts
Lack of ICT skills and infrastructure development in South Africa	Government is doing little or nothing as regards technological infrastructure development, as well as in ICT skills development.	Poor technological development in South Africa	In South Africa, we are actually left behind in terms of technology…even in Cape Town, which is the central hub of technology in South Africa, there is a huge shortage of ICT and ICT solutions…(SME 6, manager) If you look at America, Iceland, Finland and the other guys, I have realized that they have got the speed and the technology that is government driven. Government invests in the telecommunication industry. It is not happening here. We are sitting with crappy Internet lines that are very expensive. (SME 3, manager)
		Lack of ICT skills development	…I mean, I know government is planning on putting the new fibre optics that is super quick but you know let just say that in the next five years that the fibre optics rolls out, so you've got fibre optics throughout South Africa but what has government done to bring people through that are going to understand and be able to keep it running? … (SME 1, manager)
Low level of ICT prioritization by government	Creating an ICT-savvy environment is not a priority for Government	Government interest in ICT is political	I am sure when it is time for elections and political gains, yes, they would show support, it is not their main priority. (SME 4, manager) I have read about what government promised to do, like the free Wi-Fi sitting public spaces but I haven't seen much. (SME 10, employee)
		Government not interested in creating an ICT-savvy environment	Ideally, but you know the government, they don't worry much about that. Well, they have different interests than to provide people with a conducive IT environment. (SME 4, manager) Looking at our current government it is a high hope. For instance, like the budget speech, I can't remember once in the budget speech him mentioning anything about any IT environment going on, not that I can recall (SME 10, employee)
		Government have more critical problems	It is a difficult question because all over the world you get free Wi-Fi at the moment except South Africa. It is difficult because, at the moment, there is no such thing as government doing anything about IT, there are so many other problems that they need to be focusing on. They should fix the problem of racism, and crime. These are of more priority than providing people with free Wi-Fi.(SME 3, employee) I think government have got enough problems on their plate and trying to get involved...They have got far more important things. Let the business industry do that, government doesn't need to get involved. (SME 1, manager)

Table 6: **Searching for themes**

As suggested by Braun and Clarke (2006), a visual representation using the thematic map as depicted in Figure 4 and Figure 5 was used at this early stage to help sort different codes into themes. The thematic maps were created using the NVIVO software. It helped in assisting to think about the relationships that exist between different codes and themes. For example, Figure 5 depicts how the initial codes "*Poor technological development in South Africa*" and "*Lack of skills development*" inform the theme "*Lack of ICT skills and infrastructure development in South Africa*".

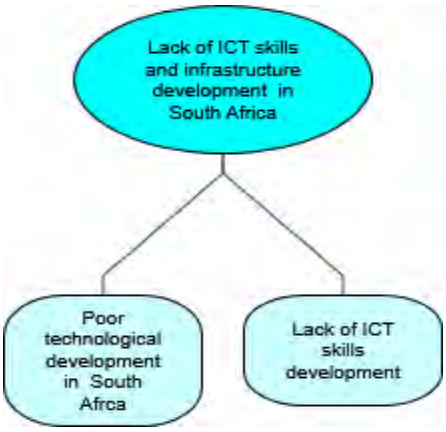


Figure 4: Thematic map for theme – *Lack of ICT skills and infrastructure development in South Africa*

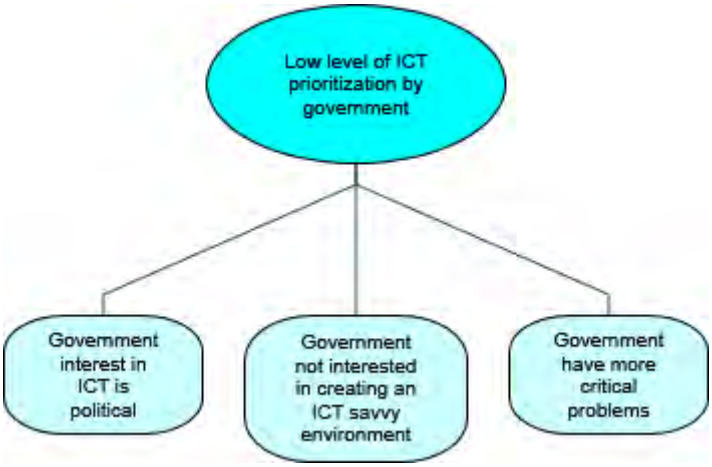


Figure 5: Thematic map for theme – *Low level of ICT prioritization by government*

3.6.4 Reviewing the themes

This phase involved the assessment and refinement of themes. The goal here was to ensure internal homogeneity and external heterogeneity (Patton, 1990). This means that data within themes should fit together meaningfully and at the same time each theme must show clear and recognizable distinctions. The researcher proceeded by ensuring that all the coded extracts for each theme were coherent enough; in situations where this was not the case, the theme or themes in question were not discarded but reworked. Furthermore, themes that communicated the same idea were identified and collapsed together to form an overarching theme. For example, the analysis of the data in Table 7 shows that sub-themes "*Poor technological development in South Africa*" and "*Lack of ICT skills development*" are coherent under the theme "*Lack of ICT skill and infrastructure development in South Africa*". Furthermore, the themes, "*Lack of government policy that addresses BYOD*", "*Lack of ICT skill and infrastructure development in South Africa*" and "*Low level of ICT prioritization by the governmen*t" all spoke about the idea of the government not being ready to directly or indirectly support the BYOD initiative. These themes were collapsed to form an overarching theme known as "*Lack of government readiness*". This theme was then visually represented using the thematic map in Figure 6.

Reviewed Theme	Theme	Description	Sub Theme	Data Extract
Lack of government readiness	Lack of government policy that addresses BYOD	Government do not currently have a policy that could assist organisation in governing the BYOD	Lack of government policy that addresses the BYOD	There is no alignment between BYOD and what government introduce as an act…as an SME, you have to come up with your own policy and also your procedure on how to implement BYOD and how to regulate it within your particular company…POPI what it says is you are not allowed to share someone ID number, personal information without the consent of that person…But it doesn't drill down to cater for things like BYOD. The POPI acts just helps to cater for a small portion of the BYOD. There are other aspects to it (SME 6, manager) I mean I have seen a lot of employees get fired because of Facebook. So there should be a policy on what a person is allowed to say on Facebook, and what a person is not allowed to say on Facebook. So that they know those lines before the get there, so maybe some legislation or a bit of guideline like the Labour Law Act. (SME 8, manager)
	Lack of ICT skill and infrastructure development in South Africa	Government is doing little or nothing as regards technological infrastructure development , as well as in ICT skills development	Poor technological development in South Africa	In South Africa, we are actually left behind in terms of technology…even in Cape Town, which is the central hub of technology in South Africa, there is a huge shortage of ICT and ICT solutions… (SME 6, manager) If you look at America, Iceland, Finland and the other guys, I have realized that they have got the speed and the technology that is government driven. Government invests in the telecommunication industry. It is not happening here. We are sitting with crappy Internet lines that are very expensive. (SME 3, manager)
			Lack of ICT skills development	…I mean, I know government is planning on putting the new fibre optics that is super quick but you know let just say that in the next five years that the fibre optics rolls out, so you've got fibre optics throughout South Africa but what has government done to bring people through that are going to understand and be able to keep it running? (SME 1, manager)

	Low level of ICT prioritization by government	Creating an IT savvy environment is not a priority for Government	Government interest in ICT is political	I am sure when it is time for elections and political gains yes they would show support, it is not their main priority." (SME4,manager) I have read about what government promised to do, like the free Wi-Fi sitting public spaces but I haven't seen much. (SME10, employee)
			Government not interested in creating an ICT-savvy environment	Ideally, but you know the government, they don't worry much about that. Well, they have different interests than to provide people with a conducive IT environment. (SME 4, manager) Looking at our current government it is a high hope. For instance, like the budget speech, I can't remember once in the budget speech him mentioning anything about any IT environment going on, not that I can recall (SME 10, employee)
			Government have more critical problems	It is a difficult question because all over the world, you get free Wi-Fi at the moment except South Africa. It is difficult because at the moment, there is no such thing as government doing anything about IT, there are so many other problems that they need to be focusing on. They should fix the problem of racism, and crime. These are of more priority that providing people with free Wi-Fi.(SME 3, employee) I think government have got enough problems on their plate and trying to get involved...They have got far more important things. Let the business industry do that, government doesn't need to get involved. (SME 1, manager)

Table 7: **Reviewing themes**

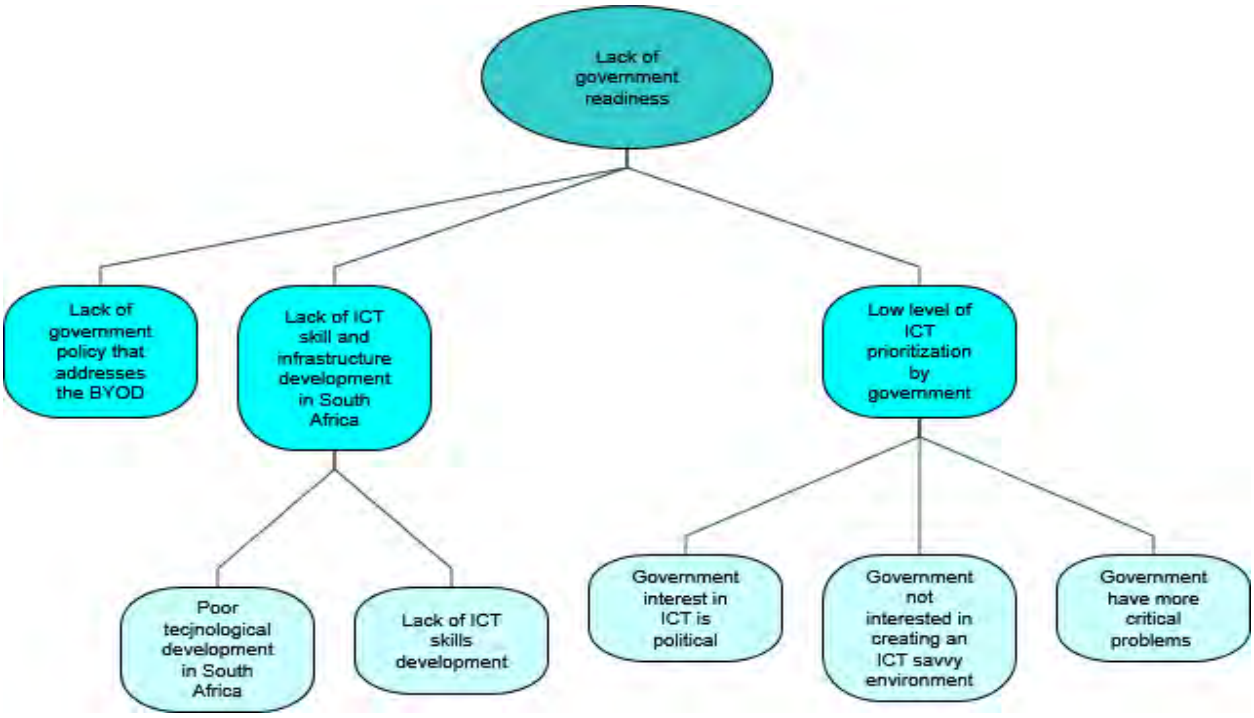


Figure 6: Thematic map for reviewed theme – *Lack of government readiness*

3.6.5 Defining and Naming Themes and Producing Report

This phase provided the final opportunity for the refinement of each candidate theme. At this point, the objective of each theme was determined individually as well as holistically in relation to other themes. Furthermore, it was also imperative to determine what aspect of data each theme conveyed. This involved rechecking each theme with the data set to ascertain internal consistency and validity; and also mapping the themes back to the factors that influence BYOD adoption (Chapter 2). Seven organisational and four environmental themes were found to be influencers of BYOD adoption. Table 8 and Figure 7 display a summary of findings which are discussed in the following section.

Themes		Descriptions	Example of data Extract
POER- Organisational	Awareness	The knowledgeability of SMEs in terms of BYOD	BYOD for our organisation is mainly about…having to use laptops and iPad as well as tablets for running test… (SME 6, manager)
	Low Management Support	Lack of commitment and enthusiasm towards BYOD by SME management and owners	But I mean me personally, I don't get anything for using my personal device and I do use my personal airtime and data at times (SME 4, employee)
	Business Resources	A wide range of organisational capabilities and intangible assets of the organisation	Business mobility, moving around with your office is also very important. Being out of office but actually you are not out of the office because every communication can locate you wherever you are… (SME 7, manager)
	Human Resources	The availability of employees that possess the necessary information technology (IT) exposure, know-how and experience needed to deal with BYOD initiatives and projects	My employees are 10 million times more tech savvy than I am; I am the oldest. I have a very young force and they are clued up (SME 3, manager)
	Employee Pressure	It refers to the push by employees to use personal devices for work activities.	…. the organization does not have a choice because they cannot afford to buy smart phones for employees. We use our personal devices for instant messaging , it is a very good communication tool in the company (SME9, employee)
	Lack of formal governance	Lack of formal rules and principles guiding the use of employees' personal mobile devices for work relate purposes	Maybe, it is something to look into, I haven't considered it, I haven't even thought about it at all, but now that you are saying it, I think there should be a formalized policy (SME 8, manager)
	Technological readiness	Evaluation of the level of computerization, the flexibility of existing systems and the experience with network-based applications	So in terms of security, I would not say we are a bit exposed to security …we don't have any measures put in place…(SME 6, manager)
PEER- Environmental	Influence by market forces	Accessing the influence of organisational business partners such as suppliers and customers	My candidate and my client influenced my decisions to go with the BYOD because I have to move with them (SME 3, manager)
	Lack of support from the industry	The absence of development, service level and cost structure of support giving institutions	Telkom are down very often but we carry on doing business; not ideal though…when you compare us with oversees, the prices are terrible and the quality is bad. (SME 4, manager)
	Lack of government readiness	Lack in the preparation of the nation state and its various institution to promote, support, facilitate and regulate BYOD and its various requirements	I can't remember once in the budget speech government mentioning anything about any IT environment going on, none that I can recall. (SME 10, employee)
	Socio-cultural factor	The Socio-cultural factor refers to the way information, communication and technological tools are being used in a society	So yes, there is some type of pressure to always want to keep up with the big boys… (SME 9, employee)

Table 8: **Factors influencing the adoption of BYOD by SMEs in South Africa**

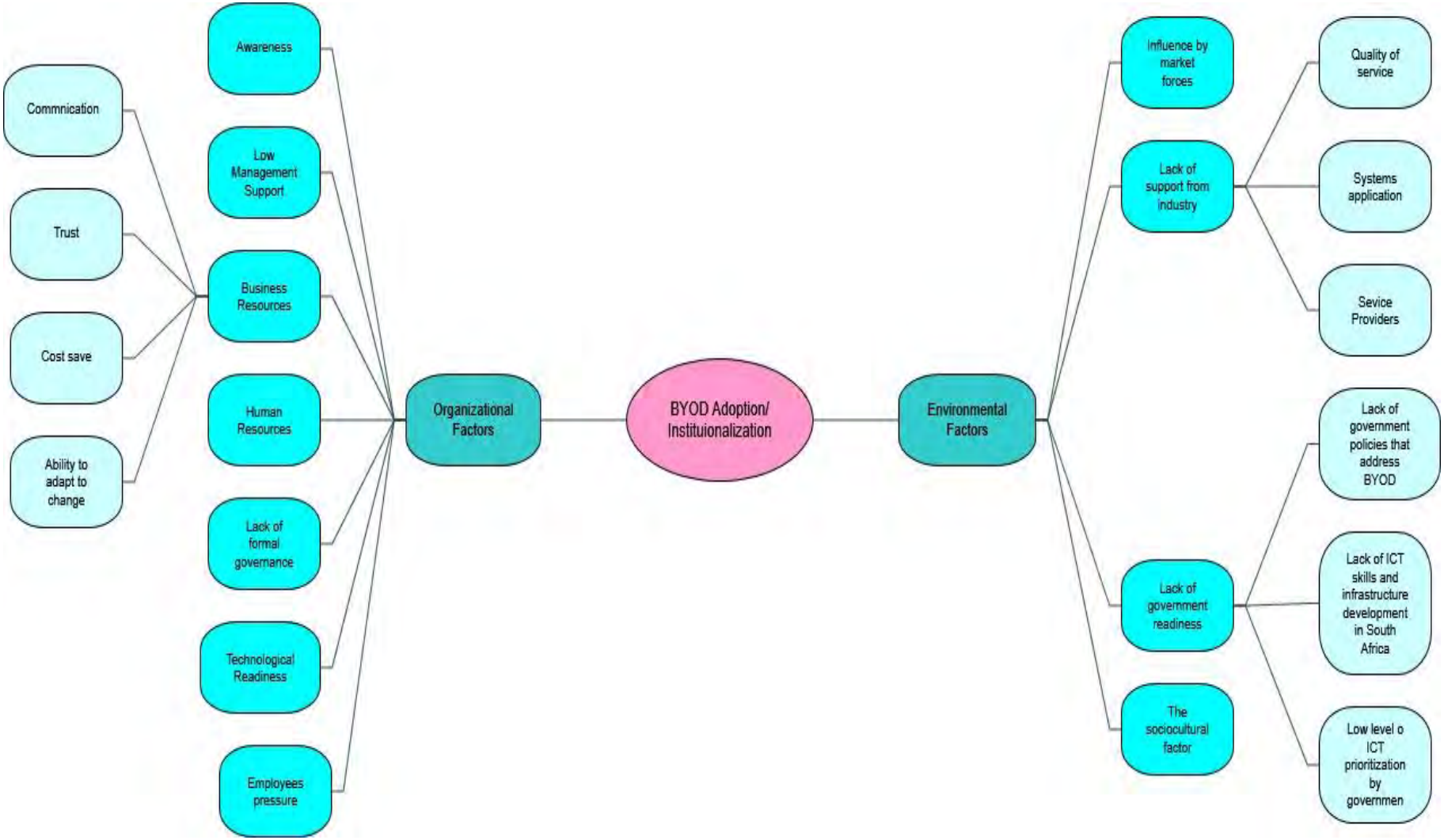


Figure 7: **Thematic map summarizing the factors influencing the adoption of BYOD by SMEs in South Africa**

3.7 Summary

Table 9 shows a summary to the research design

Methodology	**Approach**
Ontological stance	Subjectivism
Epistemology	Interpretive
Research purpose	Exploratory and Explanatory
Research approach	Deductive
Research method	Qualitative
Research Instrument	Interviews
Data collection technique	Semi-structured interviews
Data analysis technique	Thematic analysis

Table 9: Research methodology summary

CHAPTER 4: RESEARCH FINDINGS

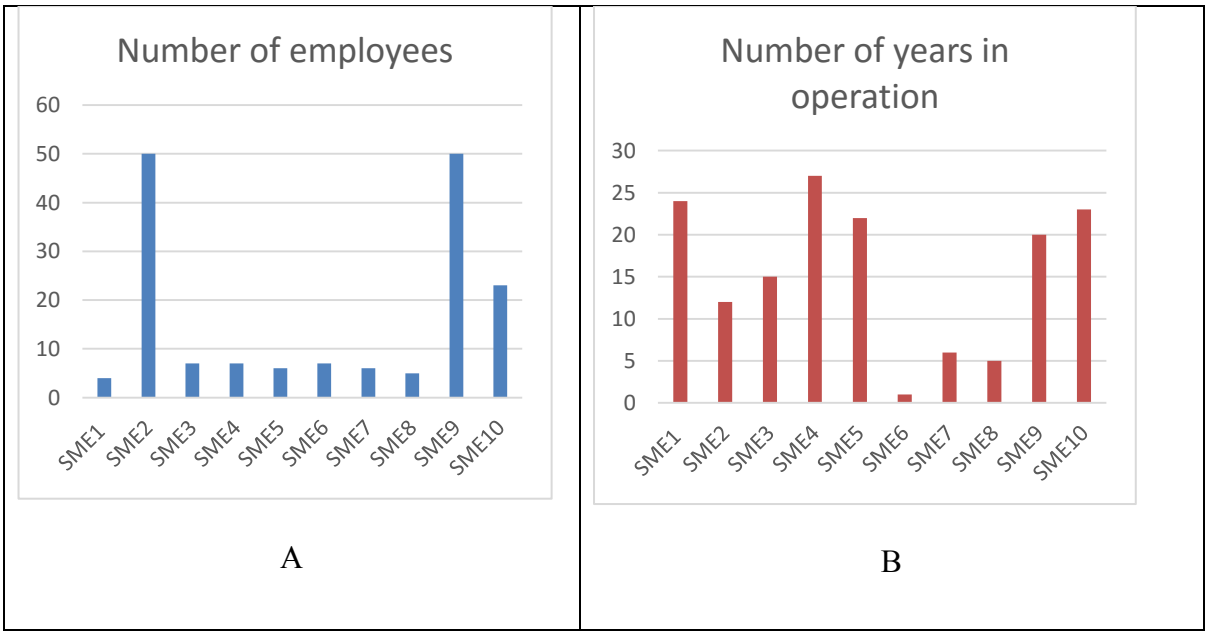
4.1 Introduction

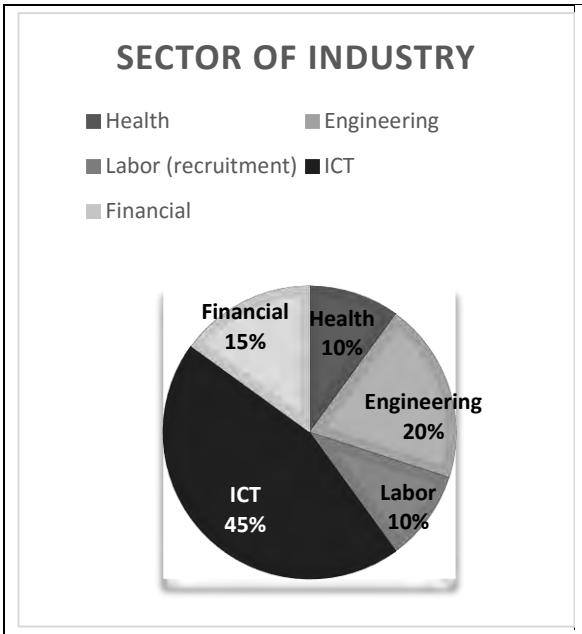
This chapter presents the findings of the study. Data was collected using semi-structured interviews and analysed using thematic analysis. A total of 15 in-depth interviews were conducted from 10 SMEs.

The rest of the chapter is arranged as follows: section 4.2 present SMEs' characteristics; section 4.3 discusses the overall adoption; section 4.4 presents factors influencing the adoption of BYOD; section 4.5 discusses the findings; and section 4.6 summarizes the chapter.

4.2 SMEs' characteristics

Data was collected from SMEs located in Cape Town – the region in South Africa with the second highest urban population and the multi-cultural hub of the country. Cape Town positions itself as the ICT and innovation cradle of South Africa and therefore does serve as a representative sample of South African SMEs for investigation of BYOD. A total of 15 interviews were conducted. This comprised of nine management individuals and six employees.





SME	Sector
SME 1	Health (Healthcare services and supplies)
SME 2	Engineering (Technical maintenance and support)
SME 3	Labour (Recruitment)
SME 4	ICT (Security and networking)
SME 5	ICT (Point of Sale systems)
SME 6	ICT (Software development)
SME 7	ICT (IT solutions)/ Financial (Tax)
SME 8	Engineering (Engineering solutions and supplies)
SME 9	ICT (Design and modelling solutions)
SME 10	Financial (Auditing)

C

Figure 8: Number of employees, years in operation and industry sector of SMEs

Figure 8 (A) shows the size of the SMEs that participated in this study based on the number of employees. It indicates that all participating firms are SMEs as they all have less than 250 employees (National Small Business Amendment Act, 2003), with 70% employing less than 10 people. SME 2 and SME 9 have the highest number of employees at 50, while SME 1 has the lowest number with four employees. Figure 8 (B) shows the number of years in operation for each SME. Results indicate that 30% of SMEs have been in operation for less than 10 years, 20% for less than 20 years and the remaining 50% for 20 years and above. SME 4 has been in operation the longest, and SME 6 the shortest, compared to the rest of the group. SMEs in the information technology and communication (ICT) sector represent the majority of the respondents, with 45%. This was expected given that Cape Town is the ICT hub of South Africa (2thinkKnow, 2015). Other sectors included engineering which represented 20%, financial with 15%, health and labour with 10% respectively.

4.3 BYOD Adoption

BYOD adoption is act of using employees' personal devices for work related activities regardless of whether the device access the organizational network or not. This term is conceptualized in this study based on findings, perceptions and observations, and as such, SMEs were categorized into three groups of BYOD adoption maturity levels, namely "No Adoption", "Initial adoption" and "Institutionalized". No adoption included SMEs whose employees are not allowed to use their personal mobile devices for work-related purposes. In such SMEs, management provided employees with all devices needed for work activities. This was the case of SME 1 (manager) who explained that:

> *We do not use personal devices; all the devices that are used are company-owned. All the reps that we have on the road, we supply them with their own computer and with a smartphone.*

The next category is the "Initial Adopter". These are SMEs that allow employees to use personal devices to support non-essential work-related activities (for example, communication within and outside the organisation). SMEs in this category are not allowed to use their mobile devices to access organisational file and resources. This is the case, as some SMEs are concerned about the security implications associated with BYOD. They mainly use their devices to facilitate communication within and outside the organisation as explained by SME 2 (manager):

> *Employees are not allowed to use their devices for core work purposes, except for communication purposes. What we do, though, is if they have their own personal devices we activate the email exchange service on it and add their work email address… We have seen more and more people are wanting emails on their phone so they can see when they are being looked for.*

The last category included SMEs that have "institutionalized" BYOD adoption. These are SMES that have fully integrated employees' personal devices for core work activities (for example, accessing organisational files and resources). The business model of SMEs in this category heavily rely on BYOD hence, without employees' devices, SMEs cannot carry out their day-to-day activities. SMEs in this category have capitalized on the concept of BYOD and, as such, they allow or mandate employees to use their personal devices to access organisational files and resources. SME 10 (manager) explains:

It is a condition of our employment; you need to have a personal laptop with certain specifications to run our audit software on. We are not making it mandatory for them to use their cell phones, but they have got to use their laptops because our business model needs us to go out to our clients to do audits and tests at their premises, so it is really the only way for employees to perform their work function.

The three levels of adoption categories are displayed above in Table 10.

Adoption levels	Description	SME	Sector
No Adoption	Use of personal devices for work activities (mobile phone/laptop/tablet) is not allowed	SME 1	Health
Initial Adoption	Use of personal devices for non-essential work activities e.g. communication (within organisation/outside organisation)	SME 2	Engineering
		SME 3	Labour (recruitment)
		SME 4	ICT
		SME 5	ICT
Institutionalized	Use of personal devices for core work activities (access to organisational files and resources)	SME 6	ICT
		SME 7	ICT/ Financial
		SME 8	Engineering
		SME 9	ICT
		SME 10	Financial

Table 10: Levels of BYOD adoption categories

4.4 Factors Influencing the Adoption of BYOD

4.4.1 Organisational Factors

In this study, findings indicate that seven organisational factors, as shown in Figure 9, influence BYOD adoption.

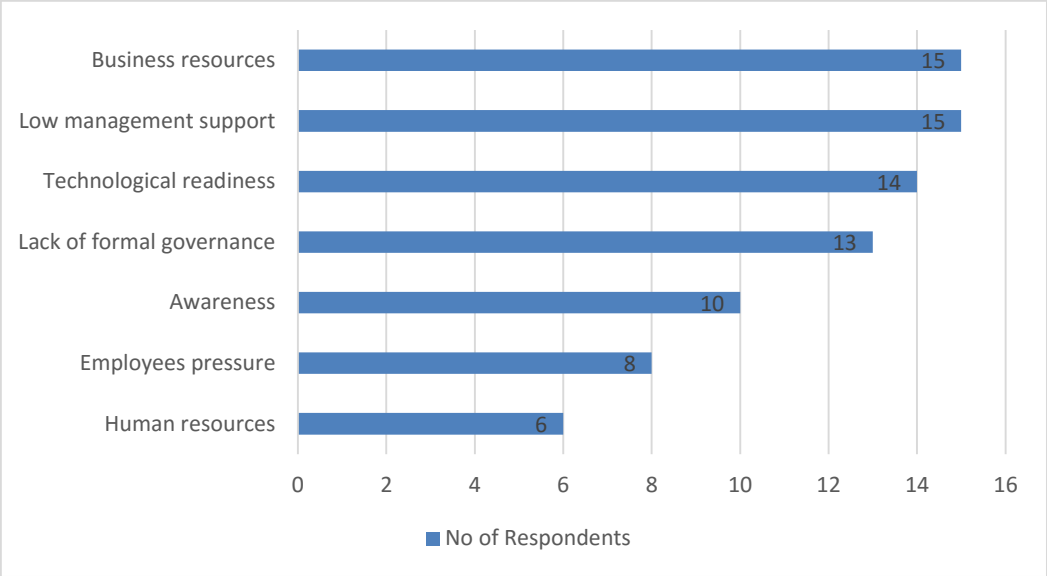


Figure 9: **SMEs' perceptions on organisational factors influencing BYOD adoption**

4.4.1.1 BYOD awareness

Awareness refers to the perception and understanding of BYOD element in organisations (Molla & Licker, 2005a). BYOD is generally perceived as the use of personal devices for work-related activities amongst most respondents. SME 6 (manager) explains:

> *BYOD for our organisation is mainly about employees' devices; because we are a software development company it is more of having to use laptops and iPad as well as tablets for running tests. You find out that most of the time our employees use their own devices simply because at times we work off-site.*

Employees and management generally believe that employees are masters of their mobile devices because they are more familiar with them. Managers had the assumption that employees need no training on how to use their devices for work-related purposes. SME 3 (employee) and SME 10 (manager) explain:

> *Obviously there is no need to train me on how to use my cell phone because I know how it works*. (SME 3, employee)

> *No, we don't train them on how to use their laptop, we expect them to have a working knowledge of that through university or high school even, but we do give them training*

> *on the software program (Caseware) that they use for audit. So we do give them training on that.* (SME 10, manager)

However, results indicate that such understanding is flawed because personal life and work life are two extremes with blurred lines. Organisations cannot conclude that employees can totally transfer and use experience from the former for the latter, as the context differs. SME 7 (manager) explains:

> *Yes we do, because at times many employees carry about devices and they do not know the worth of these devices; they even buy this device because of prestige, because of pride, because of the trend, because of fashion. Just very few people need the power of that machine. So when you start introducing them to what that machine can do in our infrastructure or in our company, some of them get even more surprised because of what their device can do.*

4.4.1.2 Low management support towards BYOD

Management support refers to the commitment and enthusiasm towards BYOD by SME management and owners. It involves having a clear-cut vision and strategy (Molla & Licker, 2005a). All SMEs at the different levels of BYOD adoption, predominantly SMEs the initial adoption and institutionalized level, stated that the support provided by organisations towards the adoption of BYOD is low. Management relies on BYOD, yet they fail to provide the much-needed encouragement and compensation that employees require for using their mobile devices for work-related purposes. SME 8 (manager) explains:

> *We kind of took a step back after we tried that application (mobile content manager). It would have cost us 160 Rands per month per person which over a year, is a few thousand Rands … That sort of steered us away, and I think there was a kind of a de-focus with the use of that.*

Findings indicate that employees were not pleased with the current level of support as they feel that they are being taken advantage of by their organisations. This was stated by employees of SME 4 and SME 9:

> *But, I mean, me personally, I don't get anything for using my personal device and I do use my personal airtime and data at times. (SME 4, employee)*

> *Yes, they should bring in a policy firstly and then also add it to your contract because it involves your personal device, or the company must then supply me with a company phone that's just for me. (SME 9, employee)*

Furthermore, findings also indicate that the majority of SMEs are still unclear about how to align the adoption of BYOD with their organisational goals as SME6 (manager) explains:

> *Well, we have not mapped it down on paper, but as part of being management, management is two. I am the operations director and I have my business partner; he is the chief executive officer. From a strategical point of view we have realized that this is the way of us reaching effectiveness and efficiency; we are aware of the strategy and the discussions attached to it. But having a layout on how BYOD can integrate and bring efficiency, we haven't put it on paper but the strategy in terms of discussion, the strategy in terms of implementation, we have predominately relied on BYOD, and its working, man.*

For SME 6, management had discussions around BYOD on how it can be incorporated with their business model. They concluded that for their new business to stay operational, their strategy is to leverage on employees devices for work purposes. They stated that, inasmuch as they would have preferred to provide standardized equipment for their employees, they simply do not have the capital for such a project.

4.4.1.3 Business resources as an influence to BYOD adoption

The core of business resources includes a wide range of organisational capabilities and intangible assets of the organisation (Molla & Licker, 2005a). These include funding, existing business relationships, openness to organisational communication and risk-taking behaviour. All SMEs pointed out business resources as fundamental to the adoption of BYOD. In this study, business resources that influence the adoption of BYOD by SMEs are manifested in communication, trust, cost, and adaptability to change.

Communication is core to every business as it is a unified platform for interaction and interconnection within and outside a business. Within the organisation, you need to communicate with employees within and outside the organisation; you need to communicate with trading partners such as suppliers and customers. Because SMEs are knowledgeable in terms of communication, they are able to leverage on BYOD to improve upon existing means of

communication. This explains the introduction of the social media application called WhatsApp in SME 9 (employee):

> *The WhatsApp group was something we started because we grew from four employees to about eleven and we needed some way to communicate with everyone in one space, instead of having to phone each and every person.*

To large organisations, technologies can be bought and implemented to eliminate and reduce risks. This is not the case for SMEs as they are resource constrained. For SMEs in this study, trust is a core value which informs business decisions. This is explained by SME 1 (manager):

> *We are a small organisation; we meet and talk regularly and a lot of our hiring is done on trust, and being reps they have a lot of time to do whatever they want to do and we trust them to be doing work and not anything else. When it comes to reps you have to trust. I have got a rep in Pretoria and I don't even see her all the time, but I speak to her regularly and it's a matter of trust that she is doing what she does and at the end of the month we look at the sales and you get an idea if she is working or not. So trust is a huge factor.*

As a result of the high level of trust that exists amongst the employees and management of SMEs, trust is playing a central role in the adoption of BYOD. It provides SMEs with the much-needed confidence to allow employees use their personal devices for work-related purposes without having to worry too much about security breaches and data theft. Management trusts their employees enough to allow them BYOD, even in the absence of IT security infrastructures. This was indicated by SME 6 (manager):

> *So in terms of security, I would say we are a bit exposed to security issues, but what mitigates it is the level of trust, you know. In terms of security we don't have any measures put in place, so we are just operating on trust.*

BYOD is a cost saving initiative because is shields an organisation from the capital outlay needed by business to provide technological devices to their employees. This was explained by SME 6 (manager):

> *It needs to be adopted by small companies like ours. It is beneficial because again we don't have resources to actually buy these gadgets for everyone, equipment for*

> *everyone, so it becomes a bonus; it becomes a plus if already the individual has his or her own devices already. So it is cost-cutting on our side and operationally we have become effective.*

However, to some SMEs that have, or that are already making moves to institutionalize, BYOD is a cost-intensive initiative. This is due to the fact that they have to come up with the capital outlay needed to securely connect employees' devices to the organisation's resources. SME 3 (manager) explains:

> *In the long term, it would save costs but there is the initial cost. For example, we now have to take a new contract and the value of just that contract is about 92,000 Rands, so you must go weigh that out. We need to go through a service provider like Oxbow and they want you to sign a five-year contract and that is risky considering the uncertainty… It's taken a while to put fibre optics lines in; they promise between to nine months but they want you to sign the contract now.*

Despite the concerns raised by a few SMEs, the majority BYOD is perceived to be a cost saving initiative for their organisations.

The BYOD phenomenon is argued to be a technological disrupter that is changing the adoption of information technology (IT) devices from a top-down approach to a bottom-up approach (Andriole, 2012). This adoption approach comes with change, and, as such, organisations are still coming to terms with understanding how best to deal with BYOD. Change has hindered the uptake technology in organisations; however, in this study, traces of change adaptability are perceived as an influence to the adoption of BYOD by SMEs. For most SMEs, change is second nature; "it is a situation of adapt or die…. as an IT organisation, we really promote BYOD because it is very important, it is here to stay and the earlier your staff can grasp the concept, the better for the establishment*."* (SME 7, employee). SME 6 (manager) elaborates:

> *Yeah, we adapt to change; if you check the dynamics of small and medium enterprises, they are constantly exposed to change, the environment is dynamic, we are not stabilized as compared to large cooperations. The most important thing for SMEs to survive is being able to adapt to change, be it economically, be it in terms of infrastructure, be it technologically. SMEs need to be agile; they need to be flexible in absorbing and also in adapting to change.*

4.4.1.4 Human resources as an influence to BYOD adoption

Human resources suggests the availability of employees that possess the necessary information technology (IT) exposure, know-how and experience needed to deal with BYOD initiatives and projects (Molla & Licker, 2005a). The influence of human resources on the adoption of BYOD by SMEs was reported by a fair number (40%) of respondents, specifically SMEs at the institutionalized level of adoption. They stated that employees are well knowledgeable about their personal devices, and as such are able to adopt BYOD quite easily. This was indicated by SME 3 (manager) and SME 6 (manager):

> *My employees are 10 million times more tech savvy than I am. I am the oldest. I have a very young force and they are clued up.* (SME 3, manager)

> *Yeah, I would say the skills level of employees… it is a contributing factor. It is number one on the list and for us it is less training.* (SME 6, manager)

This, however, was not the case with all SMEs. There were traces of BYOD resistant from the older generation of employees. This generation of employees has greater chances of not being technological savvy (anti-BYOD) because technology was not a norm for their generation. SME 8 (manager) explains:

> *Yes, I think we are more technologically inclined; the only staff that is having problems is much older than the other ones and he doesn't have the experience. He is before computers. So that is definitely a factor – he carries about a little note pad in his pocket and he jots down there, whereas I would just make notes on my phone, using my note app.*

Findings indicate that most SMEs have the required experience and exposure needed for the initial adoption of BYOD. Issues, however, arise when moving from adoption to institutionalization. Some SMEs (such as SME 5 & 8) do not have the required skill set for this transition, as it involves the strategic integration of employees' devices to organisational resources. This was iterated by SME 5 (employee):

> *The tablet in essence is just a small pc. I believe BYOD would involve moving emails from one pc to another and that is very complicated. We do not know how to set up emails on these devices.*

4.4.1.5 Employees Pressure as an influence to BYOD adoption

There were consistent remarks from employees of the need for the organization to allow for the BYOD practice. Most indicated that the devices provided by the organization were not suitable for all occasions as demonstrated by an employee in SME 9:

> *Employees here actually get themselves to use their personal tablets for presentations because it is too heavy to carry about the company laptop when you need to show someone how to use our products. So why not just show them how it works using a device you have anyways. The laptop is an extra baggage that you have to carry about and ensure that it is charged, and that it is working and doesn't crash and all kind of stuffs.*

In addition to the devices being perceived not suitable for all occasions, there was a strong perception that employee's devices were more sophisticated than the organization's devices. This added benefit of employee's devices did place pressure on management to allow for the conduct of BYOD as the manager of SME6 states:

> *For instance, now one of our developers, who develops in IOS and android bought a laptop in the past week .....He bought this latest dell with a core i7 processor. The speed is quick and we can actually run several virtual machines on it, we can have windows and mac OS on it and it is quick……It would definitely be an issue for our organization to purchase such and equipment and because he has it in his own private capacity he uses it for work, it actually brings effectiveness for the company. It is in our best interest to allow BYOD* (SME 6, manager).

4.4.1.6 Lack of formal governance

Governance refers to the strategic, tactical and operational model put in place by an organisation to govern its business activities and BYOD initiatives (Molla & Licker, 2005a). It suggests the set of rules and principles guiding the use of employees' personal mobile devices for work-related purposes. All SMEs, particularly those at the initial adoption and institutionalized level, demonstrate the lack of a formal governance model in their adoption of the BYOD phenomenon. This concern was communicated by SME 8 (manager):

> *Maybe, it is something to look into; I haven't considered it, I haven't even thought about it at all, but now that you are saying it, I think there should be a formalized policy.* (SME 8, manager)

The issue of BYOD governance in SMEs is problematic as no SME had a formal BYOD policy in place, partly due to the lack of know-how as SME6 (manager) explains:

> *I would have to draft it and see how other companies have been doing it. But I doubt I have consulted with many companies, I have guys who are running their own companies and I have not heard, to this point, of a person who is having a BYOD policy.*

SME 10 was the only SME that was close to having some sort of formal governance in place. They had a section within their organisational policy that addressed the allowance employees get for using their laptops for work activities. It states that:

> An allowance or R100.00 per month and R5 per hour of use will be paid to those personnel who are required to use/purchase their own computer for work…

Furthermore, findings indicate that some SMEs are reluctant to come up with a formal BYOD policy. They argue that the enforcement of such a policy takes away the leeway from BYOD, thus discouraging their employees from using their personal devices. This was communicated by SME 7 (manager):

> *You don't need to start telling the employee not to go to certain website; you don't have to tell the employee not to do certain things because they perform company tasks on their tablet. It would be disastrous to start telling them that.*

Although no SME reported having a formal BYOD policy in place, the findings indicate that the majority of SMEs have found a way around this issue. They rely on verbal rules in governing the way employees use their personal mobile devices for work-related purposes. SME 8 (manager) explains:

> *No, it is not a written policy, it just a sort of, you know, we know it; don't download music and videos with the company Internet, because we have a cap… this policy is totally verbal, it is not written. I think you are right, there is no formal, formal policy relating to any electronic device or data device, nothing.*

Even for SMEs that have institutionalized BYOD, the issue of not having a formalized BYOD policy in place is also prevalent. This could be traced to the fact that the concept of having IT-related policies seems foreign to SMEs. Most SMEs responded with "no" when queried about having a general IT policy for their organisation. To the few that had, the presence of the policy was merely to tick off the regulatory checklist in opening a business.

The consequence of not having a formal BYOD policy in place influenced the presence of privacy issues in SMEs. The privacy issues reported involved employees, organisations and customers infringing on employees' privacy. For example, SME 9 (employee) felt that her privacy was being compromised due to the fact that there was not any formal rule stating how after-work communication should be handled. SME 9 (employee) explains:

> *Sometimes, the guys in the group after working hours keep chatting on the group and they post pictures when the rest of us are trying to be at home and have a quiet time and your phone is beeping every now and then. Then I am forced to mute the group.*

4.4.1.7 Technological readiness as an influence to BYOD adoption

Evidence in this study indicates that SMEs, irrespective of their level of adoption, are not technologically ready for the adoption of BYOD. Over 90% of respondents indicated that they lacked the required level of computerisation needed in the area of security and compatibility. Even SMEs that have institutionalized BYOD do so without putting in place the appropriate technological facilities that are needed. SME 6 (manager) explains:

> *So in terms of security, I would not say we are a bit exposed to security… We don't have any measures put in place.*

Results indicate that SMEs are extremely security naive and as such exposed to security risks. Some of these risks include virus attacks and information theft. Most had no preventive measures in place to ensure that they don't get attacked. This was exemplified in the response by the IT manager in SME 8:

> *Besides abuse of Facebook, I can't see any threat. You have people spending a lot of time on their phones when they could be working, or staring at their tablet and looking at Facebook, looking at whatever useless things. That distraction, that's the only way I see a negative side.*

The compatibility of employees' personal devices with organisational infrastructure also emerged as a major point of concern. This issue is peculiar to organisations that have or are planning to institutionalize BYOD. The consequence of incompatibility is that it marginalizes some employees from being able to use BYOD due to the mismatch of platforms. SME 10 (manager) explains:

> *Well, I am no IT expert but I know that with the software that we run, there are certain specs that are required. Our IT manager always informs employees before they are employed. So I do actually think that there are problems with some of these systems. I do not know if it is the Apple devices. Some of them don't link well onto our server, so there are technical issues.*

The lack of funds to finance the procurement of security measures was also reported by SMEs as a major contributing factor to the lack of technological readiness. SME 6 (manager) explains:

> *Well, at the moment we don't have the relevant funding stream. But I believe as time goes by the more clients we get, the more revenue we create then we can actually afford those security measures that can be bought and implemented as a safeguard.*

4.4.2 Environmental factors

In this study, findings indicate that four environmental factors as shown in Figure 10 influence BYOD adoption.

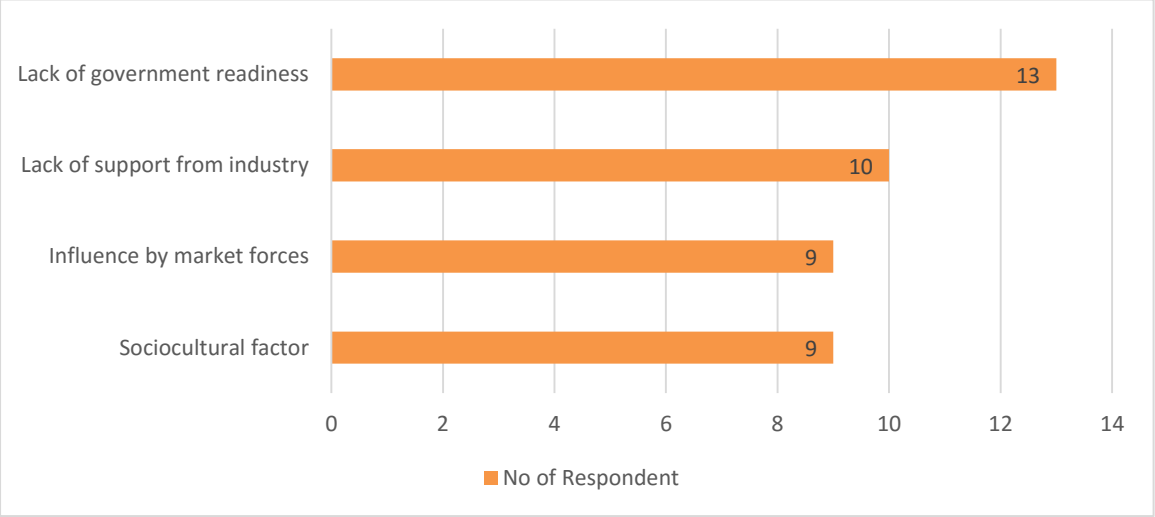


Figure 10: **SMEs' perceptions on environmental factors influencing BYOD adoption**

4.4.2.1 Market force as an influence to BYOD adoption

Influence by market forces involves assessing the influence of organisational business partners such as suppliers and customers on the use of employees' personal devices for businesses. Results show that the majority of SMEs (60%), particularly those at the initial adoption level, indicated that their customers have significantly influenced the adoption of BYOD in their organisations. To SMEs, this makes the adoption of BYOD appealing to them as customers dictate the trend. This was the case of SME 3 (manager):

> *My candidate and my client influenced my decisions to go with BYOD because I have to move with them… If the client is a tech-savvy company then we techno savvy with them, and if they are old fashioned we move with them. Basically, the client's needs come first.*

Customers have taken preference to engage and communicate with business via social media, using their mobile devices. This is changing the traditional means of communication between customers and organisations. This practice, initiated and pushed by customers, is influencing a BYOD pull by SMEs. SME 4 explains (employee):

> *What I have noticed is that a lot of customers send you messages via social media, which is comfortable, and that is helping; when they cannot get you on the phone or on email, they send you messages via social media… Even the manger himself has also got clients contacting him a lot on WhatsApp. So it is definitely helping communications with the clients as well.*

To SMEs, they have to be flexible enough to communicate with their customers in a way that appeases their demands. SME 3 (manager) explains:

> *Also candidates who are not employed don't have money. So they have got their little Blackberry phone and they've got little data. I have to communicate with them in a way that they can afford to communicate with me. So that is also a very important factor.*

Similar remarks were also made by SME 5 (manager) who have had to adopt BYOD because their customers, due to the nature of their businesses, need to be able to contact them instantly *whenever they have concerns.*

Our customers, restaurants mainly, their business is mission critical. When they have a problem, they have a problem; they don't want to wait for tomorrow because they can't serve their customers… I can't delay; this is our business all the time.

4.4.2.2 Lack of support from related industries

Findings indicate that the majority of SMEs (66%), predominantly SMEs at the initial adoption and institutionalized level, recognized the absence of development, service level and cost structure from support-giving institutions such as the telecommunications industry, financial industries, trust enablers and the information technology (IT) industry. This negatively influences the adoption of BYOD in SMEs. Results show that the lack of support is majorly felt in the aspect of quality of service, system applications and service providers.

The majority of SMEs constantly complained about the bad quality of Internet service being provided by internet service providers in South Africa. They say they already pay too much for the terrible service they get and upgrading to a better Internet line would be too expensive for them. They perceive this problem as peculiar to South Africa, because when compared to the developed world, good quality Internet is not as expensive because supporting industries invest so much in the IT industry. SME 4 (manager) explains:

For our accounting system, we need diginet lines which are very expensive. We currently use ADSL and VPN, which is manageable. Telkom are down very often but we carry on doing business, not ideal though… When you compare us with overseas, the prices are terrible and the quality is bad.

Some of the managers of SMEs (for example the manager of SME 4) are foreign nationals from developed nations. They have good memories as regards the quality of Internet service and, as such, are not pleased with the quality of service in South Africa.

A fair amount of SMEs stated that the software applications that are being provided by software companies/suppliers in the industry are mainly desktop-related. They mentioned that most of their core applications are yet to be adapted or available on mobile phones. SME 8 (manager) explains:

Not so much, I think in South Africa, or maybe in our industry or maybe the connections with the suppliers we use, they are not driving BYOD. It is all desktop-

> *related stuff. For instance, we run everything on a server and we access the server through a remote desktop, so it's a virtual pc and those functions are not really available on phones. Yeah, you can sort of do it, but to view a desktop on your phone is not ideal. There is no adoption of Pastel, because we use Pastel. If there was a Pastel app that I could use, sure I would do a quote on my phone 100%, I would do that. But there isn't such a thing so I am not using it.*

This prevents the institutionalization of BYOD in some SMEs due to the non-adaptation of system applications for mobile devices by industry software providers.

As SMEs transition from the level of initial adopters to that of institutionalization, they need to ensure that they have the right infrastructure in place to ensure that they are able to connect employees' devices to the organisation's resources. Putting such a level of infrastructure in place is expensive for most SMEs hence they opt for taking contracts with service providers. This, however, is challenging as few SMEs have complained that the contracts being provided are quite expensive and with unfavourable terms, considering the level of uncertainty as regards the benefits associated with BYOD. SME 3 (manager) explains:

> *In the long term, it would save cost but there is the initial cost. For example, we now have to take a new contract and the value of just that contract is about 92,000 Rands, so you must go weigh that out. We need to go through a service provider like Oxbow and they want to sign a five-year contract and that is risky considering the uncertainty… It's taken a while to put fibre optics lines in; they promise between seven to nine months but they want you to sign the contract now.*

4.4.2.3 Lack of government readiness towards ICT

Results indicate that the majority (87%) of SMEs (no adoption, initial adoption and institutionalized level), perceive a lack in the preparation of the nation state and its various institutions to promote, support, facilitate and regulate BYOD and its various requirements. The analysis of findings shows that three sub-themes are responsible for influencing government readiness in South Africa. These include: (i) the lack of government policies that address BYOD; (ii) the lack of ICT skill and infrastructure development in South Africa; and (iii) the low level of ICT prioritization by government.

SMEs complained about the difficulty encountered in coming up with a BYOD policy for their

organisation as there was no one single government policy that addresses the policy issues relating to BYOD. They mentioned that the closest government policy to BYOD is the Protection of Personal Information Act (POPI); nonetheless, the POPI just caters for privacy-related aspects of BYOD. SME 6 (manager) explains:

> *There is no alignment between BYOD and what government introduces as an act… As an SME, you have to come up with your own policy and also your procedure on how to implement BYOD, and how to regulate it within your particular company… POPI what it says is you are not allowed to share someone's ID number, personal information, without the consent of that person. That's the bottom line of POPI; it is private information that needs to be acknowledged before sharing. But it doesn't drill down to cater for things like BYOD. The POPI act just helps to cater for a small portion of BYOD. There are other aspects to it.*

SMEs complained about the shortage of ICT expertise in South Africa. They perceive that this affects the adoption of BYOD within SMEs due to the limited amount of ICT expertise to manage dependent environmental infrastructure, which BYOD depends on. They say the government is trying to intervene in technological development by putting infrastructure in place; however, they are doing little in trying to develop people that would actually manage and eventually improve these infrastructures. SME 1 (manager) explains:

> *Put the infrastructure there, but then get the qualified people that would come through and manage that infrastructure… I mean I know government are planning on putting the new fibre optics that are super quick but, you know, let's just say that in the next five years that the fibre optics roll out so you've got fibre optics throughout South Africa, but what has government done to bring people through that are going to understand and be able to keep it running? So you need these people at a young age that are being taught now, so that if and when they are problems these guys are going to be ready to solve these problems.*

SMEs pointed out that South Africa is lagging behind to the rest of the world when it comes to technological infrastructure. This is really affecting the uptake of BYOD adoption because BYOD is heavily dependent on the availability technological infrastructure. SME 3 (manager) explains:

> *If you look at America, Iceland, Finland and the other guys, I have realized that they have got the speed and the technology that is government driven. Government invests in the telecommunication industry. It is not happening here. We are sitting with crappy Internet lines that are very expensive.*

A similar statement was made by SME 6 (manager):

> *In South Africa, we are actually left behind in terms of technology… Even in Cape Town, which is the central hub of technology in South Africa, there is a huge shortage of ICT and ICT solutions.*

Findings indicate that SMEs perceive the government as placing little or no priority on the creation of an ICT-savvy environment that encourages the adoption of BYOD. To SMEs, current indicators depict a lack of interest on the part of government. SME 10 (employee) explains:

> *Looking at our current government it is a high hope. For instance, like the budget speech, I can't remember once in the budget speech government mentioning anything about any IT environment going on; none that I can recall.*

Similar statements were also echoed by several SMEs. For example, SME 4 (manger) also agreed:

> *I am sure when it is time for elections and political gains, yes, they would show support; it is not their main priority.*

Despite no or a low level of priority given to ICT by the government, some respondents felt that, in the context of South Africa, the issue of ICT is not the most pressing; hence this could potentially be the cause of the level of attention ICT receives from the government. SME 3 (employee) explains:

> *It is a difficult question because, all over the world, you get free Wi-Fi at the moment except South Africa. It is difficult because, at the moment, there is no such thing as government doing anything about IT; there are so many other problems that they need to be focusing on. They should fix the problem of racism and crime. These are of more priority than providing people with free Wi-Fi.*

4.4.2.4 Socio-cultural factor as an influence to BYOD adoption

The socio-cultural factor refers to the way information, communication and technological tools are being used in the society. This socio-cultural factor was reported as an influence by 60% of SMEs, particularly those at the initial adoption and institutionalized level. Findings indicate that BYOD is finding its way into businesses because it is an innovation concept that is brought about by the way mobile devices are being used in our society. SME 6 (manager) explains:

> *We are living in a tech-forward society; you go to the financial industry, it is fintech they talk – financial technology. I want banking to be easy for me; in the comfort of my home I want to log on through my laptop and make a transaction; in the comfort of my travelling I want to log on through my phone and buy electricity for my house and it should go directly… So we are tech-forward and, having to be a tech-forward society, we need devices that support that mobile movement and it's BYOD, it's devices; those are the gadgets.*

Furthermore, findings indicate that the influence of the societal technological culture is gaining traction due to the social benefits and pressure that arise from being technologically in tune, or otherwise, when it comes to your mobile devices and gadgets. SME 7 (manager) explains:

> *Yes, we do, because at times many people carry about devices and they do not know the worth of these devices; they even buy this device because of prestige, because of pride, because of the trend, because of fashion. Just very few people need the power of that machine.*

A similar statement was also made by SME 9 (employee) to buttress this perception:

> *So yes, there is some type of pressure to always want to keep up with the big boys… Mr P our sales guy is sitting with three devices; he has got the Samsung phone and a note and a tablet.*

4.5 Discussion

4.5.1 PERM

Results from this study are generalized based on the empirical data collected from respondents of SME samples that participated in this research study. Findings reveal that there are SMEs present at all three levels of BYOD adoption. These includes the no-adoption level, which

consisted of SMEs whose employees are not allowed to use their personal mobile devices for work related purposes; the initial adoption level, which consisted of SMEs that are allowed to use their personal mobile devices mainly for communication purposes only; and the institutionalized level, which consisted of SMEs that are allowed to use their devices to access organisational files and resources. At all levels, SMEs agreed on being aware of the benefits that the organisation stands to gain from the adoption of BYOD.

Organisational factors identified to exert a positive influence on adoption of BYOD include the availability of business resources, specifically the availability of trust and communication, and the availability of human resources that are adept in the use of their mobile devices for work activities. The availability of business resources was perceived to be the strongest influencer for adoption. All SMEs indicated that business resources such as communication, trust, cost saving and the ability to adapt to change were the reasons for adoption despite the overwhelming challenges BYOD presents. This is not surprising, as SMEs are known to be constrained by tangible assets and resources (Olawale & Garwe, 2010). SMEs are, however, mitigating some of these constraints by capitalizing on their intangible assets to fully enjoy the benefits and at the same time compensate for the shortfalls associated with BYOD. For example, a well-known challenge associated with the adoption of BYOD is technological readiness. Findings indicate that SMEs (for example SME 6 and SME 8) lack proper information technology (IT) equipment and technical know-how to ensure the safety of organisational files and resources. This, however, did not prevent them from adopting and institutionalizing BYOD as they relied heavily on trusting employees in mitigating the challenges presented by the lack of technological readiness. Several studies in literature have reported high levels of trust among management and employees of SMEs (Kinnie et al., 1999; Erdem & Atsan, 2015). Seigneur et al. (2013) in their survey of trust and risk metric for BYOD mobile workers concluded that trust would be useful to depend on since it is very beneficial when there is uncertainty as a result of interactions which could be termed as risky.

Employees' pressure towards the use of personal devices was perceived as an opportunity for cost saving and improved productivity (SME7), although it added pressure for the organization to develop BYOD policy. Employees indicated the need for the organization to create a culture of BYOD practice. Given the fact most management did not want to formally legitimise BYOD practice; they perceived employee's efforts of adopting BYOD as putting pressure on the organization although they do acknowledge the benefits attached to BYOD use. Similar findings

are reported by Hensema (2013). Human resources was also regarded as a positive. Although, its availability was not generally perceived as a strong influence by respondents, it however did present itself as an opportunity, especially for SMEs that have institutionalized BYOD, because at this stage, organisations need employees that are technically well knowledgeable on BYOD as iterated by SME 6 (manager): "*Yeah, I would say the skills level…it is a contributing factor, it is number one on the list and because for us it is less training. That is why our recruitment process is tightened up; we want guys who are actually operational*..."

Environmental factors that are identified as opportunities include market forces and the socio-cultural factor. Results indicate that most SMEs perceive the influence of market forces, particularly customers and clients, to be key in the adoption of BYOD. For SMEs, the means and mode of communicating with customers and client is shifting from the traditional use of fax, emails and telephone calls to the use of social media and instant messaging. For example most customers and clients prefer to communicate via WhatsApp on their various mobile devices (SME 4). The push for such a level of engagement by customers and clients is influencing the pull for the adoption of BYOD in SMEs. Gareeb and Naicker (2015) also report on how customers are exerting higher influence on SMEs. Another environmental factor that presents an opportunity for the adoption of BYOD in SMEs emanates from socio-cultural influence. For example, most SMEs indicate how social media and instant messaging was strongly influenced by their family and peers in society. To other employees, such as in SME (6 & 9), BYOD use was associated with societal pride and prestige. This was reported by SME 9 (employee) *"...in our industry where it is about IT savviness, you need to be jacked up, you need to be very well informed and current with your apps and devices*."

Organisational factors perceived to be challenges to the adoption of BYOD include; awareness, low management support, lack of formal governance and technological readiness. There was a general perception amongst employers that employees are masters of their mobile devices (for example, SME 3, 4, 8, 10), and are more familiar with it and as a consequence require no training on how to use their devices for work-related purposes. This seems to be sufficient for organisations that are initial adopters; however, for SMEs at the institutionalization stage this understanding was problematic because although employees might be functional masters as regards BYOD, the same cannot be said of their technical capabilities as they lack knowledgeability/the right technical know-how for such a level of complexity. Harris et al. (2012) has reported on how SMEs often lack the required IT resources and capabilities needed

for BYOD, and Alnoor and Arif (2011) point to the need for specialized training and expertise given the complexity associated with BYOD. From findings, it is evident that SMEs are not technologically ready (for example, SME6, 7, & 9). They lack the necessary technological infrastructure and experience needed to tackle security risks and issues associated with BYOD (Madzima et al., 2014).

Low management support and lack of formal governance were also perceived to be hindrances to BYOD adoption. With the former, employees cited the following issues: lack of subsidy for the purchase of their personal devices (SME 5, employee); lack of reimbursement for the use of personal data and airtime (SME 4, employee); and the lack of a policy to protect employees from theft or damages (SME 9, employee). The perception from employees was one of neglect as they feel they are being taken advantage of by their employers. These findings are consistent with Twinomurinzi and Mawela (2014) who indicated that employers in South Africa are turning a blind eye towards providing support for BYOD; they (employers) feel entitled to their employees' personal devices for BYOD. Everything about the use of employees' personal devices for work activities was mainly verbal with no formal organisational policy in place. There was the instance of an employee (SME 10, employee) who was in a dilemma because the organisation had legalized the use of employees' personal laptops as part of the employee contract, without necessarily putting a BYOD policy in place. "*We are not encouraged; it is a necessity for us to have our own laptop because no laptop no job…there is no organisational policy in place for BYOD as I pay for my insurance; if I remember correctly, we only have a guideline in our office rules*" (SME 10, employee).

SME managements argued that confining BYOD to a formal policy takes away the flexibility and advantages BYOD provide. There was thus a lack of consensus on the issue of formal governance as employees and employers share different views. Employees were of the view that a formal policy has to be in place to protect the use of their devices, while employers say putting a formal policy in place introduces a bottleneck which affects the morale of employees and eventually discourages them from bringing their devices – tools that SMEs heavily rely on for their day-to-day operations. Another contributing factor to this challenge was the reality that SMEs do not have the experience in coming up with a policy for BYOD. SME 6 (manager) stated "I *would ….see how other companies have been doing it. But I doubt I have consulted with many companies, I have guys who are running their own companies and I have not heard, to this point, of a person who is having a BYOD policy."* This was also reported by Hensema (2013) who

indicated that SMEs rarely have a policy or technical measures in place to deal with BYOD because of their size and the general lack of policy in SMEs. Drafting an organisational IT policy is difficult enough; the added complexity of the IT devices belonging to employees even makes it overwhelmingly challenging.

Environmental factors considered as hindrances to the adoption of BYOD include: lack of support from industry and the lack of government readiness. For the successful adoption and institutionalization of BYOD in businesses, the presence of support from industries such as but not limited to telecommunication, finance and software is important. In this study, the majority of SMEs reported the need for a reliable and affordable internet service provider (ISP). There was general awareness that ISPs service quality were poor and costly as SME 4 manager states "*Our devices, televisions and computers can all use a lot more bandwidth; however, the prices are way too expensive and the quality is not as good… we need a competition for telecom; when you have competition you get better service. Telecom is the back bone for everybody else; everybody goes through them, MWEB, Vodacom*". This was confirmed by Maharajh (2015) and Fatsani et al. (2015). They both reported that the dominance and monopoly of the internet by Telkom in South Africa fundamentally crippled the emergence of Internet service providers (ISPs). Other areas of concern to SMEs included the lack of core organisational software (for example, accounting packages) for mobile phones by the software providers (SME 8) and the provision of unfavourable contracts by infrastructure service providers (SME 7).

The final challenge highlighted was government support. Results from the study showed government support to have a negative influence towards the adoption of BYOD by South African SMEs because of: (i) the lack of government policy to address BYOD (SME 8), (ii) the lack of ICT skill and infrastructure development in South Africa (SME 3), and (iii) the low level of ICT prioritisation by government (SME 10). This was confirmed in a similar study conducted by Gareeb and Naicker (2015). Findings from their study indicates government support to have a negative influence towards the adoption of broadband internet technologies by South African SMEs due to lack of government readiness.

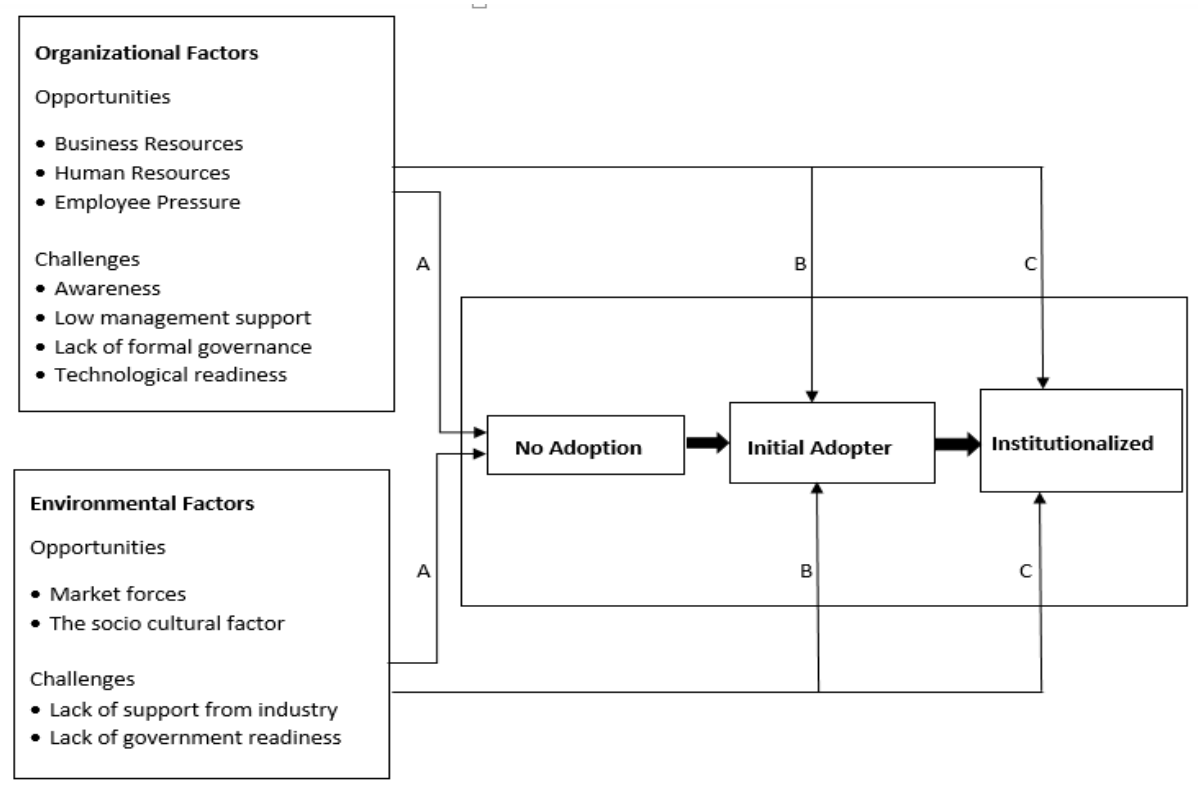


Figure 11: **Factors influencing the adoption of BYOD**

In summary, the findings, as shown in Figure 11, indicate that the combination of both the organisational and environmental factors, form the contextual basis which influences SMEs in South Africa towards adopting and institutionalizing BYOD in their organisations. A, B and C indicates how the identified contextual factors interacts with the different BYOD adoption maturity levels.

4.5.2 Structurational Analysis

4.5.2.1 Structures of signification

According to structuration theory, structure of signification refer to the rules that constitute meaning, assumptions and sense-making practices that inform shared understanding which grows into being institutionalized over time (Giddens, 1982). They are structures of meaning which human agents enact by relying on their interpretive scheme, via communication, to assess and rationalize their actions.

One of the structure that emanated from the study was that of "No training", which employers enacted by drawing on the understanding that employees generally perceive their personal

devices as easier to use and more intuitive when compared to the devices usually provided by the organisation. As a result, SMEs that adopted BYOD already have a preconceived understanding of BYOD to be plug and play where employees can just bring in their devices and they are ready to use for work purposes. This might be true for the initial level of adoption. However, this understanding was challenged by the technological unpreparedness of SMEs which then necessitates the re-evaluation of "No training" structure of SMEs at the institutionalized stage. At this level of adoption, employees now more than ever need to be conscious of the security issues and risk involved as they are now prospective targets of virus attacks, security and data breaches.

Another structure that featured strongly was that of "No formal governance" of BYOD. This structure shaped by SME management discouraged any form of formal BYOD governance. SMEs perceived informal verbal governance as ideal because it encouraged flexibility which supports the concept of BYOD. SMEs' management perceived that the introduction of formal policies would eventually discourage employees from using their personal devices because of the set rules and procedures involved. However, some employees perceived differently as they felt marginalized by management's decision. An employee from SME 9 explains: "*they should bring in policy firstly and then also add it to your contract because it involves your personal device or the company must then supply me with a company phone that just for me"*. The rationale behind this understanding could largely be attributed to the reality that SMEs are inexperienced when it comes to drafting and enforcing policies to govern the organisation. According to Mahmood (2008), SMEs traditionally encounter the problem of governance due to the general lack of understanding among these SMEs vis-à-vis the importance of corporate governance. This was evident in this study as most SMEs responded with "no" (i.e. SME1, SME5, and SME8) when asked about having an information technology (IT) organisational policy, not to talk of a separate one for BYOD. The lack of formal governance enabled the structures of signification and by supporting the use of verbal governance, SMEs management unconsciously expressed and reinforced its understanding of BYOD to its organisation; drawing on existing and creating new interpretive schema that associates BYOD with the lack of formal governance. This factor that was shaped by SMEs agent is reshaping the way BYOD is adopted in SMEs.

Minimal technological readiness was another structure of signification enacted by SMEs as they drew on the understanding that BYOD adoption did not require costly infrastructure investment, and that business resources advantage such as trust, were able to mitigate some of the challenges

(for example security) associated with BYOD. This was explained by SME6 (manager): "*So in terms of security, I would say we are a bit exposed to security issues but what mitigates it is the level of trust you know. In terms of security we don't have any measures put in place, so we are just operating on trust…"* This was more prevalent at the level of initial adoption where the major requirement involved employees just making their personal devices predominantly available for communication purposes within and outside the organisation. At this stage, employees' devices perform work activities without being integrated with existing networked ICT resources. Hence, the non-dependency on technological readiness. This meaning associated with BYOD influenced its adoption as most SMEs are resource constrained. According to Harris et al (2012), SMEs lack of sophisticated IT infrastructure created a positive influence for the adoption of BYOD because they are not being constrained by incompatible legacy IT systems.

However, this understanding was challenged at the level of institutionalization. This is due to the integration of employees' devices to organisational files and resources hence, the need for appropriate IT infrastructure. Despite the revaluation of this perception at level of institutionalization, findings indicated that the majority of SMEs still institutionalized BYOD drawing on the existing communicated understanding associated with the initial level of adoption. Madzima et al (2014) issued a warning to such SMEs, stating that the institutionalization of BYOD without adequate technological readiness would only compound existing security issues in SMEs. Despite the fact that this exposes SMEs to security risks, the understanding that BYOD is not constrained by security technological readiness became institutionalized to form a schema that SMEs used to understand BYOD.

4.5.2.2 Structures of domination

The structures of domination are created and dismantled as SMEs' agents exploit resources available at their reach. Findings present the following as resources for BYOD: management support and business resources. Although all SMEs reported low level of support provided by management towards the use of their personal devices for work activities, they still indicated that the organisation created an atmosphere of flexibility or compulsion which encourages or mandates employees to BYOD. Management support being provided by few SMEs includes monthly data plan subscription (SME 8), organisational Wi-Fi (SME 6), airtime (SME 8) and subsidized insurance (SME 10). Despite the general level of dissatisfaction that was expressed by employees, findings indicate that management did show some level of interest in providing

support toward the acceptance of BYOD in their organisation. SMEs that provided a monthly data plan, organisational Wi-Fi, airtime and subsidized insurance drew, on the financial resources at their disposal. Financial support is an allocative resource, and SMEs have been able to exploit its availability to influence their employees in adopting BYOD. Other SMEs have had to depend on authoritative resources to create an atmosphere where employees are obliged to BYOD. This was the case of SME 10 where management formalized a rule in the employment contract which mandated employees to provide their personal laptops for work activities. Authority dominates employees' influence through organisational hierarchy (Klesel et al., 2015). SME owners and managers have large amounts of authoritative resources which they use in influencing the adoption of BYOD. In both cases (allocative and authoritative), SMEs' management have been able to utilize power in their interaction by contextually exploiting the resource at their disposal to effect change.

Business resources as structures of domination allowed the transition of SMEs from the level of initial adoption to the institutionalization of BYOD. The availability of trust has provided SMEs with the confidence to allow employees to use their devices to access organisational resources without the fear of security breaches and data theft. Trust is very beneficial when there is uncertainty as a result of interactions which could be termed as risky (Seigneur et al., 2013). Business resources have thus provided SMEs with the capacity to exploit the opportunities and challenges associated with BYOD to their advantage, thereby shaping and reshaping structures of domination. Employees' pressure as structures of domination allowed employees to push for the adoption of BYOD in SMEs. This was as a result of employees' owning more sophisticated devices when compared to those provided by organization. By exploiting these devices to their advantage, employees were empowered to pressurize management in allowing BYOD practices.

4.5.2.3 Structures of legitimation

The use of informal governance, particularly verbal governance, was perceived as a norm among SMEs both at the initial and institutionalized level of adoption. Most SMEs relied on informal governance because: (i) SMEs were generally not knowledgeable about creating policies (SME 6, manager); (ii) and SMEs felt that by formalizing BYOD, they take away the flexibility that comes with the phenomenon which would eventually discourage employees from BYOD (SME 7, manager). As a result of these challenges, SMEs over time have had to come up with their own style of governance and in so doing created "informal governance" as structures of legitimation.

The use of verbal rules in governing BYOD, therefore, became a normality which SMEs routinized and established as a model that guides the use of employees' devices for work activities (Rai et al., 2009).

SMEs legitimised their structures by understanding that there was: (i) no government policy that addressed BYOD (SME8); (ii) minimal industry support (SME 4); and the presences of social pressure which enabled BYOD use. This was pointed out by an employee from SME 9 who highlighted that employees needed to have the latest devices if they were to be taken seriously by customers. She explained, *"Yes, especially in our industry where it is about IT savviness, where if you are going to go to people to sell IT stuff you need to be jacked up, you need to be very well informed and current with your apps and devices."*

Mobile devices are being purchased because of the prestige and social status associated with the device, and not necessarily because of the functionality of the device. Hence, employees who are also members of society, are being pressurized into BYOD as they also want in on the reward at an organisational level. They bring in their devices, not necessarily because they require them for work activities, but because of their social status within and outside the organisation. The socio-cultural factor, therefore, became normality which an SME interprets and verbalizes in determining whether its owner, manager or employees are sophisticated. The socio-cultural factor enabled the adoption of BYOD in SMEs as employees avoided being looked down upon.

4.5.2.4 Unintended consequences

Social practices that surround the use of information technology result in intended and unintended consequences, based on conditions that are anticipated and unanticipated (Orlikowski & Robey, 1991). Structuration consists of both intended and unintended consequences (Giddens, 1984). Unintended consequences are unforeseen outcomes which would have not taken place if the actor had acted differently. Information technology, in this case BYOD, is not always used or implemented as intended by its adopters.

Findings indicated that the unintended consequences of the adoption and institutionalization of BYOD were as a result of instantiated rules and resources in SMEs. These unintended

consequences include: (i) employees' dislike due to the exploitation of their mobile devices by organisations and (ii) the increasing influence of social media for business communication. SMEs rely on employees' devices majorly for communication and access to organisational files and resources. Due to the benefits of BYOD in the workforce, employees are encouraged to BYOD. However, due to the actions of SMEs managers and owners to the management of BYOD, some employees had resentment concerning the use of their devices for organisational purposes. They indicated that there are no policies in place to support and acknowledge the use of their mobile devices for work activities. They want management to provide support for their devices by (i) formalizing their use and (ii) providing better compensation. Similar findings were reported by Kabanda and Brown (2014) where employees from Tanzanian SMEs also felt taken advantage of, as their personal devices were being utilized for work purposes without their explicit consent. This suggests an unintended consequence that would not have taken place if the management of SMEs had acted differently by putting in place formal rules, procedures and policies to govern the use of BYOD in organisations. Management however argued that the introduction of formal policies would eventually take away the flexibility associated with BYOD, eventually discouraging employees away from BYOD. Employees' dislike of the organisational use of their devices was not the planned outcome management had intended, as they adopted, institutionalized and prevented the formalization of BYOD.

Another unintended outcome that resulted from the instantiation of rules and resources in SMEs was the growing influence of social media in business communication in SMEs. Findings indicate the decline in the use of traditional means of communication such as faxes, emails and telephones for communication within and outside the organisation. With the adoption of BYOD, organisations have found that they use more instant messaging, particularly the WhatsApp messenger to communicate with their employees, and customers as well. The introduction of WhatsApp as a tool of business communication has amalgamated the benefits of phone calls and emails. From emails, it takes the cost saving feature while from phone calls, it takes the instantaneous feature. Hence, business communications are now instant and at the same time cost saving. This unforeseen benefit of social media is adding to the attractiveness of BYOD in SMEs. As SMEs adopted the BYOD, they did not anticipate BYOD changing the communication practice. From time to time, these unintended consequences interact with SME practices, causing a feedback loop that influences social reproduction and implicates transformation (Giddens, 1982).

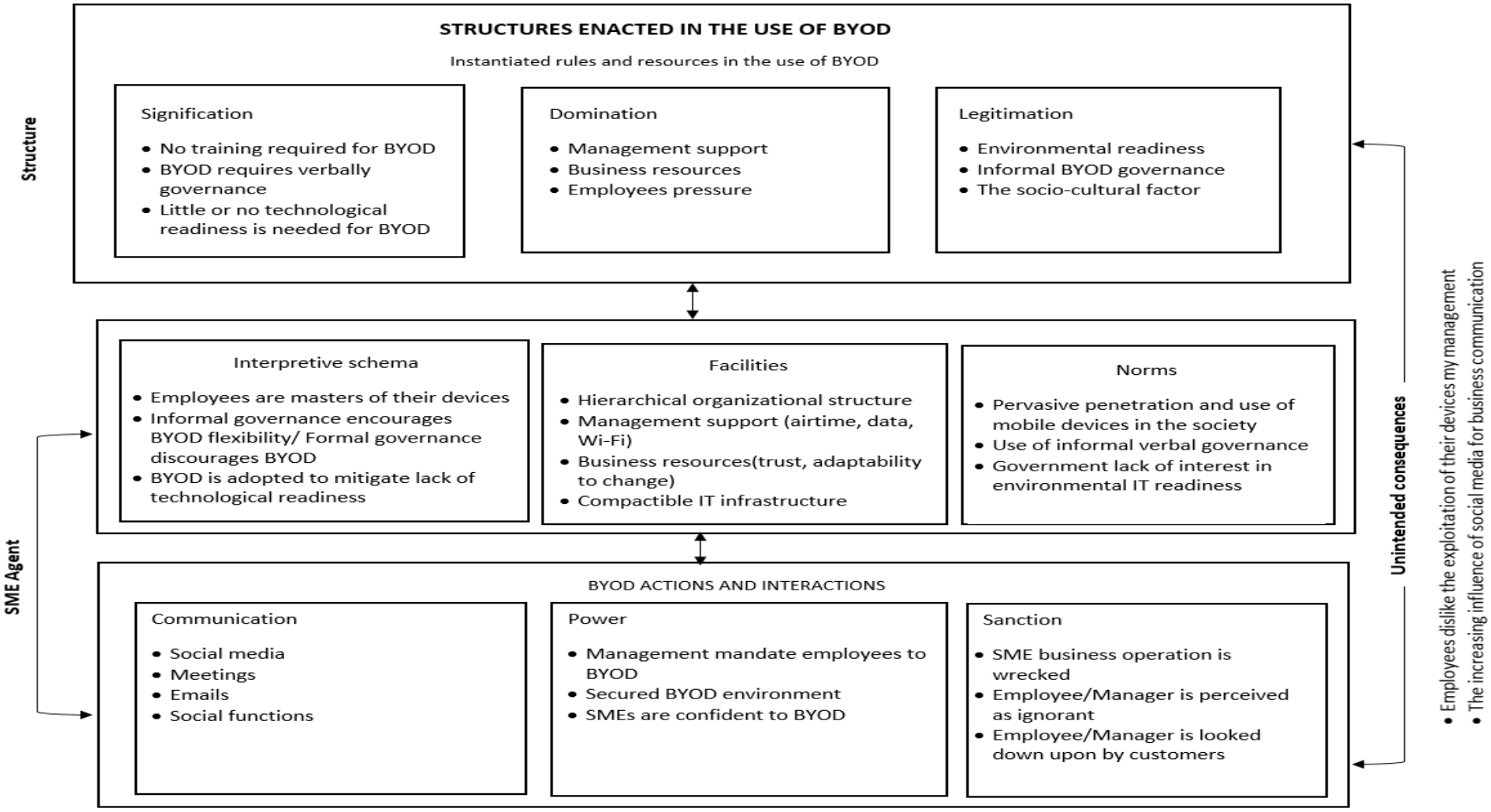


Figure 12: **Structures enacted in the use of BYOD**

Figure 12 provides a summary of the structures enacted (signification, domination and legitimation); as well as the unintended consequences that arose with regards to the use of BYOD in South African SMEs.

4.6 Summary

The aim of this chapter was to investigate the contextual factors that influence the adoption of BYOD with the purpose of understanding how these contextual factors shape and reshape SMEs actions.

Findings reveal that there are SMEs present at all three levels ("no adoption", "initial adoption" and "institutionalization") of BYOD adoption, with most SMEs at the initial and institutionalized levels of adoption. Results indicate organisational and environmental factors to be responsible for BYOD in South African SMEs. That is, for BYOD to be adopted and institutionalized in an organisation, there needs to be organisational readiness in terms of awareness, management support, business resources, human resources, employees' pressure, formal governance, and technological readiness. Specifically, business resources, management support and technological readiness are identified to be of outmost importance to the success of BYOD. Environment factors include: lack of government readiness, lack of support from industry, influence by market forces and the socio-cultural factor.

Using structuration theory, this study provides understanding on the guiding structures within which BYOD meanings are formed, as well as the process of sense making which results in various behaviours and understanding. For instance, it provides understanding as to why employers prefer to use verbal rules in governing the use of employees' devices for work purposes. Although rarely reported in literature, analysis in this chapter uncovered that SME managers perceive the introduction of a formal BYOD policy as too restrictive for an innovation like BYOD. They believe that for BYOD to survive, the organisation has to be flexible.

Other significant findings include how the availability of business resources such as trust and adaptability are structures of domination which provides SMEs confidence in allowing their employees to use BYOD despite the challenges posed by the technology. The socio-cultural factor was also reported as structures of legitimation which pressurized SMEs agents to BYOD as they portray sophistication and avoid being looked down upon.

Finally, the unintended consequence of increase in the use of social media, more particular the use of WhatsApp as a tool for business communication within an organisation, was also a major highlight. By adopting and institutionalizing BYOD, SME management did not foresee or anticipate BYOD relegating business communication tools like emails and phone calls within the organisation. Due to the widespread use of its application, there is strong optimism amongst respondents as regards the legalization of social media applications like the WhatsApp as a tool for communication in business.

CHAPTER 5: CONCLUSION

5.1 Introduction

The aim of this study, as presented in Chapter 1, is to investigate BYOD adoption in South African SMEs, particularly how BYOD contextual factors shape and reshape SMEs' actions. Related works on BYOD were presented in chapter 2. The research methodology was covered in chapter 3. The research findings is presented and discussed in chapter 4. The present chapter summarizes findings obtained from the study with the purpose of reviewing the extent to which the research questions and goal has been addressed.

The rest of the chapter is organized as follows: section 5.2 presents the summary of answers to the research questions, Section 5.3 presents the contribution and recommendation of the study, Section 5.4 concludes by stating the limitations of the study and outlining future work that could be carried out on BYOD.

5.2 Summary of answers to the research questions

5.2.1 What contextual factors influence adoption of BYOD by SMEs?

Findings indicate that the contextual factors influencing BYOD adoption and institutionalization by SMEs are organisational and environmental. That is, for BYOD to become part of an SME there needs to be organisational and environmental readiness. Organisational factors consist of awareness, low management support, business resources, human resources, employees' pressure, lack of formal governance and technological readiness. These factors where further discussed in terms of opportunities and challenges. As opportunities, this study identified organisational factors of business resources, human resources and employees' pressure. As challenges, the study identified awareness, low management support, lack of formal governance and technological readiness. Environmental factors that contextually influenced the adoption of BYOD includes; market forces, the socio-cultural factor, lack of industry support and lack of government readiness. While the socio-cultural factor and market forces were perceived as creating opportunities; lack of support from industry and lack of government readiness were challenges associated with the adoption of BYOD.

By bringing this contextual factors to focus, the study has assisted in highlighting key areas (opportunities and challenges) that SMEs, practitioners and government need to concentrate on for the effective adoption and institutionalization of BYOD in SMEs.

5.2.2 How are these contextual factors shaping and consequently reshaping SMEs actions?

This study adopted structuration theory in understanding how contextual influences shape and reshape SMEs actions. Following the structurational analysis, the study identifies structures responsible for enabling and constraining BYOD. These structures were enacted as a result of the interplay between BYOD interactions with contextual (organisational and environmental) modalities of interpretive schema, facilities and norms; consequently leading to the shaping and reshaping of BYOD contextual influences. The structures include; structures of signification, structures of domination and structures of legitimation.

As structures of signification, the study reported the presence of "No training", "No formal governance" and "technological readiness" as structures that informs South African SMEs shared understanding with regards to BYOD. For example, findings showed how the general level of awareness at the no adoption and initial adoption level is such that employees are well knowledgeable when it comes to BYOD. This shared understanding which is communicated via meetings, emails and social media influenced the view SME management have towards the provision of training within the organisation. However, this understanding was challenged at the level of institutionalization as employees at this stage need to be conscious of the security issues and risk involved as they are now potential targets of virus attacks, security and data breaches.

As structures of domination, the study reports the presence of "management support", "business resources" and "employees pressure" as structures which South African SMEs exploit as regards BYOD. They suggest both material and non-material resources that SME agents related to and drew on, and thus became the basis for exerting power on social actions in the adoption and institutionalization of BYOD. The more an SME becomes knowledgeable about the amount of resources at its disposal, the more capacity it has acquire and exercise power (Kort & Gharbi, 2011; Hardcastle, Usher, Holmes, 2005). By exercising power in its interaction, SMEs give rise to the shaping and reshaping of structures of domination

Finally, as structures of legitimation, the study reported the presence of "informal governance", "environmental readiness" and "the socio-cultural factor" as structures that have being legitimized as per BYOD in South African SMEs. Taking the socio-cultural factor as an example, the way of life in Cape Town creates an atmosphere that encourages BYOD in SMEs. People want to integrate their mobile devices to all aspect of live from entertainment, to utility to finance and now the organisation. This standard which is created by the society is being fuelled by the reward and sanction system associated with mobile devices. Pride, prestige and social status are some of the rewards the society associates with BYOD while the possibility of being looked down upon and labelled unimportant are sanctions employees face when they do not BYOD. As members of the society, SME employers and employees also contribute to the creation of this mobile device socio-cultural norm. This norm in turn pressurizes SMEs employers and employees to BYOD as they enjoy the rewards and avoid the sanctions at an organisational level. The more SMEs became aware of these norms and reaffirm them to prevent sanctions, the more they contributed to the shaping and reshaping of structures of legitimation. Studies that have adopted the structuration theory have often been criticized as limiting themselves to the internal structural property of the organisation (Jones & Karsten, 2008), this study however shows how the engagement of organisations within a plural and overlapping social system presents a better account of BYOD.

To the knowledge of the researcher, this is the first time a study in the context of developing countries is extending the structurational view to the BYOD phenomenon. The implication of this contribution is that the study as assisted to provide a structurational account in which BYOD is interpreted as "an ensemble of equipment, applications, and techniques that carry social meanings" as to being "a tool with identifiable benefits, costs, and skill requirements" (Kling & Scacchi, 1982, p. 7). These findings have provided understanding into the complex macro and micro level perspectives that leads to BYOD in a social system.

5.3 Contribution and recommendation

By conducting an empirical study to understand the adoption of the BYOD phenomenon in SMEs, this research has contributed to literature- particularly the field of organisational and environmental readiness. It has provided contextual organisational and environmental factors that SMEs need to be aware of before adopting and institutionalizing BYOD. The study identified the socio-cultural factor and employees pressure as an extension to the PERM factors.

Findings from the study have assisted to provide a distinct categorization of BYOD adoption levels. To the knowledge of the researcher, such categorization has not been reported in literature. This contributes to the ongoing debate on BYOD definition.

This research has provided theoretical contribution by using multiple theoretical (Perceived EReadiness Model and Structuration theory) perspective (triangulation) in underpinning this study. This increases the credibility of results and overcomes the weakness and inherent biases from single-theory studies. As suggested by Krefting (1991), by juxtaposing multiple theoretical perspectives, the distortion from a single theoretical approach is minimized thereby, improving the quality of research.

Findings from this research has also shown the extent of applicability of the theories as applied to SMEs in the South African context. The PERM proved to be highly applicable as it revealed original themes that tied back to the unique characteristics of SMEs in South Africa. The Structuration theory nonetheless revealed inconsistencies between some of the structured findings that structuration often proposes. This is a findings in itself about the inapplicability of structuration theory in SME settings. It can be argued that the dynamic nature of SMEs does not fit into the linear structure that structuration theory suggests.

The focus of this research is very topical and as such, it provides practical contributions. Findings from these studies would assist SME managers and practitioners make informed decisions when it comes to the adoption and use of BYOD. Findings indicate that SMEs are generally not aware of the security implications associated with the BYOD phenomenon. SMEs are fragile and their business may not be able to withstand the consequence of a security attack. Since South African SMEs are major contributors to the economy of the country (The Banking Association South Africa, 2015), it is imperative for government to assist from time to time in educating and informing SMEs on the pros, cons and security implications of adopting new IT phenomenon, such as BYOD. Furthermore, irrespective of the level of adoption, SMEs management also need to educate employees on the various security concerns associated with the BYOD.

The lack of government readiness towards ICT was a major highlight that was reported in the study. Findings reveal a tacit over-reliance on government by SMEs. In the African context, this is a unique phenomenon that is probably unique to South Africa, compared with Kabanda and Brown's (2014) findings from Tanzania where government support is not expected. Research

has pointed out how the introduction of ICT in developing countries, particularly mobile devices have assisted in the improvement of capabilities (Smith, Spence & Rashid, 2011), reduction of poverty and improvement of livelihood (Sife, Kiondo & Lyimo-Macha, 2010). Against this background, it is crucial that the South African government puts in more effort in creating an environment that is conducive for ICT adoption. Government can achieve this by;

- Providing telecommunication services like broadband and internet at an affordable rate.
- Putting educational infrastructures in place that promotes the availability of IT human resources
- Setting up agencies that can assist in training and educating SMEs on how to develop and implement IT policies

5.4 Limitation of the study and future work

The major limitation to this study is the lack of balance in the spread of the various SMEs in different sector. Due to limited studies on BYOD, specifically in the context of developing countries and at the SME level, the study argued for purposive sampling to select specific type of samples that could provide useful information to aid the purpose of the research. The majority of the SMEs that participated in study were from the ICT sector.

Empirical research on the BYOD phenomenon is rare, particularly in the context of SMEs in developing countries. Given that Cape Town has positions itself as the ICT and innovation hub in South Arica, it represented a good starting point on which investigation on the BYOD phenomenon in South Africa can commence. However, taking into consideration the environmental differences between urban and rural areas in South Africa, findings might not be generalizable to the rural areas in the country.The study provides a foundation on which future studies on BYOD can be explored. For a more balanced and representative data on BYOD adoption in South African SMEs, the researcher recommends future studies to sample more SMEs from different sectors and different part of South Africa.

Findings reveal the dilemma SMEs encounter in creating policies which are perceived to be a “real headache” and mitigating privacy issues with BYOD policies. It would be interesting to understand the creative means that SME’s handle such conflicts. Future studies can investigate possible solutions that balance the dynamic nature of SMEs against the use of a BYOD strategy.

Due to the time constraint of a master's study, the study adopted a cross sectional research time frame- that is, data collection was done at a single point of time. Further studies can consider adopting a longitudinal research timeline. Since data is collected over a longer period of time, this approach could assist in giving a more in-depth understanding on how contextual factors influencing BYOD typically shape and how this shaping is produced and reproduced.

REFERENCES

Abor, J., & Quartey, P. (2010). Issues in SME development in Ghana and South Africa. *International Research Journal of Finance and Economics,* 39(1), 218-228.

Ackerman, A. S., & Krupp, M. L. (2012). Five components to consider for BYOT/BYOD. *In Proceedings of the International Association for Development of the Information Society conference, 35-41.* Retrieved *February* 3, 2015 from http://files.eric.ed.gov/fulltext/ED542652.pdf.

Akin-Adetoro A., & Kabanda S. (2015). Contextualizing BYOD in SMEs in developing countries. In Proceedings of the 2015 *Annual Research Conference on South African Institute of Computer Scientists and Information Technologists*, Stellenbosch, South Africa, September 28-30.

AlNoor, M. & Arif, B.R. (2011). Adoption of B2B e-commerce by the SMEs in Bangladesh. Innovative Systems Design and Engineering, 2, (6), 48-59.

Alvesson,M.,& Skoldberg, K.(1994).Taking the linguistic turn in organisational research. *Journal of Applied Behavioral Science*, 36(2), 136-58.

Andriole, S. J. (2012). Managing technology in a 2.0 world. *IT Professional Magazine*, *14*(1), 50-57.

Apulu, I., & Latham, A. (2011). Drivers for information and communication technology adoption: A case study of Nigerian small and medium sized enterprises. *International Journal of Business and Management, 6*(5), 51-60.

Armando, A., Costa, G., Merlo, A., & Verderame, L. (2014). Enabling byod through secure meta-market. *In Proceedings of the 2014 ACM Conference on Security and Privacy in Wireless & Mobile Networks,* WiSec 2014, 219–230, Oxford, UK. July 23-25

Armando, A., Costa, G., Merlo, A., & Verderame, L. (2015). Formal modeling and automatic enforcement of bring your own device policies. *International Journal of Information Security, 14*(2), 123-140.

Ashrafi, R., & Murtaza, M. (2008). Use and impact of ICT on SMEs in Oman. *The Electronic Journal of Information Systems Evaluation, 11*(3), 125-138.

Astani, M., Ready, K., & Tessema, M. (2013). BYOD issues and strategies in organisations. *Issues in Information Systems, 14*(2), 195-201.

Avgerou, C. (2001). The significance of context in information systems and organisational change. *Information Systems Journal, 11*(1), 43-63.

Awa, H. O., Ojiabo, O. U., & Emecheta, B. C. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. *Journal of Science & Technology Policy Management*, *6*(1), 76-94

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist,* 44 (9), 1175-1184.

Baskerville, R. (2011). Design Theorizing Individual Information Systems. *In proceedings of the 15th Pacific Asia conference on Information Systems*. Brisbane, Australia, July 7-11.

Bell, J. (2010). *Doing Your Research Project* (5th ed.). New York: McGraw-Hill.

Bell, M. (2013). Considerations when implementing a BYOD strategy. *IS Practices for SME Success Series, 1(1)*, 19-22.

Borrego, M., Douglas, E. P., & Amelink, C. T. (2009). Quantitative, qualitative, and mixed research methods in engineering education. *Journal of Engineering Education, 98*(1), 53-66.

Braun, V., & Clarke V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(1), 77-101.

Brodin, M. (2016). BYOD vs. CYOD: What is the difference? In *Proceedings of the 9th international Conference Information Systems.* Vilamoura, Algarve, Portugal, April 9-11.

Brooks, C. (2012). BYOD (Bring your own device). Retrieved August 15, 2015 from http://www. bcs. org/upload/pdf/cbrooks-oct12. Pdf.

Cavana, R.Y., Delahaye, B.L., Sekaran, U. (2001). *Applied Business Research: Quantitative and Quantitative Methods* (3rd ed.). Australia: John Wiley & Sons.

Chang, C., Cheng-Chieh, W., & Chen, S. (2014). The influence of bring your own device on the psychological climate at workplace. In *Proceedings of the Sixteenth International Conference on Electronic Commerce,* Philadelphia, PA, USA August 05-06, 2014.

Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for E-Commerce: Institutional enablers of the organisational assimilation of web technologies. *MIS Quarterly*, 26(2), 65-89.

Chow, J. (2013). Bring your own devices: A cautionary tale for public employees during investigatory searches. *Hastings Const.LQ, 41(1)*, 623-631.

Cisco (2014). Cisco BYOD survey amongst South African business leader. Retrieved September 15, 2015 from https://www.cisco.com/web/ZA/press/blog/2014/101014.html

Cochrane, T., Antonczak, L., Keegan, H., & Narayan, V. (2014). Riding the wave of BYOD: Developing a framework for creative pedagogies. *Research in Learning Technology.* Retrieved June 18, 2015 from *http://www.researchinlearningtechnology.net/index.php/rlt/article/view/24637*

Crossler, R. E., Long, J. H., Loraas, T. M., & Trinkle, B. S. (2014). Understanding compliance with bring your own device policies utilizing protection motivation theory: Bridging the intention-behaviour gap. *Journal of Information Systems, 28*(1), 209-226.

Dell, & Intel. (2011). The Evolving Workforce: Expert Insights. Retrieved May 13, 2015 from http://www.dell.com/learn/us/en/uscorp1/corp-comm/the-evolving-workforce

Department of Education (2008). Example of a code of conduct for a school. Retrieved March 25, 2016 from http://www.education.gov.za/Portals/0/Example%20of%20a%20Code%20of%20Conduct%20for%20a%20school.pdf?ver=2009-10-13-121912-523

Disterer, G., & Kleiner, C. (2013). BYOD bring your own device. *Procedia Technology, 9*(1), 43-53.

Edwards, T., Delbridge, R., & Munday, M. (2005). Understanding innovation in small and medium-sized enterprises: a process manifest. *Technovation*, 25(10), 1119-1127

Erdem, F., & Atsan, N. (2015). Trust Based Relationships between Family Members and Long-Term Employees of Family-Owned SMEs. *International Business Research*, *8*(4), 223.

Fatoki, O.O., & Smit, A.V. (2011). Constraints to credit access by new SMEs in South Africa: A supply-side analysis. *African Journal of Business Management*, 5(4), 1413-1425

Fleck, R., Cox, A. L., & Robison, R. A. (2015). Balancing boundaries: Using multiple devices to manage work-life balance. *In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems,* Seoul, Republic of Korea. April 18-23.

French, A. M., Guo, C., & Shim, J. (2014). Current status, issues, and future of bring your own device (BYOD). *Communications of the Association for Information Systems, 35*(1), 192 - 197.

Gareeb, P., & Naicker, V. (2015). Determinants for South African SMEs to Adopt Broadband Internet Technologies. *The Electronic Journal of Information Systems in Developing Countries*, *68(5), 1-24.*

Gheorghe, G., & Neuhaus, S. (2013). Poster: Preserving privacy and accountability for personal devices. *Proceedings of the 2013 ACM SIGSAC Conference on Computer & Communications Security,* Berlin, Germany, November 04-08.

Giddens, A. (1982). Profiles and critiques in social theory. London: Macmillan.

Giddens, A. (1984). The constitution of society: Outline of the theory of structuration. Los Angeles: University of California Press.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, *8*(4), 597-606.

Goss, J., & Lindquist, B. (1995). Conceptualizing international labour migration: a structuration perspective. *International Migration Review*, 29 (2), 317-351

Gustav, A. & Kabanda, S. (2016). BYOD adoption concerns in the South African financial institution sector. *In proceedings of the International conference on Information Resources Management,* Cape Town, South Africa, May 18-20.

Hardaker, G., & Singh, G. (2011). The adoption and diffusion of eLearning in UK universities: A comparative case study using Giddens's Theory of Structuration. *Campus-Wide Information Systems*, *28*(4), 221-233.

Hardcastle, M.A.R., Usher, K. J., & Holmes, C.A. (2005). An overview of structuration theory and its usefulness for nursing research. *Nursing Philosophy*, 6(4), 223-234.

Harris, M., Patten, K., Regan, E., & Fjermestad, J. (2012). Mobile and connected device security considerations: A dilemma for small and medium enterprise business mobility? In *18th Americas Conference on Information Systems,* Seattle, Washington, USA, August 9-11, 2012.

Harris, M. A., & Patten, K. P. (2014). Mobile device security considerations for small- and medium-sized enterprise business mobility. *Information Management and Computer Security, 22*(1), 97-114.

Hensema, M. (2013). Acceptance of BYOD among Employees at Small to Medium-sized Organisations. In *19th Twente Student Conference on IT*, Netherlands, June 2013.

Heracleous, L., & Hendry, J. (2000). Discourse and the study of organisation: Toward a structurational perspective. *Human Relations*, *53*(10), 1251-1286.

Hopkins, N., Sylvester, A., & Tate, M. (2013). Motivations for BYOD: An investigation of the contents of a 21st century school bag. *In 21st European conference on Information Systems* Utrecht, Netherlands, June 5-8, 2013.

Ingalsbe, J. A., Shoemaker, D., & Mead, N. R. (2011). Threat modeling the cloud computing, mobile device toting, consumerized enterprise-an overview of considerations. *In 17th Americas Conference on Information Systems*, Detroit, Michigan, August 4-7, 2011.

James, P., & Griffiths, D. (2012). The Mobile Execution Environment: A Secure and NonIntrusive Approach to Implement a Bring You Own Device Policy for Laptops. In *Proceedings of the 10th Australian Information Security Management Conference.* Perth, Western Australia, December 3-5.

Jadeja, Y., & Modi, K. (2012). Cloud computing-concepts, architecture and challenges. In *International Conference on Computing, Electronics and Electrical Technologies (ICCEET),* India, March 21-22, 2012.*IEEE*

Johnston, K. A., Kabanda, S. K., Adams, S., & Davids, E. (2008, July). How SMEs in Western Cape of South Africa use ICT. In Management of Engineering & Technology, 2008. PICMET 2008. Portland International Conference on (pp. 1043-1051), CapeTown, July, 27-31.IEEE.

Jones, M. R., & Karsten, H. (2008). Giddens's structuration theory and information systems research. MIS Quarterly, 32 (1)127-157.

Jones, S., Wilikens, M., Morris, P., & Masera, M. (2000). Trust requirements in EBusiness: A conceptual framework for understanding the needs and concerns of different stakeholders. *Communications of the ACM*, 43(12), 81-87.

Joppe, M. (2000). *The Research Process.* Retrieved September 27, 2015, from

http://www.academia.edu/930161/The_research_process

Kabanda, S., & Brown, I. (2014). Bring-Your-Own-Device (BYOD) practices in SMEs in Developing Countries–The Case of Tanzania. *In 25th Australian Conference on Information Systems*, Auckland, New Zealand, December 8-10, 2014.

Katara, S. K., & Ilavarasan, P. V. (2013). Mobile technologies in e-governance: A framework for implementation in India. In *Proceedings of the 7th International Conference on Theory and Practice of Electronic Governance,* Seoul, Republic of Korea, October 22-25, 2013.

Kinnie, N., Purcell, J., Hutchinson, S., Terry, M., Collinson, M., & Scarbrough, H. (1999). Employment relations in SMEs: market-driven or customer-shaped?. *Employee relations*, 21(3), 218-236.

Kongolo, M. (2010). Job creation versus job shedding and the role of SMEs in economic development. *African Journal of Business Management, 4*(11), 2288-2295.

Kort, W., & Gharbi, J.E. (2011). Call centers performance; An application of structuration theory. *Communications of the Ibima*. Retrieved April 7, 2016 from http://www.ibimapublishing.com/journals/CIBIMA/2011/606307/606307.pdf

Kling, R., & Scacchi, W. (1982). The web of computing: Computer technology as social organisation. *Advances in computers*, 21(1), 1-90.

Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly, 23(1),* 67-93.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *American Journal of Occupational Therapy, 45*(3), 214-222.

Lebek, B., Degirmenci, K., & Breitner, M. H. (2013). Investigating the influence of security, privacy, and legal concerns on employees' intention to use BYOD mobile devices. In *Proceedings of the 19th Americas Conference on Information Systems (AMCIS)*, Chicago, Illinois, USA, August 15-17, 2013.

Leclercq-Vandelannoitte, A. (2015). Managing BYOD: How do organisations incorporate user-driven IT innovations? *Information Technology & People, 28*(1), 2-33.

Lee, A. S. (1991). Integrating positivist and interpretive approaches to organisational research. *Organisation science*, *2*(4), 342-365.

Lee, J., Crossler, R., & Warkentin, M. (2013). Implications of monitoring mechanisms on bring your own device (BYOD) adoption. In *34th International Conference on Information Systems*, Milan, Italy, December 15-18, 2013.

Lennon, R. (2012a). Changing user attitudes to security in bring your own device (BYOD) & the cloud. *Tier 2 Federation Grid, Cloud & High Performance Computing Science (RO-LCG), 2012 5th Romania,* 49-52.

Lennon, R. G. (2012b). Bring your own device (BYOD) with cloud 4 education. *Proceedings of the 3rd Annual Conference on Systems, Programming, and Applications: Software for Humanity,* Tucson, AZ, USA, October 21-25, 2012.

Longo, B. (2013). Learning on the wires: BYOD, embedded systems, wireless technologies and cybercrime. *Legal Information Management, 13*(2), 119-123.

Loose, M., Weeger, A., & Gewald, H. (2013). BYOD–The next big thing in recruiting? examining the determinants of BYOD service adoption behaviour from the perspective of future employees. In *19th Americas Conference on Information Systems*, Chicago, Illinois, August 15-17, 2013.

Lyon, C., & Osterman, M. (2014). Security BYOD: Be your own defence. *Proceedings of the 2014 ACM SIGUCCS Annual Conference on User Services Conference,* Salt Lake City, UT, USA, November 02-07, 2014.

Madzima, K., Moyo, M., & Abdullah, H. (2014). Is Bring Your Own Device an institutional information security risk for small-scale business organisations? In *Information Security for South Africa (ISSA), Johannesburg, South Africa, August 13-15, 2014*. IEEE.

Maharajh, R. (2015). Digital Liberty, the Knowledge Commons and some Challenges for the Governance of Information and Communication Technologies and the Internet for

Brazil, Russia, India, China and South Africa. In *Proceedings of the 7th BRICS Academic Forum.* Moscow, Russia, July 9, 2015.

Mahemba, C. M., & De Bruijn, E. J. (2003). Innovation activities by small and medium-sized manufacturing enterprises in Tanzania. *Creativity and Innovation Management*, 12(3), September, 162-173.

Mahmood, S. (2008). Corporate governance and business ethics for SMEs in developing countries: Challenges and way forward. *Paper presented at the International Society of Business, Economics, and Ethics World Congress 2008*, Cape Town, South Africa, July 15-18.

McFarland, D. J., & Hamilton, D. (2006). Adding contextual specificity to the technology acceptance model. *Computers in Human Behavior, 22*(3), 427-447.

Klesel M, Mokosch G, & Niehaves B (2015) Putting Flesh on the Duality of Structure: The Case of IT Consumerization. *In Proceedings of Americas conference on Information systems (AMCIS)*, Puerto Rico, August 13 – 15, 2015.

Montealegre, R. (1997). The interplay of information technology and the social milieu. *Information Technology & People*, 10(2), 106-131.

Molla, A., & Licker, P. S. (2005a). eCommerce adoption in developing countries: A model and instrument. *Information & Management, 42*(6), 877-899.

Molla, A., & Licker, P. S. (2005b). Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country. *International Journal of Electronic Commerce, 10*(1), 83-110.

Moore, D.R.J. (2011). Structuration theory: The contribution of Norman Macintosh and its application to emissions trading. *Critical Perspectives on Accounting*, 22, 212-227.

Miles MB & Huberman M (1994). Qualitative Data Analysis: A Sourcebook of New Methods. Beverly Hills, CA: Sage Publications.

Mitrovic, Z., Veljkovic, I., Whyte, G., & Thompson, K. (2014). Introducing BYOD in an organisation: The risk and customer services viewpoints. *paper presented at the 1st Namibia customer service awards & conference*, Windhoek, Namibia, November 3 -5, 2014.

Moschella, D., Neal, D., Opperman, P., & Taylor, J. (2004). The "Consumerization" of Information Technology. CSC. El Segundo, California, USA. Retrieved June 10, 2015 from https://www.google.co.za/?gfe_rd=cr&ei=yK-pV-CME uo8wf8kr2oCg#q=+The+%E2%80%9CConsumerization%E2%80%9D+of+Information +Technology.+CSC +El+Segundo%2C+California%2C+USA

Myers, M. D. (2009). *Qualitative research in business and management.* Sage.

National Small Business Amendment Act, (2003). Republic of South Africa. Published in Government Gazette, 461(25763), 1-6.

Niehaves, B., Köffer, S., & Ortbach, K. (2012). IT consumerization–a theory and practice review. In *Proceeding of the 18th Americas Conference on Information Systems*, Seattle, Washington, USA, August 9-11, 2012.

Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in south africa: A principal component analysis approach. *African Journal of Business Management, 4*(5), 729-738.

Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organisations: Research approaches and assumptions. *Information Systems Research, 2*(1), 1-28.

Orlikowski, W. (1992). The duality of technology: Rethinking the concept of technology in organisations, *Organisation Science*, 3(3), 398-427.

Orlikowski, W.J. (2000). Using technology and constituting structures: A practice lens for studying technology in organisations. *Organisation Science*, 11(4), 404.

Orlikowski, W. J., & Iacono, C. S. (2000). The truth is not out there: An enacted view of the "Digital economy". *Understanding the Digital Economy: Data, Tools, and Research.* Boston: MIT Press, 352-380.

Orlikowski, W.J., & Robey, D. (1991) Information technology and the structuring of organisations, *Information Systems Research*, 2(2), 143-169.

Ortbach, K., Bode, M., & Niehaves, B. (2013). What influences technological individualization? –An analysis of antecedents to IT consumerization behavior. *In 19th Americas Conference on Information Systems,* Chicago, Illinois, August 15-17, 2013.

Page, L. (2013). The trade-offs for bring your own devices. *IS Practices for SME Success Series, 1(1),* 91-94.

Patel, R. K., Sayers, A. E., Patrick, N. L., Hughes, K., Armitage, J., & Hunter, I. A. (2015). A UK perspective on smartphone use amongst doctors within the surgical profession. *Annals of Medicine and Surgery, 4*(2), 107-112.

Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Patten, K., & Passerini, K. (2007). Next generation small and medium enterprises mobility strategy roadmap. *Proceedings of ISOneWorldConference, Las Vegas, NV*, 11-13.

Pozzebon, M., & Pinsonneault, A. (2005). Challenges in conducting empirical work using structuration theory: Learning from IT research. *Organisation Studies*, 26(9), 1353-1376.

Premkumar, G. (2003). A meta-analysis of research on information technology implementation in small business. *Journal of Organisational Computing and Electronic Commerce, 13*(2), 91-121.

Putri, F., & Hovav, A. (2014). Employees' compliance with BYOD security policy: Insights from reactance. Organisational Justice, and Protection Motivation Theory. *In Proceedings of the European Conference on Information Systems (ECIS) 2014*, Tel Aviv, Israel, June 9-11, 2014,

Qing, Y. L. (2013). BYOD on rise in Asia, but challenges remain, ZDNET. Retrieved June 11, 2015 from http://www.zdnet.comibyod-on-rise-inasia-but-challenges-remain-70000 I 06601

Rogers, E.M. (1995). Diffusion of innovations (4th ed.). New York: Free Press.

Rogers, E.M. (2003). Diffusion of Innovations (5th ed.). New York: The Free Press.

Ruch, T. J., & Gregory, R. W. (2014). Consumerization of IT - Where is the Theory? In *Proceedings of the 18th Pacific Asia Conference on Information Systems*, Chengdu, China, June 24 – 28, 2014.

Russell, A. W., Vanclay, F. M., & Aslin, H. J. (2010). Technology assessment in social context: The case for a new framework for assessing and shaping technological developments. *Impact Assessment and Project Appraisal, 28*(2), 109-116.

Saunders, Lewis, P., & Thornhill, A. (2003). Research methods for business students, 3rd edition. Pearson education limited Harlow England.

Saunders, M.L.P. & Thornhill, A. (2009). Research method for business students. Pearson education limited Harlow England.

Sayler, A., Grunwald, D., Black, J., White, E., & Monaco, M. (2014). Supporting CS education via virtualization and packages: tools for successfully accommodating bring-your-own-device at scale. *In Proceedings of the 45th ACM technical symposium on Computer science education*, Atlanta, GA, USA, March 05-08, 2014.

Sawyers, J.L., Pretorius, M.W., & Oerlemans, L.A.G. (2008). Safeguarding SMEs dynamic capabilities in technology innovative SME-large company partnerships in South Africa. *Technovation*, 28 (4), 171-182.

Seigneur, J., Kölndorfer, P., Busch, M., & Hochleitner, C. (2013). A survey of trust and risk metrics for a BYOD mobile worker world. In *proceeding of the third International Conference on Social Eco-Informatics*. Lisbon, Portugal, 17-22 November 2013. Retrieved June 15,2015 from www.thinkmind.org

Shim, J., Mittleman, D., Welke, R., French, A. M., & Guo, J. C. (2013). Bring your own device (BYOD): Current status, issues, and future directions. In *19th Americas Conference on Information Systems,* Chicago, Illinois, August 15-17, 2013.

Sife A., Kiondo E., & Lyimo-Macha J.G. (2010). Contribution of Mobile Phones to Rural Livelihoods and Poverty Reduction in Morogoro Region, Tanzania. *Electronic Journal of Information Systems in Developing Countries* 42 (3), 1-15.

Singh, N. (2012). BYOD genie is out of the Bottle – "Devil or angel". *Journal of Business Management & Social Sciences Research, 1*(3), 1-12.

Smith, K. J., & Forman, S. (2014). Bring your own Device--Challenges and solutions for the mobile workplace. *Employment Relations Today, 40*(4), 67-73.

Smith, M. L., Spence, R., & Rashid, A. T. (2011). Mobile Phones and Expanding Human Capabilities. *Information Technologies & International Development* 7 (3), 77-88.

Song, Y. (2014). "Bring your own device (BYOD)" for seamless science inquiry in a primary school. *Computers & Education, 74(1)*, 50-60.

Thompson, C. B., & Walker, B. L. (1998). Basics of research (part 12): qualitative research. *Air medical journal*, *17*(2), 65-70.

The Banking Association South Africa (2015). SME Enterprise. Retrieved January 12, 2015 from http://www.banking.org.za/what-we-do/sme/sme-enterprise.

Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of advanced nursing*, *48*(4), 388-396.

Tornatzky, L. & Fleischer, M. (1990). The process of technology innovation, Lexington, MA, Lexington Books.

Trend Micro. (2012). Enterprises Achieve a Wide Range of Benefits by Deploying Bring-Your-Own-Device Programs. Retrieved May 1, 2015 from: http://www.trendmicro.com/cloudcontent/us/pdfs/business/whitepapers/wp_forrester_measure- value-of-consumerization.pdf.

Twinomurinzi, H., & Mawela, T. (2014). Employee perceptions of BYOD in South Africa: Employers are turning a blind eye? *Proceedings of the Southern African Institute for*

Computer Scientist and Information Technologists Annual Conference, centurion, South Africa, September 29-October 1, 2014.

Venkatesh, G., & Sridhar, V. (2014). Mobile-first strategy for MSMEs in emerging markets. *IT Professional,* (1), 58-61.

Visagie, J. (1997). SMMEs' challenges in reconstructing South Africa. *Management Decision, 35*(9), 660-667.

Walsham, G. (2002). Cross-cultural software production and use: A Structurational analysis. *MIS quarterly*, 26(4), 359-380.

Walsham, G., & Han, C.K. (1993). Information systems strategy formation and implementation: The case of a central government agency. *Accounting, Management and Information Technologies*, 3(3), 191-209.

Walsham, G. (1997). Actor-network theory and IS research: current status and future prospects. In *Information systems and qualitative research* (pp. 466-480). Springer US.

Waterfill, M. R., & Dilworth, C. A. (2014). BYOD: Where the employee and the enterprise intersect. *Employee Relations Law Journal, 40*(2), 26-36.

Yin, R. (2009). Case Study Research. Sage Publications: London.

Yin, C., Liu, L., & Liu, L. (2014). BYOD Implementation: Understanding Organizational Performance through Gift Perspective. *In proceedings of the 18th Pacific Asia conference on Information Systems*. Chengdu, China, June 24-28

Yun, H., Kettinger, W. J., & Lee, C. C. (2012). A new open door: The smartphone's impact on work-to-life conflict, stress, and resistance. *International Journal of Electronic Commerce, 16*(4), 121-152.

2thinknow. (2015). Innovation Cities Index 2014: Africa. Retrieved October 19, 2015 from http://www.innovation-cities.com/innovation-cities-index-2014-africa/9364

APPENDIX A: Research Instrument

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
UR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 3261 Fax: +27 (0) 21 650 3260
Internet: http://www.commerce.uct.ac.za/informationsystems/

17 November 2015

Request to conduct research and interview participation consent form

Dear Sir/Madam,

In terms of the requirements for completing a Masters Degree in Information Systems at the University of Cape Town a research study is required.

The researcher, in this case Akin-Adetoro Adedolapo, has chosen to conduct a qualitative interview research entitled "Bring Your Own Device' (BYOD) adoption in South African SMEs". The researcher would like to request permission to conduct this qualitative interview research at your organization. The objective of the research is to identify contextual factors affecting BYOD adoption with the purpose of understanding how these factors shape and are reshaped.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this study. No individual names, including organization names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The main data collection method will be one-on-one interviews with a small group of the staff who use and are responsible for the BYOD. The interview will be conducted at a place most convenient to you and will last 45 minutes. If you are willing to participate in this study, kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on 0739074069 or email:AKNADE006@myuct.ac.za

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

Akin-Adetoro Adedolapo

Signed

Researcher \ M.Com Student, (UCT)
Department of Information Systems
University of Cape Town
Email: AKNADE006@myuct.ac.za

Dr. Salah Kabanda

Research Supervisor
Department of Information Systems
University of Cape Town
Email: salah.kabanda@uct.ac.za

"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."

SECTION 1: INTERVIEWEE DEMOGRAPHICS

Interviewee	
Full Name:	
Position:	
Organisation:	
Division:	
Department:	
Business Unit or Team:	
Career	
Number of Years with organisation:	
Previous Position (in organisation , elsewhere):	
Organisation	
Sector	
No of employees	
Total Turnover	
Location	
Year Of Incorporation	
Interview Data	
Date:	
Venue:	
Duration:	

SECTION 2: ORGANISATIONAL

What organisational factors would you say influenced your organisation to adopt BYOD? (Factors could be related to: privacy, security, infrastructure, policies, cost, training /education, ICT expertise, top management support etc.).

Awareness

1. What does BYOD mean to your organisation? What influences you in adopting BYOD?
2. Are you aware of your organisational stance (policy, strategy) as regards the use of your mobile device for work related activities?
3. Is your organisation aware of any training/education that can be provided to staff as regards the use of their personal devices for work related purposes (i.e. security training)?
4. What are the benefits or potential benefit of BYOD to your organisation?
5. What are the threats or potential threats of BYOD to your organisation
6. How do you communicate/Interacts with your employees/with other employees (top down communication, emails, forums, get-togethers (informal social gatherings), collaboration, incentives, and meetings)?

7. Over time have there been changes to how mobile devices are being used in your organisation for work related purposes. If so, why? If not, why? Before the new changes, what was happening before? (should support demographics in terms of how long the person has worked in that particular organisation).
8. Does your job require you to access the company server after work (i.e official emails address).
9. What would you say brings about the awareness of BYOD in your organisation? (Could be related to routine organisation activities or environmental customs/standards.)
    - Would you say the current adoption level of BYOD in this organisation is one way or the other related to the level of BYOD awareness in this organisation? If so, why? If not, why?

Management Support

1. Does management provide support for the adoption of the BYOD?
    - How does management provide support when it comes to BYOD?

   Could be related to business resources (finance), human resources, technological readiness, governance (BYOD policy).

   Finance: when your device gets damaged who pays? Reimbursement for data and call charges.

   Human resources: The right IT staff.
2. Have you had BYO-related training required in implementing, maintaining and using BYOD? Was the training sponsored by the organisation? (Training could be related to networking, security, systems administration, systems support).
3. Does the organisation have clear objectives and a clear image of how BYOD can help in achieving organisational goals? In developing these objectives, were employees consulted?
4. In comparison to other IT implementation in the organisation, how would you rate the level of priority given to the BYOD (low/adequate/high/very high)?
    - In your opinion why do you think BYOD is getting the current level of support from management? (Could relate to routine organisation activities-business processes or environmental customs/standards.)

Human Resources

1. Would you say your organisation has the expertise to implement and maintain BYOD? (Expertise could be related to networking, security, systems administration, systems support, legal/policy.)
2. Who champions (state what action should be taken with respect to) BYOD and why this person? (Action should be related to human resources, readiness, business resources.)
3. Who makes the final decision when it comes to BYOD/IT implementation/activities (in these case hiring (technical and non-technical legal/policy) and training of human resources in relation to the BYOD).
    - What or who informs these decisions?
4. What is your opinion with regard to this person being the one in that position?
5. Would you say the level of BYOD adoption in this organisation is as a result of the human resource available? If so why? If not why?
6. What rules and processes have been endorsed/legalized as a result of BYOD in your organisation

Business Resources

1. Does your organisation have the funds to finance BYOD initiatives?

Do you perceive your organisation as having a culture of trust: information sharing, relationship etc.?

Would you say there is a pressure within your staffs to get the latest IT device? Does this cause any form of divide between employees? If so, why? If not so, why?

With the ability to work from anywhere, are you/your employees reluctant to work from the office. If so, why? If not so, why?

Is your organisation capable of dealing with rapid changes? How does your organisation deal with change?

2. What is your perception and understanding of the influence of non-technical resources (human resources, business resources-money) in the organisation towards BYOD? Over time have there been changes to the non-technical resources (human resources, business resources) channelled to BYOD? If so why? If not so why?

3. Would you say the level of BYOD adoption in this organisation is as a result of the business resources (finance, trust, communication, information sharing, and policies) available? If so, why? If not, why?

Technological Readiness

1. Are you well computerized with Internet, bandwidth and WLAN?
2. Are you equipped with a MDM (mobile device management) solution? If no, how do you mitigate the security and privacy concerns related with BYOD? If yes, how do you manage privacy (monitoring) and security (any other security mitigation method besides MDM in place? For example, awareness and training concerns related with the MDM.
3. Are your existing systems flexible enough to integrate BYOD (wireless routers, server capacity, and security firewall)?
4. What role does the current technological readiness in your organisation play in creating an environment that supports BYOD (does it encourage or discourage)?

Policy /Governance

1. Do you have an ICT-related organisational policy? Does this policy encourage/discourage the BYOD phenomenon?
2. Do you have a BYOD policy? If yes, why and how was the policy developed? Who developed the policy? Who were the stakeholders involved during the development?
3. What were the difficulties experienced in coming up with and implementing the BYOD policy? (opposition from employees, disagreement between management and employees).
4. What happens if this organisational policy (ICT policy, BYOD policy) is not followed (any sanctions)?
5. What organisational or business process in your organisation encourages the use of the BYOD (i.e. sales process, as sales manager ae always on the road)?
6. Over time have there been changes to policies (ICT/BYOD). If so, why? If not, why? (After a security breach, how does your organisation prevent it from occurring again?)
7. Would you say the level of BYOD adoption in this organisation is as a result of the current policies? If so, why? If not, why?
8. Would you say the current policies (ICT/BYOD) supports/enhances the way things are done in the organisation (norms/business process)?

SECTION 3: ENVIRONMENTAL

What environmental factors would you say influenced your adoption of BYOD? (Factors could be related to: customers, suppliers, business partners, supporting industries and government support.)

Market Forces

1. Would you say BYOD is being adopted amongst your supplier, business partners and competitors? If so, why? If not so, why?
    - Would you say they (supplier, business partners and competitors) have become more competitive (productivity, cost save, talent attraction and retention) with BYOD adoption?
2. Was your organisation influenced by customers, suppliers, business partners, competitors or the incoming workforce in adopting BYOD? If so, why? If not so, why?
3. How do you communicate with customers, suppliers, business partners and the incoming workforce? (Could be official or non-official.)
4. What is your perception and understanding of the influence of market forces towards BYOD?
5. Would you say the level of BYOD adoption in this organisation is as a result of market forces? If so, why? If not, why?

Supporting Industry

1. Would you say that the industry creates an environment that facilitates and supports the adoption of BYOD? (This could be related to access to research results (cisco), IT/legal expertise from the industry, quality of services provided by service providers - for example, IT-Internet service providers, Telco's.)
2. Have you used any of the support provided by the industry to your advantage? If so which support? If not, why?
3. What communication structures exist between your organisation and supporting industries? (contracts, support license). (Would you say your organisation is particular about what brand and model of device your employees use due to the availability of support for their device by the industry?)
4. Over time have there been changes to the support from industry? If so, why? If not, why?
5. Would you say the level of BYOD adoption in this organisation is as a result of the supporting industry? If so, why? If not, why?

Government Support

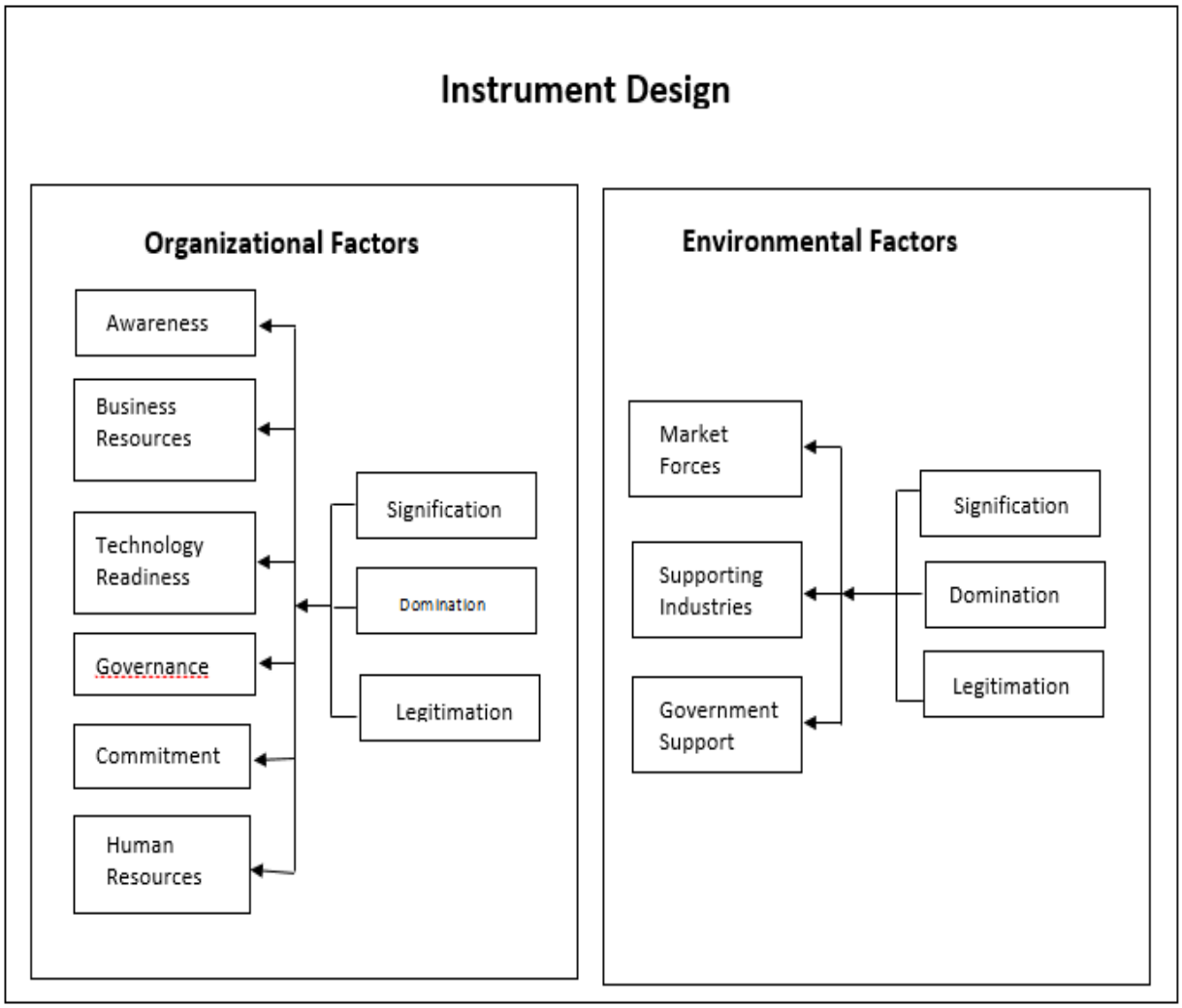
1. Should government be creating a conducive technological environment? If so, why? If not so, why?
2. Over time has government support towards the technology changed? If so, why? If not so, why?
3. What resources (technical and non-technical) would have to be created or amended by government for SMEs, if you are to institutionalize BYOD in your organisation? (This could be related to the national ICT infrastructure-bandwidth costs, Internet speed and accessibility, mobile network security etc.; environmental security-use of devices in public places; cybercrime; government regulation- POPI Act, critical skills permit to close skill gap.)
4. Are you aware of any government policy that governs the use of IT/ICT (POPI Act, New Integrated ICT Policy)
5. What support is available to ensure that SMEs abide by government policies? What's your perception of this support?
6. What penalty do you incur if you do not obey government regulation (POPI Act)?
7. What communication structures exist between your organisation and the government (could be related to any government regulated SME body)? What is your perception of this communication structure?

SECTION 4: CONCLUSION

1. Are there any questions you would like to ask?

Thank you very much for your time.

APPENDIX B: Instrument Design



APPENDIX C: Overview of studies on BYOD in developed and developing countries

	N	Papers on SMEs	Focus	Method	Underling Theory	Geographic Coverage	Authors
Developed Countries(37)	**30**	**7**	• Work life balance/conflicts • Integration of the BYOD and the cloud resources • BYOD Security, compliance and legal issues • Employees privacy • BYOD Organizational issues • BYOD strategy and Mobile Device Management(MDM) • Intention to use the BYOD • Implementing a BYOD policy for mobile devices • BYOD as a tool for teleworking • The use of the BYOD • BYOD framework development • Trust and risk metric for the BYOD • BYOD in the classroom • BYOD in the public sector. • Security risks and business mobility(BYOD) • Organisations reaction to the adoption and use of BYOD • Issues and Benefits of the BYOD	• Survey via a questionnaire • Case Study • Experiments by simulations • Literature review analysis • Qualitative and interpretive approach: unstructured interviews, Grounded theory • Descriptive statistics • Structural equation modelling(SEM) • Partial least squares, Binary logistic regression • Confirmatory factor analysis, Exploratory factor analysis, Principal component analysis, • Bootstrapping	• Boundary theory • Protection Motivation Framework • Decomposed theory of planned behaviour (D-TPB) • Unified Theory of Acceptance and Use of Technology (UTAUT) • The technology acceptance model(TAM) • The theory of reasoned action (TRA)	Australia (4) Europe(19) North America(7) Asia(1)	James & Griffiths(2012);Lennon(2012) Nykvist (2012);Lennon(2012) Yun et al (2012);Gheorghe & Neuhaus (2013);Longo (2013);Astani et al (2013);Chow (2013);Lebek et al (2013);Hopkins et al (2013);Loose et al (2013);Disterer & Carsten (2013);Seigneur (2013);Hensema (2013);Lyon & Osterman (2014);Sayler et al (2014);Crossler et al (2014);Cochrane et al(2014);Armando et al (2014a);Armando et al (2014b);Niehaves et al (2014) Fleck et al (2015);Ríos-aguilar & Lloréns-montes (2015);Patel et al (2015);Harris et al(2012);Harris & Patten (2014);Leclercq-Vandelannoitte(2015);Page(2013);Bell (2013)
Developing Countries(11)	**9**	**2**	• Implementing M-Government framework with the BYOD • Influence of BYOD on job performance • BYOD as a tool to aid learning • Risk and customer service perspective to BYOD in organization • Employees compliance to BYOD security policy • Employees perspective on the BYOD • BYOD practices • Benefits and risks associated with BYOD	• A survey Approach via questionnaire • Questionnaire, semi-structure interviews • Literature review analysis • Descriptive statistics • Structural equation modelling (SEM) • Partial Least Squares(PLS) • Thematic analysis	• Protection motivation theory • Reactance theory • Organizational Justice theory • Theoretical framework on work design and psychological climate	Africa(4) Asia(5)	Singh (2012);Katara & Ilavarasan (2013);Chang et al (2014);Song (2014) Mitrovic et al (2014);Putri & Hovav (2014);Kabanda & Brown (2014);Twinomurinzi & Mawela (2014);Madzima et al (2014)

APPENDIX D: Abbreviation and Acronyms

BYOD	Bring Your Own Device
CoIT	Consumerization of Information Technology
CYOD	Choose Your Own Device
DOI	Diffusion of Innovations
GDP	Gross Domestic Product
HYOD	Here is Your Own Device
ICT	Information and Communications Technology
IS	Information Systems
ISP	Internet Service Provider
IT	Information Technology
MDM	Mobile Device Management
m-commerce	Mobile Commerce
PC	Personal Computer
PEER	Perceived External EReadiness
PERM	Perceived EReadiness Model
POER	Perceived Organisational EReadiness
POPI	Protection of Personal Information Act.
SMEs	Small and Medium Enterprises
TOE	Technology, Organisation, and Environment
UCT	University of Cape Town