Dissertation for Master's Degree in Information Systems

SME and NPO Readiness for Adopting Software-as-a-Service in Developing Countries

For the Department of Information Systems

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Moritlha Madisha

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ABSTRACT

Software-as-a-Service (SaaS) is an emerging technology, which has been rapidly adopted in organisations of all sizes in different countries despite some scepticism of SaaS's benefits and of vendors' promises. Most of the research into SaaS has investigated the technology, business model and general/first world adoption determinants. However, there is a paucity of research in SaaS readiness and SaaS adoption in developing countries. Moreover, research has often investigated organisations of all sizes rather than focusing on a particular size range.

This research aims to study SaaS readiness and adoption in South Africa. South Africa is an emerging economy, but it has the qualities of both an emerging and a developing country. The telecommunications infrastructure in particular has the qualities of a developing country. This study focuses on small to medium sized organisations, comprising both enterprises and non-profit organisations. Molla and Licker's (2005a) Perceived E-Readiness Model (PERM) is adapted and used to study SaaS readiness and adoption. Important SaaS multi-theoretical factors were added to the PERM to increase the rigorousness of the model.

The study took a positivist stance using the PERM to develop a questionnaire suitable for small to medium sized organisations using SaaS. The questionnaire collected both quantitative and qualitative data (in the form of open ended questions).

WarpPLS, a structural equation modelling tool, was used to analyse quantitative results. The research instrument satisfied a number validity tests. In the combined SME and NPO dataset, awareness and resources as well as market forces (MF) were significantly correlated to SaaS adoption. The SME dataset found awareness, resources, market forces and commitment (together with governance) significantly affecting SaaS adoption. The NPO dataset found resources, market forces and commitment (together with governance) also significantly correlated to SaaS adoption. MF was negatively correlated to SaaS adoption in the NPO dataset.

The qualitative results confirmed most of the quantitative results and provided a richer understanding of SaaS adoption factors. The discovered SaaS adoption factors are: Awareness, Resources, Internet Infrastructure (cost of internet, access to the internet and reliability of internet), Strategic Flexibility, Functionality, Business Efficiency, Training and Security, and Privacy Concerns. The dominant determinants in both the quantitative and qualitative findings were Awareness and Telecommunications Infrastructure. Implications were drawn and recommendations are made based on the findings.

Awareness of SaaS is important for organisations considering the initial adoption of SaaS. Furthermore, high internet costs, low internet reliability and poor access are detrimental to the adoption of SaaS.

Vendors should consider promoting and educating SMEs and NPOs about SaaS. Government needs to enforce a policy that would foster affordability and encourage competition amongst telecommunications companies; and telecommunication companies need to find creative ways in which to make the internet more affordable for SMEs, without losing significant profits.

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1 INTRODUCTION

Carr (2005) predicts that computing will follow a utility mode, just as electricity did. Electricity used to be insourced (or provided in-house) and now electricity is used as a utility Software-as-a-Service (SaaS) is one of the technologies currently influencing the utility mode. SaaS is one of the possible cloud computing platforms. It has been rapidly adopted in many organisations and in different countries, while other organisations have been sceptical of its benefits and of SaaS vendors' promises (Benlian & Hess, 2011). In recent years, researchers and practitioners have been studying the determinants of SaaS adoption (Benlian, Hess, & Buxmann, 2009; Benlian & Hess, 2011; Gartner Inc., 2011a; Gartner Inc., 2011b; Gartner Inc., 2011c; ISACA, 2009).

SaaS is a technology business model that delivers software to the user via the web on a per subscription or a pay-as-you-go basis (ISACA, 2009; Lenk, Klems, Nimis, Tai, & Sandholm, 2009). According to Gartner, the total cost of ownership (TCO) and the speed and ease of deployment are primary drivers in organisations. In contrast, the limited flexibility of customisation is the key issue encountered when deploying SaaS in organisations (Gartner Inc., 2011a; Gartner Inc., 2011c) .

In the year 2009, as many as 65% of SaaS investments were made in content, collaboration and communication, and customer relationship management software (Gartner Inc., 2011b). SaaS is growing in adoption among large, small and medium-sized enterprises (SME).

SMEs play a vital role in the economy, while Non-Profit Organisations (NPOs) play an inspiring role in society, economy and politics. SMEs are characterised by small organisations with limited resources (capital, skills and personnel). In contrast, NPOs range from large organisations to small organisations. This study focuses on small and medium-sized NPOs. Small organisations stand to benefit more from SaaS than do large organisations as they have more limited resources to use traditional software (Dubey & Wagle, 2007).

1.1 The History of SaaS

In the late 1990s, the on-demand software application delivery model came in different application forms; it was commonly known as the Application Service Provider (ASP) (Benlian et al., 2009). The vendor was responsible for the management and running of a data centre which delivered client-rented software over the web. The software that was delivered to a client was mostly pre-packaged or off-the-shelf software. A single instance was run for each customer (Randeree, Kishore, & Rao, 2008) but customers were able to customise the applications to some extent. However, most ASP vendors failed to capture enough clients to cover their upfront costs as vendors offered on-demand software, using the upfront perpetual software licence (Kaplan, 2007).

Efficiencies for vendors were lost because of the clients' varying degree of customisation (Xin & Levina, 2008). The immaturity of wide area networks (WANs) cost more bandwidth and had a higher latency than local area networks (LANs) (Brodsky & Tan, 2003), thereby contributing to the failure of ASP.

Software-as-a-Service (SaaS) solved ASP failures – by providing web access to software application from vendor-developed application or client's application hosted on the vendor machine. Thus, it utilises the new design paradigm of multi-tenant architecture application and data architecture. Multi-tenancy allows for the sharing of one or more instances. This new design offers multiple clients more scalability and cost-effectiveness, while still maintaining efficiencies for vendors (Benlian et al., 2009; Kaplan, 2007). Furthermore, SaaS takes advantage of the currently mature WAN infrastructure.

1.2 The Research Purpose

Empirical research in SaaS adoption is limited – particularly in developing countries. This provides numerous research opportunities in the area of SaaS readiness and adoption. The research opportunities are: investigating the factors influencing organisational SaaS readiness and adoption, investigating the factors that inhibit or enable SaaS readiness and its adoption amongst SMEs and NPOs, and testing the validity of the Perceived E-Readiness Model (PERM) (Molla & Licker, 2005a) for SaaS adoption. Therefore, this study aims to

provide an explanatory research of SaaS readiness and adoption in small to medium sized organisations.

Consequently, the purpose of this research is to empirically test the PERM by conducting a survey amongst South African SMEs and NPOs at an organisational level for those factors inhibiting or enabling SaaS readiness and its adoption, and for the factors influencing SaaS readiness and its adoption.

1.3 Research Questions and Objectives

Based on the research purpose, the derived research question is:

What is the relationship between SaaS readiness and SaaS adoption in SMEs and NPOs in South Africa?

Therefore, the secondary research questions are:

A. What is the state of SaaS readiness within SMEs and NPOs in South Africa?

B. What is the state of SaaS adoption within SMEs and NPOs in South Africa?

Therefore, the research objectives are:

- Discover the factors that enable or inhibit SaaS adoption.
- Assess whether the perceived organisational SaaS-readiness factors affect SaaS adoption.
- Assess whether the perceived external SaaS-readiness factors affect SaaS adoption.
- Measure the extent of initial SaaS adoption.
- Measure the extent of the intention to adopt SaaS.
- Compare the SME with the NPO findings.

1.4 Relevance and Motivation of This Research

SaaS is a relatively new technology and a current field of research in both academia and industry. This research satisfies the Centre for Information Technology and National Development in Africa (CITANDA) themes (CITANDA, 2011). These themes include ICT, innovation, and information systems (IS) in the context of developing countries. The identified gaps in the literature give a strong motivation to study SaaS in developing

countries. Furthermore, this research will provide the required knowledge for SaaS readiness and adoption in the developing nations.

This study investigates both small to medium sized organisations (SMEs and NPOs) because they share some common attributes. These include limited skills and knowledge, limited Information Communication Technology (ICT) infrastructure and scarce resources (Hikmet, Bhattacherjee, Menachemi, Kayhan, & Brooks, 2008; Haselkorn & Walton, 2009; Kapurubandara & Lawson, 2007). However, SMEs and NPOs exist for different objectives; SMEs operate for profit, while the purpose of NPOs is to bring a positive change in society, economy and politics. Therefore, this research serves to identify and confirm similarities and differences between SMEs and NPOs. Also, most SaaS research has focused on large organisations and organisations of all sizes whereas this research focuses on small to medium sized organisations.

This research breaks new ground in SaaS readiness research. Moreover, it attempts to validate the Perceived E-Readiness Model (Molla & Licker, 2005a) for SaaS adoption, which was previously used for e-commerce adoption.

Academia and industry stand to derive significant value from the findings. SaaS providers will gain knowledge on the readiness and adoption of SaaS in a developing country context. The findings will assist them in understanding and mitigating the challenges of adoption. Moreover, internet service providers deliver the platform for SaaS and they consequently stand to benefit, as well. Government can use the findings to facilitate a role in the adoption of SaaS by implementing rules and regulations that promote the adoption of SaaS.

1.5 An Overview of the Report

The next chapter will give the background of the research. It also provides a comprehensive literature review on SaaS, SMEs and NPOs. The theoretical framework follows and this chapter will discuss the relevant theories and the proposed theoretical model. The next chapter is on the design of the research. It describes the research design and the data-collection process. This is followed by the data analysis and the findings chapter. This

chapter describes the data analysis process and discusses the research findings. Finally, the conclusion summarises the research by highlighting the research findings, discusses the implications of the research and makes a few recommendations to industry.

2 BACKGROUND AND LITERATURE REVIEW

This chapter provides the background and literature review on SaaS, SMEs and NPOs. It forms the foundation of the research. It begins by defining SaaS, discusses SaaS technology, provides the research model, and investigates SaaS benefits and challenges. Section two defines SMEs; it discusses the SME role, and sheds light on the discourse on SME ICT adoption and the barriers that inhibit ICT adoption in SMEs. Section three focuses on NPOs, and uses a similar structure as the previous section. Additionally, section four briefly discusses the differences and similarities between NPOs and SMEs. The discourse on e-readiness, which forms the foundation for SaaS readiness, is found in section five. Section six discusses SaaS adoption and SaaS adoption factors. Finally, the identified gaps in the literature are summarised in section seven.

2.1 SaaS Definition and Technology

This section investigates SaaS definition, technology and a business model. It also discovers the benefits and challenges of SaaS. It is meant to provide a basic understanding of SaaS.

2.1.1 SaaS Definition

There is no internationally accepted definition of SaaS. Many researchers and professionals have given a similar definition of SaaS. However, some researchers accentuate the technology definition (Chandramouli & Mell, 2010; Xin & Levina, 2008), while others focus on the use, access and SaaS business model (ISACA, 2009; PCMAG, 2010). The following are some of the definitions from academia and industry:

"...standard piece of software is owned and managed remotely by the vendor and delivered as a service over the Internet. The application is based on a single set of common code and data definitions, and is distributed in a one-to-many manner to all clients" (Xin & Levina, 2008, p. 2).

"...software applications are run on a SaaS provider's system and accessed by a customer – usually through a web browser via the Internet. This means that the software application

itself is not hosted on the user's PC or within a business's servers, but within the SaaS provider's facilities" (Joint, Baker, & Eccles, 2009, p. 1).

The proposed definition for SaaS is: "On demand multi-tenant software, hosted by a vendor that clients or customers access over the web or with a thin client; and it is rented on a subscription basis, or pay-as-you go model, where a service guarantee is offered by a Service Level Agreement (SLA)". It is important to note that cloud computing and SaaS are relatively new technology paradigms. Therefore, some attributes of the definition might change over time, due to modifications in the underlying technology, utilisation, access and context.

Cloud computing has been defined as a "large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically re-configured to adjust to a variable load (scale), allowing also for an optimum resource utilisation. This pool of resources is typically exploited by a pay-per-use model, in which guarantees are offered by the Infrastructure Provider by means of customised SLAs" (Vaquero, Rodero-Merino, Caceres, & Lindner, 2009, p. 51).

Cloud computing consists of three platforms, namely: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). IaaS has the capability to provide the customer computing resources, such as provisioning, processing, storage and other computing resources. For instance, a customer can run his/her operating systems or servers on this platform. PaaS is a cloud platform that provides a software environment, which allows customers to run acquired or customer-created applications on demand, and to scale (ISACA, 2009; Vaquero et al., 2009).

2.1.2 SaaS Technology and Business Model Characteristics

SaaS characteristics are similar to cloud computing characteristics. SaaS is characterized by on-demand, broad network access – meaning access to SaaS anywhere and almost on any device, resource pooling, rapid elasticity and measured services. It can be deployed over private clouds, community clouds, public clouds and hybrid clouds (ISACA, 2009; Motahari-Nezhad, Stephenson, & Singhal, 2009). Private clouds are operated exclusively for an

organisation, and they may be managed by the organisation itself, or by the vendor. Community clouds are shared by organisations with a common mission or interest and are managed by the organisations themselves, or by a third party. Public clouds are available to the general public, and are owned by vendors selling cloud services. The hybrid cloud is a combination of at least two clouds (public, community and private clouds) "…that remain unique entities, but are bound together by standardised or proprietary technology that enables data and application portability (e.g. cloud bursting for load balancing between clouds)" (ISACA, 2009, p. 5).

Service level agreements (SLA) are a formal agreement between client and vendor concerning the guarantee on server, platform or application time and quality that will be available to the client. However, meaningful SLAs in the SaaS market are hard to find (Durkee, 2010).

Technologies, such as Web 2.0, rich internet application (RIA), service-oriented architecture (SOA) and virtualization, have enabled the development and progress of SaaS. These have been identified as enablers for SaaS (Nitu, 2009). However, it is important to note that significant internet bandwidth and the cost thereof remain vital enablers, especially in developing countries; this is not a major issue in developed countries because of the already existing, affordable and significant bandwidth.

2.1.3 Four Maturity Levels of SaaS

A well designed SaaS application should be multi-tenant efficient, configurable and, most importantly, scalable. Multi-tenancy means that a number of customers can use the same application instance from the same vendor. However, SaaS applications have to be multi-tenant aware (Chong & Carraro, 2006). This means that the software must appear as if the tenant were the sole owner of the application (Mietzner, Metzger, Leymann, & Pohl, 2009). The customers are able to customise the application to their business and personal needs.

This customisation is not done at code level, but at the meta-data level (Chong & Carraro, 2006). This configures application behaviours and appearances to suit the clients' needs. Thus, the vendor is required to make the process of customisation easy for the customer. Multi-tenancy can be implemented at the operating system, middleware, virtual machine and application level. The application layer has four maturity levels (Arya, Venkatesakumar, & Palaniswami, 2010). At Level One, the vendor architecture has a separate instance for each tenant, and each has his/her own code base; this level is similar to ASP (Hudli, Shivaradhya, & Hudli, 2009). The vendor must create copies of the application requiring customisation.

At Level Two, the vendor also creates a separate instance for each customer, but the tenants utilise a single code base. The application might fail scaling, due to load (Hudli et al., 2009). Level Three utilises the same instance for multiple tenants. However, this level has configurable metadata for the tenants. Level Four makes use of multiple instances shared among the tenants, and a load balancer enables the scaling of applications. Level Four is the most mature application layer, as it supports multi-tenancy, and allows customers the use of any of the multiple instances, while maintaining scalability by using a load balancer (Arya, Venkatesakumar, & Palaniswami, 2010; Chong & Carraro, 2006; Hudli, Shivaradhya, & Hudli, 2009) . The figure below shows the different maturity levels of SaaS.

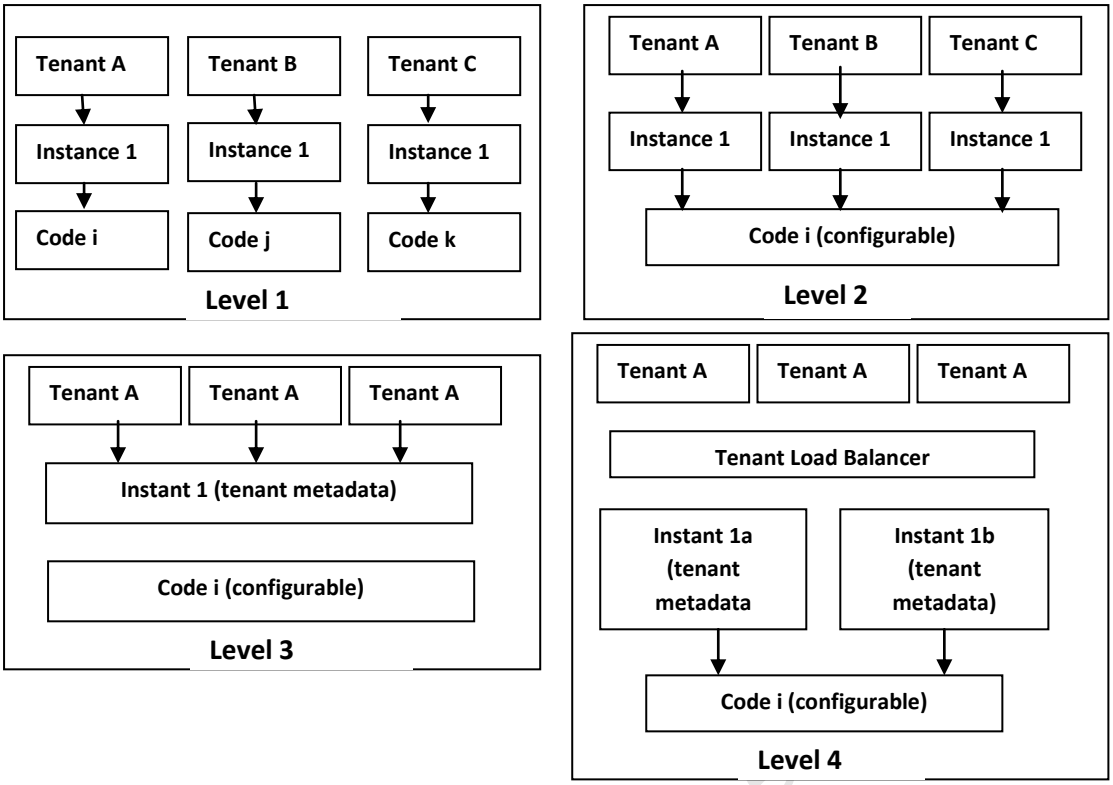


Figure 1: Four Levels of SaaS Maturity Model (Arya et al., 2010)

2.1.4 SaaS Benefits and Advantages

This section lists and explains the benefits and advantages of SaaS.

Immediacy

SaaS can be provisioned and used quickly because SaaS offers its services and storage on demand. On-premise software projects can take weeks or months to acquire, configure and run in the business (Basal & Steenkamp, 2010; ISACA, 2009). This essentially rewards organisations with the ability to quickly amend software, if they are not satisfied with the product; it also reduces the cost related to time delays. Users benefit from usage of the latest software.

Pay As You Go or Subscription Pricing Model

This pricing model is more attractive because, unlike other on-premise software, it does not require the client to pay upfront. This reduces the risks associated with acquiring and using software. The cost of using SaaS can be significantly lower compared with on-premise

software because the client only pays for what he/she uses. It also offers the client some level of flexibility, as the customer can terminate the use of the software at any given time after the subscription period and thus stop paying.

Superior IT Infrastructure

Running a data centre can be complicated and challenging. Small to medium-sized organisations are usually constrained in providing high reliability as it is relatively expensive. SaaS vendors are better skilled, well equipped and more experienced because this is their core business (Deyoja, 2008). Thus vendors have large data centres with a wealth of resources that can provide better availability and performance.

Software Maintenance

The software is maintained by the vendor. The client is responsible for client-side application customisation. One of the challenges facing the client with respect to on-premise software is the installation of the latest software updates. Contrary to this, the SaaS vendors are responsible for any software updates, and software upgrades and updates happen almost without the customer noticing.

Efficiency

All the software maintenance and hosting responsibilities are done by the vendors. This saves valuable time and financial resources, which allow the customers to focus on their core business. This could lead to potential business and product growth, and result in sustainable business for the customers.

Mobile Computing

On-premise software limits the user's mobility. Additional licences are usually required to allow use of the software on multiple machines in different locations. Now, the user can work from the office and/or from home, by simply connecting to the internet and using the SaaS application. Furthermore, the SaaS applications are web based; this allows vendors

(e.g. Google, SalesForce.Com and others) to provide mobile phone support by offering a mobile version of the SaaS application.

2.1.5 SaaS Challenges and Disadvantages

Limited Customisation

One of the major challenges facing SaaS is that customisation by clients is only applied at the metadata level. Customisation applied at this level is less flexible when compared with the client's access to code. The customizers will have to utilise application programming interface (API) to build code on top of the application, in order to achieve significant customisation.

Long-Term Sticker Shock

SaaS may seem cheap for organisations and individuals; however, many organisations are concerned about the skyrocketing costs associated with using SaaS. The acquisition of configuration services and exceeding the storage limit can lead to additional charges (Deyoja, 2008). Furthermore, SaaS users might incur unforeseen expenses during the contract or the subscription period, as they are unable to enforce the service level agreements (SLA) due to their poorly defined nature.

Integration Problems

Organisations usually have their own information systems in place. Thus, integration with the SaaS application would be important in order to fulfil their business requirements. SaaS offers few integration options (Lassila & Pöyry, 2006). Therefore, it is of great value to consider integration when choosing a SaaS solution. There are different SaaS integration technologies and skills that exist to successfully implement SaaS. These are:

1) API provided by the SaaS vendor

2) SaaS integration technology from a third party

3) a systems integrator (Deyoja, 2008).

However, to fully implement and integrate SaaS with legacy systems would result in additional costs being incurred by the customers.

Lack of Open Standards

The lack of open standards in SaaS makes it difficult to integrate with other applications (on-premise or other SaaS applications) (Vaquero et al., 2009). This renders it difficult for customers to switch between vendors and interface with multiple clients. Therefore, this creates vendor lock-in.

Upgrade Incompatibility

Software maintenance might be free and done by the SaaS vendor; however, there are still concerns for customers. For instance, upgrades to software might drastically change the functionality of the SaaS application. Consequently, the customers might have to turn to IT support. This is more problematic as customers have little or no control of the software, as is the case with on-premise software (Deyoja, 2008). On-premise software allows the user more control of when software upgrades should take place.

Perceived Security Concerns

SaaS utilises the vendor's infrastructure efficiently by sharing its resources with customers. However, there are concerns regarding data privacy. SaaS data is stored in the cloud, which can cause data location problems (Basal & Steenkamp, 2010; Jacobs, 2005). There is also the threat posed to data by malicious software (Chandramouli & Mell, 2010). Security and privacy are underlined as key factors that determine the continued use of SaaS and SaaS adoption (Benlian, Koufaris, & Hess, 2010).

Barriers to Entry in Developing Countries

Poor telecommunications infrastructure (limited bandwidth, expensive and unreliable internet) is not an issue in developed countries, but it is an issue in developing countries (Basal & Steenkamp, 2010). Internet bandwidth is more expensive in developing countries than it is in developed countries. Moreover, the internet is unreliable and not as easily accessible as it is in developed countries.

2.2 SME Definition and Characteristics

This section outlines discourse on SMEs. It first defines the size of SMEs, and then describes the important role of SMEs as well as the role that ICTs (Information Communication Technologies) play in SMEs. A brief literature review on ICT adoption benefits and challenges is discussed.

2.2.1 SME Size

SMEs are defined according to their size in terms of the number of employees, turnover per year and asset value (Dietsch & Petey, 2004; Riemenschneider, Harrison, & Mykytyn, 2003). Researchers and governments in different countries define SMEs differently, according to their country's context. There is no fixed SME size globally; however, there is considerable overlap between the different SME definitions. In this research, SME size and turnover are defined, according to the South African National Small Business Act of 2003 (Government Gazette., 2003).

The SA National Small Business Act defines the SMEs according to the number of employees, the turnover and the asset value per sector. Defining SMEs, according to the SA Small Business Act, prevents the process of re-inventing the wheel, and it provides an SME standardisation for the context of South Africa. The SME definition per sector can be found in Appendix 1.

2.2.2 SME Role

SMEs play a significant role in economic growth and innovation by creating jobs, by contributing a significant percentage towards the Gross Domestic Product (GDP), and by having a positive impact on socio-economic development in communities (Wolcott, Kamal, & Qureshi, 2008). SMEs support industrialisation in at least two ways: firstly, by graduating to become large enterprises and, secondly, by owners of SMEs ensuring that the next generation establishes bigger businesses by utilising their accrued capital (Kotelnikov, 2007).

2.2.3 Role of ICTs in SMEs

ICTs enhance and support growth, extend SMEs to local and global markets, and reduce costs of an operation (Qiang, Clarke, & Halewood, 2006; Qureshi, 2005; Raymond, Bergeron, & Blili, 2005). Figure 2 illustrates the dynamics of two aspects of reaction to competitive pressure on SMEs. The picture on the left in Figure 2 shows the dynamics of what typically happens to most SMEs when there is competitive pressure. SMEs lose their customer base to competition in the form of new SMEs and foreign companies. As a result, the current SMEs are forced to reduce their prices, in order to compete.

Kotelnikov (2007) argues that SMEs should ideally react creatively and aggressively by utilising ICTs to expand their distribution channels and to innovate effective and efficient business processes and/or products.

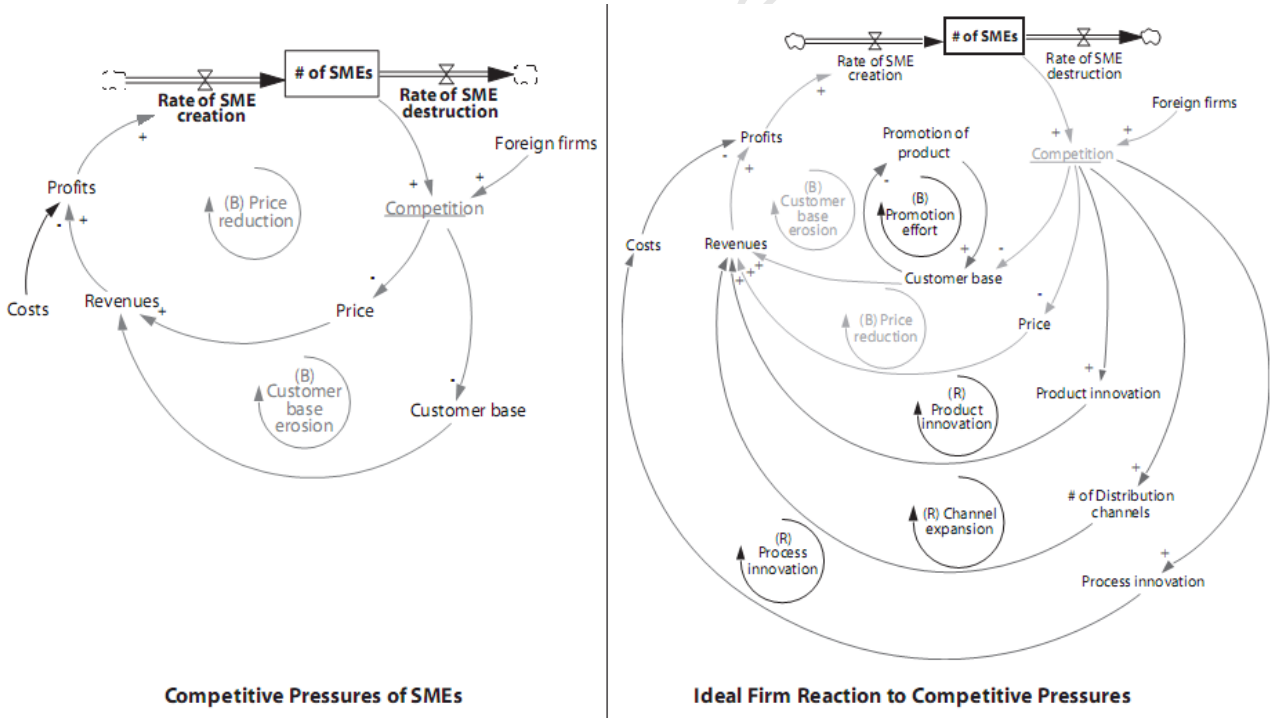


Figure 2: A Systems Dynamics View of a Firm's Response to Competitive Pressures (Kotelnikov, 2007)

2.2.4 Adoption and Use of ICTs within SMEs

SMEs in the developing and developed world encounter challenges using ICT (Barba-Sánchez, Martínez-Ruiz, & Jiménez-Zarco, 2007; Matthews, 2007; Tan, Chong, Lin, & Eze, 2010; Wolcott et al., 2008). However, these challenges may be more pronounced in developing countries due to their poor infrastructure. SMEs may be aware of the possible benefits of ICT adoption, but they have limited knowledge and the lack of supporting infrastructure and security have hindered their decision to adopt (Matthews, 2007; Tan et al., 2010). Also, ICT adoption has moved from being optional to becoming a necessity (Tan et al., 2010). Kotelnikov (2007) acknowledges there is no "one-size-fits-all" ICT solution; and SMEs should adopt ICTs at varying levels. ICT has enabled SMEs to run their businesses more effectively and efficiently, and to enhance their knowledge and skills (Qureshi, 2005).

Moreover, ICTs have enabled SMEs to access local and global markets to compete or partner with large companies in developed countries (Matthews, 2007). ICT adoption has been linked with cost reduction (Qureshi, 2005)and sales growth (Qiang et al., 2006), as well as with business growth support (Kotelnikov, 2007; Qiang et al., 2006) and good export performance (Raymond et al., 2005). Matthews (2007) cautions that it is dangerous to give credit solely to ICTs since ICT investment, coupled with organisational and internal investment, has contributed to positive growth and the sustainability of SMEs.

2.2.5 Barriers to ICT Adoption and Use

Developing countries are bound by greater challenges for ICT than those in developed countries (Kapurubandara & Lawson, 2007). The barriers that exist can be differentiated between internal and external barriers to SMEs. Poor understanding and awareness of ICT, limited ICT literacy and skills, poor education and lack of technical skills, high cost of ICT equipment and human capital deficiency are the main internal barriers to ICT adoption (Fink & Disterer, 2006; Qiang et al., 2006).

These barriers are prevalent in SMEs in both developing and developed countries. A major difference between developing and developed countries is the lack of support in the form of telecommunications infrastructure, the high cost of bandwidth, a lack of skills and poor

regulation or over-regulation of ICT policies in developing countries (Fink & Disterer, 2006; Kapurubandara & Lawson, 2007; Qiang et al., 2006). SMEs need to find solutions or suitable support to mitigate these inhibiting factors regarding their ICT adoption – despite the lack of a support system.

The support structures can assist by improving the telecommunications infrastructure and the pricing structure (Kapurubandara & Lawson, 2007). Adoption is also affected by the extent of the current technology being used within an organisation (Cloete, Courtney, & Fintz, 2002).

2.3 NPO

Non-profit organisations (NPOs) are important to society, to the economy, to politics and to culture. This section defines NPOs and discusses the role and characteristics of NPOs. Additionally, it explores current NPO ICT adoption, ICT's role for NPOs, and the factors that have inhibited the adoption of ICTs.

2.3.1 NPO Definition and Characteristics

NPO are non-profit civil society organisations seeking to promote social, economic, environmental, political and cultural interests (Anheier, 2004; Parker & Selsky, 2004; Selsky & Parker, 2005). NPOs include advocacy groups, foundations, charities, and a diverse group of social service organisations (Parikh, 2009).

There are mainly two types of Non-Governmental Organisations (NGOs) serving different purposes: operational NGOs and advocacy NGOs. The purpose of an operational NGO is to design and implement the development-related projects, while advocacy NGOs' purpose is to promote a specific cause. Community-Based Organisations (CBOs) are commonly referred to as 'grassroots' organisations (Types of NGOs, 2010). They are often smaller than NGOs; and they are unique, because they are frequently membership-based and they represent the local community. In addition to community social involvement, CBOs sometimes provide business services (Parikh, 2009). For example, CBOs offer financial assistance to help small

farmers achieve economies of scale; the funding comprises aggregated monies from different members of the CBO.

Many NGOs and CBOs that do not participate in economic activity rely primarily on private donations or grants from foundations or government agencies. NPOs are thought to be not competitive; however, they compete for funding and volunteers and they also contribute significantly to the economy (Hackler & Saxton, 2007; Haselkorn & Walton, 2009; Zorn, Flanagin, & Shoham, 2011). The workforce in most NPOs is usually on a voluntary and temporary basis (Haselkorn & Walton, 2009; Maiers, Reynolds, & Haselkorn, 2005). Furthermore, staff turnover is high, peaking at approximately 80% (Maiers et al., 2005). This translates to a lot of new staff being required to be trained, each time they join the respective NPO.

2.3.2 NPO ICT Adoption and Use

Parikh (2009) suggests that NPOs should fulfil a number of information and communication needs, in order to accomplish their mission. Generally, NPOs have lagged behind businesses in ICT investment; however, donors and other stakeholders have urged NPOs to adapt ICTs– and many have done so (Haselkorn & Walton, 2009). Despite this, many NPOs view ICTs as "overhead", thus rendering them redundant as a fundamental resource in fulfilling their mission (Haselkorn & Walton, 2009; Maiers et al., 2005).

NPO funding is usually short-term and project-based; consequently, NPOs have limited resources to invest in long-term ICT resources (Haselkorn & Walton, 2009; Maiers et al., 2005).

Staff size, management discretion, management demographic characteristics, technology expertise, government funding and donor commitment are all characteristics that influence the investment of technology in NPOs (Finn, Maher, & Forster, 2006; Hikmet, Bhattacherjee, Menachemi, Kayhan, & Brooks, 2008). Studies have shown that ICTs enhance efficiency and effectiveness (Noir & Walsham, 2007; Zorn et al., 2011). Moreover, they increase transparency and legitimacy for stakeholders by using internet-based tools, such as

collaborative websites and blogs (Madsen & Vaccaro, 2011; Noir & Walsham, 2007; Vaccaro & Madsen, 2009).

2.3.3 NPO Barriers to ICT Adoption

The donor funding for NPOs is usually short term (Heeks, 2002). Furthermore, there is a lack of sustainability policies or strategies to develop human resources and ICT (Lead Team, 2005). Funding fragmentation is a common problem for NPOs. As a consequence, this renders NPOs ineffectual in fulfilling their mission. Funders usually have their own objectives, with which NPOs have to align themselves. Thus, fragmentation can result in gaps, overlaps and a lack of definition of the business process, technological solutions and reports (Chilundo & Aanestad, 2005; Monteiro, 2003).

The context of developing countries affects most NPOs; these comprise skills shortages and poor infrastructure (telecommunications, electricity, roads and transportation) (Waema, 2002). These factors impede the adoption of ICTs. Poor infrastructure and skills shortage (and low workforce turnover), in addition to donor fragmentation policy, result in aggregated adoption barriers for NPOs in developing countries.

2.4 Similarities and Differences between SMEs and NPOs

This section highlights the similarities and differences between small to medium sized organisations (NPOs and SMEs). They both have limited skills, a small workforce, poor ICT infrastructure and also suffer from a resource scarcity (Barba-Sánchez, Martínez-Ruiz, & Jiménez-Zarco, 2007; Haselkorn & Walton, 2009). SMEs support themselves by generating revenue and most of their staff are paid (Kotelnikov, 2007; Wolcott, Kamal, & Qureshi, 2008), while NPOs depend on external funding and some of their staff volunteer (Haselkorn & Walton, 2009; Parikh, 2009). Table 1 below illustrates the similarities and differences.

Table 1: Similarities and Differences between SMEs and NPOs

SMEs	NGOs
Limited skills	Limited skills
Limited workforce	Limited workforce
Paid workforce	Paid and volunteer workforce
Limited ICT knowledge	Limited ICT knowledge
Poor ICT infrastructure	Poor ICT infrastructure
Resource scarcity	Resource scarcity
For Profit	Make a positive change in economics, society and politics
Generates and depends on revenue	Generates and depends on funding

2.5 SaaS Current Adoption and Adoption Factors

This section explores the literature on SaaS adoption. It studies surveys and empirical studies in order to explore the adoption of SaaS in the industry. Most of the current literature explores organisations of all sizes and organisations in developed countries.

2.5.1 SaaS Adoption

Most of the SaaS literature accentuates the technology and the business model (Arya et al., 2010; Concha, Espadas, Romero, & Molina, 2010; Hudli et al., 2009). This is valuable as it brings knowledge and understanding of the technology and business model, which in turn, leads to related research in understanding the adoption of SaaS. Most of the literature on SaaS adoption is for organisations of all sizes. SaaS has been cited as the best solution for SMEs around the world (Dubey & Wagle, 2007; Kern, Kreijger, & Willcocks, 2002).

However, empirical research and surveys have shown that for both SMEs and large enterprises that have adopted SaaS, size does not affect the process of adoption (Benlian et al., 2009; Kaplan & Consultant, 2005). Furthermore, empirical studies show that large enterprises identify significant opportunities for utilising SaaS in different areas of their business (Benlian et al., 2009). However, some large enterprises are often slow to adopt SaaS because of the cost of on-premise software investments (Roberts, 2010). Organisations face the challenge of weighing the trade-offs of the benefits of “scalability, reliability, security, ease of deployment, and ease of management for customers” against the associated risks of “trust, privacy, availability, performance, ownership, and supplier persistence” (Erdogmus, 2009, p.5).

There is a need for major software upgrades, and the costs of ICTs are continually on the rise. However, the compelling benefits of SaaS are expected to catalyse the adoption of SaaS (Software World, 2010).

The main adoption barriers are application quality (i.e. application performance and scalability), application reliability (i.e. steady services) and information security and privacy concerns (i.e. wrongful access of company data, security breaches) (Benlian et al., 2009). Non-adopters are sceptical about the promise of lower total cost of ownership after the adoption of SaaS. Thus, SaaS adopters and non-adopters are guided by different factors (Benlian & Hess, 2011).

Cost efficiencies, quality improvements, improved application performance, economic decisions, and strategic flexibility are the principal contributors to the decision to outsource (Benlian & Hess, 2011; Gewald, Wüllenweber, & Weitzel, 2006; Gewald & Dibbern, 2009).

Moreover, cost efficiencies, quality improvements and strategic flexibility are all dominant factors in the adoption of SaaS (Benlian & Hess, 2011). Rapport with the vendor, flexibility of contracts, SaaS features and functionalities, responsiveness by the vendor, and the ability of the vendor to meet the expectations of the clients will determine the continued use of SaaS (Benlian et al., 2010).

2.5.2 SaaS Risks

Subashini and Kavitha (2010) identify the key SaaS security issues that need to be considered; they are: data security, network security, data locality, data integrity, data segregation, data access, authentication and authorization, data confidentiality, web application security, data breaches, virtualization vulnerability, availability, backup, identity management and a single sign-on process.

Security risks comprise both technical and perceived security. The degree of perceived security is determined by the technical security and the subjective security. Subjective

security is influenced by the feeling of having some level of control (Heart, 2010; Shin, 2009).

Wu (2010) underlined multiple risks. These risks can be grouped into four categories: organisation and policy risks (e.g. lock-in, loss of governance, poor governance or no governance, service termination or failure), technical risks (e.g. scalability and resource exhaustion, data leakage, system availability and backup), legal risks (e.g. data privacy risk, licensing risk) and network risk (e.g. network intrusion, network breaks, identity management).

Empirical research provides evidence that organisation and individual perception of these risks negatively affect the adoption of SaaS (Benlian & Hess, 2011; Nicolaou & McKnight, 2006; Ravichandran, 2005). Benlian et al. (2010) have highlighted security and privacy as two of the most important quality factors in SaaS utilisation.

2.6 SaaS Readiness

SaaS readiness is vital in measuring the capability of the organisation's resources and external resources (infrastructure, market influence and government) to adopt SaaS; this is particularly true in the context of developing countries. This section focuses on e-readiness research, as SaaS readiness is based on an e-readiness model.

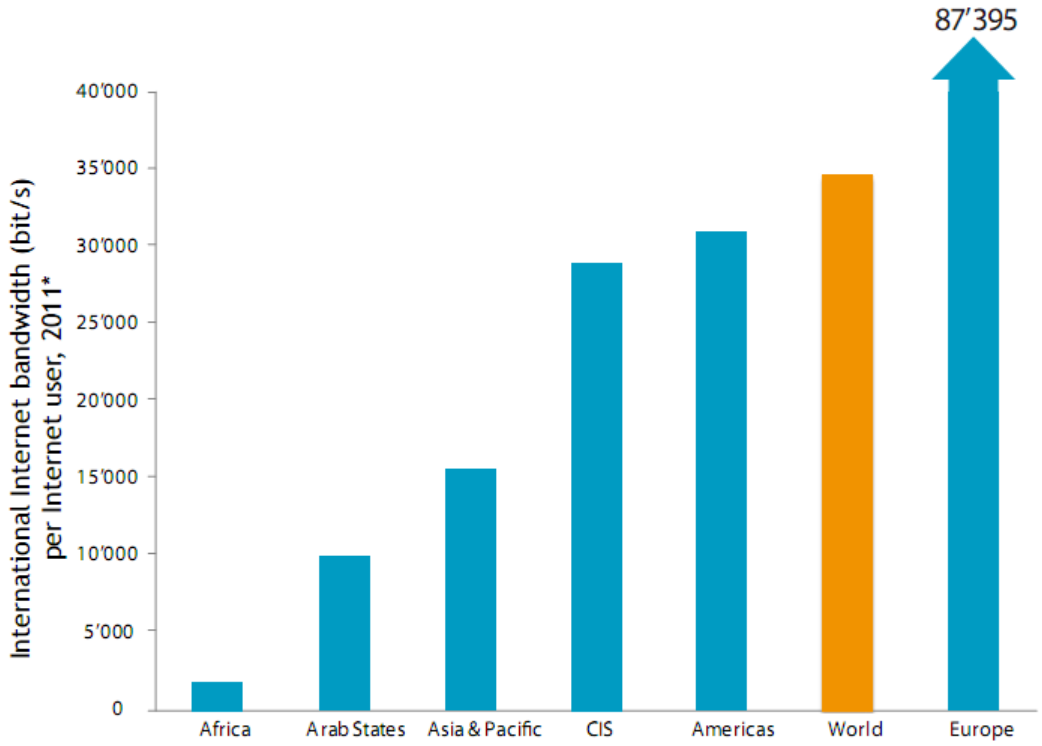
2.6.1 E-Readiness

E-readiness is defined similarly by various researchers – depending on the context and purpose (Maugis et al., 2005; Mutula & Brakel, 2006; Vaezi & Bimar, 2009). E-readiness is an attribute used to measure whether a country has the necessary infrastructure (high bandwidth and reliability at affordable prices), ICTs integrated within organisations (e-commerce applied in daily business), community ICT access (used for everyday and easy access), and government utilisation (e-government) supported by strong competition and an independent regulator that has a commitment to universal access and free local and foreign trade (Maugis et al., 2005; Mutula & Brakel, 2006; Vaezi & Bimar, 2009).

However, this e-readiness definition does not consider skills and organisational capability (capital, awareness and education/skills). Organisational and industry skills are important determinants of successful e-commerce or ICT adoption within organisations, especially in developing countries and within SMEs and NPOs, where there is a lack of resources (skills and capital). Thus, e-readiness assesses the degree of ability and capacity an organisation has to take advantage of any value creation opportunities facilitated by the internet (Maugis et al., 2005).

2.6.2 Current State of E-Readiness in Developing Countries

Figure 3 illustrates a comparison of the international internet bandwidth. This figure shows the average bandwidth per user. This highlights the disparities between the different groups of countries. Europe has the best bandwidth available per user at a staggering 87 395 bits per second, while Africa has the worst at 2000 bits per second. These findings confirm that a lot of the developing countries in Africa face more external challenges than do the developed nations.



Note: * Estimate

Figure 3: Comparison of Internet Bandwidth between the Dorld, developed and Developing Countries (Internet Telecommunications Union, 2011)

Table 2 illustrates a comparison of countries and a group of countries' internet statistics. The internet statistics are based on millions of Speedtest.net and PingTest.net speed tests. However, the quality, the cost of the internet and the promise are often measured over a year period. The data show the grouping of the European (EU), Organisation for Economic Cooperation and Development (OECD), Group of Eight (G8) and Asia Pacific Economic Cooperation (APEC) countries.

The BRIC (Brazil, Russia, India and China) economy countries are illustrated individually, together with other developed and developing or emerging economies. The BRIC economy countries all perform better than South Africa with regard to speed, cost and promise – with the exception of India. The statistics show that developed countries generally have faster, more affordable and better internet quality than the emerging or developing countries. Russia's is the highest ranked emerging country, in terms of all determinants, and the internet speed is marginally slower than it is in the G8 countries, but marginally higher than it is in the APEC countries. South Africa has the most expensive internet, and the second

worst promise in the countries listed in the table. From the statistics, it is safe to infer that South Africa has slow internet speed, moderate quality internet connection, and poor fulfilment on the promised internet speed.

Table 2: Internet Statistics around the World from NET INDEX (Ookla, 2011)

	Download Speed	Download speed ranking	Upload Speed	Upload Speed ranking	Quality (R-factor)	Quality ranking	Cost per USD	Cost USD ranking	Promise on Speed	Promise ranking
EU	12.82 Mbps	N/A	3.66 Mbps	N/A	83.4	N/A	5.1	N/A	85.3%	N/A
OECD	11.29 Mbps	N/A	2.68 Mbps	N/A	82.7	N/A	5.99	N/A	83.6%	N/A
G8	11.16 Mbps	N/A	3.6 Mbps	N/A	83.1	N/A	5.62	N/A	80.1%	N/A
APEC	9.03 Mbps	N/A	3.36 Mbps	N/A	82.5	N/A	13.44	N/A	83.0%	N/A
Brazil	5.84 Mbps	63	1.19 Mbps	96	73.8	60	16.14	53	94.9%	21
Russia	10.64 Mbps	37	8.58 Mbps	15	86.9	4	2.79	10	98.1%	8
India	1.7 Mbps	141	0.88 Mbps	122	N/A	N/A	24.27	58	83.3%	43
China	5.27Mbps	67	2.88 Mbps	38	81.2	45th	6.26	33	86.7%	33
South Africa	2.93 Mbps	100	1.13 Mbps	101	83.7	29	39.01	64	74.4%	54
Mexico	4.34 Mbps	75	1.02 Mbps	109	N/A	N/A	14.17	49	85.2%	38
Egypt	1.34 Mbps	150	0.48 Mbps	159	70.5	26.17	26.17	59	83.6%	42
USA	12.53 Mbps	32	3.01 Mbps	36	82.5	42	4.93	30	93.5%	25
UK	11.95 Mbps	34	1.99 Mbps	57	85.6	17	3.53	18	73.1%	56
Japan	13.61 Mbps	29	10.42 Mbps	11	N/A	N/A	N/A	N/A	N/A	N/A

2.7 Identified Gaps

Over the years, most of the SaaS literature has accentuated the technology and the business model (Arya et al., 2010; Chong & Carraro, 2006; Concha et al., 2010; Hudli et al., 2009). This proved valuable, as it brought knowledge and understanding of the technology and business model, which in turn, led to related research in understanding the adoption of SaaS. However, SaaS readiness is an understudied phenomenon in SaaS research; hence, it provides considerable opportunities to study this area.

There is limited research on the adoption of SaaS in developing countries. There is virtually no research that studies SaaS adoption in either SMEs or NPOs in developing countries. This study will be virtually the first to investigate the adoption of SaaS in SMEs and small-to-medium NPOs in a developing country context. It will make a comparative analysis of these two organisations.

3 THEORETICAL FRAMEWORK

A theoretical framework that assesses SaaS readiness and adoption for NPOs and SMEs is required. This framework should assess SaaS readiness and still be able to address the developing country's constraints. From the literature, SMEs and NPOs are characterized as small or medium-sized organisations with a lack of resources. The major difference between the two is that NPOs are not for profit and some NPO staff are volunteers.

3.1 Diffusion of Innovations Theory

Diffusion of Innovations (DOI) theory studies the innovation and adoption process. Rogers (2003, p.5) defines diffusion as "…the process by which an **innovation** is **communicated** through certain channels over **time** among the members of a **social system**". The four highlighted words or phrases are the key elements of the theory. According to Rogers (2003, p.12), innovation is "an idea, practice or object that is perceived as new by individual or other units of adoption".

Both definitions of diffusion and innovation unite the definition of DOI theory. This theory provides a rich analytical tool for organisational SaaS adoption, or non-adoption. There are five characteristics that influence the rate of diffusion of innovation: relative advantage, compatibility, complexity, trial-ability and observe-ability.

3.2 IS Outsourcing Theories

The SaaS adoption decision is strongly related to the Information Systems (IS) outsourcing theory, because the application is not owned by the client. Researchers (Benlian et al., 2009; Xin & Levina, 2008) have applied several IT or IS outsourcing theories to determine the adoption of SaaS. Some researchers have analyzed outsourcing decisions, based on the outsourcing theories (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004). The Resource Based View (RBV), Production Cost Economies (PCE) and Property Rights Theory (PRT), as well as the Total Cost Theory (TCT) explain asset uncertainty, asset specificity and the strategic value of IT or IS decisions.

The Institutional theory and the IT governance theory are both essential for decision-making. Institutional theory is considered in the Perceived E-Readiness Model (PERM). This will be discussed in the following chapter. IT governance theory is not considered because it is not seen as a significant element since SMEs and NPOs typically have minimal ICT infrastructure running. Appendix 1 gives a summary of the theories.

3.2.1 Application Specificity

Application specificity is the degree to which applications can be customised to meet client requirements and/or desires; the higher the degree of specificity the more customised an application is. Usually, commercial off-the-shelf software has generic functions and features; this also applies to SaaS solutions. When commercial software functionality does not fit with clients' idiosyncratic business processes, clients have the option of adapting their business processes to fit the new application, or of customising the new application to suit their business process (Francalanci, 2001; Soh, Kien, & Tay-Yap, 2000).

Since, SaaS does not allow clients to customise the core application (code level), the client might need to build customising components, by using API to meet the desired customisation. According to TCT, an asset with high specificity is managed less costly in-house, while the rest of the assets should be outsourced to obtain better efficiency (Williamson, 1991).

For example, when an organisation in-sources a highly specific application, any upgrade that is done must be implemented with a consideration of the current applications. In outsourcing mode, the vendor cannot fully meet every other clients' software needs or even consider them, because they trade-off with their own needs of decreasing the cost of the operation. PRT (Hart & Moore, 1990) argues that the client has little incentive to customise software to their needs because of the potential hold-up problem by the vendor (Susarla, Barua, & Whinston, 2001). The vendor's ownership of the SaaS application and the client's investment in customisation gives the vendor more bargaining power in the future.

For example, a vendor can choose to increase prices and to not support any backward compatibility (Xin & Levina, 2008), or he can change the application business processes.
IS studies that investigated asset specificity obtained mixed results. Some of the authors did not find any significant relationship between asset specificity and outsourcing (Benlian et al., 2009; Susarla et al., 2001). Furthermore, there is some level of inconsistency between asset specificity and the outsourcing relationship (Aubert, Rivard, & Patry, 2004).

If IS provisioning requires high levels of customisation, Dibbern et al. (2005) have shown that it is more cost effective and advantageous not to outsource by using IS as a strategic tool (Dibbem, Chin, & Heinzl, 2005). Benlian et al. (2009) identified application specificity as being the most important driver of SaaS-based applications.

3.2.2 Application Uncertainty

Application uncertainty is defined as the uncertainty to adopt technology or software due to a lack ofawareness of the benefits compared with the challenges and uncertain environmental conditions (pricing, processes or market change) (Benlian et al., 2010). Asset uncertainty, which is somewhat similar to application uncertainty, can be an inhibiting factor in outsourcing (Blumenberg, Beimborn, & Koenig, 2008) and can adversely affect the extent of outsourcing (Williamson, 1991).

Earlier studies found that uncertainty had a significant effect on outsourcing; as a result, high uncertainty caused less outsourcing (Nam, Rajagopalan, Rao, & Chaudhury, 1996). Furthermore, it was found that the uncertainty level was a major inhibitor to IT outsourcing (Aubert et al., 2004).

In information technology (IT), outsourcing technology uncertainty (technical functions, features or hardware) and business uncertainty (pricing, processes or market change) are influenced by environmental uncertainty (Dibbern, 2004). In order for business to adapt to changes in uncertain environmental conditions, RBV and PCE argue that organisations should disintegrate, in order to increase their flexibility (Levina & Ross, 2003; Slaughter & Ang, 1996).

High levels of uncertainty in the IS or IT market, together with uncertainty of the needs of the organisation, could be more expensive for organisations to outsource (Ang & Cummings, 1997; Loh, 1994; Nam et al., 1996; Poppo & Zenger, 1998).

3.2.3 The Strategic Value of IT and Application Inimitability

Different researchers have contributed to the development of a resource-based framework. Pitelis uses Penrose's (Penrose & Pitelis, 2009) work to interpret the resource-based view (RBV). By using RBV, companies can be seen as a collection of capabilities or resources that can be heterogeneously dispersed, thereby enabling each company to successfully compete against another. An organisation differentiates itself from current and potential future competition if some of its valuable resources are inimitable and non-substitutable (Peteraf, 1993; Quinn & Hillmer, 1995).

These can be tangible or intangible resources, such as software applications, brand value or business process. Often software that automates the strategic business process requires a higher degree of customisation (Prahalad & Hamel, 2006). Clients will be less likely to adopt SaaS applications because of the limited customisation offered by SaaS applications. However, organisations are willing to outsource highly imitable applications such as, for instance, Office because it is easily substitutable.

Potter and Miller (2009) believe that the deployment of IT will reduce the costs thereof, and improve the differentiation by improving performance or by enabling new business ventures (Porter & Millar, 1999).

3.3 E-Readiness Model

Organisations in developing countries which adopt ICTs, especially e-commerce, encounter unique challenges compared with organisations in developed countries, where these challenges are virtually non-existent or negligible. These challenges are a lack of efficient, reliable and affordable infrastructure, a lack of skills, and a lack of support (suppliers, strong competition among suppliers and an independent regulator). Thus, this makes e-readiness

research an imperative in developing countries for the adoption of new technology, such as SaaS or Cloud Computing.

There is a significant amount of e-readiness research that has been done. However, most of the models measure a country's or a region's readiness (Ang & Straub, 1998; Ifinedo, 2010); others accentuate technology (Claycomb, Iyer, & Germain, 2005; Davis, 1989; Rogers, 1983). Furthermore, most models are designed not for developing countries, but rather for developed countries. It is also of importance to acknowledge that decision-making in developing countries is often highly centralised (Wang, Tang, & Tang, 2001). Thus, the manager's perception regarding "their organisation, innovation, and their environment is likely to be critical in adopting e-commerce" (Molla & Licker, 2005, p. 878). Organisational models are key determinants of internal characteristics, while environmental determinants are the key to external characteristics that influence adoption (Molla & Licker, 2005b).

Molla et al. (2005a) proposed a perceived manager's e-readiness model that assesses managerial, internal, organisational and external issues as determinants for e-commerce adoption. This model is somewhat more comprehensive because it captures a significant number of factors that contribute to the adoption of e-commerce. The model groups two sets of constructs: Perceived Organisational E-Readiness Model (POER) and Perceived External E-Readiness Model (PEER) (Molla & Licker, 2005a; Molla & Licker, 2005b).

The POER model measures the manager's perceived organisational factors including awareness, resources, commitment and governance (Molla & Licker, 2005a; Molla & Licker, 2005b), while PEER measures the manager's perceived environmental factors such as government readiness (in this context it is called country's capability), market forces readiness and the readiness of the supporting industries (Molla & Licker, 2005a; Molla & Licker, 2005b). This e-readiness model has been adapted for SaaS readiness, and the two sets of constructs will be used to determine the adoption of SaaS. Figure 4 shows the Perceived E-Readiness Model with the two constructs. The model has been validated and utilised by original designers in South Africa and applied in China (Tan, Tyler, & Manica, 2007).

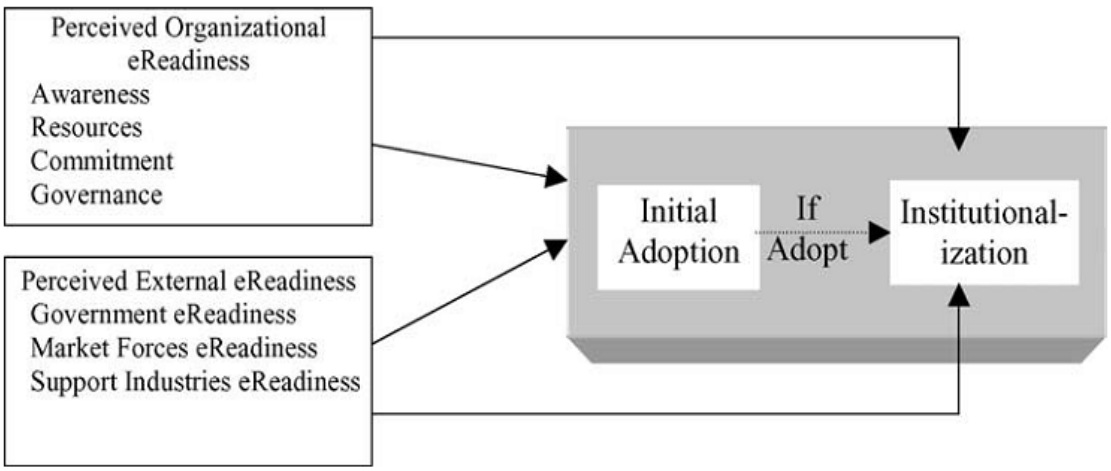


Figure 4: Perceived e-Readiness Model (Molla & Licker, 2005a; Molla & Licker, 2005b)

*Note "Government E-Readiness" in this research is referred to as "Country's SaaS readiness" or "Country's capability".

3.4 SaaS Theoretical Models

There is currently a SaaS adoption model that focuses on the client's adoption factors (Xin & Levina, 2008).This framework is developed from PRT, PCE, TCT and RBV and IS theories to identify the SaaS adoption factors. These factors are: degree of desired software customisation; demand uncertainty for functionality; demand uncertainty for service volume; the client's cost of capital, the number of users; the Client's IT capabilities; the strategic importance of IT application; Institutional influence; and Enterprise IT architectural maturity (Xin & Levina, 2008). Figure 5 illustrates the model. This model does not yet have results, and it has not been validated; thus, the validity of this framework is still questionable.

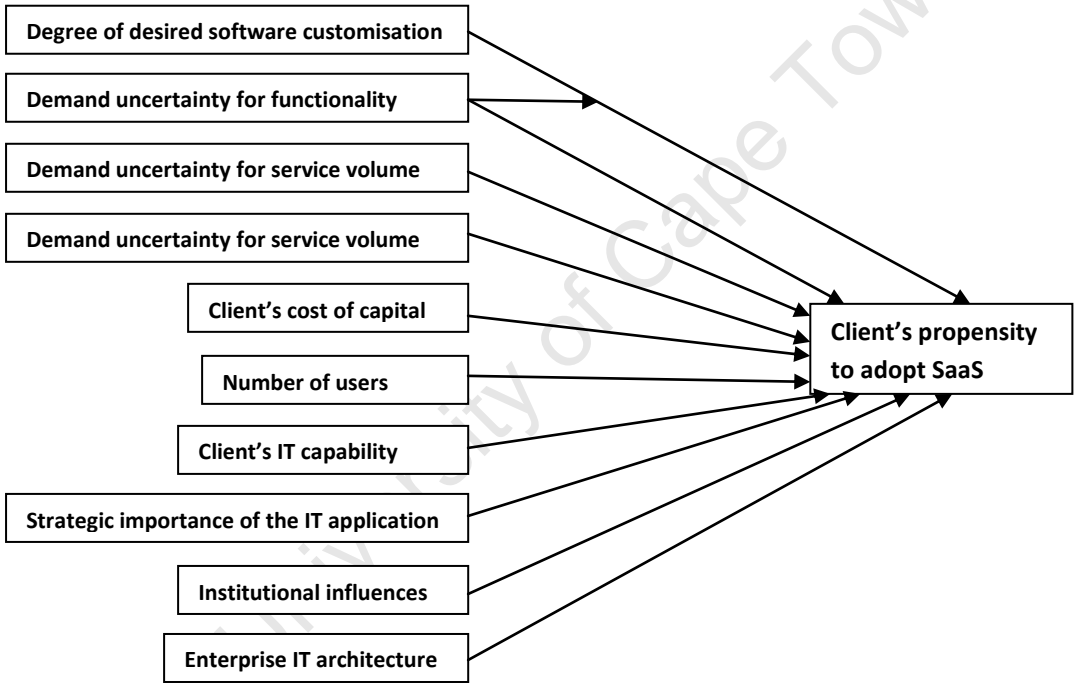


Figure 5: Software-as-a-Service Model: Elaborating Client-Side Adoption Factors (Xin & Levina, 2008)

There is another model that evaluates the drivers of SaaS adoption from a range of different application types (Benlian et al., 2009). The framework categorises the factors into three SaaS adoption constructs: RBV of SaaS, TCT of SaaS and the theory of planned behaviour (TPB). The TCT has application specificity and application uncertainty factors, RBV has strategic value of application and application inimitability as factors, while TPB has attitude

toward SaaS adoption and subjective norm as factors of adoption (Benlian et al., 2009). Figure 6 illustrates the multi-theoretical SaaS adoption model.

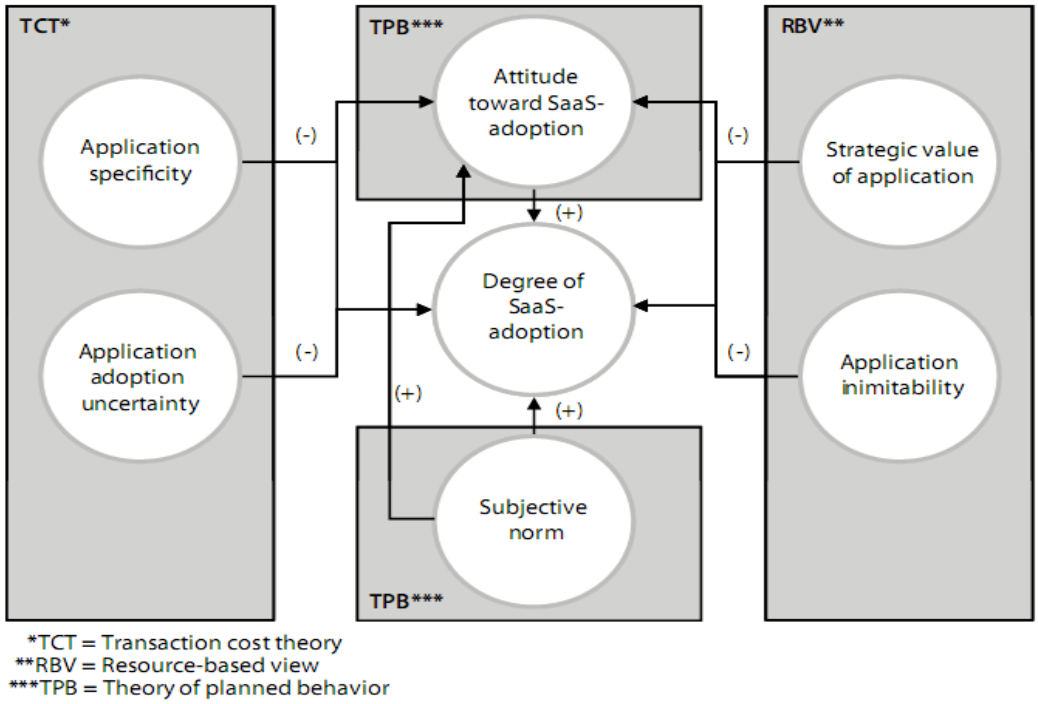


Figure 6: Multi-Theoretical SaaS Adoption Model (Benlian et al., 2009)

Both SaaS models are well developed, but they have not yet been validated by a different researcher. The models only focus on adoption factors, rather than on the readiness to adopt; in addition, the research was applied in developed countries. These frameworks do not address the maturity of the telecommunications infrastructure, the regulatory bodies and any other factors which might inhibit or contribute to the adoption of SaaS in developing countries.

The model by Molla et al. (2005a) addresses the adoption of e-readiness for organisations in developing countries by using the PERM. Hence, this model could well be modified to render it more suitable for SaaS adoption. This is a comprehensive model for assessing the readiness in developing countries. However, it does not address outsourcing and business model questions. SaaS is a relatively new outsourcing technology and a business model as well. As a consequence, outsourcing, technology and business-related questions need to be addressed. Thus, the SaaS theoretical framework should be more comprehensive when the PERM is incorporated with some significant SaaS-related adoption factors. This should

provide meaningful determinants for SaaS adoption and readiness that is underpinned by the PERM model, and incorporated into the multi-theoretical SaaS adoption model. The developed research model is illustrated in Figure 7. Although the model of Xin et al. (2008) has not yet been validated, TPB factors were not used within their model. The TPB is omitted in the proposed research model; this was due to the added and unnecessary complexity thereof. The continued use dependent variable is omitted as SaaS is at its early stages of adoption (Benlian et al., 2010) and it would be difficult to measure the continued use of SaaS.

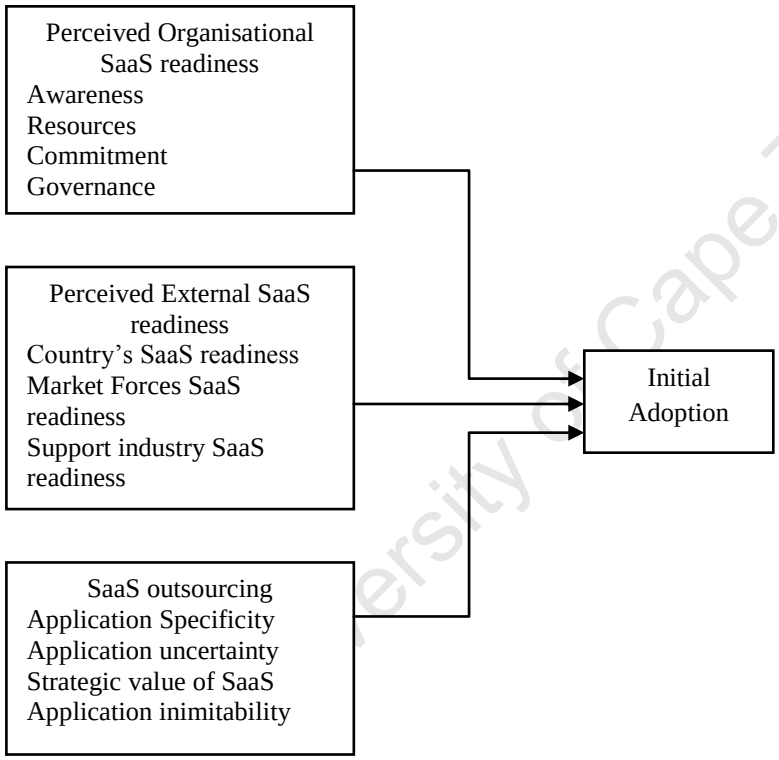


Figure 7: SaaS Readiness Model for SME and NGO in Developing Countries (Benlian et al., 2009; Molla & Licker, 2005a; Molla & Licker, 2005b; Xin & Levina, 2008)

3.5 PERM Research Hypotheses

This section introduces the research hypotheses. The research hypotheses are adapted from the PERM. In the next chapter, it is discovered that the questionnaire was too long. As a result, the SaaS theoretical model questionnaire section was unfortunately omitted. Therefore, only the PERM research hypotheses are included. The dependent variable is SaaS

adoption. However, the PERM uses two dependent variables: e-readiness initial adoption and e-readiness continued use. This study only uses one dependent variable, SaaS initial adoption, as SaaS is at its early stages of adoption and it would be difficult to measure the continued use of SaaS. The hypotheses are grouped into two sets of constructs: perceived organisational SaaS-readiness and perceived external SaaS-readiness

3.5.1 Perceived Organisational SaaS Readiness

Perceived organisational SaaS readiness measures the degree to which managers perceive their organisation to possess the awareness, the resources, the commitment and the governance to adopt SaaS. This section gives a brief description of the proposed hypothesis.

Awareness

Awareness "refers to an organisation's perception, comprehension, and projection of the benefits and risks of…" (Molla & Licker, 2005b, p. 86) SaaS. DOI theory recognises awareness as an important aspect of adoption (Rogers, 1995). However, managers and their subordinates in both SMEs and NPOs face the disadvantage of not having the know-how required to use the technology effectively for information, communication and business operations (Alam & Mohammad Noor, 2009; Barba-Sánchez et al., 2007). Therefore, the following can be argued:

Hypothesis A: Awareness contributes significantly (and is positively related) to the adoption of SaaS.

Resources

Resources refer to the organisation's level of human, technological and other business capabilities. Resource availability affects the ability of organisations to perform through challenges and opportunities (Fink & Disterer, 2006; Lead Team, 2005; Matthews, 2007; Qiang et al., 2006). The financial, human and technological resources of developing countries are lagging behind those of developed countries (Palacios, 2003; Tarafdar &

Vaidya, 2004), and most organisations in developing countries lack experience in doing business that utilises e-commerce (Moodley, 2003; Odedra-Straub, 2003).

Moreover, SMEs and NPOs have an insufficiency of financial resources, human resources and technological resources (Furuholt & Ørvik, 2006; Matthews, 2007; Qiang et al., 2006). Therefore, human, technological and structural forms of readiness are critical in both facilitating and impeding SaaS adoption. Human resources pertain to employee availability (accessibility) with satisfactory (ICT) skills and experience, and other e-commerce-related skills (Zhuang & Lederer, 2006; Zhuang & Lederer, 2006) . Therefore, the following issue may be argued:

Hypothesis HR: The availability of appropriately skilled resources contributes significantly (and is positively related) to the adoption of SaaS.

Business resources comprise capabilities, financial resources and assets (tangible and intangible) and the "openness of organisation communication, risk-taking behaviour and nature of existing business relationships, and financial resources" (Molla & Licker, 2005, p. 87).

Hypothesis BR: The availability of business resources contributes significantly (and is positively related) to the initial adoption of SaaS.

Technological resources comprise an organisation's ICT capabilities, the extent of its ICT adoption and its experience with network-based applications (Kaefer & Bendoly, 2004; Zhuang & Lederer, 2006; Zhuang & Lederer, 2006). Therefore, the following argument is derived:

Hypothesis TR: The availability of technological resources contributes significantly (and is positively related) to the adoption of SaaS.

Commitment

Commitment pertains to the support and energy shown by key members and decision-makers of the organisation (Molla & Licker, 2005b; Tan et al., 2007). These are the members who have the vision and strategy to champion SaaS. E-commerce literature provides evidence that commitment plays a significant role in the success of adoption (Houghton & Winklhofer, 2004; Thatcher, Foster, & Zhu, 2006). Furthermore, studies in developing countries indicate that commitment is a key factor in IS project failure (Wang & Cheung, 2004). These empirical findings are also applicable to SaaS. Therefore, the following argument is derived:

Hypothesis C: Commitment contributes significantly (and is positively related) to the adoption of SaaS.

Governance

Governance is the "…the strategic, tactical and operational model that defines the way organisations structure to establish objectives, allocate resources and make decisions" (Molla & Licker, 2005, p. 89). An organisation's governance influences its adoption of e-commerce and institutionalisation (Chatterjee, Grewal, & Sambamurthy, 2002; Odedra-Straub, 2003). Organisations in developing countries frequently lack good governance (Palacios, 2003). Therefore, the following argument is derived:

Hypothesis GV: Good governance contributes significantly (and is positively related) to the adoption of SaaS.

3.5.2 Perceived External SaaS Readiness

Perceived external SaaS readiness measures the managers' view of the country and the respective institutions and structures that facilitate, promote and support SaaS adoption. It is composed of the country's capability, market forces and support industries.

A Country's Capability

A country's capability refers to an organisation's view of the preparedness of a country and the country's various structures (i.e. ICT infrastructure and policy) that can advance, engender and regulate e-commerce and the introduction of other new technologies (e.g. SaaS) (Reimers, 2003; Tan et al., 2007; Xu, Zhu, & Gibbs, 2004). Government plays a vital role in creating structures, policies and regulations that facilitate the technology, innovation – or in this case – the adoption of SaaS (Alam & Mohammad Noor, 2009; Aljifri, Pons, & Collins, 2003; Hempel & Kwong, 2001).

Studies have shown that regulating bodies in developing countries are not as mature as those in developed countries (Tarafdar & Vaidya, 2004; Travica, 2002). Government, in developing countries, often influences the competitive nature more than, or as much as, the market forces (Cant & Machado, 2008). Thus,

Hypothesis C: The good capabilities of a country contribute significantly (and are positively related) to the adoption of SaaS.

Market Forces

Market forces refer to an organisation's perception of its customers, suppliers and business partners, its competitors and the competitive pressure requirement to use technology (SaaS) (Molla & Licker, 2005a; Tan et al., 2007). The maturity of SaaS also contributes to market forces. Carr (2005) expects the use of non-traditional computing (SaaS and cloud computing) to be driven by reliability, stability and the realisation of the benefits experienced by the early adopters. Generally, ICT adoption is driven by market forces and the early adopters (Alam & Mohammad Noor, 2009; Wang & Cheung, 2004). This theory is applied to SaaS. Therefore,

Hypothesis MF: The readiness of market forces SaaS contributes significantly (and is positively related) to the adoption of SaaS.

Supporting Industries

In developing countries, the infrastructure – and the cost of using this infrastructure – is often a matter of concern for organisations. Supporting industries refer to the existence, the development and the capability as well as the maturity of the ICT industry – and the affordability of external institutions in enabling SaaS, such as service providers, telecommunications, IT industry and trust enablers (Molla & Licker, 2005a; Molla & Licker, 2005b). The ICT industry plays an important role in facilitating and supporting SaaS; telecommunications also play a significant role in being the carrier of SaaS (Kapurubandara & Lawson, 2007). However, both of these key structures are not yet well developed, and bandwidth is expensive in developing countries (Furuholt & Ørvik, 2006; Kapurubandara & Lawson, 2007; Molla & Licker, 2005b). Therefore,

Hypothesis SI: Good supporting industries contribute significantly (and are positively related) to the adoption of SaaS.

4 RESEARCH DESIGN AND RESEARCH METHODOLOGY

This chapter discusses the research design and research methodology. The research takes a positivist stance and uses a survey to collect quantitative and qualitative data. The qualitative data is used to support and provide a richer analysis of SaaS readiness and adoption. The chapter starts with the research philosophy. The next section is research strategy and approach. This is followed by the research theory contributions, the research timeline and research sampling, respectively. This is then followed by the research instrument section, which explains the proposed questionnaire. Finally, the chapter is concluded by the data collection, the ethical issues and the research limitations, respectively.

4.2 Research Philosophy

Research in IS was predominantly positivist up until the early 1990s (Orlikowski & Baroudi, 1991). Since the late 1990s, interpretive and critical research paradigms have been gaining momentum (Denzin & Lincoln, 2003; Walsham, 2006). Orlikowski and Baroudi (1991) argued that each of these paradigms has value and is required for the success of IS research. Currently, the main IS research paradigms are positivist, interpretive and critical research (Guo & Sheffield, 2008).

Positivist research is based on the assumption that the researcher has an objective physical and social view of the world. It is assumed that the researcher plays a neutral role in the research (Guo & Sheffield, 2008). However, interpretive and critical researchers argue that although researchers might attempt to remain aloof from the experiment, they are inherently a component of the research. Positivism is concerned with the empirical testing of theories (Orlikowski & Baroudi, 1991). Furthermore, such research is assumed to be unbiased and value-free (Cavana, Delahaye, & Sekaran, 2001).

Interpretive research does not posit the world as fixed, but rather sees it as an emergent social phenomenon that is based on human conscious and subjective experiences (Orlikowski & Baroudi, 1991). Therefore, the reality is subjectively perceived and the researcher interacts with the research initiative (Cavana et al., 2001). In contrast, the two

other perspectives view critical research as a paradigm that attempts to critically analyse and transform the social reality that is being investigated. Thus, it is concerned with critiquing existing social structures and exposing any contradictions.

This study adopts a positivist stance because it aims to empirically test the hypotheses and validate the PERM for SaaS. Furthermore, the study attempts to arrive at an objective view of SaaS adoption by using existing theories and a theoretical framework. Thus, the purpose here is to verify the theories and adapt the PERM for SaaS. This should expand the knowledge base of the PERM and its capability and authenticate it for SaaS adoption. This would be the first SaaS readiness study to be conducted in South Africa.

4.2 Research Strategy and Approach

There are two research data-collection categories: quantitative and qualitative data. Quantitative data are based on the collection of numbers and statistics through surveys and other methods; furthermore, the researcher remains objectively separated from the subject matter. A researcher can be deductive, inductive or both in the research undertaking. Deductive research occurs when a researcher has a theoretical proposition or hypothesis and attempts to obtain concrete empirical evidence to support this. In contrast, inductive research is when a researcher observes certain phenomena and derives conclusions that lead to the development of a theory (Cavana et al., 2001).

This research collects both quantitative and qualitative data, as each of these approaches increases the rigour and richness of the findings. Quantitative data analysis is deductive in nature, since there is already an existing theory, and the objective is to prove and build on this existing theory. However, the analysis of the qualitative data and their development is inductive in nature.

4.3 Research Theory Contributions

IS has four common research approaches: descriptive, explanatory, predictive and prescriptive (Grover, Lee, & Durand, 1993). The descriptive approach is applied when there

are already existing theories on which to build, and it describes a phenomenon of interest. Explanatory approach is applied to explain the behaviour of a phenomenon of interest. The predictive approach predicts a phenomenon of interest by using concepts and relationships. The prescriptive approach dictates a set of actions which must be performed in order to achieve a specific outcome from the phenomenon of interest (Silke, 2001).

This study will be building on existing theories, and it will attempt to prove them. Therefore, the research approach is explanatory, because it attempts to expand on existing theory and to explain the current state of SaaS readiness and its adoption. It is also predictive in nature, as it attempts to measure the intent and extent of such adoption.

4.4 Research Timeline

The timeframe of the research is cross-sectional. The data collection commenced in March 2011, and was completed in June 2011. A longitudinal study would have yielded a transition in the SaaS readiness state and its adoption state, whereas the focus of the research is the current state of adoption.

4.5 Research Sampling

The participants in the research are SME and NPO managers. These managers are decision-makers in IT related matters and/or overall businesses management. Hence, they can be chief information officers, IT managers, general managers, chief executive officers, chief financial officers, or even SME owners. Therefore, the population of the research is all SME and NPO managers who have influence or decision-making capabilities related to ICTs within their organisation.

4.6 Research Instrument

Quantitative data were collected by using a survey. The research model and questionnaire are adapted from the PERM research (Molla & Licker, 2005a; Molla & Licker, 2005b), and then reworked to suit SaaS adoption. Benlian et al. (2009) developed a SaaS adoption model

and questionnaire for different application types and organisations of all sizes in developed countries.

The biggest difficulty was compiling a questionnaire that addressed all the relevant factors adequately, yet remained concise enough to be fully completed by the respondents. Pilot testing was conducted on the questionnaire. It was found that the initial questionnaire was too long to be fully completed, and there was a poor understanding of SaaS and lack of SaaS awareness amongst the respondents. Moreover, the SaaS adoption model by Benlian et al. (2009) is more useful for organisations which have already adopted and are aware of SaaS. Therefore, the SaaS decision factors related to the questionnaire were omitted, as they are not the most important determinants for SaaS readiness.

The removed questionnaire section is in Appendix 2D. The SaaS decision factors consist of two sections: highly customised software (i.e. CRM, ERP and etc.) questions and highly imitable or substitutable software (i.e. Collaboration, Office and etc.) questions. Only one questionnaire is shown in the appendix, as they are both the same, but reference is made to either highly imitable or highly customised software. For example, "The following questions are relevant to CRM, ERP, SCM or Business Intelligence software hosted by a vendor" can be easily changed to "... to Office, collaboration, email, PBX or productivity software hosted by a vendor".

4.6.1 Questionnaire Design

A Likert scale was used in the questionnaire to assess the strength of the subject's level of agreement or disagreement with statements on a scale (Cavana et al., 2001). The adapted questionnaire utilised a five-point Likert scale. Research has attested to lack of skills and poor education within SMEs and NPOs. Therefore, a five-point Likert scale is ideal for reducing unnecessary complexity. There are two questionnaires, one for SMEs and another for NPOs. All sections are the same, except that section A and B questions are slightly different. See Appendix 2 to study both the questionnaires.

Section A captures the relevant background information on organisations and individuals completing the questionnaire for both SMEs and NPOs, but the section questions differ. The questions asked are similar, but the questions and responses address the respective NPO or SME. For instance, “What is your annual revenue?” is suitable for SMEs wheras “What is your annual budget?” is suitable for NPOs. The purpose was to make comparisons between organisations of different sizes and sectors, and to study the education level of the respondents.

Section B consists of PERM model-adapted questions. The PERM was adopted by Tan, Tyler and Manica (2007) in China, and the questions were slightly modified to suit the context and to obtain information on industry descriptors. This research utilises the adapted PERM questionnaire used in China, as this is an improved version of the questionnaire. Table 3 and Table 4 show the questions together with the respective variables.

Section C has some adoption-related questions and also includes open-ended questions, which attempt to uncover what the quantitative questionnaire section could not detect. The purpose of the adoption questions is to determine the current adoption, planned adoption and awareness of the various SaaS applications (Please refer to Appendix 2 to study the questionnaire). Finally, section D is an optional section. The purpose is meant to collect contact details for further research and/or respondents who would like to receive the ICT toolkit.

Table 3: Research Questionnaire Questions and Variables (Perceived Organisational SaaS Readiness)

Statement	Variable
Our organisation is aware of SaaS implementations of our partner organisations	Awareness
Our organisation is aware of other NPO's SaaS utilisation	
Our organisation recognises the opportunities and challenges enabled by SaaS	
Our organisation understands SaaS business models that could be applicable to our organisation	
We are aware of the potential benefits of SaaS to our organisation	
We have considered/evaluated the impact of SaaS to the way our sector operates	
We have considered/evaluated the impact on organisations in our industry that fail to adopt SaaS. This would be to their disadvantage	
Most of our employees are computer literate	Human Resources
Most of our employees have unrestricted access to computers	
Communication is very open in our organisation (no strict rules to follow the channels of communication)	Business Resources
Our organisation exhibits a culture of enterprise-wide information sharing	
We have a policy that encourages grassroots SaaS initiatives, i.e. Google Apps, Zoho, Virtual Private Network (VPN) and others.	
Failure in new projects (organisation ventures or SaaS implementation) can be tolerated in our organisation	
Our organisation is capable of dealing with rapid changes	
We have sufficient experience with network-based applications	Technology Resources
We have sufficient internet bandwidth to utilise SaaS	
Our organisation is well connected to Local Area Network (LAN) and Wide Area Network (WAN)	
We can afford high bandwidth connectivity to the internet	
Our existing systems are flexible	
Existing systems are customisable to our beneficiaries' and our partners' needs	
Our organisation has a clear vision for SaaS	Commitment
Our vision of SaaS activities is widely communicated and understood throughout our company	
Our SaaS initiatives have champions	
Senior management champions SaaS	
The roles, responsibilities and accountability are clearly defined within each SaaS initiative	Governance
SaaS accountability is extracted via an ongoing responsibility	
Decision-making authority has been clearly assigned to all SaaS initiatives	
We have thoroughly analysed the possible changes required to take effect in our organisation, suppliers, partners, and beneficiaries – as a result of each SaaS implementation.	

Table 4: Research Questionnaire Questions and Variables (Perceived External SaaS Readiness)

Statement	Variable
We believe that our beneficiaries are ready to do business in an SaaS environment	Market forces SaaS readiness
We believe that our organisation partners are ready to conduct business on SaaS	
We believe that there are effective laws to protect our privacy and our beneficiary privacy	Government SaaS readiness
The government demonstrates strong commitment to promote SaaS	
The telecommunications infrastructure is reliable and efficient in supporting SaaS	Support Industries Readiness
Our organisation partners and/or beneficiaries are capable of supporting SaaS transactions	
The technology infrastructure of business partners and/or beneficiaries is capable of supporting SaaS transactions	
We feel that there is efficient and affordable support from the local IT industry to support the move to SaaS	
We feel that company data and transactions with employees online can be executed safely by using SaaS.	

4.6.2 Questionnaire Pilot Study

The questionnaire went through many revisions between the supervisor and the student researcher. A pilot study was conducted in three phases. The purpose of the pilot study was to enhance the usability and reduce the ambiguity of the questionnaire. The first and second phases were conducted using a hard-copy format questionnaire. An experienced practitioner with reputable work experience in NPOs and the SME industry was asked to review both the SME and the NPO questionnaire. There were recommended changes to the questionnaires, and most of the changes were taken into account. The detailed recommended changes are provided in Appendix 2. The major changes were in reducing the length of the questionnaire and rephrasing the questions and/or removing questions, which were too difficult to be understood by either SME or NPO decision makers. Also, the SaaS definition was expanded.

In the second phase, the questionnaires were sent out to postgraduate students and academic staff in the Information Systems department. Few responses were collected. From

the feedback, suggested changes were taken into account and most of them were implemented. Subheadings that represent variable names for the respective reflective indicators were removed and some questions were rephrased or removed.

The final phase included sending out electronic surveys to the same group of students and academic staff as in phase two. The electronic questionnaire pilot study's purpose was meant to improve the electronic platform usability and the electronic questionnaire format. A few changes were recommended, and most were taken into account. The major changes were reducing the number of questions per page, and modifying most of the compulsory questions to optional questions.

4.6.3 Questionnaire Distribution Techniques

Africa Growth Institute (http://africagrowth.co.za/), BizCommunity (http://www.bizcommunity.com/Companies/196/11.html) and FinWeek Blackpages directories were utilised for the SME sample. These databases contain contact details of SMEs. FinWeek Blackpages (http://www.shandukablackpages.co.za) contained contacts from some South Africa's 100% black-owned SMEs. NPO contact details were collected from the Prodder database (http://www.prodder.org.za/). The Prodder database is the leading South African NPO directory. Most of the surveys were sent via email; hence, the email addresses of the respective organisations were collected from the websites.

Survey Gizmo (http://www.surveygizmo.com/) is an online survey tool. It was used to compile and send out the questionnaires to SMEs and NPOs. About 2000 and 3500 electronic questionnaires were sent out to NPOs and SMEs, respectively, via email. Reminder emails to complete the surveys were sent three weeks after the first invitation; they were then sent every two weeks – until there were enough responses.

The ICT Toolkit was promised on completion of the questionnaire. The ICT Toolkit is a self-assessment toolkit and ICT guide for small and medium organisations, originally designed for NPOs, but it is relevant to SMEs. The ICT Toolkit was meant to incentivise participants to complete the surveys.

4.7 Data-Collection Techniques

All responses were checked for completeness. The electronic data were transcribed to a spreadsheet, and then transferred to a statistical package. The non-electronic (survey) data were also recorded in an excel spreadsheet, and also later transferred to WarpPLS. Warp PLS was used to check the validity and the reliability of the instrument and the model, and then the data were modelled, according to the theoretical model by attempting to detect any significant relationships amongst the variables. After the statistical analysis, the qualitative data from the surveys were transcribed to a spreadsheet. The qualitative data were analysed using qualitative methods.

4.8 Ethical and Confidential Issues

The participants' names and companies have been kept confidential. The only people who have access to the data from the participants are the student researcher and the supervisor of the research. Respondents were given a brief covering letter stating the purpose of the survey. This letter informed them about the research and what the researchers would do to preserve their confidentiality and privacy. The covering letter has a University of Cape Town letterhead for authenticity purposes. When the respondents completed a survey (online or hardcopy), they acknowledged that they had read the covering letter, and had understood their rights, as well as the researcher's rights and responsibilities.

Furthermore, the survey questionnaire, as well as a brief description of the purpose of the research have both been approved by the University of Cape Town Ethics committee. The covering letter and the questionnaire are provided in Appendix 2.

4.9 Limitations of the Research

There are a number of limitations to research design and data collection. There are resources and time constraints to reach the population and to be able to reach a minimum sample, as prior studies show low response rates (Molla & Licker, 2005a; Molla & Licker,

2005b; Tan et al., 2007). There are other factors not in the model that might affect its adoption. Moreover, the quantitative study cannot give us the underlying reasons for adopting or for not adopting SaaS.

In order to reduce the number of limitations, the study has a qualitative component that is made up of open-ended questions designed to detect the underlying reasons for adoption or for non-adoption. Furthermore, the data collection was sent out mostly via email, since the SMEs and NPOs without any internet connection would be excluded from the research.

5 DATA ANALYSIS AND FINDINGS

This chapter tests the theories and models discussed in earlier chapters; it does this by critically analysing the results. The readiness and adoption of SaaS in SMEs and NPOs is investigated in this chapter, both quantitatively and qualitatively. WarpPLS and Microsoft Excel were used to analyse the quantitative data. Microsoft Excel was also utilised to analyse the qualitative data.

There were altogether 129 responses, 50 and 79 responses for SMEs and NPOs, respectively. However, only 104 of these responses were valid. Out of the 104 responses, 42 and 62 were valid SMEs and NPOs, respectively. The criteria for validity were satisfactory completion and appropriate responses. Questionnaires which were more than 25% incomplete were discarded. Moreover, responses which showed the same answers, or a pattern approach to the responses, were discarded.

Section 5.1 presents the respondent and organisation profiles of SMEs and NPOs. It does this by providing a distinction between SME and NPO responses. This section investigates the organisation sector, the SME revenue, the NPO budget, the highest level of education of the different respondents and the internet use in the organisations.

Section 5.2 explains the statistical tool and the independent variable used in the research. This is followed by section 5.3, which tests the instrument validity by using structural equation modelling (SEM) construct validity and reliability tests. Subsequently, section 5.4 provides a multicollinearity test for the latent variables (LVs). The observation of the quantitative results is presented in section 5.5. The results illustrate the LVs with their respective path coefficients, standard errors for path coefficients and p-values. This is followed by section 5.6, which demonstrates the model fit test.

The findings of the qualitative results are presented in section 5.7. The various categories and a comparative analysis of SMEs and NPOs are then presented. Next, section 5.8 describes the relationships of the identified themes within the qualitative responses.

Thereafter, section 5.9 discusses the findings. Moreover, a SaaS adoption model for developing countries is developed. Finally, Section 5.10 summarises the findings.

5.1 Profile of Respondents and Organisations

The PERM is composed of several profile variables, including the organisation sector and the organisation size. The profile has been adapted to suit this research, by adding variables such as the number of years of operation and the level of internet use. A profile of the respondents and the organisations they represent was collected by means of a survey. The profiles facilitate better understanding of the responses.

5.1.1 SME Sector

The SME sector illustrates the sector distribution of the respondents. The sectors are set according to the South African SME Act (Government Gazette, 2003). There were 37 SME respondents, out of a possible 42, who specified their sector. The trade and ICT sectors had the majority of the responses, with 33% and 27% respectively.

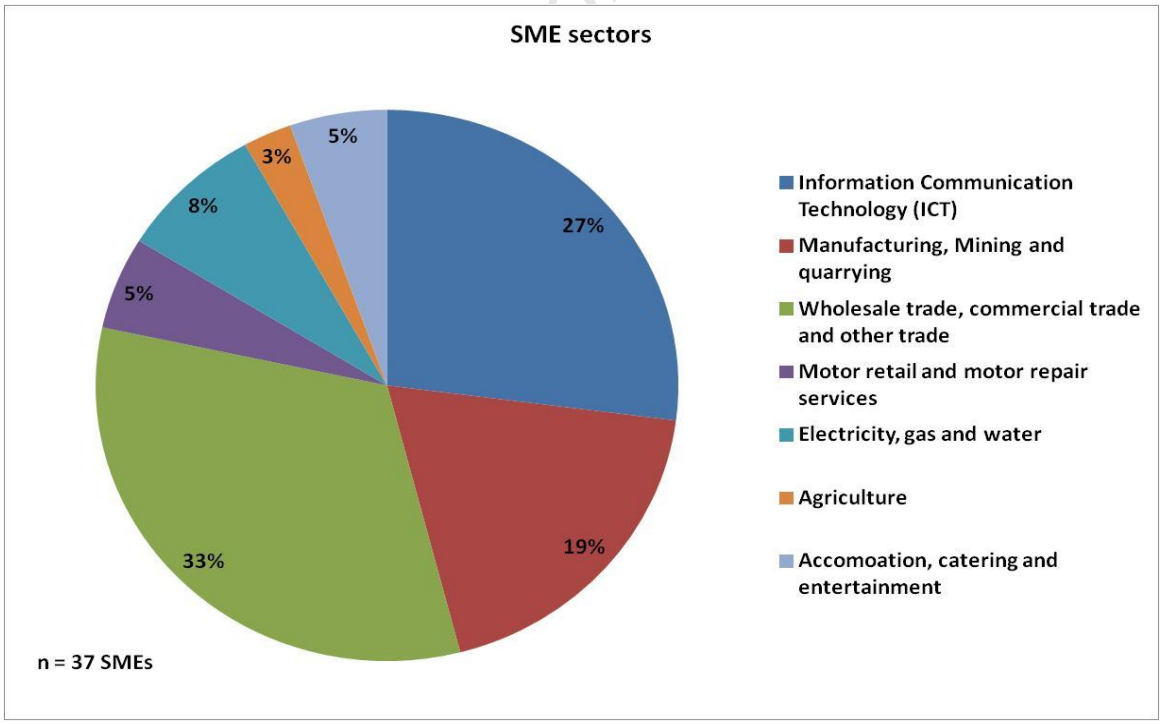


Figure 8: SME sectors

5.1.2 NPO Sector

The NPO sector pie chart illustrates the composition of the NPO respondents in the research. Only one NPO respondent did not complete this question; thus, there were 61 completed NPO sector responses out of a total of 62 responses. The pie chart shows how 61% of the respondents represent operational NGOs; 20% represent advocacy NGOs; and the rest are CBOs and other types of NGOs.

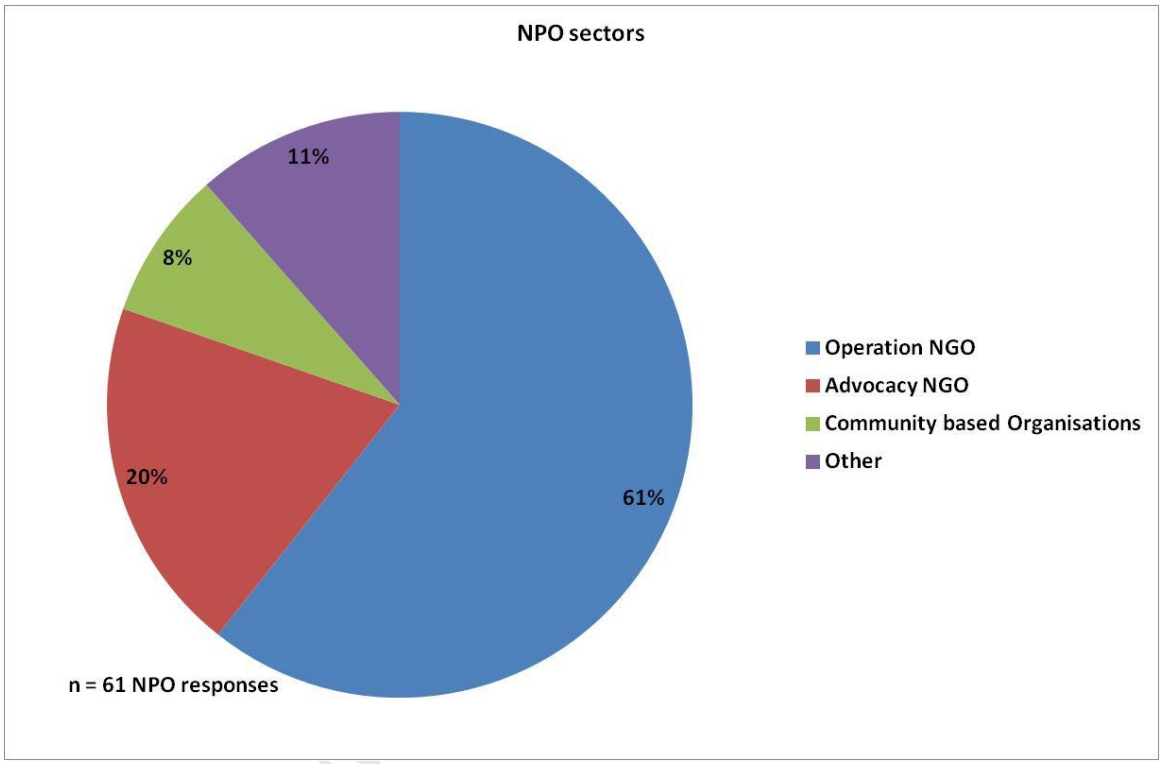


Figure 9: NPO Sectors

5.1.3 SME Revenue and NPO Annual Budget

This section compares SME revenues with NPO budgets. There was one missing response each from the SME and NPO dataset. The results indicate that NPOs generally have more financial resources than SMEs. Furthermore, a chi-squared test (see Appendix 3G) confirms that there is a significant difference between SME revenues and NPO budgets. Also, there is a possibility of misinterpretation as some SME respondents might perceive revenue as net profit or as gross income.

The results show that most NPO budgets range from R1 million to R1.5 million, and the poorest have a budget in the region of R500 000 to R1 million. Conversely, most SME revenues are less than R500 000, while the poorest SMEs have revenues of more than R7.5 million. Figure 10 illustrates a comparison of the NPO budgets with the SME revenues per annum.

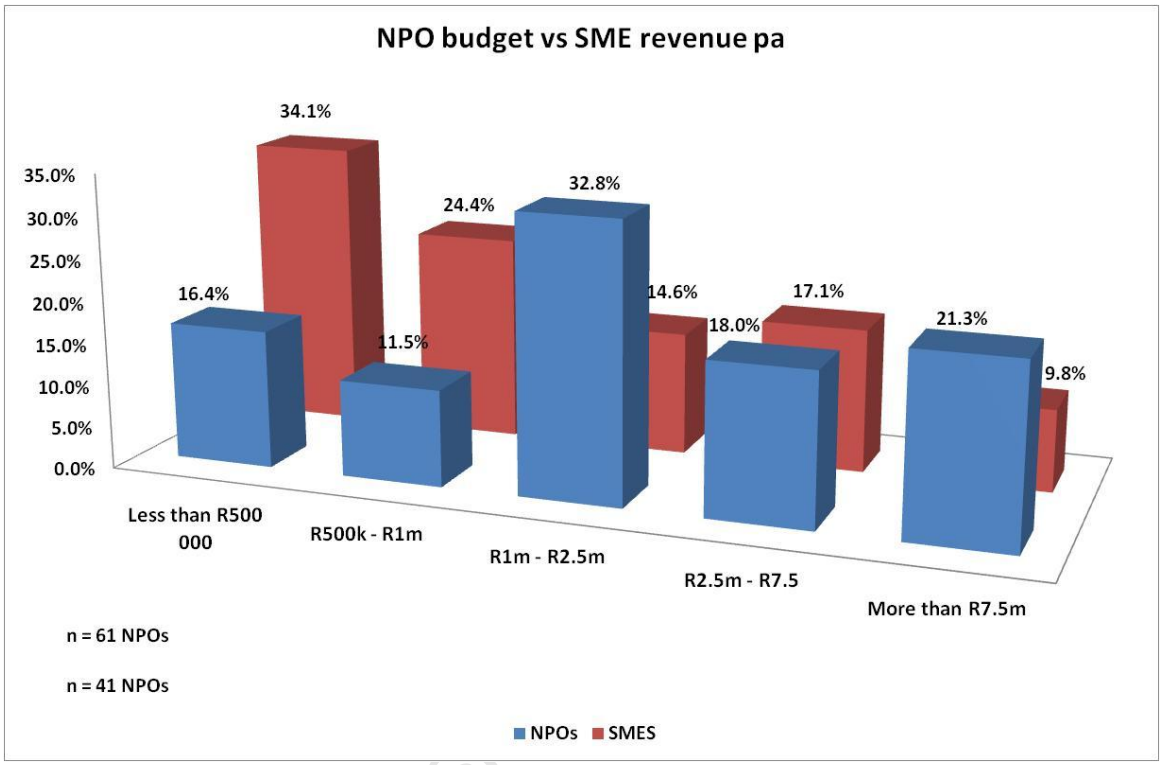


Figure 10: Comparison of NPO Budgets with SME revenues Per Annum

5.1.4 Highest Level of Education

Figure 11 illustrates the highest level of education obtained by respondents from SMEs and NPOs. The highest level of education refers to the educational level of the respondent and not to the general educational level of people in the organisation. All the SMEs completed this question, while there were only two missing NPO responses. The responses show that most (at least 86%) of the respondents have a post-high school qualification (Bachelor's degree, Bachelor's diploma, etc).

The second highest number (at least 30%) of responses has a Master's qualification, or a higher qualification than Honous or a Bachelor of Technology Qualification. The lowest

number of responses had a matriculation or a high school qualification. The chi-squared test in Appendix 3G shows that there was no significant difference in the population of SMEs and NPOs as regards the educational level of the respondent.

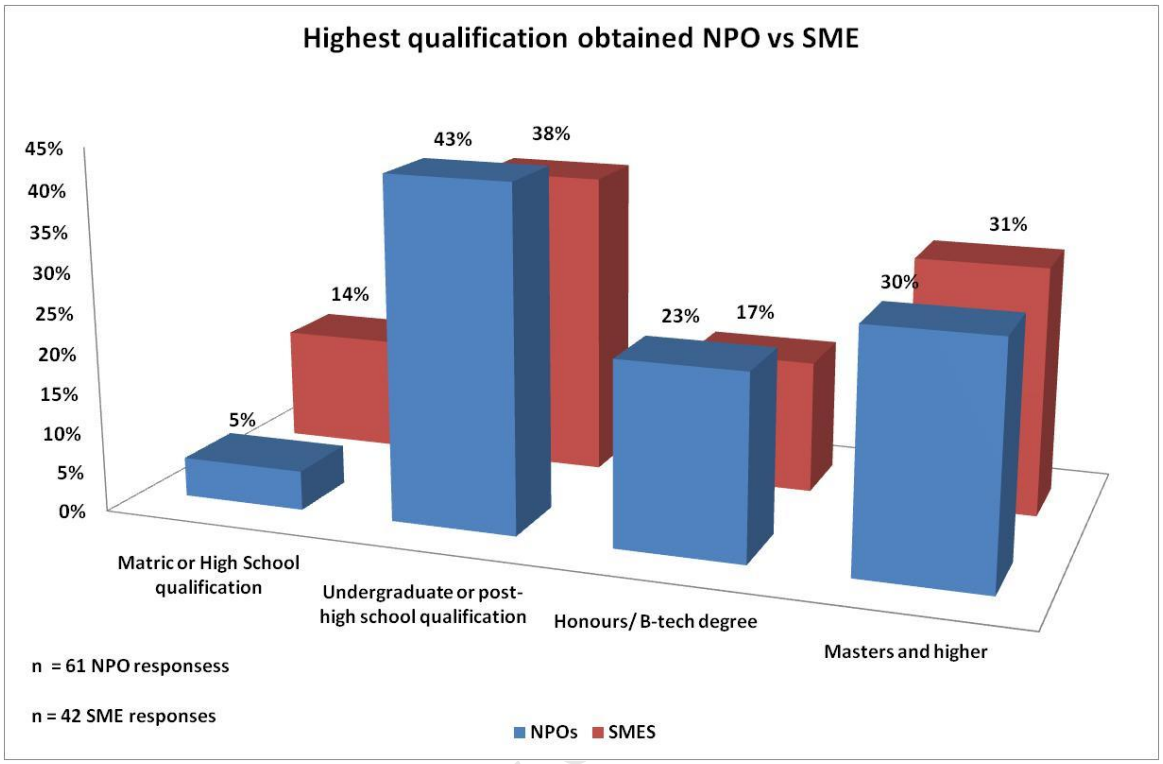


Figure 11: Highest Qualification Obtained by NPO and SME Respondents

5.1.5 Years of Operation

Years of operation of an organisation help one to understand the stability of the organisation. Figure 12 illustrates the comparison of years of operation for both SMEs and NPOs. There were one and two missing responses for this question for SMEs and NPOs, respectively. Most NPOs have been in existence for more than eight years, while most SMEs have been in existence for four to eight years. The smallest number of NPOs was less than three years old, while the smallest number of SMEs was less than a year old and more than eight years old. A chi-squared test in Appendix 3G confirms that there is a significant difference between the SME and NPO years of operation.

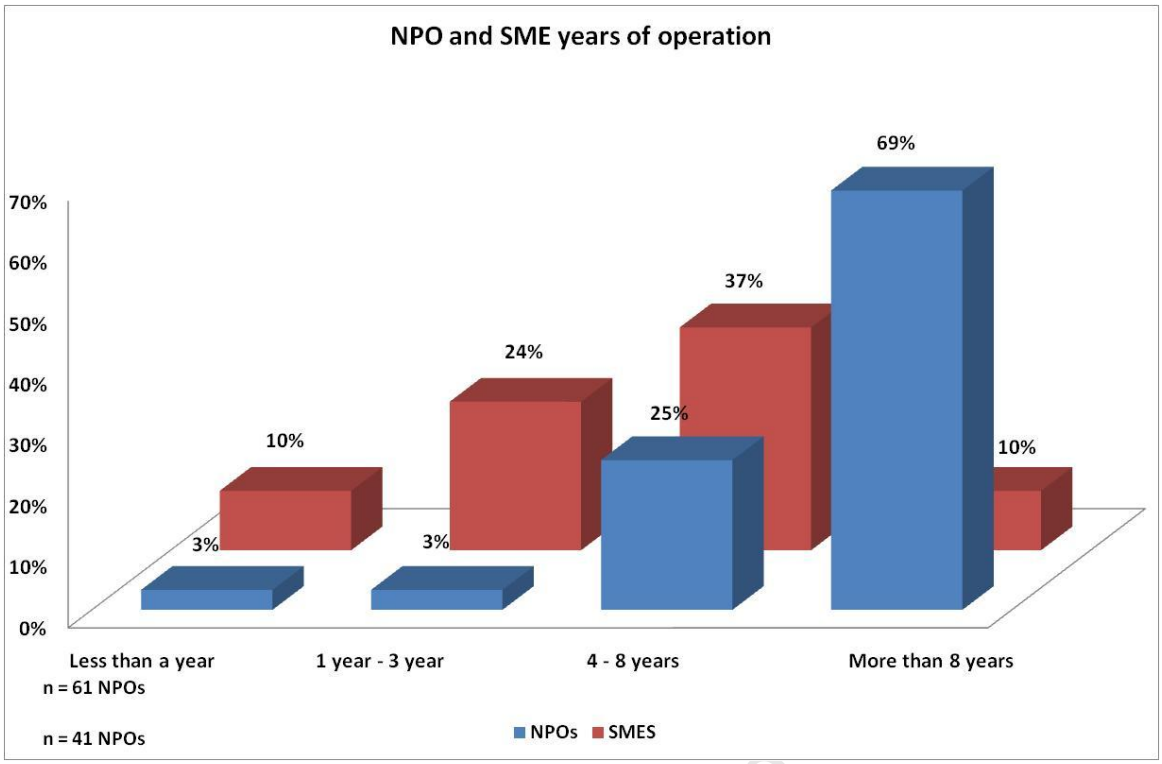


Figure 12: NPO and SME Years of Operation

5.1.6 Level of Internet Use

For the level of internet use, there were two missing responses for each SME and NPO sample. It is worth noting that all the respondents completed an online survey. As a result, it is safe to assume that they all had minimum internet access. However, the level of internet access and use is not known. Basic internet use refers to use of the internet for emailing and surfing the internet, while extensive internet use refers to using the internet extensively to run some or most of the business operations, such as e-commerce.

Figure 13 illustrates that most organisations use the internet extensively. NPOs use the internet more extensively than SMEs. In contrast, the chi-squared test in Appendix 3G indicates there is no significant difference between the SME and the NPO level of internet use.

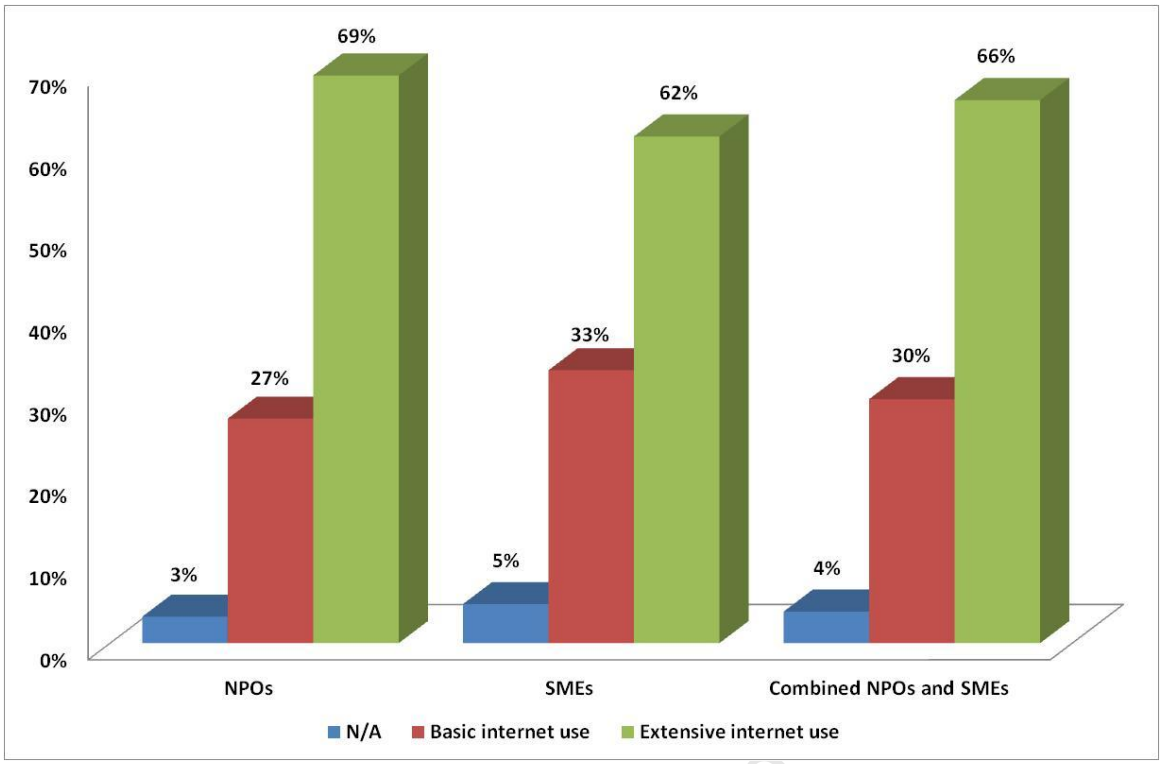


Figure 13: SME and NPO Internet Use

5.2 Statistical Package and Independent Variable

This section explains the statistical package and the independent variable.

5.2.1 WarpPLS statistical tool

WarpPLS 2.0 is a structural equation modelling (SEM) statistical package (Kock, 2011). PLS within WarpPLS refers to partial least squares. The program gives the user the option to use one of the four analysis algorithms: Warp2 PLS regression, Warp3 PLS regression, PLS regression and robust path analysis. There are two re-sampling methods: Bootstrapping and Jack-knifing. The Warp2 PLS regression algorithm attempts to identify U-curve relationships between the latent variables (LVs). If a relationship exists, the algorithm transforms (or warps) the predicted scores to improve the U-curve relationship to obtain the estimated path coefficients in the model.

The Warp3 PLS regression algorithm attempts to identify the relationships between LVs; the relationship's first derivative is defined by a U-curve. This relationship has corresponding

patterns to an S-curve and it can be represented by the merging of two U-curves, with one of them inverted. However, PLS regression algorithm performs no warping of relationships. It utilises the least squares minimisation sub-algorithm to calculate path coefficients, indicator weights, loadings and LV scores. Both Warp 2 and Warp 3 PLS regression algorithms use the PLS regression weight calculation algorithm to estimate path coefficients, weights and loadings in the model. Robust path analysis determines the LV scores, by averaging all the associated indicators with an LV (Kock, 2010; Kock, 2011).

Bootstrapping sampling is the random arrangement of rows of the original dataset, where the order of some rows may be repeated. This is analogous to shuffling a deck of cards. In contrast, Jack-knifing creates a number of re-samples equal to the original sample size, but each resample has a row removed. This re-sampling method is good at dealing with samples containing outliers; thus, making it suitable for small sample sizes (99 or less) (Chiquoine & Hjalmarsson, 2009).

The WarpPLS 3 and bootstrapping settings were used to perform analysis on the combined SME and NPO dataset, because WarPLS3 had a better r-squared (see Table 5) than WarpPLS 2, and bootstrapping is recommended for samples of 100 or more (Kock, 2011; Nevitt & Hancock, 2001). The Jack-knifing re-sampling method was used for each SME and NPO sample, as each sample was smaller than 100.

The data analysed were the initial datasets, without any removal of offending LVs and/or indicators. Table 5 shows the r-squared values of the different statistical tools, namely: WarpPLS and Statistica. WarpPLS 3 has a better r-squared than WarpPLS 2 and Statistica. This provides some evidence that WarpPLS 3 is a better statistical analysis tool for these data. WarpPLS 3 explains 51.7%, 52.8% and 60.7% variance of the combined NPO and SME, NPO and SME datasets, respectively.

Table 5: Initial R-Squared Table for All Datasets

	PLS 2	PLS 3	Statistica
NPO & SME	0.508	0.517	0.511
NPO	0.523	0.528	0.489
SME	0.570	0.607	0.602

5.2.2 Independent Variable

The dependent variable, adoption, is measured by two LVs, highly imitable or substitutable software categorised as productivity software (e.g. Google Apps, Zoho, and Microsoft Live) and highly specific software (e.g. Oracle CRM on Demand and Salesforce CRM). However, the original questionnaire had another indicator, Virtual Private Branch Exchange (VPBX). This is not included in the final dependent variable model because VPBX is not really SaaS, but a hosted Private Branch Exchange (PBX) solution, and adding VPBX results in a low R squared (see Appendix 3H, section 2).

The respondents were asked about their current SaaS status; their response options on a Likert scale were: Never heard of it, heard of it, considering using it, planning on using it and already using it. The results are presented in Table 6. The majority of the respondents had not heard of SaaS. Approximately 21% and 36% of the respondents had heard of a SaaS productivity suite and a highly specific SaaS application, respectively. Between nine and twelve percent are considering using SaaS, while 31% have already adopted a SaaS productivity suite and approximately eight percent have adopted SaaS highly specific applications. In addition, approximately seven and six percent of the respondents are planning to adopt highly imitable and highly customisable software, respectively.

Relatively high adoption in the highly imitable applications compared to highly specific applications confirms that most SaaS investments are made in content, collaboration, communication and Customer Relationship Management (CRM) (Benlian et al., 2009; Gartner Inc., 2011b). However, CRM is the only highly specified application.

More responses have never heard of highly specified SaaS applications. Using application specificity, highly specific application vendors are aware that organisations are less likely to

outsource highly specific applications. Therefore, there is less research and development in highly specific SaaS applications and few products in the market and hence poor awareness in highly specific SaaS applications.

Table 6: SaaS Adoption Status

	Productivity SaaS suite	ERP, CRM & BI SaaS
Never heard	29%	40%
Heard	21%	36%
Considering	12%	9%
Planning	7%	6%
Already using	31%	8%

5.3 Construct Validity and Item Reliability

Construct validity and reliability tests are vital parts of data analysis. They are used to ensure data consistency and rigour (Boudreau, Gefen, & Straub, 2001). A dataset of NPOs, SMEs and a combined dataset of both NPOs and SMEs was used for construct validity and item reliability. Cronbach Alpha and Composite Reliability tests were used to assess instrument validity and item reliability, respectively (Kock, 2010; Kock, 2011). Construct validity was tested by using convergent validity and discriminant validity tests.

5.3.1 Construct Validity

Construct validity attempts to measure the quality of agreement between the theoretical constructs and the research instrument. There are two measures of construct validity: convergent validity and discriminant validity. Convergent validity assesses the quality of the instrument by measuring the general agreement amongst the test items and the theoretical constructs. Therefore, it measures whether the set of test items within the instrument are interpreted in the same way as the designer had intended. Conversely, the discriminant validity is the absence of any relationship amongst variables, which, according to the theoretical constructs, should not be there (Kock, 2011).

Table 7 indicates the combined loadings and cross-loadings for a combined NPO and SME dataset, which is then used to measure convergent validity. The convergent validity

requirement is that the respective loadings (the ones in a red font) should be equal to or greater than 0.5, and the respective P-value should be less than 0.05 (Hair, Anderson, & & Tatham, 1987). The values from the combined loadings and the cross-loadings table satisfy the convergent validity requirement. Therefore, the test items were interpreted in the same way by respondents as that intended by the researcher.

Appendix 3A illustrates other combined loadings and cross-loadings for individual NPO and SME datasets. SME convergent validity test was satisfied in the first test. NPO cross-loadings had to go through three steps of validity tests. The first test identified Q4 BR and Q1 SI indicators as not satisfying the convergent validity requirement, and they were thus removed. The second test identified Q3 BR indicator, and it was removed. Finally, all the indicators satisfied the convergent validity requirement in the third test.

Table 7: Combined Loadings and Cross-Loadings for Combined SME and NPO Dataset

	Awareness	HR	BR	TR	Commitment	Governance	MF	Government	SI	Adoptio	P value
Q1 Awareness	0.899	-0.045	-0.028	0.079	-0.064	0.006	-0.099	0.094	0.002	-0.051	<0.001
Q2 Awareness	0.858	0.067	-0.092	-0.007	0.407	-0.421	-0.047	0.038	0.145	-0.152	<0.001
Q3 Awareness	0.84	0.061	-0.029	-0.092	-0.581	0.408	-0.162	0.136	-0.033	0.198	<0.001
Q4 Awareness	0.916	0.058	-0.018	-0.074	0.201	-0.046	-0.031	0.068	-0.059	0.02	<0.001
Q5 Awareness	0.858	-0.13	0.081	-0.006	-0.144	0.119	0.014	-0.006	-0.142	0.241	<0.001
Q6 Awareness	0.903	-0.022	0.04	0.021	0.094	-0.061	0.062	-0.084	-0.056	-0.04	<0.001
Q7 Awareness	0.825	0.012	0.049	0.081	0.063	0.009	0.275	-0.258	0.156	-0.218	<0.001
Q1 HR	0.186	0.851	-0.107	0.058	0.039	-0.127	-0.08	0.141	-0.174	0.005	<0.001
Q2 HR	-0.186	0.851	0.107	-0.058	-0.039	0.127	0.08	-0.141	0.174	-0.005	<0.001
Q1 BR	-0.094	0.099	0.659	-0.31	0.648	-0.731	0.046	-0.373	0.38	-0.218	<0.001
Q2 BR	-0.137	0.102	0.825	-0.122	-0.253	0.166	-0.005	-0.019	0.17	-0.098	<0.001
Q3 BR	0.28	-0.096	0.636	0.022	0.378	0.056	-0.054	0.018	-0.134	0.199	<0.001
Q4 BR	0.011	-0.124	0.519	0.039	-0.56	0.404	-0.153	0.265	-0.237	0.286	0.002
Q5 BR	-0.011	-0.032	0.758	0.356	-0.222	0.131	0.115	0.149	-0.241	-0.067	<0.001
Q1 TR	0.053	0.097	0.041	0.683	0.56	-0.115	-0.041	0.075	-0.308	0.03	<0.001
Q2 TR	0.066	-0.11	0.006	0.756	-0.498	0.171	0.148	-0.029	0.001	0.139	<0.001
Q3 TR	-0.119	0.012	0.038	0.767	-0.09	0.256	0.001	-0.136	0.108	-0.077	<0.001
Q4 TR	0.027	0.071	-0.281	0.801	-0.244	0.035	0.051	0.174	0.104	-0.059	<0.001
Q5 TR	0.008	-0.11	0.101	0.818	-0.086	-0.036	-0.106	-0.204	0.196	0.022	<0.001
Q6 TR	-0.03	0.056	0.109	0.74	0.444	-0.331	-0.053	0.138	-0.158	-0.05	<0.001
Q1 Commitment	0.149	-0.103	0.175	0.063	0.864	-0.263	0.152	-0.042	-0.052	-0.097	<0.001
Q2 Commitment	0.012	0.075	-0.134	-0.063	0.929	-0.11	0.165	0.047	-0.023	-0.072	<0.001
Q3 Commitment	-0.153	0.025	-0.077	0.02	0.904	0.218	-0.214	0.086	-0.047	-0.019	<0.001
Q4 Commitment	-0.001	-0.004	0.047	-0.016	0.906	0.147	-0.1	-0.095	0.12	0.185	<0.001
Q1 Governance	-0.056	-0.031	-0.092	0.12	0.179	0.94	-0.099	0.067	-0.043	0.014	<0.001
Q2 Governance	-0.024	0.04	-0.026	0	-0.041	0.938	-0.203	0.064	-0.084	0.109	<0.001
Q3 Governance	0.051	0.014	-0.01	-0.003	-0.019	0.937	0.004	-0.059	0.149	-0.094	<0.001
Q4 Governance	0.032	-0.024	0.136	-0.126	-0.128	0.876	0.319	-0.078	-0.023	-0.031	<0.001
Q1 MF	0.023	0.032	-0.1	-0.068	0.173	-0.136	0.946	0.071	0.089	-0.055	<0.001
Q2 MF	-0.023	-0.032	0.1	0.068	-0.173	0.136	0.946	-0.071	-0.089	0.055	<0.001
Q1 Government	0.093	0.13	-0.118	0.07	0.015	0.151	-0.166	0.826	-0.171	-0.014	<0.001
Q2 Government	-0.093	-0.13	0.118	-0.07	-0.015	-0.151	0.166	0.826	0.171	0.014	<0.001
Q1 SI	0.117	-0.157	0.026	0.2	-0.6	0.216	0.045	0.33	0.706	0.026	<0.001
Q2 SI	-0.039	0.018	-0.016	-0.079	0.397	-0.455	0.2	-0.084	0.861	-0.115	<0.001
Q3 SI	-0.043	0.021	0	0.011	-0.057	-0.013	-0.098	-0.09	0.875	0.021	<0.001
Q4 SI	-0.074	-0.012	-0.103	-0.051	0.267	0.108	0.046	-0.187	0.792	-0.221	<0.001
Q5 SI	0.066	0.12	0.107	-0.06	-0.111	0.229	-0.214	0.092	0.723	0.328	<0.001
SaaS Proactivity	-0.044	-0.025	0.027	-0.027	-0.016	0.153	-0.053	-0.051	0.021	0.894	<0.001
ERP, CRM & BI	0.044	0.025	-0.027	0.027	0.016	-0.153	0.053	0.051	-0.021	0.894	<0.001

Table 8 below displays combined NPO and SME discriminant validity findings. Appendix 3B illustrates the individual discriminant validity tables for the NPO and SME datasets. In order to satisfy the discriminant validity test, the values on the diagonal should be greater than any of the values above or below them in the same column, and the values in the diagonal

should be higher than the values to the left and right in the same row (Fornell & Larcker, 1981). The results from these tests satisfy the discriminant validity test.

Table 8: Discriminant Validity Results for Combined NPO and SME Sample

	Aware-ness	HR	BR	TR	Gover-nance	MF	Country	SI	Adoption
Awareness	0.872	0.133	0.507	0.32	0.69	0.45	0.266	0.416	0.594
HR	0.133	0.851	0.345	0.405	0.184	0.181	0.119	0.144	0.313
BR	0.507	0.345	0.687	0.541	0.513	0.401	0.443	0.493	0.420
TR	0.32	0.405	0.541	0.762	0.435	0.398	0.217	0.422	0.405
Governance	0.69	0.184	0.513	0.435	0.923	0.612	0.357	0.559	0.558
MF	0.45	0.181	0.401	0.398	0.612	0.946	0.473	0.694	0.507
Country	0.266	0.119	0.443	0.217	0.357	0.473	0.826	0.617	0.273
SI	0.416	0.144	0.493	0.422	0.559	0.694	0.617	0.794	0.432
Adoption	0.594	0.313	0.420	0.405	0.558	0.507	0.273	0.432	0.894

5.3.2 Reliability

Reliability measures the quality of the research instrument. For example, a high quality research instrument has high reliability if the set of questions or statements is interpreted in the same way by most or all of the respondents.

Many researchers (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994; Nunnaly, 1978) argue that both the Cronbach Alpha and the Composite Reliability coefficients are required to be equal to or greater than 0.7. However, this is a more conservative approach to measuring reliability. A more relaxed measure is that either the Cronbach Alpha or the Composite Reliability should be equal to 0.7, or greater than 0.7.

This coefficient typically applies to composite reliability, as it usually has the higher of the two coefficients (Fornell & Larcker, 1981). There is an even more relaxed reliability measure: either coefficient should be equal to or greater than 0.6 (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). However, it is not applied in this study, as it was not necessary. Table 9 illustrates the interpretations for each criterion.

Table 9: Guide to Interpret the Item Reliability

	Both cronbach alpha & composite reliability	Either cronbach alpha or composite reliability	Both cronbach alpha & composite	Both cronbach alpha & composite reliability	Both cronbach alpha & composite
Region	< 0.7	> 0.7	>= 0.7 & < 0.8	> 0.8	>0.9
Interpretation	Unaccaptable	Acceptable	Good	Very good	Excellent

Table 10 shows the LVs for the combined SME and NPO datasets, with their respective number of indicators, reliability coefficients and reliability interpretations. The number of indicators is the number of test items for each variable. Appendix 3C shows the table of reliability coefficients for the SME and NPO datasets.

Table 10: Table of Reliability Coefficients of NPO and SME Sample

Variable	Number of indicators	Cronbach alpha	Composite reliability coefficient	Reliability Interpretation
Awareness	7	0.947	0.957	Excellent
HR	2	0.619	0.84	Acceptable
BR	5	0.713	0.814	Good
TR	6	0.855	0.892	Very Good
Commitment	4	0.922	0.945	Excellent
Governance	4	0.942	0.958	Very Good
MF	2	0.883	0.945	Very Good
Country	2	0.533	0.811	Acceptable
SI	5	0.851	0.895	Very Good

Table 10 HR (Human Resources) and Country are the only variables accepted on the relaxed measure of reliability. BR (Business Resources) has good reliability, and most respondents interpreted the respective questions orstatements reasonably well. Awareness, TR (Technology Resources), Commitment, Governance, MF (Market forces) and SI (Support Industries) have better reliability. This means that most respondents interpreted those sets of questions or statements extremely well. All LVs in Appendix 3C satisfy the coefficient reliability requirements. Thus both individual samples interpreted the test items, as was intended by the researcher.

5.4 Variance Inflation Factor

The variance inflation factor (VIF) measures the extent of multicollinearity amongst the latent variables hypothesised in the theoretical model. There are two criteria for the test of multicollinearity. One recommends that the VIF be less than 5, while another has a more relaxed criterion for which the VIF should be less than 10 (Hair et al., 1987; Kline, 1998). The conservative criterion of 5 was used here.

Table 11: Variance Inflation Factor of NPO and SME Samples

Sample		Awareness	HR	BR	TR	Commitment	Country	MF	Government	SI
NPO & SME	VIF	2.403	1.242	2.107	1.617	6.220	4.802	2.390	1.769	2.587
	New VIF	2.151	1.242	2.033	1.613	Removed	2.534	2.353	1.737	2.587
NPO	VIF	2.346	1.232	1.344	1.881	8.721	7.233	2.71	1.447	1.902
	New VIF	1.936	1.215	1.34	1.84	Removed	2.986	2.7	1.438	1.898
SME	VIF	2.649	1.212	2.631	1.455	4.658	3.64	2.273	2.688	4.088

Table 11 illustrates the VIF for the NPO, the SME and the combined NPO and SME dataset. The table shows initial VIF prior removal and new VIF after offending LV removal. All the LVs in the SME dataset satisfy the VIF test. In the NPO and combined NPO and SME dataset, the commitment VIF is too high, and it was removed from the model. Governance is within the borderline of satisfying the VIF requirements.

The initial and updated VIF values in Table 11 suggest that Governance and Commitment are highly correlated. Therefore, it would beneficial to combine Commitment and Governance into one variable. Also, the Statistica tool provided evidence that Commitment is significant.

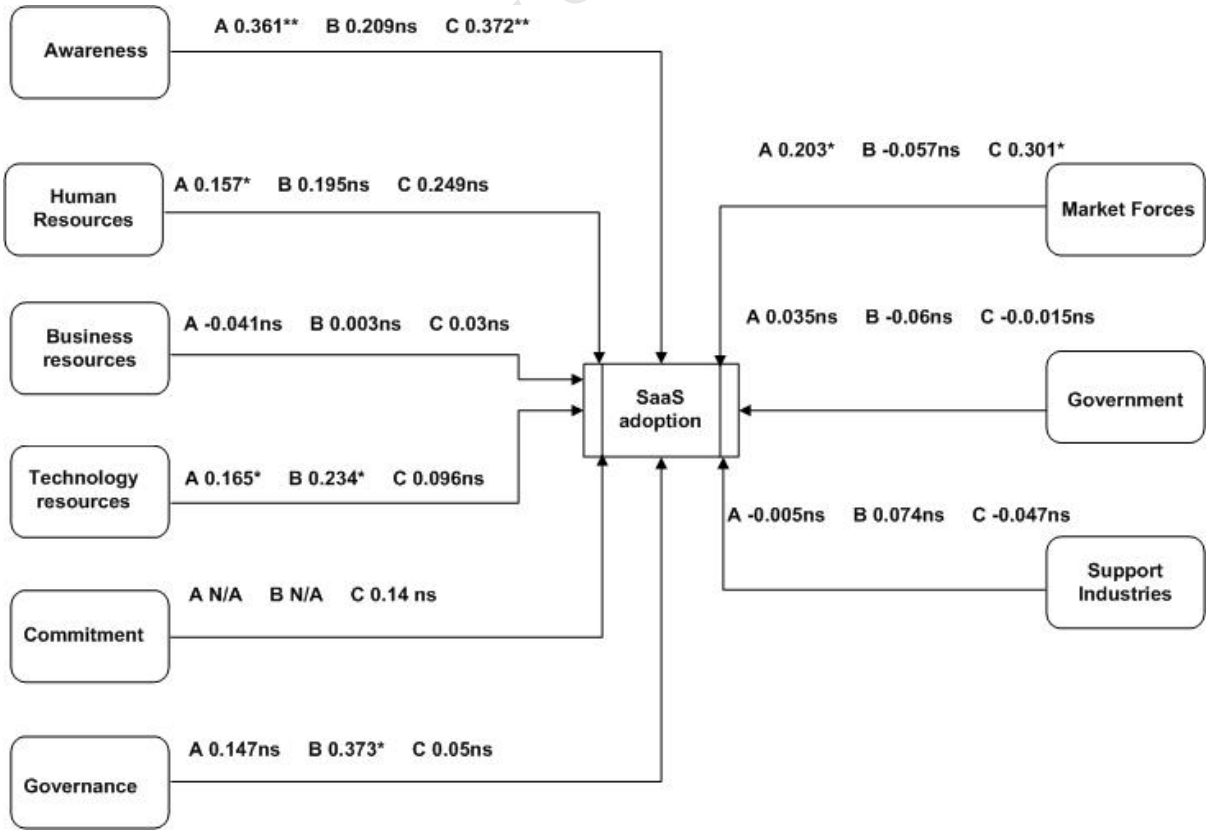
5.5 Quantitative findings

This section provides the quantitative results and hypothesis findings.

5.5.1 Results

The values shown in Figure 14 are the path coefficients. Positive path coefficients mean that there is a positive causal relationship with the dependent variable, while a negative value for this item means that there is a negative causal relationship. Commitment, Business Resources, Country's Capability and Support Industries are the only variables that are not significant for all the datasets. Awareness and Market Forces in the SME sample are significantly and positively correlated to adoption. Governance and TR in the NPO sample contribute significantly (and are positively related) to adoption. Awareness, HR, TR and MF have a significant positive causal relationship with adoption. Detailed results are illustrated in Appendix 3D.

The T-test for all the indicators showed that there is no significant difference between the SME and the NPO sample responses, with the exception being only one indicator: Q1 MF. This is consistent with the current findings, where the SMEs' MF is significant, but the NPOs' MF is not significant. This T-Test is illustrated in Appendix 3F.



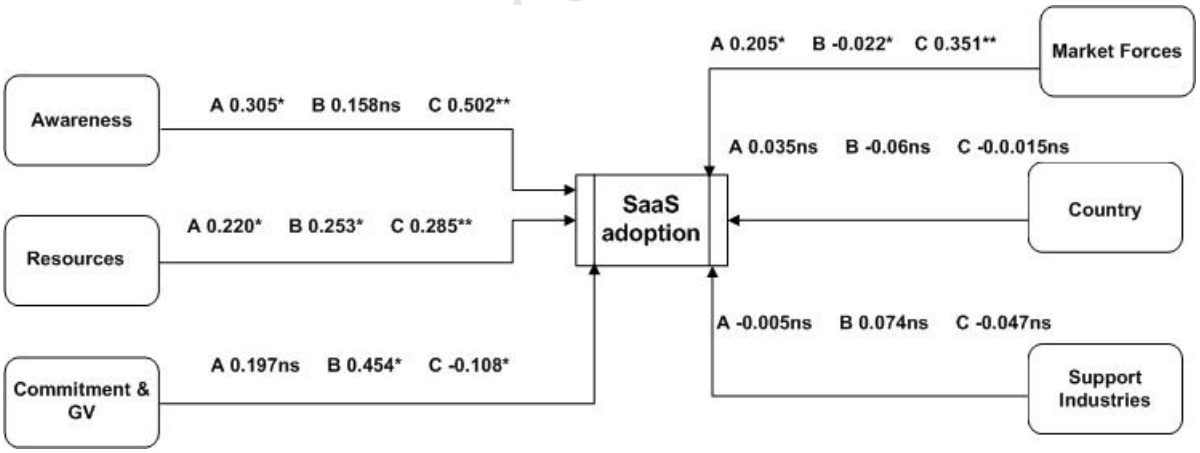
A's R^2 0.495; B's R^2=0.513 & C's R^2=0.607 *P<0.05; ** p <0.01; ns = not significant.

A = Combined SME and NPO sample; n = 104; B = NPO sample; n = 62; C= SME sample; n = 42

Figure 14: WarpPLS Test of Structural Model

Figure 15 illustrates an aggregated adoption model. This model puts Governance and Commitment as one variable, as they are highly correlated. Also, all the resources (TR, HR and BR) are compiled into one variable because they all measure one variable, resources. All the other variables remain as they were. The resources variable is significant for all the datasets are positively correlated. Commitment and government are significantly correlated to SaaS adoption in both SMEs and NPOs. Country's Capability, Market Forces, Support Industries and Awareness are consistent in both models. Detailed results are illustrated in Appendix 3D.

The R^2 value decreases significantly when using an aggregated adoption model. This suggests that the initial model is a better model to measure the adoption of SaaS.



A's R^2 0.487, B's R^2=0.488 & C's R^2=0.573 *P<0.05; ** p <0.01; ns = not significant.

A = Combined SME and NPO sample; n = 104; B = NPO sample; n = 62; C= SME sample; n = 42

Figure 15: Aggregated Adoption Model

5.5.2 Hypotheses

There are two tables below; each illustrates the hypotheses proposed in the design chapter, with the respective dataset. One is for the original model, while the other is a revised model, which combines Commitment and Governance variable into one variable and Resources (TR, BR and HR) variables into one resource variable. The null hypothesis means that there was not enough evidence to reject the null hypothesis. While a positive or negative correlation translates to the null hypothesis being rejected, the alternative hypothesis is either positively or negatively correlated.

Table 12: Hypotheses for Original Model

Hypotheses	Combined	NPO	SME
Awareness	Positively	Null hypothesis	Positively
HR	Positively	Null hypothesis	Null hypothesis
BR	Null hypothesis	Null hypothesis	Null hypothesis
TR	Positively	Positively	Null hypothesis
Commitment	Null hypothesis	Null hypothesis	Null hypothesis
Governance	Null hypothesis	Positively	Null hypothesis
MF	Positively	Null hypothesis	Positively
Country	Null hypothesis	Null hypothesis	Null hypothesis
SI	Null hypothesis	Null hypothesis	Null hypothesis

Table 13: Hypotheses for Revised Model

Hypotheses	Combined	NPO	SME
Awareness	Positively	Null hypothesis	Positively
Resources	Positively	Positively	Positively
GV & Commitment	Null hypothesis	Positively	Positively
MF	Positively	Negatively	Positively
Country	Null hypothesis	Null hypothesis	Null hypothesis
SI	Null hypothesis	Null hypothesis	Null hypothesis

Good awareness and market forces are positively correlated to SaaS adoption in SMEs; however, it is not significant in NPOs. Since SMEs operate in a competitive environment, awareness (e.g. of partners and competitors) and market forces (e.g. from competitors, customers and partners) influence their adoption of SaaS. NPO's governance and technology readiness positively contributes towards SaaS adoption. This possibly suggests that external

funders exert pressure on NPOs to have strong governance within their organisation. Technology resources variable is not significant for SMEs but is significant for NPOs and the combined sample. This could be due to insufficient responses within the SME sample as the SME sample had the least number of responses. The significant effect of governance in NPOs is in contrast with the insignificant effect of governance in SMEs. As a result, the aggregate effect is insignificant. However, awareness and MF variables are still significant for the combined sample where each sample had a distinct effect (or non-effect). Therefore, combined sample indicates that the combination of distinct effects (or non-effects) can be masked. These findings confirm that there are similarities and differences between NPOs and SMEs.

5.6 Model Fit

Kock (2011) recommends using three model fit indices in SEM - Average Root Square (ARS), Average variance inflation factor (AVIF) and Average path coefficients (APC) – in order to test the model fitness. The model fitness criteria requirements are that both APC and ARS P values should be less than 0.05, and that the AVIF should be less than 5. Furthermore, the order of importance matters; the most important index is the ARS, followed by the AVIF and APC.

The model fit results are illustrated in Table 14. Therefore, the model used is suitable for the sample observed. However, only the ARS and AVIF satisfy the model fit criteria for the combined NPO and SME model, while the NPO and the SME dataset satisfy the ARS and AVIF requirements only. The results are fair, since both the NPO and SME dataset have few responses.

Table 14: Model Fit Results

	Model fit indices	Values	P values
NPO & SME	ARS	0.495	0.001
	AVIF	2.031	N/A
	APC	0.139	0.001
NPO	ARS	0.513	P=<0.001
	AVIF	1.919	N/A

	APC	0.150	P=0.907
SME	ARS	0.607	P=<0.001
	AVIF	2.811	N/A
	APC	0.145	1.000

5.7 Qualitative Results

A few open-ended questions in the questionnaire were asked, in order to confirm the quantitative results, and to gain a richer understanding of adoption or non-adoption of SaaS. The results from the qualitative responses confirmed some of the findings from the quantitative results. Qualitative questions probed the following: the perceived barriers and benefits of SaaS adoption, the perceived factors that would influence organisations to adopt SaaS, and the perceived capability of supporting industries and SaaS providers to seamlessly deliver SaaS.

A general inductive approach for qualitative data analysis by Thomas (2003) was followed to analyse the data. Persisting categories were identified for each SME and NGO dataset. The minimum frequency (N) threshold for identifying categories is two. A threshold of two is suitable for the small sample available. The threshold is low, in order to facilitate a richer understanding of factors that contribute to adoption (or non-adoption), although they might not be significant in measuring overall adoption. Furthermore, this would facilitate measuring the persisting categories in each set of questions.

5.7.1 Organisations' Perceived Barriers to SaaS Adoption

Table 15 shows organisations' perceived barriers to SaaS adoption. The barriers are grouped into categories and some categories have themes. Poor awareness, concern about security and information privacy and limited resources are all common barriers to both SMEs and NPOs. The categories are aligned with category frequency, which is represented by N. Frequency is the number of times the category was identified.

Table 15: What do you consider as barriers in SaaS adoption for your organisation?

NPOs	N	SMEs	N
Poor awareness	5	Poor awareness	8
Concern about security and information privacy	2	Concern about security and information privacy	6
Poor internet infrastructure:	6	Poor internet infrastructure:	3
▪ *Low bandwidth*		▪ *Low bandwidth*	
▪ *Expensive bandwidth*		▪ *Expensive bandwidth*	
▪ *Monopolistic telecommunications provider (Telkom) to blame*		▪ *Monopolistic telecommunications provider (Telkom) to blame*	
▪ *Poor internet access in remote or rural areas*			
Limited resources:	6	Limited resources:	5
▪ *HR (limited skills and experience)*		▪ *HR (limited skills and experience)*	
▪ *TR (lack of adequate equipment to access the internet)*		▪ *TR (lack of adequate equipment to access the internet)*	
▪ *Limited funds*		▪ *Limited funds*	
Time to train	3		
Mindset shift	2		
Limited customisation and need for complex customisation	2		
Lack of ICT control	2		

Poor Awareness

Despite the brief description of SaaS coupled with well-known examples of SaaS prior to completing the questionnaire, the responses from both SMEs and NPOs show there are a number of respondents who have poor SaaS awareness. These are respondents who do not know about SaaS, do not know how it works, or do not know how it could benefit their organisations. The poor awareness and lack of knowledge of SaaS is supported with relevant quotations below:

Knowledge and awareness of what SaaS is -

"*We never heard of it*" – (SME, 10)

"*I do not have an idea of what SaaS is*" – (SME, 37)

Lack of knowledge of how SaaS works and benefits of using it -

"Money to pay for it and reliable staff to update it" – (SME, 9)

"Not exactly sure how it will benefit us" – (NPO, 17)

Poor Internet Infrastructure

Poor support structures are more pronounced in developing countries (Basal & Steenkamp, 2010). South Africa has many of the characteristics of both emerging and developing countries. Low internet bandwidth, expensive internet bandwidth, and poor internet access are common in developing countries. Poor internet access in remote or rural areas persists more for NPOs due to the fact that some of the NPOs operate in rural areas. Respondents also blame the monopolistic telecommunications industry for the poor internet infrastructure. Telkom had been the only fixed line telecommunications provider for decades until the year 2006, when the only fixed line competitor, Neotel, came into the market (SouthAfrica.info, 2011). However, since the competitor's entry there has not been much of a difference in service quality and telecommunications infrastructure. This is substantiated by the following quotations.

"*Total distrust of the reliability of the telephone service, low effective connection data rates, high data cost ...*" – (SME, 43)

" *1. Telkom 2. Telkom 3. Telkom Overpriced, under-performing internet access...*" – (SME, 2)

"*Very low and very expensive bandwidth (R500/GB!!) ...*" – (NPO, 27)

"*Our regional sites (offices), usually rural, have poor broad band connectivity which is expensive. Beneficiary connectivity is poor or non-existent and IT competencies are poor.* "- (NPO, 3)

Concern about Security and Information Privacy

There is some concern about data confidentiality and privacy as organisations are in possession of highly confidential information. Organisations are concerned about the possibility of unauthorised access to their data. There is a perception that the data in SaaS storage are not as secure as their local hosting services. The following quotations support the findings:

Security concerns -

"...total mistrust of in the 'clouds' data security." – (SME, 43)

"Security concerns ..."*– (NPO, 38)*

Information privacy-

"Our organisation handles very highly confidential information that one would think twice before using SaaS fully." - (NPO, 57)

Limited Resources

SMEs and NPOs are known for their resource scarcity (Ahmed & Chowdhury, 2009; Oyelaran-Oyeyinka & Lal, 2006; Pinho & Macedo, 2008) and these findings confirm it. Human resources, technological resources and limited funds are the persisting themes of a limited resources category. Human resources are a scarcity in the form of an insufficient workforce and insufficient skills within the workforce. Technological resources were identified as poor, and there is a lack of software, hardware and internet connectivity.

Despite SaaS being claimed to be more suitable for organisations with limited resources (Dubey & Wagle, 2007; Kern et al., 2002), the organisations are concerned about the affordability of SaaS and bandwidth.

Human Resources, Technological Resources and Limited Funds -

"...IT competencies are poor." – (NPO, 3)

"Lack of funds and other resources such as human resources." – (SME, 6)

"Hardware, Software, Connectivity." – (NPO, 6)

"Limited resources (finance & latest computer equipment) to keep connected to the internet." – (NPO, 63)

Time for Training

NPOs are concerned about the time required to train and retrain people. It is not clear whether it is their employees, beneficiaries or both of these groupings. The time to train is meant for training the respective people to use SaaS. Organisations usually require training when a new technology is introduced. Time is common in all the cases, and this indicates that time is something they cannot afford because of their limited resources. Training and/or learning are perceived to be essential, prior to using any new technology.

"Time to learn new things – we rely heavily on overseas volunteers - time to train and retrain" – (NPO, 9)

"[T]the training involved is inot [in] the utilisation of these systems. It is time consuming. – (NPO, 16)

Mindset Shift

The respondents expect to have challenges in changing the mindsets of their organisations from the traditional software paradigm. This is a factor that contributes to poor or slow adoption of new technologies (Carr, 2004, 2005). Over the years, many organisations have gone through a mindset shift from the old way of conducting business operations to the new way of doing business, with technology usually playing an enabling role (Carr 2004, 2005; Dodgson, Gann, & Salter, 2006). A mindset shift and change from within is required to adapt to the new mindset required for conducting business. As a consequence, resistance to change usually rises within the organisation, as employees are required to be retrained, and jobs are sometimes perceived to be under threat (Rothenberger & Srite, 2009; Schoepp, 2005).

"Moving peoples mindsets away from Microsoft" – (NPO, 53)

"...resistence [resistance] to change..." – (NPO, 38)

Limited Customisation and the Need for Complex Customisation

NPO respondents perceive SaaS as being best suited for applications that do not require complex interaction with other systems. These are those applications that require high specificity. As a consequence, they expect SaaS to be difficult, or to lack customisability, in order to meet the integration requirements for external systems.

Lack of ICT Control

Some NPOs' ICT is sponsored. Therefore, many organisations use ICT resources which are supplied and maintained freely by their sponsors. Hence, they do not have much control of their ICT.

"*All our IT services are sponsored...*" (NPO, 11)

"*We are part of the University's network, which makes provision for software applications, information sharing and communication platforms, which are supported by ICTS [IT provider] at no extra cost*" – (NPO, 10)

5.7.2 Perceived Barriers to SaaS Adoption for South African Organisations

Table 16 shows the organisations' perceived barriers to SaaS for South African organisations. Most of the key factors from the previous question still persist in this case. These factors are: poor awareness, concern about security and information privacy, poor internet infrastructure, limited resources and a mindset shift. Since most of the persisting factors recur, it should not be necessary to investigate the recurring factors again, with the exception of poor internet access in remote or rural areas and unreliable internet, which are a few new themes within the internet infrastructure category. The persistent category of fear of losing control of ICT systems will also be investigated.

Table 16: What challenges do you think South African organisations generally face regarding SaaS adoption?

NPOs	N	SMEs	N
Poor awareness	10	Poor awareness	9
Concern about security and information privacy	2	Concern about security and information privacy	3
Poor internet infrastructure:	8	Poor internet infrastructure:	9
▪ *Low bandwidth*		▪ *Low bandwidth*	
▪ *Expensive bandwidth*		▪ *Expensive bandwidth*	
▪ *Monopolistic telecommunications provider (Telkom) to blame*		▪ *Monopolistic telecommunications provider (Telkom) to blame*	
▪ *Unreliable internet*		▪ *Unreliable internet*	
▪ *Poor internet access*		▪ *Poor internet access*	
Limited resources:	11	Limited resources:	6
▪ *HR (limited skills and experience)*		▪ *HR (limited skills and experience)*	
▪ *TR (lack of adequate equipment to access the internet)*		▪ *TR (lack of adequate equipment to access the internet)*	
▪ *Limited funds*		▪ *Limited funds*	
Mindset shift	2	Concern of losing ICT control	2

Poor Internet Infrastructure:

Note that all the respondents in the survey responded via internet. Two key themes that emerge from this question were not present or persistent in the previous question. This question probes their perceptions of South African organisations in general, and not their own organisation. This indicates that they either perceive, or are aware of, other organisations (SMEs and NPOs) with unreliable internet and poor internet access. Also, this suggests that these barriers are not persistent within their organisation.

Unreliable Internet

"*Organisations are reluctant to move their business systems online as it requires a reliable internet connection..."* – (SME, 2)

"*...RELIABLE ACCESS TO BANDWITDH [bandwidth]* "– (SME, 11)

"*Bandwidth quality / reliability [reliability]..."* – (NPO, 56)

Poor Internet Access

"*Most of the Organisations have no internet access, so its [it's] very difficult to adopt."* – (SME, 14)

"*The lack of internet connectivity* " – (NPO, 60)

Concern of Losing ICT Control

SMEs are concerned about losing ownership and control of their systems. They believe they can offer a better in-house ICT solution than SaaS. These organisations could be correct; however, in other cases, the SaaS solution might be of the same quality or even better and more cost-efficient.

"*... Control of environment...* " – (SME, 48)

"*Many organisations still promotes [promote] a culture of ownership, and believe that they can provide better in-house solutions than the hosted alternatives.*" – (SME, 2)

5.7.3 Perceived Benefits for SaaS Adoption for South African Organisations

This section studies the perceived benefits of SaaS and the current benefits reaped by the early adopters of SaaS. Three major benefits were discovered: mobility, better and more efficient communication, business efficiency and effectiveness. The one common benefit for both SMEs and NPOs is business efficiency and effectiveness.

Table 17: What benefits do you think your organisation would gain from adopting SaaS? And/or if you have adopted SaaS what are the current benefits of adopting SaaS?

NPOs	N	SMEs	N
Business efficiency and effectiveness	14	Business efficiency and effectiveness	5
▪ *ICT operations*		▪ *ICT operations*	
▪ *Better and efficient communication*		▪ *Better and efficient communications*	
▪ *Business operations*		▪ *Business operations*	
Simplicity and convenience	4	Flexibility	2
Mobility	4	Functionality and features	3

Business Efficiency and Effectiveness

Respondents expect to gain ICT operational efficiencies which would help them focus more on their organisational operations and help their organisations to become more efficient. These efficiencies and effectiveness of ICT operations are expected to be gained from the reduced cost of ICT operations (e.g. reduced maintenance and upgrade costs) and the reduced start-up costs, the reduced time to market an application or system, and from quick and efficient business communication.

"*... Reduced cost due to higher efficiencies (i.t.o. maintaining the services). 4. Reduced time to market (i.e. just sign up and use as opposed to buy, deploy, configure).*" – (SME, 2)

"*International platform on my finger tips. Quick and efficient business communication with no high costs. Ability to do all transactions without having to be at that particular place*" – (SME, 32)

"*Smoother delivery and sharing of important work documents and information. Greater understanding of how we can maximize outcomes without spending too much time. "*– (NPO, 59)

"*Exposure, Increased Functionality & Capacity, Higher turnaround Times, Higher Management support & Functionality, [.]"* - (NPO, 8)
"*Low Setup Costs [,] Regular Software Updates and Security Patches included [.] Use of systems is on a month to month basis Available remotely, from almost any location and on most devices* " – (SME, 29)

Simplicity and Convenience

NPO respondents are both experiencing and expecting easy and convenient access to technology and ICT operations gained by the use of SaaS technology. One of the responses suggests that the respondent is speaking from experience rather than expectation. One of the responses refers to, "oncrm", OnCRM is a SaaS CRM solution provided by OpenNetworks.

"*Love google apps and oncrm and our website (OpenNetworks), has made everything simpler...* "– (NPO, 52)
"*Convenience..."* – (NPO, 48)

Flexibility

It is perceived that SaaS gives better flexibility compared with traditional software. This is due to short-term rent decision and the ability to change from one SaaS solution to another, or to revert to a previous solution if not satisfied with current SaaS solution.

"*Increased flexibility (i.e. short-term rent decision instead of long-term buy decision).* "– (SME, 2)

Mobility

NPO respondents expect to be able to access resources by using SaaS from almost anywhere and at any time. The mobility does not refer to the use of mobile phones to access the data, but to the ability to access data or applications on the move via the internet – using either a

computer (work or home computer) or a mobile device (e.g. mobile phone or tablet computer).

"*...people would be able to access information from the field or from home*." – (NPO, 38)
"*...movement and the transfer of information will be easy.* " – (NPO, 57)

Functionality and Features

SME respondents expect better functionality that meets their work requirements. There is an expectation of more useful features from SaaS technology. The quotations below substantiate the inferences made.

"*Functionality and new few features..."* – (SME, 48)
"[*I]integrated system, and good and adequate electronic system for the business*." – (SME, 6)

5.7.4 Perceived Factors that would Influence Organisations to Adopt SaaS

This question attempts to find out what factors would best influence respondents to adopt SaaS. Some persisting barriers are reversed positively as factors that would influence SaaS adoption, i.e. poor awareness is reversed to better awareness; concern about security and data privacy is reversed to guaranteed security and data privacy and suchlike. These are the three common persisting factors that influence both NPOs and SMEs.

Table 18: What would influence you to adopt SaaS?

NPOs	N	SMEs	N
Better awareness	4	Better awareness	5
Functionality	6	Functionality	6
Guaranteed security and data privacy	2	Guaranteed security and data privacy	2
Affordability of SaaS	4	Affordability	2
Training	2	Efficiencies and effectiveness	4
Better internet infrastructure	6	Good ROI	3
Resources (skills, technical resources)	3	Flexibility (and no vendor lock-in)	2
▪ *HR (limited skills and experience)*			
▪ *TR (lack of adequate equipment to access the internet)*			

Better Awareness

Better awareness is the ability of NPOs and SMEs to be aware of SaaS, and to be able to make sound decisions on whether to adopt or not. It has three themes: knowledge about how SaaS works, knowledge about benefits and challenges to SaaS adoption and use, and experience of, and exposure to, SaaS. Knowledge is a significant factor in the diffusion of innovations theory (DOI). Experience and exposure to SaaS can be translated as SaaS trial ability and observability, respectively, in terms of DOI. The inferences are supported by the quotations below.

"*A clear and simple explanation of the benefits and cost savings*" – (NPO, 33)
"*To learn about it and demonstrated its use and usefulness* "– (NPO, 22)
"[E]exposure, experience... "– (SME, 35)
"*Information of what is does better than our current systems [systems] and what is its cost?* " – (SME, 44)

Functionality and Features

Functionality is essential for organisations to fulfil their daily operations. The themes that emerge from this category are: system integration, reliability and stability of SaaS, user-friendly SaaS applications, and the ability for SaaS applications to satisfy their organisation's requirements. The findings are supported by the following quotations.

"*Reliability, little to no down-time, no maintenance of servers etc"* – (NPO, 30)
"*If the apps really did meet the needs we have*" – (NPO, 25)
"*The system integration, friendly and easier-to-use facilities."* – (SME, 8)
"*Available applications that clearly and specifically address our business needs. Anything that makes it cheaper and faster to do business and has clear impact on our bottom lien [line] (profit)[.]"* – (SME, 11)

Guaranteed Security and Data Privacy

These issues are similar to security and data privacy concerns. However, NPO and SME respondents can only be convinced or influenced to use or adopt SaaS if they are assured of data security and information privacy. One way this can be achieved is by SLA agreements.

"Guaranteed security of information and confidentiality " – (NPO, 53)
"...Assurance of data privacy. " – (SME, 48)

Better Internet Infrastructure

NPO respondents, who are not satisfied with the internet infrastructure, say they are willing to adopt SaaS if the internet infrastructure problem can be solved. The key themes that emerged from this category were: a significant drop in the cost of internet, better connection to the internet and improved internet access.

"*Improved regional connectivity (including lower cost)..."* – (NPO, 3)
"*You being able to persuade Telkom to drop our charges by 50%"* – (NPO, 27)
"*Improved internet access..."* – (NPO, 38)

Training

NPO respondents who have no prior awareness (understanding and knowledge) of SaaS suggest training as a vital tool to better understand and utilise SaaS. Usually, SaaS applications are intuitive and offer training videos to streamline the process of understanding the benefits and usage of the SaaS application. The results suggest that the respondents lack awareness; therefore, the respondents perceive training to be an essential factor in the adoption of SaaS. However, there are indeed some applications which are complex and definitely will require training.

"*Setting up a permanent office, group training/seminar for better understanding of tools*" – (NPO, 59)
"*Free training. "* – (NPO, 12)

Good ROI

SMEs are more concerned with the return on investment (ROI). They want to get the best out of their money. If SaaS promised better ROI than traditional software, then they would consider adopting SaaS. SaaS has to be aligned with the business vision. The persisting themes in this category are: satisfy business requirements, improve business efficiency, improve business profitability, and fulfil business growth.

"Available applications that clearly and specifically address our business needs. Anything that makes it cheaper and faster to do business and has clear impact on our bottom lien [line] (profit)" – (SME, 11)

"The product has to make business sense for our business visoin [vision] it has to make ROI. Thats [That's] all. "– (SME, 45)

"*Capital and upturn and potential future growth in business*" – (SME, 39)

Better Resources

There is a lack of skills within NPOs, poor literacy levels among beneficiaries, and a lack of computer skills to utilise SaaS (Finn et al., 2006; Pinho & Macedo, 2008). The NPOs who perceive better resources as being a factor that would influence them to adopt are the same NPOs who perceived the lack of resources. There is a perception that SaaS is either an additional cost or is more expensive. However, SaaS is an alternative to traditional software and is meant to be more affordable than traditional software.

Those respondents who require better resources are the same respondents with poor awareness of SaaS. This suggests that there is a connection between poor awareness and the perception of better resources.

"*...skill and accessibility in terms of cost.* " – (NPO, 23)

"*...Updated It [IT] Hardware*" – (NPO, 8)

"*availability of resources (financial and material)"* – (NPO, 63)

Affordability of SaaS

Responses cite cost, affordability and price as the key factors that would influence them to adopt and use SaaS. However, it was not clear if these were cost, affordability and the price of SaaS or the internet. The safe assumption would be the cost of SaaS and its related cost (internet, customising cost), as the question asks: "What would influence you to adopt SaaS?"

*"*Lower cost*"* – (NPO, 39)
"price ... "– (NPO, 14)
*"*Affordability*"* – (NPO, 48)
"Low Setup Costs" – (SME, 29)

5.7.5 Perceived Capability of SaaS Providers and Internet Service Providers to Seamlessly Deliver SaaS

This question was asked in order to assess the perceived capability of SaaS providers and internet service providers to seamlessly deliver SaaS. The purpose of this question was to facilitate a better understanding of the key issues regarding SaaS adoption and use. Thus, this brings deeper and richer understanding as regards current and future adoption challenges.

Table 19: Do you think SaaS providers and internet service providers have the capability to seamlessly deliver SaaS? Please give reasons why.

NPOs	N	Percentage	SMEs	N	Percentage
Yes	13	46%	Yes	19	61%
No	8	29%	No	4	13%
Not sure, do not know	7	25%	Not sure, do not know	8	26%

The responses suggest that some respondents have experience in using SaaS technologies, while others have no prior experience in using SaaS technologies. Three categories emerged for both types of organisations. The responses are grouped into "yes", "no" and "do not know". Each response has a frequency and percentage. The majority of NPOs and SMEs expect SaaS to be able to be seamlessly delivered. The fewest number of SMEs disagree and

others (13%) are not sure or do not know if SaaS can be delivered seamlessly. Note that the difference between NPOs that disagree (29%) and those that are not sure or do not know (25%) is just one response.

Yes

This response refers to those respondents who believe that both SaaS and the internet service providers can seamlessly deliver SaaS. The underlying reasons are that respondents utilise reliable internet infrastructure, that they believe it is continuously improving; and that they are already using SaaS and it works seamlessly. In addition, some believe that the country has enough skills to counter the internet infrastructure and SaaS technical infrastructure challenges.

"*Yes, Opennetworks does this for us*" – (NPO, 52)
Yes - I am with the most reliable network thus far. The telecoms infrastructure in our country is developing at a satisfactory rate. The level of interventions our network"– (SME, 32)
"*Yes, the technical infrastructure is available and there are the required skills can be found in the market*." – (SME, 29)

No

A few of respondents believe that it is not yet possible to deliver SaaS seamlessly in South Africa. The underlying reasons are: poor access in rural areas, slow internet speed, expensive bandwidth and poor service with internet service providers. NPOs are the only organisations that cite poor access in rural areas and the lack of internet connection, as they often operate in rural areas.

"*They have capability in metropolitan areas, but in rural areas, the client is often left to figure stuff out for themselves...*" – (NPO, 42)
"NO - slow and unreliable data connections, poor service, unreliable security etc" – (SME, 43)
"*It is already happening; perhaps not truly seamlessly because of bandwith [bandwidth] and problems with ubiquitous network availability.* "– (NPO, 55)

Do Not Know

Significant numbers of respondents from both SME and NPO dataset do not know or are not certain if it can be delivered seamlessly. Most of the responses were not substantiated. However, one respondent cited that knowledge or experience of seamless access to SaaS would only be gained after using SaaS technology. Most of the respondents in this category were not even aware of SaaS technology.

"*I dont know irt remains to be seen*" – (SME, 8)

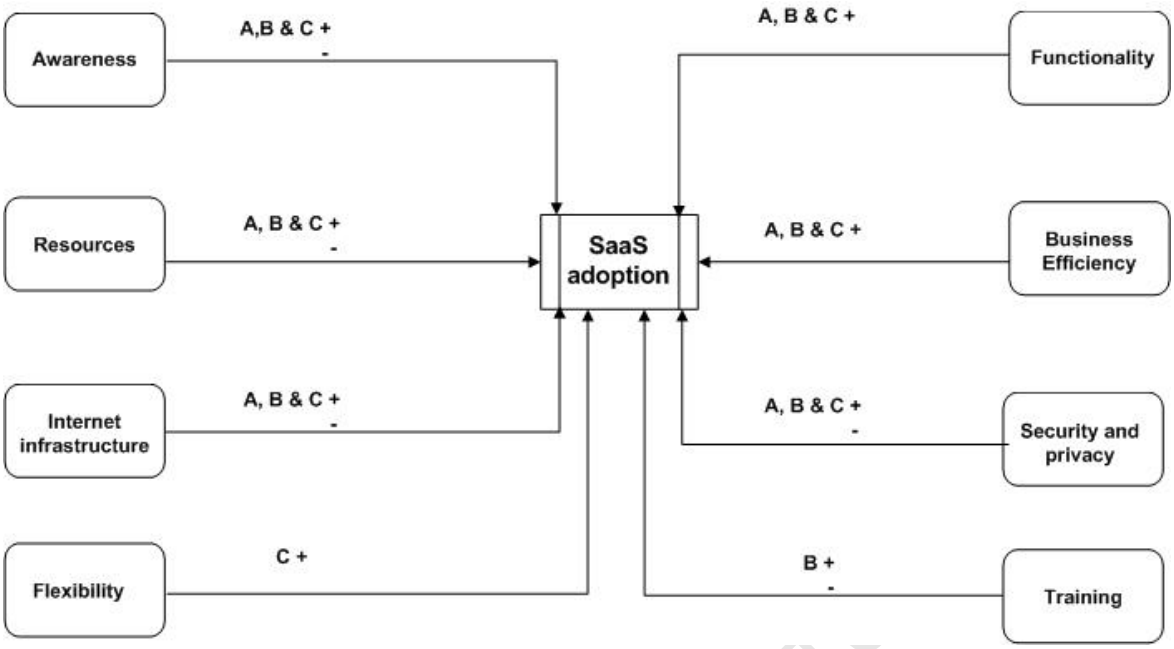
5.8 Analysis of Categories

This section discusses the SaaS adoption barriers and contributors found in the qualitative results. It begins with barriers, then is followed by contributors to SaaS adoption. Factors are persisting categories with a total frequency of at least five. Five represents approximately 10% of each sample. Barriers are identified with a negative sign and contributors with a positive sign. Figure 16 depicts the SaaS adoption barriers and the contributors.

5.8.1 Barriers to SaaS adoption

The barriers are: poor awareness, limited resources, poor internet infrastructure, security and privacy concerns and the time required to train staff to use new software. The adoption barriers confirm SME and NPO research (Fink & Disterer, 2006; Kapurubandara & Lawson, 2007; Qiang et al., 2006; Waema, 2002). Poor awareness negatively impacts SaaS adoption, as most respondents had never heard of SaaS, did not understand how it works, and did not know how it could benefit their organisations.

This confirms studies regarding the lack of knowledge and understanding of ICTs by SMEs and NPOs (Barba-Sánchez et al., 2007; Fink & Disterer, 2006; Qiang et al., 2006). As a result, some of the respondents perceived the lack of resources as a reason for not adopting SaaS. Respondents cited that they lacked the resources to provide maintenance and support for SaaS. This suggests a poor understanding of SaaS. Therefore, poor awareness negatively influences perceived limited resources.



A= Combined NPO and SME; B = NPO sample; C = SME sample; + = positive relationship; - = negative relationship

Figure 16: Barriers and Contributors/Enablers of SaaS Adoption

5.8.1 Contributing Factors (Benefits and/or Enablers) to SaaS Adoption

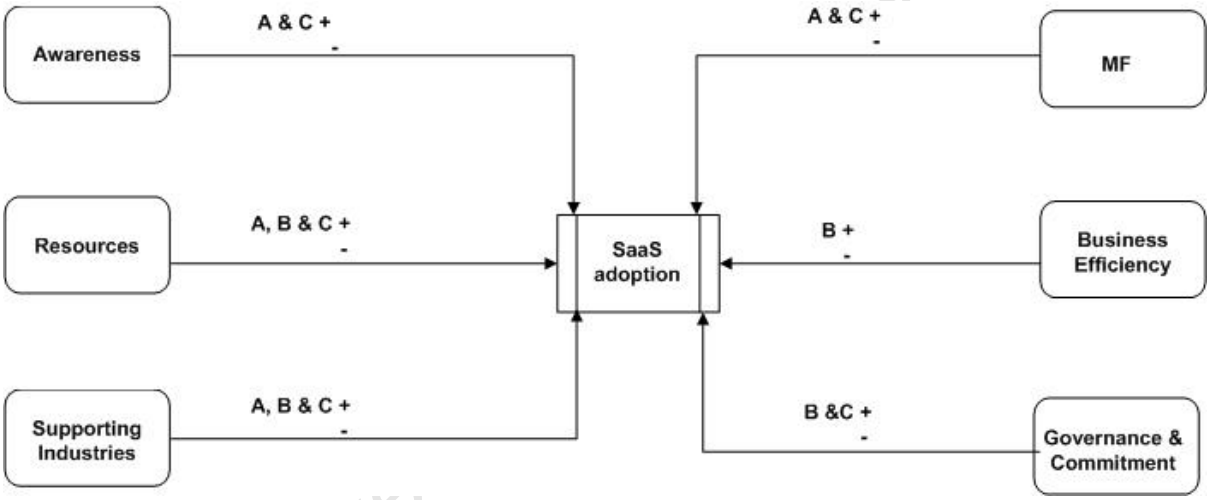
Using the DOI, contributing factors (mainly benefits) can be translated to relative advantage gained by using SaaS leading to positive adoption. The SaaS adoption contributing factors are: good awareness, good internet infrastructure, sufficient resources, good flexibility, improved business efficiency and good functionality and features. Note that there are benefits and key enablers for SaaS adoption. These enablers are good awareness, good internet infrastructure and sufficient organisational resources. The benefits include improved business efficiency, good functionality and features.

The respondents identified functionality and features as being vital factors in the adoption of SaaS. Functionality and features contribute to the simplicity and convenience of SaaS use. Organisational efficiency can be derived from the functionality and the features afforded by SaaS. Flexibility is afforded by SaaS functionality. In this case, flexibility is the ability to be able to easily change vendors without being locked in.

5.9 Discussion of the Findings

Several factors contributing to the adoption or non-adoption of SaaS were identified. The relationships between the factors have already been discussed. These factors were derived from the multiple themes found in the results. However, there may be other factors that contribute to SaaS adoption, but they were not discovered in this research. As a result, it is important to focus on the persisting categories or factors found in the research.

The overall persisting factors are significant factors from the quantitative findings and categories with at least a total frequency of ten. Ten represents approximately 20% of each sample. Figure 17 illustrates the proposed model.



A= Combined NPO and SME; B = NPO sample; C = SME sample; + = positive relationship; - = negative relationship

Figure 17: NPO and SME SaaS Adoption Model for Developing Countries

The SaaS Adoption Status results reveal that 29% and 40% of the respondents had never heard of SaaS's highly imitable and highly specified applications, respectively. According to the DOI theory, awareness is an essential component in the adoption of any new technology. The awareness quantitative research findings are well supported by the qualitative findings. This highlights the fact that awareness is an important factor in the successful adoption of SaaS. Moreover, qualitative responses stress the lack of awareness amongst these organisations. Poor awareness leads to low adoption or no adoption, while good awareness contributes positively to adoption.

Resources are important when implementing and adopting technologies. The lack of resources may lead to poor adoption or failure of the adoption of new technologies, as training, skills and funds may be required to support the use of these technologies.

The preservation of security and information privacy is important, in order to protect organisations' data and their clients' or beneficiaries' data (Benlian & Hess, 2011; Nicolaou & McKnight, 2006; Ravichandran, 2005). Businesses may possess information that helps them to become more competitive, while NPOs may be in the possession of highly confidential and beneficial information. Some organisations fear that the use of SaaS would render them more vulnerable. As a result, they are willing to adopt SaaS, if they can be assured of data security and information privacy; this could be achieved by signing a service level agreement (SLA) SLA.

Poor internet infrastructure is a significant barrier to SaaS adoption and internet penetration in developing countries (Basal & Steenkamp, 2010). As a result, it is one of the major issues affecting poor SaaS adoption, since organisations are concerned with bandwidth costs, internet access and internet reliability. Better internet infrastructure and more affordable bandwidth would improve the adoption of SaaS.

Using the PERM (Molla & Licker, 2005a; Molla & Licker, 2005b), poor internet infrastructure and data security and privacy are a subset of supporting industries variable. Therefore, the qualitative findings indicate that supporting industries (SI) readiness is essential for SaaS adoption. However, the SI variable is not significant in the quantitative results.

Functionality and features are important deciding factors in adopting SaaS. The SaaS application has to meet the expected requirements of the organisation. Otherwise, it would defeat the purpose of switching to new technology which is unfamiliar.

The ability to easily switch from a SaaS solution to a traditional solution, or an alternative SaaS solution, is required, as organisations do not want to be locked into a particular vendor. The switching costs are often expensive. As a consequence, organisations delay or

do not switch to a better solution, despite perceiving the better benefits forthcoming from SaaS, or an alternative solution.

Organisational ICT efficiency and effectiveness in running organisational operations are the current benefits obtainable from the early adoption of SaaS, and it should be an anticipated benefit from using SaaS. These findings confirm ICT research (Noir & Walsham, 2007; Qureshi, 2005; Zorn et al., 2011). This benefit is reaped from SaaS functionalities and features. Moreover, these functions and features also aid in mobility. The fruits of this benefit would definitely help organisations to focus on their core operations, especially those organisations with limited resources.

5.10 Summary of the Findings

WarpPLS is a non-linear structural equation modelling tool that has a better r-squared and sensitivity to significant correlations when compared with Statistica software, which assumes a linear relationship. Despite small individual SME and NPO samples, it maintained its sensitivity and a decent r-squared. This suggests that WarpPLS is good at handling both small and large samples.

SEM was used to statistically analyse the quantitative results. A WarpPLS 3 regression algorithm was used with a bootstrapping re-sampling technique that utilises 100 re-samples for the combined NPO and SME dataset. A Jack-knifing re-sampling technique was used for individual NPO and SME datasets. The construct and instrument passed a number of validity tests for all datasets. A multicollinearity test showed that commitment was highly correlated to governance; hence, it was required to be removed from the model for the combined NPO and SME dataset and the NPO dataset.

Since commitment was highly correlated to governance, it was combined with governance in another model to form one variable. This makes good sense, as an organisation that is highly committed to a technology would put the appropriate governance in place for that technology.

Analysis of organisations' profiles and of the respondents showed some interesting results. NPOs had a higher budget compared with SME revenues. Moreover, the educational level of the respondents of both SME and NPO datasets showed that they are mostly highly educated individuals.

In combined NPO and SME dataset awareness, resources (HR, BR and TR) and market forces are significantly correlated with SaaS adoption. The NPO findings found resources and governance grouped with commitment to be significantly positively correlated to SaaS adoption. Moreover, SME findings found awareness and market forces to have a significant positive correlation with adoption. The qualitative findings confirmed most of the results.

Based on the analysis of both the quantitative and qualitative analysis procedures, the key factors have been used to design a proposed new model to study SME and NPO SaaS adoption in developing countries.

6 Conclusion

This chapter summarizes the key research findings by reviewing the theory, evaluating the implications of the research, briefly discussing the limitations of the research, suggesting some further research opportunities and, lastly, providing some recommendations to industry.

6.1 Review of the Theory

SMEs play a significant role in economic growth, innovation and job creation as well as in contributing significantly to the GDP. NPOs promote social, economic, environmental, political and cultural interests. ICTs can enhance growth, extend SMEs' reach in local and global markets, and reduce their costs of operation. SMEs have a limited workforce and thus lack the variety of skills and ICT knowledge available to larger enterprises. NPOs have used ICTs to run more efficiently, to increase organisational transparency for funders and, thus, to increase donor funding.

NPOs' internal factors (i.e. staff size, skills and ICT literacy) and external factors (i.e. funding) influence their investment in technology. NPOs employ a high percentage of volunteers and they often have scarce technical, human and financial resources.

Organisations have to weigh the trade-offs between the benefits and the associated risks of SaaS. Studies reveal the main adoption barriers of SaaS as: application quality, application reliability, and information security and privacy concerns. Non-adopters are sceptical of the SaaS promise to lower the total cost of ownership. SaaS adopters and non-adopters are guided by a variety of factors. Cost efficiencies, quality improvements, improved application performance, economic decision-making, and strategic flexibility are the principal contributors to decisions to adopt SaaS. Most of the SaaS barriers and contributors found in this research were consistent with those discussed in the literature.

Information Systems theories help us to understand the decision to adopt SaaS. The IS theories in this research are founded on RBV, PCE, PRT and TCT. These theories helped build the SaaS decision factors considered: application uncertainty, application specificity and the

strategic value of IT. However, they do not factor in both internal and external factors. The PERM is a more complete model for SaaS adoption, as it consists of both internal and external determinants. The PERM, with additional SaaS decision factors, is a more complete model than current SaaS adoption models.

So far there is a paucity of research on SaaS adoption research in developing countries, more particularly SaaS readiness research. This study is one of the first SaaS research endeavours to explore SaaS adoption external factors, market forces, government and support industries, specifically in the context of small to medium-sized organisations in an emerging country context.

6.2 Summary of the Findings

This study broadens SaaS research beyond SaaS outsourcing decision factors and SaaS risk factors to confront more organisational and external issues. The dominant factors found include: awareness, security and privacy concerns, high internet costs and poor access to internet, and organisational resources. All of the determinants confirm what has been found in the previous studies except for the barriers of high internet costs and poor access to internet, which are less prevalent in developed countries.

The quantitative findings showed that awareness contributed positively to adoption; correspondingly, the qualitative research found that poor awareness was negatively affecting adoption. Moreover, SMEs and NPOs both cited limited resources available in their organisation as negatively affect adoption. The dominant barriers are poor awareness, limited resources, expensive and poor internet infrastructure, security and privacy concerns, while the dominant contributors and enablers of SaaS are good awareness, sufficient resources, affordable and good internet infrastructure, good or guaranteed security and privacy, functionality and business efficiency. The findings highlight the importance of both organisational and external factors as they relate to adoption.

The inhibiting impact of poor telecommunications infrastructure and lack of skills appears to be quite critical and decisive for SMEs and NPOs in developing countries. The

telecommunication findings are consistent with those of earlier academic research and white papers (i.e. OECD and ITU). This supports the necessity of technology readiness and e-readiness research. Also, the lack of skills in developing countries is a matter of concern. This is due to insufficient graduates, skilled workers preferring to work in big corporations, and the brain drain of graduates and those with experience and skills opting for life in developed nations (Mattes & Mniki, 2010; SouthAfrica.info, 2010; SouthAfrica.info, 2012).

6.3 Implications

Awareness and poor internet infrastructure are dominant factors in the adoption of SaaS. Knowledge and some understanding of SaaS are important for organisations considering the initial adoption of SaaS. High internet costs, low internet reliability and poor access are detrimental to the adoption of SaaS. Respondents attribute this to Telkom's many years of monopolising the telecommunication market, a situation that has changed little since the introduction of a second landline carrier. Poor internet infrastructure is not a prevalent factor in developed countries. Organisational resources are important determinants in the adoption of SaaS. This confirms the view that both organisational and external factors are determinants of adoption.

Molla and Licker's (2005a) PERM was adapted for SaaS readiness and subsequently validated. However, governance and commitment were found to be highly correlated with each other and were thus combined to form one variable. Therefore, if an organisation perceives SaaS as important, they are likely to exert governance over it. The combined variable was found to be significant for both the SME and the NPO dataset, but not for the combined dataset, which suggests there is a possibility of outliers in both the SME and the NPO sample.

6.4 Recommendations

Apart from future research recommendations, there are some recommendations made for each stakeholder. These stakeholders are SaaS vendors, government, NPOs and SMEs, and telecommunication companies.

6.4.1 Vendors

Vendors should increase their efforts to promote and educate SMEs and NPOs about SaaS. These promotions should focus on educating users on the use of SaaS, both its benefits and its challenges. They should also address security and privacy concerns by providing strong and reliable secure data and applications and, at the same time, indicating their commitment via SLAs. Furthermore, to offset local unreliable and expensive internet connections, they should investigate partnering with internet service providers to deliver SaaS seamlessly.

6.4.2 Government

SMEs contribute to job creation and the economy, while NPOs in developed countries import a lot of funds from developed nations. Government stands to benefit as SMEs and NPOs have reported improved business efficiency by using ICTs and SaaS, thereby creating another avenue to improve efficiency. Government, in the long term, needs to invest in the telecommunications infrastructure. It needs to enforce a policy that would foster affordability and encourage competition amongst telecommunications companies. Moreover, it needs to consider subsidising internet-related work in SMEs and NPOs.

6.4.3 Telecommunication Companies

Telecommunication companies need to find ways in which to make the internet more affordable for SMEs, without sacrificing significant profits. For instance, a partnership with government to subsidise the internet for SMEs and NPOs could be to their advantage. However, they might not have sufficient capacity to handle more users on their network. A long-term partnership with government to invest in improving the telecommunications infrastructure would be a sustainable way to create scalability and affordability. Furthermore, a partnership with vendors to provide a bundle packaged solution with a combined internet service and a SaaS solution would attract more customers.

6.4.4 NPOs and SMEs

NPOs and SMEs need to educate themselves on the uses of SaaS as well as its benefits and challenges, enablers and barriers. However, they must realise that SaaS is not a silver bullet; SaaS should only be considered on the merits of a strong business case based on a concrete value proposition. NPOs and SMEs should develop governance, evaluate vendors and security, and develop an integrated road map to investigate the level of integration required (Gartner Inc., 2011b).

6.5 Limitations and Further Research

The sample is too small for each individual NPO and SME sample, as well as for the combined sample, to represent the general population of South Africa. This is due to the low response rate, which is common in a survey (Molla & Licker, 2005a; Tan et al., 2007). There may have been an industry sector bias, since different sectors use ICTs differently. This opens up a research opportunity for a study focusing on an assortment of sectors in order to eliminate the possibility of industry bias. There may also be a response bias because organisations that have adopted SaaS (or are at least aware of it) are much more likely to respond than those that do not know it.

The limitations create an opportunity to study SMEs and NPOs in developing countries with various approaches. A case-study approach and/or a broader pure qualitative approach to SaaS adoption in developing countries would be useful in understanding the underlying reasons for adoption and the various adoption determinants. Moreover, a longitudinal study would be useful in studying the change in SaaS perceived barriers and contributors (or enablers) over a period of time. As in other adoption studies, it may be useful for future studies to unpack the differences in factors driving initial adoption versus those factors which support the long-term continued adoption and use of SaaS.

7 ACRONYMS

ASP	Application Service Provider
BR	Business Resources
CBO	Community Based Organisations
DOI	Diffusion of Innovation
HR	Human Resources
IaaS	Infrastructure as a Service
ICT	Information Communication Technology
IS	Information System
IT	Information Technology
NGO	Non-Governmental Organisations
NPO	Non-Profit Organisation
PaaS	Platform as a Service
PCE	Production Cost Economies
PERM	Perceived E-Readiness Model
PRT	Property rights theory
RBV	Resource Based View
RIA	Rich Internet Application
SaaS	Software-as-a-Service
SLA	Service Level Agreement
SME	Small Medium Enterprises
SI	Support industries
TCT	Total Cost Theory
TR	Technology Resources

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9 Appendix

Appendix 1: Literature Review Contents

Table 20: SA Small Business Act SME Size Per Sector (Government Gazette, 2003)

Sector or subsector in accordance with Standard Industrial Classification	Size of class	The total full-time equivalent of paid employees	Total turnover	Total gross asset value (fixed property excluded)
Agriculture	Medium	100	5	5
	Small	50	3	3
	Very Small	10	0.5	0.5
	Micro	5	0.2	0.1
Mining and Quarrying	Medium	200	39	23
	Small	50	10	6
	Very Small	20	4	2
	Micro	5	0.2	0.1
Manufacturing	Medium	200	51	19
	Small	20	13	5
	Very Small	5	5	2
	Micro	5	0.2	0.1
Electricity, Gas and Water	Medium	200	51	19
	Small	50	13	5
	Very Small	20	5.1	1.9
	Micro	5	0.2	0.1
Construction	Medium	200	26	5
	Small	50	6	1
	Very Small	20	3	0.5
	Micro	5	0.2	0.1
Retail and Motor Trade and Repair Services	Medium	200	39	6
	Small	50	19	3
	Very Small	20	4	0.6
	Micro	5	0.2	0.1
Wholsesal Trade, Commercial Agents and A	Medium	200	64	10
	Small	50	32	5
	Very Small	20	6	0.6
	Micro	5	0.2	0.1
Catering, Accomodation and other Trade	Medium	200	13	3
	Small	50	6	1
	Very Small	20	5.1	1.9
	Micro	5	0.2	0.1

Sector or subsector in accordance with Standard Industrial Classification	Size of class	The total full-time equivalent of paid employees	Total turnover	Total gross asset value (fixed property excluded)
Transport, Storage and Communications	Medium	200	26	6
	Small	50	13	3
	Very Small	20	3	0.6
	Micro	5	0.2	0.1
Finance and Business Services	Medium	200	26	5
	Small	50	13	3
	Very Small	20	3	0.5
	Micro	5	0.2	0.1
Community, Social and Personal Services	Medium	200	13	6
	Small	50	6	3
	Very Small	20	1	0.6
	Micro	5	0.2	0.1

Table 21: Theories Informing Outsourcing Decision Adapted from Xin & Levina (2008)

Theories	Summary and applications to IT outsourcing	Key variables
Production Cost Economies	Production cost advantages can be developed through the scale and/or scope of production (Alchian and Allen 1969; Panzar and Willig 1981). External vendors generate their scale and scope by pooling demand from a large number of customers and often managing multiple functions simultaneously. This, in turn, justifies their large investment in specialized technologies and human resources.	Vendor's versus client's economies of scale and scope in IT
	IT outsourcing is often seen as a result of client's desire to access vendors' economies of scale and scope (McFarlan & Nolan 1995; Ang and Straub 1998; Levina & Ross 2003). At the same time, many large organisations are able to utilise their economies of scale and scope internally (McFarlan & Nolan 1995). Thus, IT outsourcing becomes the question of relative advantage.	
	At the time when business and technical environments are uncertain, IT outsourcing becomes a way of dealing with this uncertainty in both labour and asset ownership as the vendor can deal with demand uncertainty in more efficient fashion (Slaughter & Ang, 1996; Levina and Ross, 2003).	Uncertainty of demand
	Another source of cost saving could come from financial costs. Firms with high cost of capital can economize on their fixed capital costs by creating a cash infusion through sale and lease-back of their IT assets through outsourcing contracts (Loh and Venkatrama 1992a; Smith et al. 1998).	Client's cost of capital
Resource Based View of the Firm	RBV suggests that capabilities of firms vis a vis their transaction partners are important determinants of sourcing decisions (Barney 1999; Van de Ven 2005), and an activity should be outsourced if it is not a core competence of a firm (Quinn 1999; Prahalad et al 1990).	
	Outsourcing non-core activities may also help firms deal with environmental uncertainty as specialized vendors should have better agile capabilities for handling change (Poppo and Zenger 1998; Quinn and Hilmer 1994).	Uncertainty
	Investments in IT can become strategic by helping firms develop their core competencies (Sambamurthy et al., 2003). Thus, firms may want to own and control those IT resources that are closely related to their best in class capabilities, making these IT resources strategic (McFarlan and Nolan 1995, Nam et. al, 1996).	Strategic importance of the IT application
	RBV also implies that if internal IT function of an organisation is strong – large, well managed, and strategically aligned with the rest of the organisation – then the firm benefits less from accessing vendors' generalized IT competencies (McFarlan and Nolan 1995; Levina and Ross 2003).	Client's IT capability

Theories	Summary and applications to IT outsourcing	Key variables
Property Rights Theory	PRT studies the role of firm boundaries in providing incentives for making relationship-specific investments (Grossman and Hart 1986; Hart and Moore 1990). A firm is composed of assets that it owns. Asset ownership conveys formal control over the uses of an asset, when such control has not been pre-specified in the contract. Thus, when the contract fails to direct the transaction, the asset owner is able to negotiate a more favorable division of surplus against agents who do not own the asset (known as the hold-up problem). Uncertainty increases the cost of writing a complete contract and also the likelihood that the contract will remain incomplete and fail to direct transactions. In case of outsourcing, a client would want to own those assets for which there is a need to make asset-specific investments to gain greater productivity, but for which the vendor can gain little value from making such investments outside the relationship with this specific client.	Asset Specificity Uncertainty
Total Cost Theory	"economic efficiency can through comparative analysis of production costs and transaction costs (Williamson, 1975; Williamson, 1985). In this analysis the transaction is the unit of analysis and a firm's success depends on managing transactions efficiency. The theory is built on two fundamental behavioural assumptions: (1) limited rationality (Simon, 1957) and (2) opportunistic behaviour." Dibbern et al, 2004, p.19) Williamson added asset uncertainty and specificity to the already existing (TCT) (Coase, 1937) that would better explain outsourcing behaviour (Williamson, 1985). Williamson later concluded that an asset with high specificity is managed less costly in-house, while the rest of the assets should be outsourced to obtain better efficiency.	Asset Specificity Uncertainty
Institutional theory	Institutional theory seeks to explain the homogeneity of organisational forms and practices that are not necessarily motivated by efficiency purposes. External influences such as government regulation, peer organisation's successful experiences, media and third-party communications could also drive firms' sourcing decision (Ang and Cummings 1997; Loh and Venkatraman 1992b; Hu et al 1997). This view is especially relevant in the current context given the growing popularity of the SaaS model in the market place.	Institutional Influences (regulation, peer
IT Governance Theory	Enterprise IT architecture refers to "the organizing logic for applications, data and infrastructure technologies, as captured in a set of policies and technical choices, intended to enable the firm's business strategy" (Ross 2003). Building a strategic enterprise IT architecture is a challenging process. Ross and her colleagues (2003, 2006) find that firms attempting to design, implement, and leverage enterprise IT architecture go through 4 distinct stages: business silo, standardized technology, rationalized process and business modularity architecture. Moving up a stage increases the strategic value of IT and enhances enterprise effectiveness. Firms with different levels of enterprise IT architecture maturity benefit differently from different types of sourcing arrangements (Ross and Beath 2006).	Enterprise IT architecture maturity

Appendix 2: Questionnaire and Covering Letter

2A Covering Letter

UNIVERSITY OF CAPE TOWN

Department of Information Systems
Leslie Commerce Building
Engineering Mall. Upper Campus
OR Private Bag, Rondebosch 7701
Tel: +27 (0)21
650-2261
Fax: +27 (0)21 650-2280

2 October 2012

Dear sir/madam,

I am a Masters student in the Department of Information Systems, Faculty of Commerce at the University of Cape Town.

I would like to invite you to be part of a research study entitled "SME and NPO readiness in adopting Software-as-a-Service in developing countries". The aim of the study is to measure the adoption or non-adoption of a new technology called "Software-as-a-Service" commonly known and abbreviated as SaaS. The objective of the study is to measure the readiness of Small and Medium Enterprises (SMEs) and Non-Profit Organisation (NPOs) to adopt SaaS.

This study will require you to complete a survey of 44 questions. All data collected from responses will be kept in a secure environment. The findings from the study will be used for academic purposes only.

As a token of appreciation for your time spent in completing this questionnaire, we would like to give you access to an online toolkit which is aimed at small and medium sized organisations to effectively use Information Communication Technologies (ICTs) for business operations. This "ICT Toolkit" is also available online to download and print. You can receive a copy on disc or download online.

Your help would be much appreciated, thank you very much for your time and cooperation.

Kind Regards,
Moritlha Madisha
Masters Student (Researcher)
Email: mdsmor002@uct.ac.za
Cell No: +27 (0)72 5314 916

Any queries about your participation in this project may be directed to my research supervisor Prof. Jean-Paul van Belle, +27 (0)21 650 4256, email: Jean-Paul.VanBelle@uct.ac.za. If you any queries or complaints about the way you have been

treated, you may contact the Head of Department Prof. Jean-Paul van Belle, +27 (0)21 650 4256, email: Jean-Paul.VanBelle@uct.ac.za

2B NPO Questionnaire Section A and B

A. Background

1. What industry does your organisation fall in?							
Community Based Organisation (CBO)		Advocacy Non-Profit Organisation (NGO)		Operation NGO		Other(Please state)	

2. How many employees are there in your organisation? Please tick the closest.							
Less than 10		10 – 25		26 – 75		More than 75	

3. What is your education level?			
Matric /High school qualification		Undergraduate degree, diploma or post high school qualification	
Honours degree or B-tech degree		Higher than honours or B-tech degree	

4. What is your position in the organisation?					
Managing Director / Chairperson		Chief information officer (CIO) or IT manager		IT specialist	
CEO, CFO or Managing Director		General Manager		Other	

5. How old is the organisation?							
Less than a year old		1 – 3 years		3 – 6 years		More than 6 years old	

6. What is the annual budget of the organisation?					
Less than R500 000		R500 000 – R1 million		R1 million – R 2.5 million	
R2.5 million – R7.5 million		More than R7.5 million			

Before you answer the rest of the questions, you need to understand the concept of Software-as-a-Service (SaaS) which is commonly known as SaaS. SaaS is on demand software hosted by a vendor that clients or beneficiaries access over the web or a thin client and it is rented on a subscription basis or pay as you go model, whereby service guarantee is offered by a Service Level Agreement (SLA). For instance software hosted by vendors used for Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Virtual Private Network (VPN) and productivity tools (e.g. Google Apps and Zoho) and even external hosted email service to mention a few.

Below is a list of some of the different types of SaaS applications with their popular examples:

- ***Productivity tools and office applications (e.g. Google Apps, Zoho and Microsoft Office Live (NOT Microsoft Office))***
- ***Virtual Private Network(VPN) services (e.g. Vodacom Business PBX, MTN Managed IPBX Business and 1Cloud hosted PBX)***
- ***Enterprise Resource Planning (ERP) software (e.g. NetSuite)***
- ***Customer Relationship Management (CRM) software (e.g. Zoho, NetSuite CRM, SalesForce, Oracle CRM on Demand)***
- ***Business Intelligence software (e.g. Google Analytics, NetSuite SuiteAnalytics and Zoho Reports*)**

B. SaaS Questionnaire

On a scale of 5(Strongly Agree) to 1 (Strongly Disagree), please indicate your level of agreement with regards to the following statements by selecting (marking an 'x') the one that matches or is closest to desired option.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Our organisation is aware of SaaS implementations in our partner organisations					
2. Our organisation is aware of other NPO's SaaS utilisation					
3. Our organisation recognises the opportunities and challenges enabled by SaaS					
4. Our organisation understands SaaS business models that can be applicable to our organisation					
5. We are aware of the potential benefits of SaaS to our organisation					
6. We have considered/evaluated the impact of SaaS to the way our sector operates					
7. We have considered/evaluated the impact on organisations in our industry that fail to adopt SaaS would be at a disadvantage					
8. Most of our employees are computer literate					
9. Most of our employees have unrestricted access to computers					
10. Communication is very open in our organisation (no strict rules to follow channels of communication)					
11. Our organisation exhibits a culture of enterprise wide information sharing					
12. We have a policy that encourages grass roots SaaS initiatives i.e. Google Apps, Zoho, Virtual Private Network (VPN) and etc.					
13. Failure in new projects (organisation ventures or SaaS implementation) can be tolerated in our organisation					
14. Our organisation is capable of dealing with rapid changes					
15. We have sufficient experience with network based applications					
16. We have sufficient internet bandwidth to utilise SaaS					
17. Our organisation is well connected to Local Area Network (LAN) and Wide Area Network (WAN)					
18. We can afford high bandwidth connectivity to the internet					
19. Our existing systems are flexible					
20. Existing systems are customisable to our beneficiaries' & partner's needs					
21. Our organisation has a clear vision for SaaS					
22. Our vision of SaaS activities is widely communicated and understood throughout our company					
23. Our SaaS initiatives have champions					
24. Senior management champions SaaS					
25. Roles, responsibilities and accountability are clearly defined					

within each SaaS initiative					
26. SaaS accountability is extracted via an on-going responsibility					
27. Decision-making authority has been clearly assigned for all SaaS initiatives					

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
28. We have thoroughly analysed the possible changes required to take effect in our organisation, suppliers, partners, and beneficiaries as a result of each SaaS implementation					
29. We believe that our beneficiaries are ready to do business on a SaaS environment					
30. We believe that our organisation partners are ready to conduct business on SaaS					
31. We believe that there are effective laws to protect our privacy and our beneficiary privacy					
32. The government demonstrates strong commitment to promote SaaS					
33. The telecommunications infrastructure is reliable and efficient to support SaaS					
34. Our organisation partners and/or beneficiaries are capable of supporting SaaS transactions					
35. The technology infrastructure of business partners and/or beneficiaries is capable of supporting SaaS transactions					
36. We feel that there is efficient and affordable support from the local IT industry to support move to SaaS					
37. We feel that company data and transactions with employees online can be executed safely using SaaS					

2B SME Questionnaire Section A and B

A. Background

1. What industry does your organisation fall in? *(For Profit organisations)*							
Information Communication Technology (ICT)		Agriculture		Entertainment		Electricity, gas and water	
Accommodation and catering		Manufacturing, Mining and quarrying		Motor retail and motor repair services		Wholesale trade, commercial trade and other trade	

2. How many employees are there in your organisation? Please tick the closest.							
Less than 10		10 – 25		26 – 75		More than 75	

3. What is your education level?			
Matric /High school qualification		Undergraduate degree, diploma or post high school qualification	
Honours degree or B-tech degree		Higher than honours or B-tech degree	

4. What is your position in the organisation?					
Owner		Chief information officer (CIO) or IT manager		IT specialist	
CEO, CFO or Managing Director		General Manager		Other	

5. How old is the organisation?							
Less than a year old		1 – 3 years		4 – 8 years		More than 8 years old	

6. What is the annual revenue of the organisation?					
Less than R500 000		R500 000 – R1 million		R1 million – R 2.5 million	
R2.5 million – R7.5 million		More than R7.5 million			

Before you answer the rest of the questions, you need to understand the concept of Software-as-a-Service (SaaS) which is commonly known as SaaS. SaaS is on demand software hosted by a vendor that clients or customers access over the web or a thin client and it is rented on a subscription basis or pay as you go model, whereby service guarantee is offered by a Service Level Agreement (SLA). For instance software hosted by vendors used for Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Virtual Private Network (VPN) and productivity tools (e.g. Google Apps and Zoho) and even external hosted email service to mention a few.

Below is a list of some of the different types of SaaS applications with their popular examples:

- **Productivity tools and office applications (e.g. Google Apps, Zoho and Microsoft Office Live (NOT Microsoft Office))**
- **Virtual Private Network(VPN) services (e.g. Vodacom Business PBX, MTN Managed IPBX Business and 1Cloud hosted PBX)**
- **Enterprise Resource Planning (ERP) software (e.g. NetSuite)**
- **Customer Relationship Management (CRM) software (e.g. Zoho, NetSuite CRM, SalesForce, Oracle CRM on Demand)**
- **Business Intelligence software (e.g. Google Analytics, NetSuite SuiteAnalytics and Zoho Reports)**

B. SaaS Questionnaire

On a scale of 1(Strongly Agree) to 5 (Strongly Disagree), please indicate your level of agreement with regards to the following statements by selecting (marking an 'x') the one that matches or is closest to desired option.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Our organisation is aware of SaaS implementations in our partner organisations					
2. Our organisation is aware of competitor's SaaS utilisation					
3. Our organisation recognises the opportunities and challenges enabled by SaaS					
4. Our organisation understands SaaS business models that can be applicable to our organisation					
5. We are aware of the potential benefits of SaaS to our organisation					
6. We have considered/evaluated the impact of SaaS to the way our sector operates					
7. We have considered/evaluated the impact on organisations in our industry that fail to adopt SaaS would be at a disadvantage					
8. Most of our employees are computer literate					
9. Most of our employees have unrestricted access to computers					
10. Communication is very open in our organisation (no strict rules to follow channels of communication)					
11. Our organisation exhibits a culture of enterprise wide information sharing					
12. We have a policy that encourages grass roots SaaS initiatives i.e. Google Apps, Zoho, Virtual Private Network (VPN) and etc.					
13. Failure in new projects (organisation ventures or SaaS implementation) can be tolerated in our organisation					
14. Our organisation is capable of dealing with rapid changes					
15. We have sufficient experience with network based applications					
16. We have sufficient internet bandwidth to utilise SaaS					
17. Our organisation is well connected to Local Area Network (LAN) and Wide Area Network (WAN)					
18. We can afford high bandwidth connectivity to the internet					
19. Our existing systems are flexible					
20. Existing systems are customisable to our customers' & partner's needs					
21. Our organisation has a clear vision for SaaS					
22. Our vision of SaaS activities is widely communicated and understood throughout our company					
23. Our SaaS initiatives have champions					
24. Senior management champions SaaS					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
25. Roles, responsibilities and accountability are clearly defined within each SaaS initiative					
26. SaaS accountability is extracted via an on-going responsibility					
27. Decision-making authority has been clearly assigned for all SaaS initiatives					
28. We have thoroughly analysed the possible changes required to take effect in our organisation, suppliers, partners, and customers as a result of each SaaS implementation					
29. We believe that our customers are ready to do business on a SaaS environment					
30. We believe that our organisation partners are ready to conduct business on SaaS					
31. We believe that there are effective laws to protect our privacy and our customer privacy					
32. The government demonstrates strong commitment to promote SaaS					
33. The telecommunications infrastructure is reliable and efficient to support SaaS					
34. Our organisation partners and/or customers are capable of supporting SaaS transactions					
35. The technology infrastructure of business partners and/or customers is capable of supporting SaaS transactions					
36. We feel that there is efficient and affordable support from the local IT industry to support move to SaaS					
37. We feel that company data and transactions with employees online can be executed safely using SaaS					

2C SME and NPO Questionnaire Section C

C. SaaS adoption and institutionalisation

38. Which one of the following best describes your current online status? Please choose one option.

A. We are not connected to the internet, no email.

B. We are connected to the internet and utilize the internet for email and surfing the web.

C. We are connected to the internet and utilize the internet extensively in our organisation.

39. Which one of the following best describes your current SaaS status?	Never heard of it	Heard of it	Considering using it	Planning on using it	Already using it
A. Our organisation is using SaaS productivity suite (e.g. Google Apps, Zoho and Microsoft Office Live)					
B. Our organisation is using SaaS Virtual Private Branch Exchange (PBX) hosted by vendor (e.g. Vodacom Business PBX, MTN Managed IPBX Business and 1Cloud hosted PBX)					
C. Our organisation is using SaaS Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Content Management or Business Intelligence software e.g. NetSuite, Oracle CRM on Demand and SalesForce					

40. *What do you consider as barriers for SaaS adoption for your organisation?*

41. What challenges do you think South African organisations generally face regarding SaaS adoption?

42. What benefits do you think your organisation will gain from adopting SaaS? And/or if you have adopted SaaS what are the current benefits of adopting SaaS?

43. What would influence you to adopt SaaS?

44. Do you think SaaS providers and internet service providers have the capability to seamlessly deliver SaaS? Please give reasons why.

D. Participant information (Optional)

I would like to thank you for time and effort completing this questionnaire, and would like to give you access to an online toolkit which will help small and medium sized organisations to improve their operations using ICTs (Information and Communication Technologies). Please leave your details if you want to receive findings of the study and access to the "ICT toolkit" (due to be available towards the end of the year). Please note that your personal details and any other information you provide will be kept strictly confidential and will not be attributed to organisation or individual.

Name: _____

Address of business: _____

_____

Postal Code: _____

Email address: _____

Tel/Mobile: _____

I would like to receive a copy of the "ICT Toolkit"? (Please circle your choice): Yes ☐ No ☐

Are you willing to be contacted for an interview? Yes ☐ No ☐
(Please provide contact details above if you are willing to be interviewed.)

I would like the "ICT Toolkit" in the following format: Softcopy ☐ Online access (download) ☐

2D Removed Questionnaire Section for SaaS Adoption Factors

The following questions are relevant to CRM, ERP, SCM or Business Intelligence software hosted by a vendor:

1. What percentage of the IT budget for CRM, ERP or Business Intelligence software have you invested in SaaS services?	0%	0% - 15%	15% - 30%	30% - 60%	More than 60%
2009 (Estimated in %)					
2010 (Estimated in %)					

2. How frequent do you use SaaS services for CRM, ERP, SCM or Business Intelligence	Never	Seldom	Sometimes	Often	Always
2009 Estimation					
2010 Estimation					

On a scale of 1 (Strongly Agree) to 5 (Strongly Disagree), please indicate your level of agreement with regards to the following statements by circling the one that matches or is closest to desired option

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3. The selected applications are modular (i.e. only individual modules of the application can be used).					
4. The selected applications are adapted ("customized") to company-internal processes and policies.					
5. The selected applications can be difficult to detach from own application environment.					
6. The selected applications have multiple interfaces to internal and external systems - i.e. "high degree of specificity" of the application).					
7. There are various internal and external users to access the selected applications - high number of different user types.					
8. There is a need to use the selected applications for high coordination of costs (e.g. in the sense of resource requirements and capability profiles.)					
9. The organisation is experiencing technical dependencies or uncertainties regarding SaaS outsourcing relationships.					
10. We are uncertain about the SaaS market and SaaS providers services - prices might increase and technical expertise change					
11. The organisation is experiencing environmental (customer, supplier, economy and requirements for organisation) uncertainty regarding the provision of a service or trading of goods.					
12. The selected application has strategic importance for your business (i.e. business-critical).					
13. The selected application is a major contributor to achieve your business goals.					
14. The absence of the application would result in competitive disadvantages for your business.					
15. The SaaS application type can be replaced by a wider use SaaS based application.					
16. The SaaS application is an irreplaceable resource of your company.					
17. The SaaS application is enterprise specific, i.e. it has significant company-specific configurations from a third party and thus is not as easy (or not) to integrate.					
18. The SaaS application differentiates itself from competitors with respect to applications used widely.					
19. The terms of the application via the SaaS model would give us access to important process know-how.					
20. The SaaS application is an irreplaceable resource for your company.					
21. The SaaS application is enterprise specific, i.e. it has significant company-specific configurations from a third party and thus is not as easy (or cannot be integrated) to integrate					
22. The SaaS application differentiates itself from competitors with respect to applications used widely.					
23. The terms of the application utilising the SaaS model would give us access to important process know-how.					

2E Phase 1 Recommended changes

"*Here are my candid views, reflecting my personal opinion and experience (i.e. I am not an expert).*

I would add a one page (longer) explanation of SaaS with known examples.

Page 2
Q4: There cannot be an owner in NGOs (There is a board of directors, chairperson)
Q6: For NGOs Annual budget or funding rather than income is relevant. I suspect you would get straight answers for this question - We found that most don't want to disclose.
Page 3
I didn't see a difference between documents here.
At the evaluation options there are two "strongly agree" - it needs to be corrected. Also my preference would be changing the order (Strongly agree to Strongly disagree) - for some reason I think it is more intuitive.
Some of the questions (especially ones that require technical knowledge (for example, Q16) may need "don't know" option) I see that they can choose neutral, but then it makes that option mixed with real "neutral". You may keep it as It is but be aware of it.
"Our organisation" is better than "Our business"
Q2: "Competitors" for NGOs can be repulsive
Q6: seems a bit complex. "We have considered/evaluated the impact of SaaS to the way our sector operates" can be simpler... just an idea.
Q7: same as Q6
Q10: very obscure. I am not sure what you want to get out of this. You may want to be specific.
Q12: This may need explanation.
Q13: Again obscure, generalized, and directing. If you ask this way I bet most you would get Agree - no matter what the real situation is. If you need to elicit this type of information, it has to be indirect. From the results... or a scenario based. Otherwise people get defensive.

Page 4:
Q39A: should be "Our organisation is using..." **"**

Appendix 3: Statistical Analysis

3A Combined Loadings and Cross Loadings

Table 22: Combined Loadings and Cross Loadings of NPOs (Initial Loadings)

	Awareness	HR	BR	TR	Commitment	Governance	MF	Government	SI	Adoptio	P value
Q1 Awareness	0.899	-0.089	0.030	-0.079	0.284	-0.356	-0.014	0.135	-0.058	-0.007	<0.001
Q2 Awareness	0.848	0.029	0.064	-0.104	0.666	-0.590	-0.026	0.057	0.121	-0.150	<0.001
Q3 Awareness	0.849	0.042	-0.048	-0.115	-0.298	0.263	-0.125	0.194	-0.125	0.120	<0.001
Q4 Awareness	0.919	0.121	0.024	-0.083	-0.111	0.117	-0.030	0.022	0.073	0.052	<0.001
Q5 Awareness	0.881	0.070	-0.186	-0.011	0.082	-0.027	0.084	-0.017	-0.209	0.140	<0.001
Q6 Awareness	0.893	-0.075	0.069	0.150	-0.495	0.556	-0.158	-0.086	0.094	-0.071	<0.001
Q7 Awareness	0.804	-0.107	0.048	0.259	-0.118	0.021	0.292	-0.326	0.109	-0.094	<0.001
Q1 HR	0.206	0.804	0.074	-0.150	0.559	-0.762	0.166	0.226	-0.272	-0.009	<0.001
Q2 HR	-0.206	0.804	-0.074	0.150	-0.559	0.762	-0.166	-0.226	0.272	0.009	<0.001
Q1 BR	-0.019	0.137	0.662	-0.629	0.638	-0.962	0.365	-0.137	-0.069	0.143	<0.001
Q2 BR	-0.316	-0.088	0.771	0.118	-0.786	0.819	-0.192	-0.015	0.129	-0.049	<0.001
Q3 BR	0.157	-0.067	0.523	0.128	1.162	-0.234	-0.281	0.128	-0.154	-0.053	0.009
Q4 BR	0.014	0.049	0.377	-0.156	1.269	-0.989	-0.097	0.312	-0.374	-0.046	0.065
Q5 BR	0.223	-0.008	0.756	0.419	-1.193	0.661	0.119	-0.109	0.223	-0.015	<0.001
Q1 TR	0.189	0.088	-0.001	0.724	0.058	0.425	-0.461	-0.046	0.059	-0.132	<0.001
Q2 TR	-0.101	-0.075	0.043	0.723	-0.094	-0.193	0.211	0.097	-0.058	0.280	<0.001
Q3 TR	-0.279	0.090	-0.018	0.771	0.265	0.344	-0.464	0.044	-0.023	-0.292	<0.001
Q4 TR	-0.048	0.124	-0.155	0.759	0.080	-0.422	0.206	0.254	-0.031	0.082	<0.001
Q5 TR	0.005	-0.100	0.201	0.797	0.075	-0.407	0.366	-0.227	0.129	0.093	<0.001
Q6 TR	0.236	-0.120	-0.075	0.778	-0.384	0.271	0.117	-0.105	-0.081	-0.023	<0.001
Q1 Commitment	0.150	-0.018	0.156	0.091	0.894	0.058	0.073	-0.040	0.089	-0.098	<0.001
Q2 Commitment	-0.031	0.100	-0.108	-0.045	0.944	0.104	0.031	0.072	-0.013	-0.108	<0.001
Q3 Commitment	-0.151	-0.011	-0.044	0.002	0.913	-0.103	-0.281	0.031	0.010	0.020	<0.001
Q4 Commitment	0.036	-0.073	0.003	-0.045	0.923	-0.061	0.175	-0.065	-0.084	0.186	<0.001
Q1 Governance	-0.039	-0.006	-0.061	0.044	0.649	0.935	-0.037	0.071	-0.074	-0.003	<0.001
Q2 Governance	-0.024	0.048	-0.124	0.046	0.162	0.933	-0.235	0.082	-0.110	0.082	<0.001
Q3 Governance	-0.110	-0.034	-0.011	-0.017	0.298	0.936	0.211	-0.100	0.017	-0.134	<0.001
Q4 Governance	0.185	-0.009	0.209	-0.078	-1.182	0.877	0.064	-0.056	0.177	0.060	<0.001
Q1 MF	0.052	0.112	-0.023	-0.175	0.295	-0.184	0.912	0.141	0.219	-0.091	<0.001
Q2 MF	-0.052	-0.112	0.023	0.175	-0.295	0.184	0.912	-0.141	-0.219	0.091	<0.001
Q1 Government	0.167	-0.036	-0.249	0.201	0.610	-0.264	-0.527	0.786	0.051	-0.034	<0.001
Q2 Government	-0.167	0.036	0.249	-0.201	-0.610	0.264	0.527	0.786	-0.051	0.034	<0.001
Q1 SI	-0.234	-0.322	-0.202	0.692	0.260	-0.311	0.224	0.129	0.388	-0.198	0.058
Q2 SI	-0.156	0.026	0.040	-0.213	0.480	-0.560	0.196	0.148	0.843	-0.021	<0.001
Q3 SI	-0.065	0.162	0.006	-0.130	0.176	-0.135	-0.083	0.041	0.849	-0.005	<0.001
Q4 SI	0.184	0.023	-0.119	0.007	-0.586	0.663	0.102	-0.299	0.715	-0.228	<0.001
Q5 SI	0.228	-0.080	0.196	0.027	-0.371	0.366	-0.400	0.006	0.636	0.410	0.002
Productivity	0.045	-0.024	0.006	-0.031	0.013	0.018	-0.092	-0.184	0.129	0.890	<0.001
ERP & CRM	-0.045	0.024	-0.006	0.031	-0.013	-0.018	0.092	0.184	-0.129	0.890	<0.001

Note: Government variable refers to country variable

Table 23: Combined Loadings and Cross Loadings of NPOs (Q4 BR & Q1 SI Removed)

	Awareness	HR	BR	TR	Commitment	Governance	MF	Government	SI	Adoption	P value
Q1 Awareness	0.899	-0.085	0.002	-0.064	0.263	-0.334	-0.017	0.131	-0.052	-0.009	<0.001
Q2 Awareness	0.848	0.014	0.030	-0.060	0.709	-0.625	-0.025	0.060	0.123	-0.168	<0.001
Q3 Awareness	0.849	0.050	-0.052	-0.124	-0.352	0.308	-0.128	0.185	-0.114	0.130	<0.001
Q4 Awareness	0.919	0.121	0.047	-0.097	-0.066	0.080	-0.030	0.031	0.061	0.051	<0.001
Q5 Awareness	0.881	0.087	-0.176	-0.035	-0.009	0.047	0.075	-0.035	-0.183	0.154	<0.001
Q6 Awareness	0.893	-0.088	0.055	0.174	-0.488	0.546	-0.155	-0.085	0.095	-0.077	<0.001
Q7 Awareness	0.804	-0.108	0.098	0.223	-0.044	-0.041	0.304	-0.308	0.073	-0.090	<0.001
Q1 HR	0.227	0.804	0.022	-0.122	0.572	-0.764	0.141	0.215	-0.238	-0.021	<0.001
Q2 HR	-0.227	0.804	-0.022	0.122	-0.572	0.764	-0.141	-0.215	0.238	0.021	<0.001
Q1 BR	0.009	0.149	0.646	-0.649	0.961	-1.191	0.312	-0.085	-0.112	0.126	<0.001
Q2 BR	-0.313	-0.072	0.819	0.059	-0.446	0.577	-0.199	0.058	0.017	-0.053	<0.001
Q3 BR	0.169	-0.069	0.458	0.149	1.150	-0.222	-0.293	0.119	-0.131	-0.060	0.021
Q5 BR	0.215	-0.007	0.805	0.376	-0.972	0.495	0.119	-0.059	0.147	-0.014	<0.001
Q1 TR	0.195	0.067	-0.045	0.724	0.073	0.406	-0.487	-0.057	0.108	-0.155	<0.001
Q2 TR	-0.075	-0.057	-0.018	0.723	-0.247	-0.060	0.227	0.083	-0.061	0.299	<0.001
Q3 TR	-0.281	0.110	-0.004	0.771	0.248	0.369	-0.444	0.051	-0.060	-0.279	<0.001
Q4 TR	-0.063	0.136	-0.111	0.759	0.059	-0.403	0.235	0.259	-0.069	0.096	<0.001
Q5 TR	-0.002	-0.122	0.207	0.797	0.216	-0.526	0.343	-0.212	0.136	0.072	<0.001
Q6 TR	0.231	-0.127	-0.041	0.778	-0.363	0.245	0.101	-0.110	-0.057	-0.024	<0.001
Q1 Commitment	0.145	-0.024	0.173	0.080	0.894	0.006	0.071	-0.027	0.074	-0.098	<0.001
Q2 Commitment	-0.038	0.091	-0.099	-0.039	0.944	0.093	0.032	0.069	-0.004	-0.114	<0.001
Q3 Commitment	-0.148	-0.005	-0.056	0.007	0.913	-0.066	-0.277	0.026	0.011	0.023	<0.001
Q4 Commitment	0.044	-0.065	-0.011	-0.045	0.923	-0.035	0.172	-0.070	-0.079	0.189	<0.001
Q1 Governance	-0.036	-0.009	-0.073	0.054	0.615	0.935	-0.033	0.063	-0.065	-0.003	<0.001
Q2 Governance	-0.020	0.058	-0.123	0.036	0.114	0.933	-0.235	0.073	-0.101	0.087	<0.001
Q3 Governance	-0.113	-0.031	-0.010	-0.019	0.308	0.936	0.213	-0.098	0.010	-0.135	<0.001
Q4 Governance	0.180	-0.020	0.219	-0.076	-1.106	0.877	0.058	-0.041	0.166	0.055	<0.001
Q1 MF	0.041	0.102	-0.028	-0.152	0.311	-0.201	0.912	0.145	0.210	-0.101	<0.001
Q2 MF	-0.041	-0.102	0.028	0.152	-0.311	0.201	0.912	-0.145	-0.210	0.101	<0.001
Q1 Government	0.156	-0.039	-0.232	0.203	0.565	-0.234	-0.515	0.786	0.056	-0.034	<0.001
Q2 Government	-0.156	0.039	0.232	-0.203	-0.565	0.234	0.515	0.786	-0.056	0.034	<0.001
Q2 SI	-0.186	-0.012	-0.007	-0.115	0.532	-0.611	0.228	0.166	0.840	-0.055	<0.001
Q3 SI	-0.089	0.124	-0.072	-0.005	0.134	-0.112	-0.038	0.050	0.846	-0.034	<0.001
Q4 SI	0.127	-0.016	-0.050	0.029	-0.508	0.574	0.142	-0.272	0.729	-0.244	<0.001
Q5 SI	0.207	-0.124	0.155	0.119	-0.283	0.282	-0.391	0.024	0.672	0.376	<0.001
Product	0.047	-0.022	-0.020	-0.009	-0.009	0.039	-0.086	-0.185	0.124	0.890	<0.001
ERP & CRM	-0.047	0.022	0.02	0.009	0.009	-0.039	0.086	0.185	-0.124	0.890	<0.001

Note: Government variable refers to country variable

Table 24: Combined Loadings and Cross Loadings of NPOs (Q3 BR Removed)

	Awareness	HR	BR	TR	Commitment	Governance	MF	Government	SI	Adoption	P value
Q1 Awareness	0.899	-0.082	-0.007	-0.059	-0.319	-0.009	0.128	-0.047	0.231	-0.009	<0.001
Q2 Awareness	0.848	0.013	0.022	-0.055	-0.635	-0.030	0.062	0.121	0.732	-0.172	<0.001
Q3 Awareness	0.849	0.048	-0.042	-0.128	0.299	-0.131	0.185	-0.115	-0.340	0.130	<0.001
Q4 Awareness	0.919	0.120	0.041	-0.094	0.069	-0.036	0.033	0.058	-0.038	0.048	<0.001
Q5 Awareness	0.881	0.088	-0.161	-0.038	0.055	0.084	-0.039	-0.179	-0.050	0.155	<0.001
Q6 Awareness	0.893	-0.086	0.050	0.173	0.561	-0.150	-0.085	0.097	-0.510	-0.074	<0.001
Q7 Awareness	0.804	-0.111	0.103	0.216	-0.052	0.296	-0.304	0.067	-0.007	-0.087	<0.001
Q1 HR	0.232	0.804	0.011	-0.116	-0.761	0.143	0.214	-0.236	0.567	-0.024	<0.001
Q2 HR	-0.232	0.804	-0.011	0.116	0.761	-0.143	-0.214	0.236	-0.567	0.024	<0.001
Q1 BR	0.065	0.143	0.629	-0.613	-1.245	0.266	-0.065	-0.136	1.194	0.112	0.002
Q2 BR	-0.273	-0.086	0.865	0.078	0.492	-0.263	0.085	-0.018	-0.144	-0.063	<0.001
Q5 BR	0.236	-0.019	0.830	0.383	0.431	0.073	-0.039	0.122	-0.756	-0.019	<0.001
Q1 TR	0.202	0.073	-0.068	0.724	0.421	-0.477	-0.062	0.115	0.034	-0.162	<0.001
Q2 TR	-0.098	-0.067	0.016	0.723	-0.096	0.209	0.090	-0.073	-0.173	0.304	<0.001
Q3 TR	-0.274	0.114	-0.012	0.771	0.384	-0.436	0.049	-0.056	0.217	-0.280	<0.001
Q4 TR	-0.067	0.137	-0.090	0.759	-0.388	0.244	0.256	-0.065	0.014	0.102	<0.001
Q5 TR	0.001	-0.126	0.187	0.797	-0.555	0.325	-0.206	0.127	0.301	0.067	<0.001
Q6 TR	0.238	-0.123	-0.043	0.778	0.264	0.111	-0.113	-0.051	-0.408	-0.022	<0.001
Q1 Commitment	-0.046	-0.011	-0.063	0.052	0.935	-0.036	0.064	-0.066	0.626	-0.004	<0.001
Q2 Commitment	-0.017	0.063	-0.120	0.037	0.933	-0.219	0.067	-0.093	0.042	0.089	<0.001
Q3 Commitment	-0.119	-0.033	-0.005	-0.021	0.936	0.208	-0.096	0.008	0.328	-0.136	<0.001
Q4 Commitment	0.194	-0.021	0.200	-0.072	0.877	0.049	-0.037	0.161	-1.062	0.054	<0.001
Q1 Governance	0.041	0.104	-0.030	-0.150	-0.196	0.912	0.144	0.212	0.297	-0.102	<0.001
Q2 Governance	-0.041	-0.104	0.030	0.150	0.196	0.912	-0.144	-0.212	-0.297	0.102	<0.001
Q3 Governance	0.146	-0.034	-0.227	0.209	-0.219	-0.502	0.786	0.065	0.503	-0.038	<0.001
Q4 Governance	-0.146	0.034	0.227	-0.209	0.219	0.502	0.786	-0.065	-0.503	0.038	<0.001
Q1 MF	-0.181	-0.009	-0.015	-0.111	-0.600	0.234	0.164	0.840	0.508	-0.057	<0.001
Q2 MF	-0.084	0.129	-0.077	-0.001	-0.092	-0.026	0.046	0.846	0.083	-0.034	<0.001
Q1 Govenment	0.130	-0.014	-0.043	0.024	0.589	0.149	-0.274	0.729	-0.544	-0.240	<0.001
Q2 Government	0.192	-0.135	0.162	0.112	0.227	-0.422	0.035	0.672	-0.149	0.374	<0.001
Q2 SI	0.164	-0.022	0.155	0.084	0.016	0.072	-0.026	0.073	0.894	-0.098	<0.001
Q3 SI	-0.041	0.094	-0.093	-0.039	0.103	0.039	0.066	0.000	0.944	-0.114	<0.001
Q4 SI	-0.163	-0.009	-0.047	0.006	-0.089	-0.286	0.028	0.007	0.913	0.021	<0.001
Q5 SI	0.044	-0.065	-0.008	-0.047	-0.033	0.173	-0.070	-0.078	0.923	0.190	<0.001
Productivity	0.041	-0.024	-0.016	-0.011	0.032	-0.089	-0.184	0.123	0.004	0.890	<0.001
ERP & CRM	-0.041	0.024	0.016	0.011	-0.032	0.089	0.184	-0.123	-0.004	0.890	<0.001

Note: Government variable refers to country variable

Table 25: Combined Loadings and Cross Loadings of SMEs

	Awareness	HR	BR	TR	Committment	Governance	MF	Government	SI	Adoption	P value
Q1 Awareness	0.901	0.023	-0.094	0.167	-0.048	0.101	-0.093	0.042	-0.013	-0.098	<0.001
Q2 Awareness	0.868	0.129	-0.197	0.055	0.058	-0.187	-0.123	0.098	0.158	-0.115	<0.001
Q3 Awareness	0.833	0.115	-0.035	-0.161	-0.512	0.298	-0.055	-0.087	0.196	0.219	<0.001
Q4 Awareness	0.912	0.017	-0.034	-0.132	0.283	-0.043	-0.066	0.096	-0.118	0.035	<0.001
Q5 Awareness	0.820	-0.410	0.405	0.151	-0.445	0.054	0.040	0.214	-0.285	0.366	<0.001
Q6 Awareness	0.911	0.014	-0.034	-0.011	0.460	-0.412	-0.011	-0.111	-0.020	-0.036	<0.001
Q7 Awareness	0.846	0.094	0.018	-0.068	0.127	0.228	0.324	-0.250	0.084	-0.347	<0.001
Q1 HR	-0.055	0.902	-0.290	-0.090	0.065	0.177	-0.157	-0.092	0.100	0.034	<0.001
Q2 HR	0.055	0.902	0.290	0.090	-0.065	-0.177	0.157	0.092	-0.100	-0.034	<0.001
Q1 BR	-0.335	0.203	0.685	-0.261	0.845	-0.717	-0.313	-0.562	1.108	-0.509	0.029
Q2 BR	0.222	0.190	0.886	-0.126	0.044	-0.276	0.172	-0.041	0.145	-0.340	<0.001
Q3 BR	0.360	-0.134	0.731	0.026	-0.060	0.218	0.115	-0.085	-0.301	0.327	0.011
Q4 BR	-0.439	-0.131	0.604	-0.031	-0.839	0.844	-0.093	0.078	-0.021	0.581	0.029
Q5 BR	0.043	-0.164	0.793	0.365	-0.085	0.084	0.043	0.551	-0.826	0.077	<0.001
Q1 TR	0.028	0.037	-0.002	0.632	0.457	-0.025	0.184	0.233	-0.666	0.258	0.018
Q2 TR	0.098	-0.080	0.182	0.849	-0.335	0.156	0.041	-0.164	-0.095	-0.038	<0.001
Q3 TR	-0.137	-0.093	0.000	0.766	0.347	-0.003	0.329	-0.643	0.374	-0.048	0.018
Q4 TR	-0.134	0.097	-0.309	0.845	-0.065	0.211	0.009	-0.109	0.340	-0.132	<0.001
Q5 TR	0.172	-0.117	0.076	0.847	-0.612	0.132	-0.340	0.183	0.053	0.136	0.002
Q6 TR	-0.040	0.191	0.062	0.701	0.432	-0.577	-0.175	0.601	-0.168	-0.139	<0.001
Q1 Commitment	0.207	-0.255	0.320	0.069	0.822	-0.206	0.024	0.021	-0.238	0.029	<0.001
Q2 Commitment	0.120	0.061	-0.124	-0.017	0.915	-0.249	0.231	0.014	-0.031	-0.085	<0.001
Q3 Commitment	-0.196	0.078	-0.127	-0.001	0.898	0.406	-0.011	0.158	-0.163	-0.111	0.004
Q4 Commitment	-0.116	0.094	-0.040	-0.045	0.891	0.036	-0.248	-0.193	0.416	0.172	<0.001
Q1 Governance	-0.181	0.002	-0.144	0.051	-0.058	0.954	-0.021	0.038	0.047	0.021	<0.001
Q2 Governance	-0.018	0.078	0.017	-0.022	0.015	0.947	-0.101	0.023	-0.088	0.008	<0.001
Q3 Governance	0.206	0.021	-0.018	0.107	-0.287	0.942	-0.142	0.174	0.020	0.023	<0.001
Q4 Governance	-0.004	-0.109	0.157	-0.146	0.354	0.880	0.285	-0.252	0.022	-0.057	<0.001
Q1 MF	-0.057	-0.029	-0.041	-0.017	0.022	0.037	0.988	0.028	-0.055	0.032	<0.001
Q2 MF	0.057	0.029	0.041	0.017	-0.022	-0.037	0.988	-0.028	0.055	-0.032	<0.001
Q1 Government	-0.027	0.309	-0.061	-0.024	-0.351	0.476	0.201	0.861	-0.318	-0.122	0.001
Q2 Government	0.027	-0.309	0.061	0.024	0.351	-0.476	-0.201	0.861	0.318	0.122	0.005
Q1 SI	-0.004	-0.072	-0.018	0.020	-0.509	0.321	-0.096	0.387	0.920	0.167	<0.001
Q2 SI	0.103	-0.023	0.071	-0.020	0.578	-0.516	0.126	-0.413	0.890	-0.224	<0.001
Q3 SI	0.107	-0.043	0.009	0.152	-0.053	-0.213	-0.095	-0.111	0.905	-0.100	<0.001
Q4 SI	-0.227	-0.154	-0.083	0.028	0.306	0.053	-0.061	0.008	0.887	-0.035	<0.001
Q5 SI	0.019	0.311	0.023	-0.194	-0.320	0.367	0.137	0.125	0.843	0.198	0.008
Productivity	-0.057	-0.063	-0.002	0.066	-0.072	0.160	0.068	0.267	-0.252	0.899	0.004
ERP & CRM	0.057	0.063	0.002	-0.066	0.072	-0.160	-0.068	-0.267	0.252	0.899	0.009

Note: Government variable refers to country variable

3B Discriminant Validity of NPOs and SMEs

Table 26: Discriminant Validity Table for NPO Dataset

	Awareness	HR	BR	TR	Governance	MF	Country	SI	Adoption
Awareness	0.871	0.076	0.244	0.396	0.669	0.427	0.061	0.238	0.556
HR	0.076	0.804	0.285	0.423	0.152	0.199	0.060	0.100	0.243
BR	0.244	0.285	0.782	0.571	0.261	0.310	0.176	0.269	0.206
TR	0.396	0.423	0.571	0.759	0.430	0.513	0.272	0.401	0.477
Governance	0.669	0.152	0.261	0.430	0.921	0.692	0.179	0.477	0.599
MF	0.427	0.199	0.310	0.513	0.692	0.912	0.339	0.647	0.467
Country	0.061	0.060	0.176	0.272	0.179	0.339	0.786	0.421	0.137
SI	0.238	0.100	0.269	0.401	0.477	0.647	0.421	0.775	0.333
Adoption	0.556	0.243	0.206	0.477	0.599	0.467	0.137	0.333	0.890

Table 27: Discriminant Validity Table for SME Dataset

	Awareness	HR	BR	TR	Governance	MF	Country	SI	Adoption
Awareness	0.871	0.076	0.244	0.396	0.669	0.427	0.061	0.238	0.556
HR	0.076	0.804	0.285	0.423	0.152	0.199	0.060	0.100	0.243
BR	0.244	0.285	0.782	0.571	0.261	0.310	0.176	0.269	0.206
TR	0.396	0.423	0.571	0.759	0.430	0.513	0.272	0.401	0.477
Governance	0.669	0.152	0.261	0.430	0.921	0.692	0.179	0.477	0.599
MF	0.427	0.199	0.310	0.513	0.692	0.912	0.339	0.647	0.467
Country	0.061	0.060	0.176	0.272	0.179	0.339	0.786	0.421	0.137
SI	0.238	0.100	0.269	0.401	0.477	0.647	0.421	0.775	0.333
Adoption	0.556	0.243	0.206	0.477	0.599	0.467	0.137	0.333	0.890

3C Reliability Coefficients

Table 28: Table of Reliability Coefficients for NPO

Variable	Number of indicators	Cronbach alpha	Composite reliability coefficient	Implied reliability
Awareness	7	0.947	0.957	Excellent
HR	2	0.454	0.786	Acceptable
BR	3	0.853	0.891	Very Good
TR	6	0.850	0.892	Very Good
Governance	4	0.940	0.957	Excellent
MF	2	0.799	0.909	Good
Country	2	0.383	0.764	Acceptable
SI	4	0.729	0.825	Good
Adoption	2	0.739	0.884	Good

Table 29: Table of Reliability Coefficients for SMEs

Variable	Number of indicators	Cronbach alpha	Composite reliability coefficient	Implied reliability
Awareness	7	0.947	0.957	Excellent
HR	2	0.771	0.897	Acceptable
BR	5	0.795	0.861	Good
TR	6	0.867	0.901	Very Good
Commitment	4	0.905	0.988	Very Good
Governance	4	0.942	0.958	Very Good
MF	2	0.976	0.945	Very Good
Country	2	0.652	0.852	Acceptable
SI	5	0.934	0.950	Very Good
Adoption	2	0.764	0.894	Good

3D WarpPLS Test of Structural Equation Model Detailed Results

Table 30: WarpPLS Test of Model for Combined NPO and SME Sample

	Awareness	HR	BR	TR	Governance	MF	Country	SI
Path coefficients	0.361	0.157	-0.041	0.165	0.147	0.203	-0.035	-0.005
P values	0.005	0.019	0.355	0.015	0.113	0.042	0.472	0.425
Standard errors for path coefficients	0.138	0.072	0.087	0.081	0.127	0.107	0.114	0.114

Table 31: WarpPLS Test of Model for NPO Sample

	Awareness	HR	BR	TR	Governance	MF	Country	SI
Path coefficients	0.209	0.195	-0.003	0.234	0.373	-0.057	-0.060	0.074
P values	0.346	0.115	0.500	0.015	0.027	0.376	0.081	0.149
Standard errors for path coefficients	0.239	0.137	0.155	0.130	0.239	0.166	0.221	0.158

Table 32: WarpPLS Test of Model for SME Sample

	Awareness	HR	BR	TR	Commitment	Governance	MF	Country	SI
Path coefficients	0.372	0.249	0.03	0.096	0.140	-0.050	0.301	-0.015	-0.047
P values	0.009	0.05	0.456	0.269	0.328	0.119	0.013	0.198	0.499
Standard errors for path coefficients	0.236	0.158	0.266	0.114	0.368	0.294	0.193	0.233	0.285

Table 33: WarpPLS Test of Model for Combined NPO and SME Sample

	Awareness	Resources	Com & Gov	MF	Country	SI
Path coefficients	0.305	0.220	0.197	0.205	-0.053	-0.041
P values	0.014	0.029	0.104	0.036	0.404	0.335
Standard errors for path coefficients	0.142	0.108	0.157	0.107	0.113	0.118

Table 34 : WarpPLS Test of Model for Combined NPO

	Awarene	Resources	Com & Gov	MF	Country	SI
Path coefficients	0.158	0.253	0.454	-0.022	-0.073	0.042
P values	0.449	0.013	0.010	0.476	0.083	0.248
Standard errors for path coefficients	0.232	0.123	0.241	0.163	0.221	0.151

Table 35 : WarpPLS Test of Model for Combined SME Sample

	Awarene	Resources	Com & Gov	MF	Country	SI
Path coefficients	0.502	0.285	-0.108	0.351	0.005	-0.105
P values	<0.001	0.005	0.030	0.007	0.271	0.467
Standard errors for path coefficients	0.220	0.169	0.256	0.172	0.258	0.254

3E Descriptive Statistics of SMEs and NPOs

Table 36: Descriptive Statistics of Combined NPO and SME Sample

	Valid N	% Valid obs.	Mean	Median	Mode	Frequency	Sum	Minimum	Maximum	Std.Dev.	Standard Error
Q1 Awareness	104	100.000	2.500	2	1	31	260	1	5	1.337	0.131
Q2 Awareness	104	100.000	2.404	2	2	36	250	1	5	1.243	0.122
Q3 Awareness	103	99.038	3.184	3	4	36	328	1	5	1.304	0.129
Q4 Awareness	104	100.000	3.000	3	4	31	312	1	5	1.329	0.130
Q5 Awareness	100	96.154	3.140	4	4	40	314	1	5	1.311	0.131
Q6 Awareness	102	98.077	2.637	2	2	31	269	1	5	1.311	0.130
Q7 Awareness	103	99.038	2.573	2	2	35	265	1	5	1.273	0.125
Q1 Human Resources	103	99.038	3.796	4	4	41	391	1	5	1.286	0.127
Q2 Human Resources	101	97.115	4.000	4	4	46	404	1	5	1.010	0.100
Q1 Business Resources	103	99.038	3.922	4	4	47	404	1	5	1.054	0.104
Q2 Business Resources	104	100.000	3.875	4	4	59	403	1	5	0.855	0.084
Q3 Business Resources	104	100.000	2.865	3	2	26	298	1	5	1.387	0.136
Q4 Business Resources	102	98.077	2.804	3	Multiple	30	286	1	5	1.072	0.106
Q5 Business Resources	103	99.038	3.709	4	4	51	382	1	5	0.956	0.094
Q1 Technology resources	103	99.038	3.320	4	4	43	342	1	5	1.173	0.116
Q2 Technological resources	101	97.115	3.614	4	4	44	365	1	5	1.039	0.103
Q3 Technological resources	102	98.077	3.922	4	4	44	400	1	5	1.041	0.103
Q4 Technological resources	102	98.077	3.422	4	4	33	349	1	5	1.112	0.110
Q5 Technological resources	101	97.115	3.614	4	4	41	365	1	5	0.927	0.092
Q6 Technological resources	101	97.115	3.317	3	4	37	335	1	5	0.979	0.097
Q1 Committment	103	99.038	2.592	2	2	33	267	1	5	1.150	0.113
Q2 Commitment	104	100.000	2.365	2	2	41	246	1	5	1.080	0.106
Q3 Commitment	103	99.038	2.388	2	2	39	246	1	5	1.131	0.111
Q4 Commitment	104	100.000	2.654	3	3	35	276	1	5	1.180	0.116
Q1 Governance	103	99.038	2.476	2	2	34	255	1	5	1.083	0.107
Q2 Governance	102	98.077	2.559	2	2	35	261	1	5	1.113	0.110
Q3 Governance	104	100.000	2.462	2	2	41	256	1	5	1.088	0.107
Q4 Governance	102	98.077	2.392	2	2	35	244	1	5	1.127	0.112
Q1 Market Force	102	98.077	2.598	3	3	36	265	1	5	1.137	0.113
Q2 Market Force	100	96.154	2.740	3	3	40	274	1	5	1.125	0.112
Q1 Government	100	96.154	3.270	3	4	40	327	1	5	0.941	0.094
Q2 Government	103	99.038	2.748	3	3	62	283	1	5	0.882	0.087
Q1 Support Industry	104	100.000	2.885	3	3	42	300	1	5	0.969	0.095
Q2 Support Industry	100	96.154	2.860	3	3	47	286	1	5	0.921	0.092
Q3 Support Industry	102	98.077	2.863	3	3	51	292	1	4	0.868	0.086
Q4 Support Industry	103	99.038	2.981	3	3	35	307	1	5	1.038	0.102
Q5 Support Industry	102	98.077	3.225	3	3	43	329	1	5	0.911	0.090
Online Status	100	96.154	2.690	3	3	69	269	2	3	0.465	0.046
Productivity SaaS suite	103	99.038	2.893	2	5	32	298	1	5	1.644	0.162
ERP, CRM SaaS	99	95.192	2.051	2	1	40	203	1	5	1.215	0.122

Table 37: Descriptive Statistics of NPOs

	Valid N	% Valid obs.	Mean	Median	Mode	Frequency	Sum	Minimum	Maximum	Std.Dev.	Standard
Q1 Awareness	62	100.000	2.371	2.000	2	20	147	1	5	1.218	0.155
Q2 Awareness	62	100.000	2.226	2.000	2	26	138	1	5	1.151	0.146
Q3 Awareness	61	98.387	3.131	3.000	4	22	191	1	5	1.271	0.163
Q4 Awareness	62	100.000	2.903	3.000	4	19	180	1	5	1.302	0.165
Q5 Awareness	60	96.774	3.017	3.000	4	22	181	1	5	1.321	0.171
Q6 Awareness	61	98.387	2.508	2.000	2	21	153	1	5	1.299	0.166
Q7 Awareness	61	98.387	2.426	2.000	2	23	148	1	5	1.244	0.159
Q1 Human Resources	61	98.387	3.918	4.000	4	25	239	1	5	1.144	0.147
Q2 Human Resources	61	98.387	4.016	4.000	4	29	245	1	5	0.991	0.127
Q1 Business Resources	62	100.000	3.839	4.000	4	28	238	2	5	1.011	0.128
Q2 Business Resources	62	100.000	3.984	4.000	4	42	247	2	5	0.689	0.088
Q3 Business Resources	62	100.000	2.758	3.000	2	18	171	1	5	1.327	0.168
Q4 Business Resources	62	100.000	2.887	3.000	3	20	179	1	5	1.010	0.128
Q5 Business Resources	61	98.387	3.820	4.000	4	31	233	1	5	0.866	0.111
Q1 Technology resources	61	98.387	3.377	4.000	4	25	206	1	5	1.128	0.144
Q2 Technological resources	61	98.387	3.525	4.000	4	27	215	1	5	1.089	0.139
Q3 Technological resources	60	96.774	4.067	4.000	4	32	244	1	5	0.899	0.116
Q4 Technological resources	61	98.387	3.443	4.000	4	22	210	1	5	1.073	0.137
Q5 Technological resources	59	95.161	3.678	4.000	4	26	217	2	5	0.880	0.115
Q6 Technological resources	60	96.774	3.467	4.000	4	25	208	2	5	0.929	0.120
Q1 Governance	62	100.000	2.468	2.000	2	23	153	1	5	1.112	0.141
Q2 Governance	62	100.000	2.226	2.000	2	26	138	1	5	1.047	0.133
Q3 Governance	62	100.000	2.403	2.000	2	23	149	1	5	1.166	0.148
Q4 Governance	62	100.000	2.677	3.000	3	22	166	1	5	1.156	0.147
Q5 Governance	62	100.000	2.500	2.000	2	19	155	1	5	1.098	0.139
Q6 Governance	61	98.387	2.574	2.000	2	21	157	1	5	1.117	0.143
Q7 Governance	62	100.000	2.371	2.000	2	29	147	1	5	1.044	0.133
Q8 Governance	61	98.387	2.279	2.000	2	22	139	1	5	1.127	0.144
Q1 Market Force	61	98.387	2.295	2.000	3	22	140	1	5	0.972	0.124
Q2 Market Force	60	96.774	2.633	3.000	3	27	158	1	5	1.089	0.141
Q1 Government	59	95.161	3.288	3.000	3	26	194	1	5	0.832	0.108
Q2 Government	61	98.387	2.656	3.000	3	40	162	1	5	0.793	0.102
Q1 Support Industry	62	100.000	2.774	3.000	3	26	172	1	5	0.913	0.116
Q2 Support Industry	61	98.387	2.721	3.000	3	31	166	1	4	0.819	0.105
Q3 Support Industry	60	96.774	2.817	3.000	3	34	169	1	4	0.748	0.097
Q4 Support Industry	62	100.000	2.919	3.000	3	23	181	1	5	1.013	0.129
Q5 Support Industry	61	98.387	3.262	3.000	3	31	199	1	5	0.854	0.109
Online Status	60	96.774	2.717	3.000	3	43	163	2	3	0.454	0.059
Productivity SaaS suite	62	100.000	2.871	2.500	5	20	178	1	5	1.645	0.209
ERP, CRM SaaS	60	96.774	1.983	2.000	Multiple	24	119	1	5	1.157	0.149

Table 38: Descriptive Statistics of SMEs

	Valid N	% Valid obs.	Mean	Median	Mode	Frequency	Sum	Minimum	Maximum	Std.Dev.	Standard Error
Q1 Awareness	42	100.000	2.690	2	Multiple	13	113	1	5	1.490	0.230
Q2 Awareness	42	100.000	2.667	3	4	12	112	1	5	1.337	0.206
Q3 Awareness	42	100.000	3.262	4	4	14	137	1	5	1.363	0.210
Q4 Awareness	42	100.000	3.143	3	4	12	132	1	5	1.372	0.212
Q5 Awareness	40	95.238	3.325	4	4	18	133	1	5	1.289	0.204
Q6 Awareness	41	97.619	2.829	3	2	10	116	1	5	1.321	0.206
Q7 Awareness	42	100.000	2.786	3	2	12	117	1	5	1.298	0.200
Q1 Human Resources	42	100.000	3.619	4	4	16	152	1	5	1.464	0.226
Q2 Human Resources	40	95.238	3.975	4	4	17	159	1	5	1.050	0.166
Q1 Business Resources	41	97.619	4.049	4	4	19	166	1	5	1.117	0.174
Q2 Business Resources	42	100.000	3.714	4	4	17	156	1	5	1.043	0.161
Q3 Business Resources	42	100.000	3.024	3	Multiple	9	127	1	5	1.473	0.227
Q4 Business Resources	40	95.238	2.675	3	2	14	107	1	5	1.163	0.184
Q5 Business Resources	42	100.000	3.548	4	4	20	149	1	5	1.064	0.164
Q1 Technology resources	42	100.000	3.238	4	4	18	136	1	5	1.246	0.192
Q2 Technological resources	40	95.238	3.750	4	4	17	150	2	5	0.954	0.151
Q3 Technological resources	42	100.000	3.714	4	5	14	156	1	5	1.195	0.184
Q4 Technological resources	41	97.619	3.390	3	Multiple	11	139	1	5	1.181	0.184
Q5 Technological resources	42	100.000	3.524	4	4	15	148	1	5	0.994	0.153
Q6 Technological resources	41	97.619	3.098	3	3	14	127	1	5	1.020	0.159
Q1 Governance	41	97.619	2.780	3	3	12	114	1	5	1.194	0.186
Q2 Governance	42	100.000	2.571	2	2	15	108	1	5	1.107	0.171
Q3 Governance	41	97.619	2.366	2	2	16	97	1	5	1.090	0.170
Q4 Governance	42	100.000	2.619	3	3	13	110	1	5	1.229	0.190
Q5 Governance	41	97.619	2.439	2	2	15	100	1	5	1.074	0.168
Q6 Governance	41	97.619	2.537	2	2	14	104	1	5	1.120	0.175
Q7 Governance	42	100.000	2.595	3	3	14	109	1	5	1.149	0.177
Q8 Governance	41	97.619	2.561	2	2	13	105	1	5	1.119	0.175
Q1 Market Force	41	97.619	3.049	3	3	14	125	1	5	1.224	0.191
Q2 Market Force	40	95.238	2.900	3	3	13	116	1	5	1.172	0.185
Q1 Government	41	97.619	3.244	3	4	17	133	1	5	1.090	0.170
Q2 Government	42	100.000	2.881	3	3	22	121	1	5	0.993	0.153
Q1 Support Industry	42	100.000	3.048	3	3	16	128	1	5	1.035	0.160
Q2 Support Industry	39	92.857	3.077	3	3	16	120	1	5	1.036	0.166
Q3 Support Industry	42	100.000	2.929	3	3	17	123	1	4	1.022	0.158
Q4 Support Industry	41	97.619	3.073	3	4	17	126	1	5	1.081	0.169
Q5 Support Industry	41	97.619	3.171	3	4	20	130	1	4	0.998	0.156
Online Status	40	95.238	2.650	3	3	26	106	2	3	0.483	0.076
Productivity SaaS suite	41	97.619	2.927	2	Multiple	12	120	1	5	1.664	0.260
ERP, CRM SaaS	39	92.857	2.154	2	1	16	84	1	5	1.309	0.210

3F T-Test Table between SMEs and NPOs

Table 39: T-Test Table between NPOs and SMEs

	Mean	Mean	t-value	df	p	Valid N	Valid N	Std.Dev.	Std.Dev.	F-ratio	p
Q1 Awareness	2.370968	2.690476	-1.19871	102	0.233417	62	42	1.217817	1.489608	1.496167	0.150890
Q2 Awareness	2.225806	2.666667	-1.79433	102	0.075723	62	42	1.151184	1.337392	1.349671	0.283803
Q3 Awareness	3.131148	3.261905	-0.49818	101	0.619440	61	42	1.271160	1.362557	1.148971	0.615587
Q4 Awareness	2.903226	3.142857	-0.90123	102	0.369591	62	42	1.302075	1.371690	1.109788	0.701868
Q5 Awareness	3.016667	3.325000	-1.15451	98	0.251099	60	40	1.321166	1.288758	1.050926	0.881474
Q6 Awareness	2.508197	2.829268	-1.21562	100	0.226994	61	41	1.299012	1.321031	1.034188	0.892382
Q7 Awareness	2.426230	2.785714	-1.41569	101	0.159942	61	42	1.244441	1.297948	1.087842	0.755725
Q1 Human Resources	3.918033	3.619048	1.16140	101	0.248218	61	42	1.144481	1.464247	1.636860	0.080609
Q2 Human Resources	4.016393	3.975000	0.20048	99	0.841516	61	40	0.991494	1.049725	1.120911	0.679987
Q1 Business Resources	3.838710	4.048780	-0.98975	101	0.324661	62	41	1.011306	1.116943	1.219823	0.476879
Q2 Business Resources	3.983871	3.714286	1.58852	102	0.115264	62	42	0.689308	1.042645	2.287948	0.003280
Q3 Business Resources	2.758065	3.023810	-0.95842	102	0.340116	62	42	1.326718	1.473143	1.232914	0.451713
Q4 Business Resources	2.887097	2.675000	0.97530	100	0.331763	62	40	1.009867	1.163273	1.326892	0.317115
Q5 Business Resources	3.819672	3.547619	1.42614	101	0.156912	61	42	0.866183	1.063872	1.508548	0.144510
Q1 Technology resources	3.377049	3.238095	0.58874	101	0.557353	61	42	1.127888	1.245666	1.219752	0.476758
Q2 Technological resources	3.524590	3.750000	-1.06713	99	0.288510	61	40	1.089443	0.954074	1.303902	0.380326
Q3 Technological resources	4.066667	3.714286	1.69878	100	0.092471	60	42	0.899466	1.195229	1.765762	0.044920
Q4 Technological resources	3.442623	3.390244	0.23217	100	0.816884	61	41	1.072763	1.180636	1.211226	0.494284
Q5 Technological resources	3.677966	3.523810	0.82233	99	0.412863	59	42	0.879668	0.993592	1.275786	0.389131
Q6 Technological resources	3.466667	3.097561	1.88410	99	0.062486	60	41	0.929127	1.019923	1.204995	0.507677
Q1 Committment	2.467742	2.780488	-1.35669	101	0.177906	62	41	1.112046	1.193989	1.152802	0.607291
Q2 Commitment	2.225806	2.571429	-1.61392	102	0.109635	62	42	1.046765	1.107466	1.119341	0.679712
Q3 Commitment	2.403226	2.365854	0.16338	101	0.870549	62	41	1.165905	1.089865	1.144408	0.656962
Q4 Commitment	2.677419	2.619048	0.24629	102	0.805951	62	42	1.156226	1.228769	1.129418	0.656831
Q1 Governance	2.500000	2.439024	0.27837	101	0.781296	62	41	1.097688	1.073517	1.045537	0.893604
Q2 Governance	2.573770	2.536585	0.16462	100	0.869578	61	41	1.117423	1.120213	1.005001	0.970885
Q3 Governance	2.370968	2.595238	-1.03211	102	0.304462	62	42	1.043856	1.148902	1.211393	0.489846
Q4 Governance	2.278689	2.560976	-1.24349	100	0.216594	61	41	1.127403	1.119124	1.014850	0.974888
Q1 Market Force	2.295082	3.048780	-3.45638	100	0.000805	61	41	0.972013	1.223749	1.585041	0.104273
Q2 Market Force	2.633333	2.900000	-1.16358	98	0.247420	60	40	1.088720	1.172331	1.159493	0.598439
Q1 Government	3.288136	3.243902	0.23002	98	0.818553	59	41	0.831510	1.090424	1.719713	0.058320
Q2 Government	2.655738	2.880952	-1.27671	101	0.204631	61	42	0.793416	0.992714	1.565479	0.111867
Q1 Support Industry	2.774194	3.047619	-1.41961	102	0.158771	62	42	0.912919	1.034818	1.284882	0.369126
Q2 Support Industry	2.721311	3.076923	-1.90748	98	0.059387	61	39	0.819169	1.035797	1.598828	0.101986
Q3 Support Industry	2.816667	2.928571	-0.63900	100	0.524282	60	42	0.747689	1.021545	1.866691	0.027776
Q4 Support Industry	2.919355	3.073171	-0.73429	101	0.464473	62	41	1.013004	1.081440	1.139679	0.635483
Q5 Support Industry	3.262295	3.170732	0.49585	100	0.621085	61	41	0.854432	0.997558	1.363079	0.273144
Online Status	2.716667	2.650000	0.70082	98	0.485075	60	40	0.454420	0.483046	1.129959	0.661395
Productivity SaaS suite	2.870968	2.926829	-0.16795	101	0.866957	62	41	1.644503	1.664185	1.024080	0.918478
VPBX SaaS	1.852459	2.000000	-0.59322	100	0.554373	61	41	1.208802	1.264911	1.094989	0.739173
ERP, CRM SaaS	1.983333	2.153846	-0.68024	97	0.497974	60	39	1.157022	1.308645	1.279263	0.389476

3G Chi-Squared Tests

1. SME Revenue vs. NPO Budget

Table 40: Summary Frequency Table for SMEs and NPOs

	Summary Frequency Table (sme and npos) Table: Organisation(2) x Revenue vs Budget(4)					
	Organisation	Revenue vs Budget < R1 million	Revenue vs Budget R1 million - R2.5 million	Revenue vs Budget More than R7.5 million	Revenue vs Budget R1million - R7.5 million	Row Totals
Count	NPO	17	31	13	0	61
Row Percent		27.87%	50.82%	21.31%	0.00%	
Count	SME	24	0	4	13	41
Row Percent		58.54%	0.00%	9.76%	31.71%	
Count	All Grps	41	31	17	13	102

Table 41: Pearson Chi-Squared Test with Expected Frequencies for SME and NPOs

Summary Table: Expected Frequencies (sme and npos) Pearson Chi-square: 47.8791, df=3, p=.000000				
Revenue vs Budget < R1 million	Revenue vs Budget R1 million - R2.5 million	Revenue vs Budget More than R7.5 million	Revenue vs Budget R1million - R7.5 million	Row Totals
24.51961	18.53922	10.16667	7.77451	61.0000
16.48039	12.46078	6.83333	5.22549	41.0000
41.00000	31.00000	17.00000	13.00000	102.0000

2. Highest Level of Education

Table 42: Summary Frequency Table for SMEs and NPOs

	Summary Frequency Table (sme and npos) Table: Organisation(2) x Education(2)			
	Organisation	Education Matric & undergrad	Education Postgrad	Row Totals
Count	NPO	29	32	61
Row Percent		47.54%	52.46%	
Count	SME	22	20	42
Row Percent		52.38%	47.62%	
Count	All Grps	51	52	103

Table 43: Pearson Chi-Squared Test with Expected Frequencies for SME and NPOs

Summary Table: Expected Frequencies (sme and npos) Pearson Chi-square: .233092, df=1, p=.629240			
Organisation	Education Matric & undergrad	Education Postgrad	Row Totals
NPO	30.20388	30.79612	61.0000
SME	20.79612	21.20388	42.0000
All Grps	51.00000	52.00000	103.0000

3. Years of Operation

Table 44: Summary Frequency Table for SMEs and NPOs

	Summary Frequency Table (sme and npos) Table: Organisation(2) x YOO(3)				
	Organisation	YOO Less than 3 years	YOO 4 - 8 years	YOO More than 8 years	Row Totals
Count	NPO	4	15	42	61
Row Percent		6.56%	24.59%	68.85%	
Count	SME	14	15	12	41
Row Percent		34.15%	36.59%	29.27%	
Count	All Grps	18	30	54	102

Table 45: Pearson Chi-Squared Test with Expected Frequencies for SME and NPOs

Summary Table: Expected Frequencies (sme and npos) Pearson Chi-square: 19.0324, df=2, p=.000074				
Organisation	YOO Less than 3 years	YOO 4 - 8 years	YOO More than 8 years	Row Totals
NPO	10.76471	17.94118	32.29412	61.0000
SME	7.23529	12.05882	21.70588	41.0000
All Grps	18.00000	30.00000	54.00000	102.0000

4. Internet Use

Table 46: Summary Frequency Table for SMEs and NPOs

	Summary Frequency Table (sme and npos) Table: Organisation(2) x Internet use(2)			
	Organisation	Internet use Basic	Internet use Extensive	Row Totals
Count	SME	14	26	40
Row Percent		35.00%	65.00%	
Count	NPO	17	43	60
Row Percent		28.33%	71.67%	
Count	All Grps	31	69	100

Table 47: Pearson Chi-Squared Test with Expected Frequencies for SME and NPOs

Summary Table: Expected Frequencies (sme and npos) Pearson Chi-square: .498675, df=1, p=.480083			
Organisation	Internet use Basic	Internet use Extensive	Row Totals
SME	12.40000	27.60000	40.0000
NPO	18.60000	41.40000	60.0000
All Grps	31.00000	69.00000	100.0000

3H Statistica Package Test

1. Combined SME and NPO Multiple Regression Results

Table 48: Regression Summary for Dependent for SME and NPO Dataset

N=102	Regression Summary for Dependent Variable: Adoption (sme and npos) R= .71500367 R²= .51123025 Adjusted R²= .45751928 F(10,91)=9.5182 p<.00000 Std.Error of estimate: .95906					
	b*	Std.Err. of b*	b	Std.Err. of b	t(91)	p-value
Intercept			-1.00640	0.779893	-1.29043	0.200170
Awareness	0.249444	0.120673	0.28613	0.138421	2.06710	0.041565
HR	0.161230	0.083663	0.21309	0.110570	1.92715	0.057080
BR	-0.016008	0.113170	-0.02933	0.207375	-0.14145	0.887825
TR	-0.009157	0.108103	-0.01498	0.176814	-0.08471	0.932677
Commitment	0.443999	0.190768	0.56517	0.242829	2.32743	0.022161
GV	-0.157990	0.166739	-0.19955	0.210602	-0.94753	0.345878
MF	0.192223	0.113590	0.23223	0.137234	1.69225	0.094020
Government	-0.049335	0.102309	-0.08283	0.171775	-0.48222	0.630809
SI	0.027159	0.119180	0.04687	0.205673	0.22788	0.820251
Online Status	0.079977	0.098651	0.22151	0.273232	0.81070	0.419651

Table 49: Summary Statistics for SME and NPO Dataset

Statistic	Summary Statistics; DV: Adoption (sme and npos)
	Value
Multiple R	0.715003668
Multiple R²	0.511230245
Adjusted R²	0.457519283
F(10,91)	9.5181733
p	0.00000000011732422
Std.Err. of Estimate	0.959055296

Table 50: Univariate Tests of Significance for Adoption in SME and NPO Dataset

Effect	Univariate Tests of Significance for Adoption (sme and npos) Sigma-restricted parameterization Effective hypothesis decomposition; Std. Error of Estimate: .9590553 SS	Degr. of Freedom	MS	F	p
Intercept	1.53164	1	1.531640	1.665211	0.200170
Awareness	3.93018	1	3.930177	4.272921	0.041565
HR	3.41601	1	3.416011	3.713915	0.057080
BR	0.01840	1	0.018404	0.020009	0.887825
TR	0.00660	1	0.006600	0.007176	0.932677
Commitment	4.98240	1	4.982402	5.416908	0.022161
GV	0.82580	1	0.825797	0.897813	0.345878
MF	2.63401	1	2.634005	2.863712	0.094020
Government	0.21388	1	0.213881	0.232534	0.630809
SI	0.04776	1	0.047764	0.051929	0.820250
Online Status	0.60452	1	0.604520	0.657239	0.419651
Error	83.70062	91	0.919787		

2. Combined SME and NPO Multiple Regression Results (VPBX added as one of the dependant variables)

Table 51: Parameter Estimates for SMEs and NPOs

Effect	Parameter Estimates (sme and npos) Sigma-restricted parameterization									
	Adoption Param.	Adoption Std.Err	Adoption t	Adoption p	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt	Adoption Beta (ß)	Adoption St.Err.ß	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt
Intercept	-1.00640	0.779893	-1.29043	0.200170	-2.55556	0.542764				
Awareness	0.28613	0.138421	2.06710	0.041565	0.01117	0.561085	0.249444	0.120673	0.009742	0.489147
HR	0.21309	0.110570	1.92715	0.057080	-0.00655	0.432719	0.161230	0.083663	-0.004955	0.327416
BR	-0.02933	0.207375	-0.14145	0.887825	-0.44126	0.382592	-0.016008	0.113170	-0.240808	0.208791
TR	-0.01498	0.176814	-0.08471	0.932677	-0.36620	0.336240	-0.009157	0.108103	-0.223891	0.205576
Commitment	0.56517	0.242829	2.32743	0.022161	0.08282	1.047517	0.443999	0.190768	0.065061	0.822936
GV	-0.19955	0.210602	-0.94753	0.345878	-0.61789	0.218783	-0.157990	0.166739	-0.489197	0.173217
MF	0.23223	0.137234	1.69225	0.094020	-0.04036	0.504832	0.192223	0.113590	-0.033410	0.417857
Government	-0.08283	0.171775	-0.48222	0.630809	-0.42404	0.258377	-0.049335	0.102309	-0.252559	0.153889
SI	0.04687	0.205673	0.22788	0.820250	-0.36168	0.455413	0.027159	0.119180	-0.209577	0.263894
Online Status	0.22151	0.273232	0.81070	0.419651	-0.32123	0.764253	0.079977	0.098651	-0.115981	0.275935

Table 52: Test of SS for SME and NPO Dataset

Dependnt Variable	Test of SS Whole Model vs. SS Residual (sme and npos)										
	Multiple R	Multiple R^2	Adjusted R^2	SS Model	df Model	MS Model	SS Residual	df Residual	MS Residual	F	p
Adoption	0.715004	0.511230	0.457519	87.54693	10	8.754693	83.70062	91	0.919787	9.518173	0.000000

Table 53: Regression Summary for SME and NPO Dataset

N=103	Regression Summary for Dependent Variable: Adoption EX (sme and npos R= .51140607 R^2= .26153617 Adjusted R^2= .18126836 F(10,92)=3.2583 p<.00122 Std.Error of estimate: 8.8607					
	b*	Std.Err. of b*	b	Std.Err. of b	t(92)	p-value
Intercept			6.32860	7.167196	0.88299	0.379541
Awareness	-0.343332	0.143311	-2.95555	1.233683	-2.39571	0.018613
HR	-0.211556	0.099926	-2.10419	0.993884	-2.11714	0.036947
BR	0.418812	0.134770	5.66429	1.822722	3.10760	0.002509
TR	0.310477	0.130427	3.77486	1.585762	2.38047	0.019353
Commitment	0.048155	0.233475	0.46273	2.243504	0.20625	0.837048
GV	0.138001	0.203501	1.31555	1.939957	0.67813	0.499389
MF	0.118313	0.138536	1.07981	1.264382	0.85402	0.395310
Government	-0.161158	0.123928	-2.04497	1.572545	-1.30042	0.196705
SI	-0.129897	0.145062	-1.69416	1.891946	-0.89546	0.372880
Online Status	-0.282177	0.118078	-5.84755	2.446938	-2.38974	0.018900

Table 54: Summary of Statistics for SME and NPO Dataset

	Summary Statistics; DV: Adoption EX (sme and npos
Statistic	Value
Multiple R	0.511406068
Multiple R²	0.261536167
Adjusted R²	0.181268359
F(10,92)	3.25829462
p	0.00121741544
Std.Err. of Estimate	8.86072903

3. NPO Multiple Regression Results

Table 55: Univariate Test of Significance for NPO Dataset

	Univariate Tests of Significance for Adoption (sme and npos) Sigma-restricted parameterization Effective hypothesis decomposition; Std. Error of Estimate: 1.005867				
Effect	SS	Degr. of Freedom	MS	F	p
Intercept	0.39164	1	0.391638	0.387083	0.536664
Awareness	0.81952	1	0.819524	0.809992	0.372437
HR	0.29610	1	0.296102	0.292657	0.590925
BR	0.18644	1	0.186442	0.184273	0.669570
TR	0.41382	1	0.413815	0.409002	0.525396
Commitment	2.01829	1	2.018294	1.994818	0.164032
GV	0.00080	1	0.000796	0.000787	0.977736
MF	0.01436	1	0.014360	0.014193	0.905647
Government	0.02127	1	0.021271	0.021023	0.885299
SI	0.01178	1	0.011779	0.011642	0.914509
Online Status	0.92592	1	0.925916	0.915146	0.343356
Error	50.58843	50	1.011769		

Table 56: Parameter Estimates of NPO Dataset

	Parameter Estimates (sme and npos) Sigma-restricted parameterization									
Effect	Adoption Param.	Adoption Std.Err	Adoption t	Adoption p	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt	Adoption Beta (ß)	Adoption St.Err.ß	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt
Intercept	-0.828699	1.331972	-0.622160	0.536664	-3.50404	1.846645				
Awareness	0.173206	0.192452	0.899995	0.372437	-0.21335	0.559757	0.148582	0.165092	-0.183015	0.480180
HR	0.092687	0.171332	0.540978	0.590925	-0.25144	0.436816	0.062658	0.115823	-0.169980	0.295296
BR	-0.135840	0.316445	-0.429271	0.669570	-0.77144	0.499757	-0.065567	0.152740	-0.372353	0.241220
TR	0.167821	0.262412	0.639533	0.525396	-0.35925	0.694892	0.100851	0.157695	-0.215889	0.417591
Commitment	0.597423	0.422990	1.412380	0.164032	-0.25218	1.447024	0.477132	0.337821	-0.201402	1.155666
GV	0.010187	0.363201	0.028047	0.977736	-0.71932	0.739698	0.008089	0.288427	-0.571233	0.587412
MF	0.027581	0.231513	0.119133	0.905647	-0.43743	0.492589	0.020417	0.171378	-0.323805	0.364639
Government	-0.032422	0.223607	-0.144994	0.885299	-0.48155	0.416707	-0.017203	0.118644	-0.255505	0.221100
SI	-0.034254	0.317464	-0.107897	0.914509	-0.67190	0.603392	-0.016064	0.148882	-0.315102	0.282974
Online Status	0.355092	0.371190	0.956633	0.343356	-0.39046	1.100649	0.127167	0.132932	-0.139834	0.394167

Table 57: Test of SS of NPO Dataset

Dependnt Variable	Test of SS Whole Model vs. SS Residual (sme and npos)										
	Multiple R	Multiple R^2	Adjusted R^2	SS Model	df Model	MS Model	SS Residual	df Residual	MS Residual	F	p
Adoption	0.699047	0.488667	0.386400	48.34599	10	4.834599	50.58843	50	1.011769	4.778364	0.000083

4. SME Multiple Regression Results

Table 58: Univariate Test of Significance for SME

Effect	Univariate Tests of Significance for Adoption (sme and npos) Sigma-restricted parameterization Effective hypothesis decomposition; Std. Error of Estimate: .9777099				
	SS	Degr. of Freedom	MS	F	p
Intercept	0.66720	1	0.667197	0.697966	0.410298
Awareness	3.94180	1	3.941795	4.123576	0.051548
HR	3.90931	1	3.909309	4.089592	0.052458
BR	0.35768	1	0.357681	0.374176	0.545503
TR	0.27806	1	0.278062	0.290886	0.593771
Commitment	2.23289	1	2.232886	2.335859	0.137260
GV	2.17780	1	2.177799	2.278231	0.142021
MF	3.34983	1	3.349828	3.504309	0.071326
Government	0.20821	1	0.208215	0.217817	0.644196
SI	0.40350	1	0.403502	0.422110	0.521000
Online Status	0.09018	1	0.090177	0.094335	0.760931
Error	27.72158	29	0.955917		

Table 59: Parameter Estimates of SME

Effect	Parameter Estimates (sme and npos) Sigma-restricted parameterization									
	Adoption Param.	Adoption Std.Err	Adoption t	Adoption p	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt	Adoption Beta (ß)	Adoption St.Err.ß	-95.00% Cnf.Lmt	+95.00% Cnf.Lmt
Intercept	-1.02039	1.221374	-0.83544	0.410298	-3.51838	1.477601				
Awareness	0.52344	0.257770	2.03066	0.051548	-0.00376	1.050643	0.447370	0.220308	-0.003210	0.897950
HR	0.34309	0.169654	2.02227	0.052458	-0.00389	0.690067	0.297335	0.147030	-0.003375	0.598045
BR	-0.24400	0.398884	-0.61170	0.545503	-1.05981	0.571813	-0.153973	0.251714	-0.668787	0.360840
TR	-0.16543	0.306726	-0.53934	0.593771	-0.79275	0.461896	-0.101939	0.189008	-0.488505	0.284626
Commitment	0.55511	0.363209	1.52835	0.137260	-0.18774	1.297959	0.419614	0.274553	-0.141910	0.981138
GV	-0.45340	0.300387	-1.50938	0.142021	-1.06776	0.160962	-0.354356	0.234769	-0.834512	0.125801
MF	0.37596	0.200835	1.87198	0.071326	-0.03479	0.786713	0.327998	0.175215	-0.030356	0.686353
Government	-0.15889	0.340456	-0.46671	0.644196	-0.85520	0.537417	-0.106800	0.228836	-0.574821	0.361222
SI	0.24546	0.377807	0.64970	0.521000	-0.52724	1.018162	0.163294	0.251337	-0.350749	0.677336
Online Status	0.15143	0.493023	0.30714	0.760931	-0.85692	1.159772	0.054755	0.178272	-0.309852	0.419362

Table 60: Test of SS for SMEs

	Test of SS Whole Model vs. SS Residual (sme and npos)										
Dependnt Variable	Multiple R	Multiple R^2	Adjusted R^2	SS Model	df Model	MS Model	SS Residual	df Residual	MS Residual	F	p
Adoption	0.775694	0.601701	0.464357	41.87842	10	4.187842	27.72158	29	0.955917	4.380969	0.000861