

**Intentions to Participate in Virtual Health
Communities: An empirical study of South
African health consumers**

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ABSTRACT

Much of the literature surrounding virtual health communities highlights the factors critical to their success such as availability to medical resources, efficiency of being able to access medical practitioners and the ability to access a supporting network of patients with similar medical conditions. There is however little research which establishes whether South African health consumers are ready for a virtual health community and whether health consumers will be encouraged to participate in these virtual communities to achieve greater levels of self managed health. This study addresses that question. The research was grounded in literature from the Health Belief Model (HBM) and Technology Readiness (TR) and Trust. A research model was developed, which hypothesized the effects of perceived benefits, perceived severity, cues to action, self-efficacy, confidence, trust and technology readiness attributes on health consumers' intentions to participate in a virtual health community. To test the research model, the study adopted a quantitative research design and collected data using an online structured questionnaire. The sampling frame for this study was a convenience sample of health consumers in South Africa. Ninety-nine useable responses were received. Results from multiple regression analysis showed that perceived benefits, cues to action, self efficacy and trust were good predictors of the attitude towards virtual health communities as well as intentions to participate in such communities. An important part of the study was exploring differences between health consumers with chronic conditions and those without. The study is important for medical professionals, government and pharmaceutical companies, as it provides valuable information on the extent to which South African health consumers are ready for a virtual medical community. It also identifies the factors influencing user's intentions towards the use of the virtual health community and provides significant empirical evidence for the HBM and TR literatures.

DECLARATION

I, Janine Antoinette Hayne, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Commerce (Information Systems) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Janine Antoinette Hayne

Signed at

On the day of 2012

DEDICATION

To those who suffer from a chronic illness

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CHAPTER 1: INTRODUCTION

1.1 Introduction

“South Africa is in the midst of a profound health transition that is characterised by a quadruple burden of communicable, non-communicable, perinatal and maternal and injury-related disorders. Non-communicable diseases are emerging in both rural and urban areas, most prominently in poor people living in urban settings, and are resulting in increasing pressure on acute and chronic health-care services”

Mayosi, Flisher, Lallo, Sitas, Tollman & Bradshaw (2009:934)

Recent studies have highlighted an increase in the number of people with chronic diseases. The chronic and non-communicable diseases, like hypertension and diabetes, account for up to 50% of deaths (Hofman, Ryce, Prudhomme & Kotzin, 2006). In addition to this, the burden of diseases connected to non-communicable diseases is expected to increase considerably over the next decade (Mayosi et al. 2009).

Diabetes is a chronic disease often mentioned in studies. It is highlighted that the number of people with diabetes is increasing due to the rising population, ageing, urbanization, an increase in obesity and lack of exercise (Wild, Roglic, Green, Sicree & King, 2004). It is feared that diabetes and obesity will reach epidemic proportions (Rheeder, 2006), and it has been estimated that between 2010 and 2030, there will be a 69% increase in the number of adults with diabetes in developing countries (Shaw, Sicree & Zimmet, 2009). “There is an increasing burden of chronic illness in low and middle income countries, driven by TB and HIV, as well as cardio-vascular disease and diabetes.” (Goudge, Gilson, Russel, Gumede & Mills, 2009:2).

The aforementioned has resulted in a heavy burden on the health system resulting in rising costs, concerns about scarcity of health care resources and the capacity to deliver healthcare to those chronic sufferers. Mayosi et al

(2009:935) highlight “The rising morbidity related to non-communicable diseases has major implications for the delivery of acute and chronic health-related services. Although chronic conditions have different causes, the stress placed on families, healthcare systems and governments are surprisingly similar (Epping – Jordan, Pruitt, Bengoa & Wagner, 2004). However, Epping-Jordan et al. (2004:585) adds that “most health care today is still trying to manage chronic problems using acute care mentality, methods and systems.” This has led researchers to suggest that there is an increasing need for health consumers with chronic diseases to personally manage their health-related behaviours, such as their food consumption, as well as to understand and monitor their personal health indicators e.g. blood pressure (Smith, 2007).

There are some signs that health delivery models are incorporating aspects of self-management in their efforts to empower consumers. Calabretta (2002) points out that the culture of patients seems to be shifting away from submissively relying on the doctor, towards a collaborative model where patients take responsibility for their health. It is also reiterated that patients wish to be informed and patient-focused web portals offer alternatives to doctor/patient communication and knowledge sharing (Koonce, Guise, Beauregard & Giuse, 2007).

“Because patients with chronic conditions will spend the majority of their lives outside formal health care settings, empowerment of patients and families will enable them to self-manage their conditions and prevent complications to the greatest extent possible” (Epping-Jordan, 2004:587). Studies have shown that self-management is very beneficial. When those with chronic conditions receive treatment in an integrated environment with self managed support and regular follow up, they do better (Epping-Jordan, 2004). Health related technologies (web-based technologies in particular) have the potential to play an enabling role in empowering health consumers with information and with the tools they need to engage in self-management (Chang & Chang, 2008). While Or & Karsh (2009) define health consumers as patients or individuals who are receiving medical care, an extended definition includes not only individuals seeking medical treatment, but also those looking for social and psychological support

or advise on managing their health or purchasing health care (Flexner, McLaughlin & Littlefield, 1977, Fordsberg, 2001). Online health consumers use information technology to gather health information, to control and manage their health and healthcare needs, and to facilitate more efficient use of health care resources (Eysenbach, 2000).

The remaining sections of this chapter present the background of the research problem from an IT perspective; discuss the purpose and objectives of the study and the importance of this research.

1.2 The Role of Information Technology

This section discusses a new IT enabled system for the delivery of healthcare - the virtual health community, and defines how a virtual health community can assist health consumers, including those with chronic conditions, in the management of their health.

1.2.1 *Virtual Communities*

The area of study relating to online or virtual communities is not a new topic. One of the most popular uses of the Internet has been to maintain interpersonal contacts (Markey & Wells, 2002). “Social interaction between constituents revolves around a well-understood focus that comprises of a shared objective (e.g. environmental protection), a shared identity (e.g. national culture or lifestyle choice) or a shared interest (e.g. a hobby)” (Laine, 2006:8).

Essentially, a virtual community is an online environment where a community of members having shared goals or interests (Mao, Vassileva & Grassman, 2007) is created for a specific purpose and interacts using communication technologies that bridge geographic and time differences (Parks, 2010; Johnson, 2001; Porter & Dunthu, 2008; Dermis, 2006).

1.2.2 *Virtual Health Communities*

The virtual communities which were studied were virtual health communities where the user community comprises health consumers, such as those with chronic health conditions. Examples of virtual health communities include publicly accessible communities such as patientslikeme.com whereby members of the virtual health community share similar goals of distributing and disseminating knowledge of a shared health related topic.

Virtual health communities also involve the participation of clinicians as members, and doctors regularly participate by responding to user requests and giving medical advice (Chryssanthou, Varlamis & Latsiou, 2009). For the purpose of this study, a virtual health community refers to a group of health consumers in an online environment who have similar goals, of sharing health related information by submitting online requests for advice (Chryssanthou et al. 2009). Providing and receiving community support and interacting with similar patients about a shared health related topic can enable virtual community users to self-manage their health and be more involved in their healthcare process (Demiris, 2005).

1.2.3 *Advantages*

There are many advantages to a virtual health community. Calabretta (2002) for example found that the web has the potential to positively affect both the healthcare decisions of American adults and their interactions with doctors. Furthermore, anonymity enabled them to discuss more sensitive topics.

Leimeister (2008) adds that studies have shown that virtual relationships in these communities can be very strong and can create a very supportive environment and sense of belonging (Huang, Hsiao & Chuang, 2009) e.g. for cancer sufferers (Bender, Grady & Jadad, 2008). It was highlighted that cancer survivors have valuable practical and experiential advice for others. In addition, virtual communities can overcome the limitation of many health systems, which do not adequately deal with support care issues due to their disjointed nature.

Studies show that both information sharing and emotional support are the two most common reasons for communicating between users (Welbourne, Blanchard & Boughton, 2009). Eysenbach, Powell, Englesakis, Rizo & Stern (2004:1) add that “virtual communities can be seen as mental health and social support interactions.”

Online communities can thus fulfill both an informational and a social purpose for health consumers (Stockdale & Thompson, 2008). Furthermore, they enable users to be better informed and less reliant on health care practitioners and can serve as a learning platform by creating an environment where educational material and simulations can be hosted (Laine, 2006). Consumers sharing information and learning from each other about their chronic diseases are found to lead to improved self-management (Stockdale, 2010; Gorini, Gaggioli, Vigna & Riva, 2008).

1.2.4 Challenges and Disadvantages

Although virtual communities have many positive attributes, there are also some challenges and disadvantages related to the use of virtual communities. Beijnum, Pawar, Dulawan & Hermens (2009), mention that there are no specific guidelines to building a virtual community. Furthermore, trust and security are important factors which, when absent, can compromise the effectiveness of virtual communities in health care (Demiris, 2006; Chryssanthou et al., 2009). Trust is important for creating the necessary atmosphere that makes engagement with others more open (Ridings, Gefen & Arinze, 2002). Yet, as Leimeister (2008) found within virtual communities for cancer patients, there is often a presence of mistrust.

In addition to the above, the environment of an online chronic disease community is a complex one. There are obstacles which can make interactions in a virtual health community difficult. For example, in the online environment, there is a lack of social cues which makes interaction somewhat difficult (Stockdale, 2010).

While virtual health communities have a lot to offer, there are clearly concerns that may discourage their use and adoption. This leads us to the study's research problem.

1.2.5 *The Research Problem*

Virtual health communities provide a number of advantages to support health consumers in gathering health information, engaging and getting support from others, sharing knowledge directly with others, and accessing advice from clinicians and health professionals.

However, the success of a virtual health community is ultimately dependent upon whether health consumers are willing to participate in such communities and whether they would perceive that participation would likely improve the self-management of their health conditions. Understanding the factors that influence health consumers' willingness to participate in virtual health communities thus presents a research problem in need of investigation.

1.3 Objective of the study

This research study aims to understand the extent to which health consumers, with or without chronic health conditions, are willing to use and participate in a virtual health community. Specifically, this study aims to determine whether consumer intention to participate in a virtual health community can be predicted by factors drawn from the health belief model (HBM) and technology readiness (TR) theory (these are both discussed in greater detail in Chapter 2).

This research study attempts to answer the following question:

To what extent can the attitudes of health consumers and their intentions to participate in a virtual health community be predicted by factors drawn from the health belief model (HBM) and technology readiness (TR) theory?

One specific group of consumers being studied are those who have chronic disease conditions, and for that reason need medical advice and support from

practitioners and other health consumers having the same chronic condition. This consumer group will be compared with consumers who are not currently managing a chronic condition to distinguish any differences in perceptions and intentions toward virtual health communities.

To achieve these objectives this study:

- Reviewed the literature about virtual health communities and self-management. In addition to this, identified factors (from Technology Readiness (TR) and the Health Belief Model (HBM)) which contribute to adoption intention and developed a research model.
- Used a quantitative research design and administered an email questionnaire to a sample group in order to collect the data needed to test the research model.
- Analysed the data using SPSS statistical software to test the model, including comparing health consumer's with chronic conditions to those without.
- Documented the results of the findings. Finally, discussed the possible explanations from the findings and include recommendations for future research.

1.4 Significance of the study

The following section discusses the significance of the study. This is done in the form of theoretical and practical contributions.

1.4.1 *Theoretical contribution*

The study makes a theoretical contribution by drawing on both the Health Belief Model (HBM) and Technology Readiness (TR) theory to develop its research model. Although past work has attempted to understand the technology readiness of consumers for an online / web environment (Berndt, Saunders & Petzer, 2010; Chan & Lin, 2009a and Lai, 2008), not much research has been done to assess the application of HBM and TR to the use of a virtual health

community. Furthermore sparse research into the use of virtual health communities in the South African context has been conducted.

Additionally, not a vast amount of Information System research being drawn on the HBM model to study consumer use of a health IT application. Integrating a model like HBM and TR is not a common approach and therefore can benefit researchers in this field.

1.4.2 *Practical contribution*

The study aims to provide guidance to medical professionals and government, as it will provide information as to whether a South African community will use a virtual health community. Much emphasis will be placed on building a successful model with the purpose of ensuring that a virtual health community is made more readily available.

1.5 Limitations and Delimitations of the study

The study could be limited by the fact that a virtual health community for this purpose is not operational in an existing environment. It may therefore be difficult for respondents to visualize the use of a virtual community.

This report presents an initial test of the research model and uses a convenience sample of health consumers. The generalisation of results are thus compromised.

1.6 Study outline

This chapter introduced the problem of chronic disease and the burden it places on health systems. A specific health application, such as a virtual health community was introduced as a solution to support patient's needs to manage their health more effectively. The research problem was introduced and the objective of the research, to examine whether South African consumers are likely to use a virtual health community, was documented. Finally, the

significance of this study has also been discussed and limitations documented where applicable.

The second chapter in the research report will examine topics associated with virtual health communities such as self-diagnosis, self-management, online support groups and self-service technology. Furthermore, this chapter will develop the research model from theory on the health belief model and technology readiness and present the hypotheses associated with this study.

The research methodology is discussed in chapter three. It also highlights the research instrument, the data collection procedure and processes for ensuring validity and reliability. The strategy for data analysis is also presented.

Chapter four deals with the presentation of results and tests the study's hypotheses. The results of the study are discussed further in the fifth chapter and will refer back to previously mentioned literature. Finally, the sixth chapter will present the conclusions of the research study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The problem of health consumer intentions towards the use of virtual health communities was introduced in the preceding chapter. This chapter initially discusses self-service technology and the increasing need for this amongst service organisations. Health informatics, and self-service technology in health, is then discussed in more detail together with research into their roles in self-diagnosis, self-management and online support.

Virtual health communities are then expanded on in greater detail. The shortcomings of existing literature into the use of virtual health communities are then presented. These shortcomings provide the basis for the development of the research model.

The chapter presents the theoretical underpinnings of the research model and hypotheses are developed.

2.2 Self-service technology

It has been highlighted that the service industry is expected to move toward increased use of self-service technologies (SST) (Srijumpa & Speece, 2004). Self-service technology is defined as the use of information technology to enable consumers to produce services for themselves without assistance from a service firm's employees (Beatson, Lee & Coote, 2007:75).

Self-service technologies are becoming more integrated into service delivery (Beatson et al., 2007). Evidence is beginning to link their use to more effective customer service (Bitner, 2001) and to reduce costs and increased productivity from the viewpoint of an adopting organisation (Zhao, Mattila & Tao, 2008). Yet, there remains a need for further investigation into the impacts of Self-service technologies on customers and on their perceptions of the service encounter. The reason for this is because some customers are hesitant to adopt Self-service technologies (Liljander, Gillberg, Gummerus & van Riel, 2006).

Therefore, understanding the technology readiness of customers before implementation of Self-service technologies may be fundamental to success (Beatson et al., 2007) “On account of technologies broadening characters in service delivery, it is necessary to comprehend customers’ readiness to use technology-based systems such as Self-service technologies” (Chen & Chen, 2009:1249).

Perhaps the greatest threats to adoption of Self-service technologies are feelings of discomfort with technology and technology anxiety. Nevertheless, other factors may also be important such as education, attitude and the perceived benefits of the technology (Bashir & Zakaria, 2010). Identifying the determinants of self service technology use is consequently important to service organisations interested in reducing the barriers to self service technology use.

In the context of this study relating to health care services, it is important to understand consumer perceptions of Self-service technologies and their attitudes toward interacting with a self service technology for the purposes of independently producing health-related services. Given the sensitive nature of health care and the complexities of health services provision, there is much research which needs to be conducted to understand the environment before implementing self-service initiatives into the health care context. Recently there has been an increase in health information technology investments by governments (Lau, 2011) and there is a “proliferation of patient focused applications” (Goldzweig, Towfigh, Maglione & Shekelle, 2009:291) which further emphasizes the need to understand consumer perceptions and intentions.

The role of IT in health care and the potential for health care Self-service technologies are discussed in the following section.

2.3 Health informatics

Recently, there has been a move away from separated health care institutions with the emphasis on treating the illness and acute inpatient care, towards a promotion of health consumer wellness and self-management (Davino, 2011).

This shift is changing the way in which patients' access and use medical information. Patients are beginning to take responsibility for certain aspects of the health care service through their use of self-service technologies. For example, many patients tend to gather information prior to consulting with a medical practitioner and the doctor – patient relationship is becoming more of a consultative one (Hesse, Nelson, Kreps, Croyle, Arora, Rimer & Viswanath, 2005; Stockdale et al., 2010).

It is evident that the Internet has played a large role in enabling this, with at least one study finding that just over half of all adult patients accessing medical information using the Internet and using this information to inform their choice of treatment (Arnold, Daum & Krcmar, 2004). The use of online medical information is allowing health consumers to take more responsibility for their health (Robertson & Harrison, 2009).

In addition to information retrieval, Self-service technologies within health care can enable patients to perform self-diagnosis, self-management activities, and engage with communities for support. However, the potential of these technologies is also hindered by concerns over their effective use.

The use of Self-service technologies for self-diagnosis, self-management, and community support are discussed in the following sections.

2.3.1 Self-diagnosis

With the increase in access to health information via the Internet, there is the opportunity for users to access a wealth of medical information. This therefore makes it possible for patients to diagnose themselves. Self-diagnosis is a form of self-service. However, it must be acknowledged that there is a considerable difference between using technology for diagnosing an illness and paying for groceries (Robertson & Harrison, 2009). Although both interactions are convenient, paying for groceries online bares only minimal financial risk. However, using technologies in health care delivery carries short and possibly longer-term health and medical related risks. In addition to this, confidentiality is also of concern to users who need privacy while diagnosing an illness.

Although self-diagnosis has many positive aspects such as being convenient and efficient, there is also a concern surrounding a patient's ability to diagnose correctly (Robertson & Harrison, 2009; Stockdale et al., 2010). A patient's ability to source, decipher and make use of the medical information is referred to as health literacy which is crucial to achieving the correct and precise self-diagnosis (Jordan, Briggs, Brand & Osborne, 2008).

2.3.2 Self-management

Self-management is also a very significant concept, particularly for those patients who have chronic conditions.

Self-management has been shown to:

- Minimize pain
- Enable a sense of control
- Reduce visits to medical practitioners
- Make possible a better quality of life.

Kralik, Koch, Price & Howard (2004)

"Patients involvement in the management of their care is referred to as self-management" Newman, Steed & Mulligan (2004:1523). It has been reiterated in previous studies that self-management education programs assist the patient in better healthcare, are beneficial to patients and lead to higher levels of self-efficacy.

Self-efficacy is an individual's belief of his or her ability to be able to perform a task (Buglar, White & Robinson, 2010) and the confidence or belief that they have in order to achieve a desired action. This is based on the obstacles / challenges which they are exposed to (Champion & Skinner, 2008). Self-efficacy is improved when patients are able to solve their medical issues (Bodenheimer, Lorig, Holman & Grumbach, 2002).

Patients with chronic illness cannot escape the fact that they need to self manage their illness (Bodenheimer et al., 2002). Furthermore, it was found that self managed education programs improved the health of chronic patients (Warsi, Wang, Lavalley, Avorn & Solomon, 2004). This was discussed in a study where various self-management supporting initiatives for Australian patients were used to support patient engagement (Jordan et al., 2008).

The doctor-patient relationship is changing. Patients are taking more ownership of their health related problems and questioning doctors' diagnosis. Patients are requiring more resources to be able to self manage their own health service tasks. Health information technology and Self-service technologies will be important to this continued evolution.

The following section discusses the needs of health consumers to access support groups.

2.3.3 *Online support groups*

Online support allows users to both share experiences and exchange information, thus decreasing stress levels (Chuang & Yang, 2010). Although, there are suggestions that in some cases participants may prefer a face to face environment over online support, online support groups can help patients feel empowered (Van Uden–Kraan, 2008).

Participation in an online support group is particularly important for patients not receiving the health care support they feel they require (Maloney-Krichmar & Preece, 2005) as this support can reduce the burden of the disease and improve overall health perceptions of participants (Dyer, Costello & Martin, 2010). On the other hand, one of the main challenges for the design of online support groups is for designers to facilitate the type of social engagement and interaction among members that might occur in face-to-face encounters (Robertson & Harrison, 2009). Nevertheless, the popularity of online groups continues to grow (Dyer et al., 2010) and provide personal health management (Kamal, Fels & Ho, 2010).

As illustrated above, there are ways in which IT can support such health self-service tasks as information sharing, self-diagnosis, self-management, and online community support. There have, however, been mixed reports from empirical studies, of health related Self-service technologies.

A review of the literature found a number of studies:

- An e-health online appointment system was examined by Chang & Chang (2008). This study found that the technology based service encounter had a positive effect on service quality, but not on patient satisfaction. Once a user has experienced a technology based service encounter, the results were found to be more positive (Chang & Chang, 2008).
- In an Australian study, an online self-service hub, which offers assistance to those with mental health disorders within a community, was examined. Many best practice measures have been developed to ensure high-quality service delivery. For example, anonymity was a preference for users. The study found that there is a fine line between a barrier and a benefit. It was considered a benefit for users to post feelings on a bulletin board and receive an immediate response. Although, some of the users could be exposed to distressed comments relating to self-harm. As a result, the hub is constantly monitored (Bennett, Reynolds, Christensen & Griffiths, 2010).
- In another study, Lanseng & Andreassen (2007) considered the introduction of a self-service technology for self-diagnosis. The technology acceptance model (TAM) and the technology readiness index (TRI) was used as a theoretical basis for their study. It was found that the technology's ease of use was a strong predictor of attitude and intention to use the technology to perform self-diagnosis (Lanseng & Andreassen, 2007).
- A study by Dyer et al. (2010), discussed the benefits and barriers to an online support group, called HeartNET, for heart patients. The results of the study proved that higher levels of participation within the online community resulted in greater benefits. The study did not examine determinants of participation such as whether higher perceived benefits resulted in greater participation (Dyer et al., 2010).

- Gustafson, Hawkins, Boberg, Pingree, Serlin, Graziano & Chan (1999) studied the impact of a patient focused computer based health information support system. The results of the study showed that a support system of this nature can improve the quality of life for HIV positive patients in the form of support. Furthermore, the usage of this will encourage more efficient health care interaction (Gustafson et al., 1999).
- Finally, one study by Baker, Wagner, Singer & Bundorf (2003) evaluated whether American health consumers were likely to use the Internet for medical reasons and they found that usage is not as common as is often reported amongst users. They indicated that intentions to use the Internet for accessing health care information was not as strong as originally predicted (Baker et al., 2003).

It is consequently evident that past research shows clear tensions between the value and benefits that self service technology can provide for the healthcare environment and the concerns and questions that surround their impacts and usage.

The next section discusses the key characteristics of virtual health communities.

2.4 Virtual health communities

Virtual health communities combine elements of information sharing, self-management and community support and can be a particularly powerful health care self-service technology. These elements are discussed in the following paragraphs.

Figures 1 and 2 are examples of existing virtual health communities.

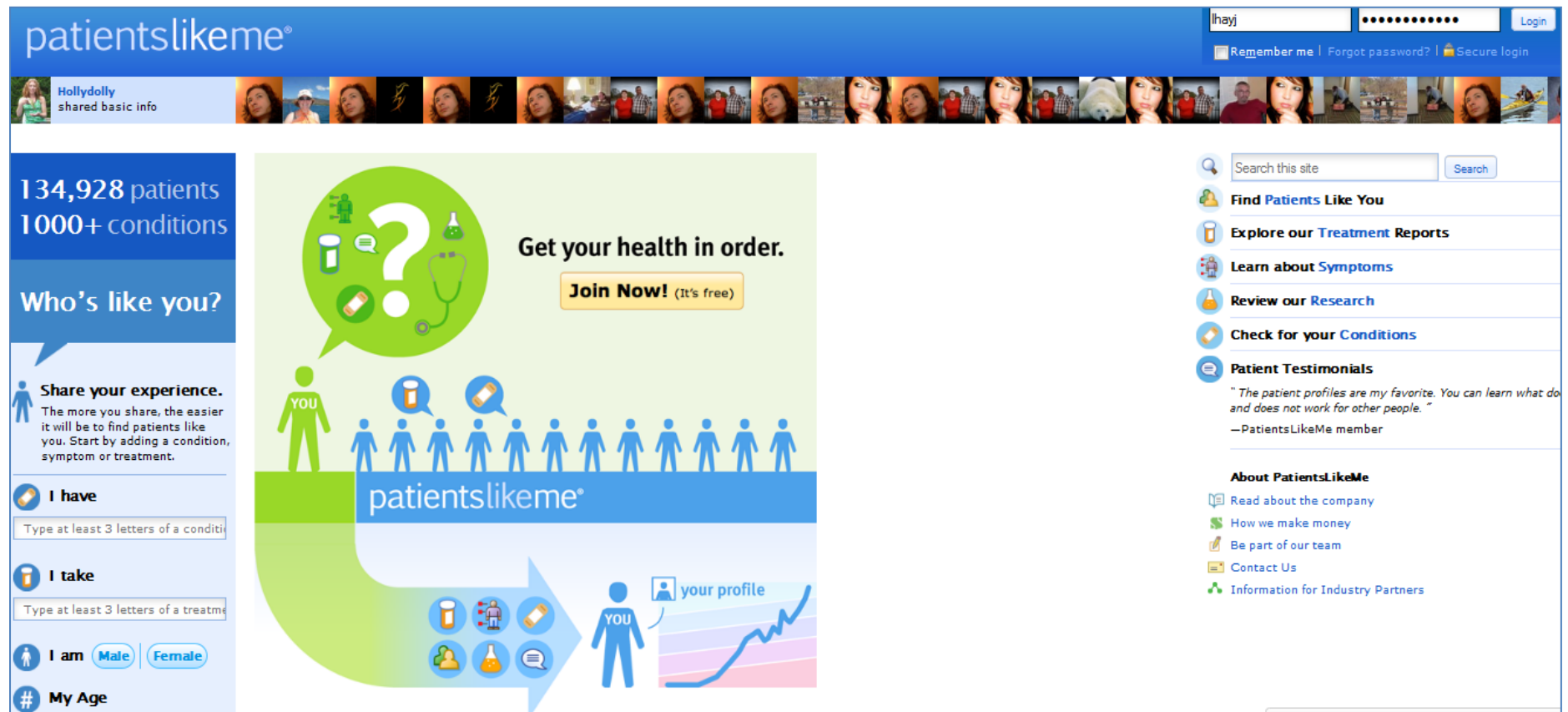


Figure 1: PatientsLikeMe.com Virtual Community



Figure 2: E Health Forum Virtual Community

2.4.1 Information sharing

Information sharing is a user's ability to exchange information with and retrieve information from other users and from medical practitioners (Welbourne et al., 2009). Information sharing is important to a virtual community's success and can improve a patient's self-management specifically in a health related context (Stockdale et al., 2008; Laine, 2006; Stockdale et al., 2010; Gorini et al., 2008).

2.4.2 Self-management

Self-management is a key to efficiency and effectiveness of chronic care (Holman & Lorig, 2004) and virtual disease management allows chronic patients in particular to be involved in the healthcare process from their own homes (Demiris, 2005).

The ability for a medical practitioner to be able to participate and contribute to the virtual health community by extending beyond the face to face communication (Demiris, 2005) assists health consumers to successfully manage their own health (Demiris, 2005).

Furthermore, medical practitioners contribute to the quality of the virtual health community information which makes self-management more achievable. "Medical experts could provide information along themes, such as FAQs or in response to postings" (Stockdale et al., 2008: 185).

Moreover, virtual communities can be a useful complement to other forms of technology enabled self-management. These other forms can include an at home asthma telemonitoring system, chemotherapy symptom reporting systems and an insulin monitoring computer based system for diabetic sufferers (Demiris, 2005).

2.4.3 Community support

A virtual health community is a platform for patients to be able to interact with similar patients and as a result receive emotional support (Welbourne et al.,

2009; Eysenbach et al., 2004). Emotional support regularly takes place within virtual health communities (Welbourne et al., 2009) and does not only refer to informational support (Leimeister, 2008). It was found that empathy and support is provided to newer members, while regular members are welcomed back if they did not visit the community in a while (Stockdale et al., 2008).

One of the barriers to a virtual health community is the lack of face to face communication and social cues (Ridings et al., 2002) which make it somewhat difficult for users to interpret the manner in which communication is taking place and as a result of this, it is important to reach an understanding of the misunderstandings that could potentially take place (Stockdale et al., 2008). However, with improvements in technology such as video and audio, social cues may not be entirely absent and users may still be able to interact with each other in a “rich” manner¹.

Anonymity is also a subject of discussion within virtual healthy community research. Users tend to prefer to be anonymous particularly when the topic relates to more sensitive behaviour (Stockdale et al., 2010) and privacy concerns should be considered when designing virtual health communities (Demiris, 2006). In a previous study which discussed the design of a virtual health community, the level of anonymity was left at the discretion of the member (Leimeister, Ebner & Krcmar, 2005).

The next section discusses the shortcomings of the previously discussed research and concludes with the motivation for this research study.

2.4.4 Literature shortcomings

Earlier research has highlighted that self-service technology is becoming more prevalent. Yet, there is still hesitation, and adoption is not necessarily guaranteed if insecurity and discomfort are experienced. In the health context, patients are requiring and needing to take more responsibility for their health.

¹ With thanks to one of the anonymous reviewers of the research

As a result, information sharing, self-diagnosis, self-management and accessing community support through technology is on the increase.

In particular, the virtual health community, which combines elements of information sharing, self-management and community support, may be an especially powerful health care self service technology.

However, while technologies have the potential to improve health service delivery, there is still a need for additional research into the willingness of patients to use these technologies and to identify the factors that may inhibit their use. Consequently this study uses concepts from the Health Belief Model (HBM) and Technology Readiness theory (TR) in an attempt to explore consumer readiness for virtual health communities.

The following research question guides the remainder of this study:

To what extent can the attitudes of health consumers and their intentions to participate in a virtual health community be predicted by factors drawn from the health belief model (HBM) and technology readiness (TR) theory?

These two theories and the research model are presented next.

2.5 Theoretical underpinnings of the study

The following section discusses the theoretical underpinnings of the study. First, the research model is presented. Constructs from both Technology Readiness (TR) and the Health Belief Model (HBM) have been identified and are incorporated in the model together with Trust from the online consumer behaviour literature.

The HBM, TR, and Trust theories are now discussed together with their respective constructs. Hypothesized relationships between the HBM, TR and trust constructs and the model's dependent variables are developed.

2.6 The Research Model

The research model presented in Figure 3 depicts five variables from HBM, namely Perceived Severity, Perceived Benefits, Cues to Action, Confidence and Self-Efficacy that are hypothesized to influence two dependent variables (Attitude and Behavioural Intention).

Four variables from TR are also hypothesized to influence the dependent variables. These are: Innovation, Optimism, Discomfort and Insecurity. Finally, Trust is identified as an independent variable. A number of demographic factors are included and their effects on the dependent variables will be explored.

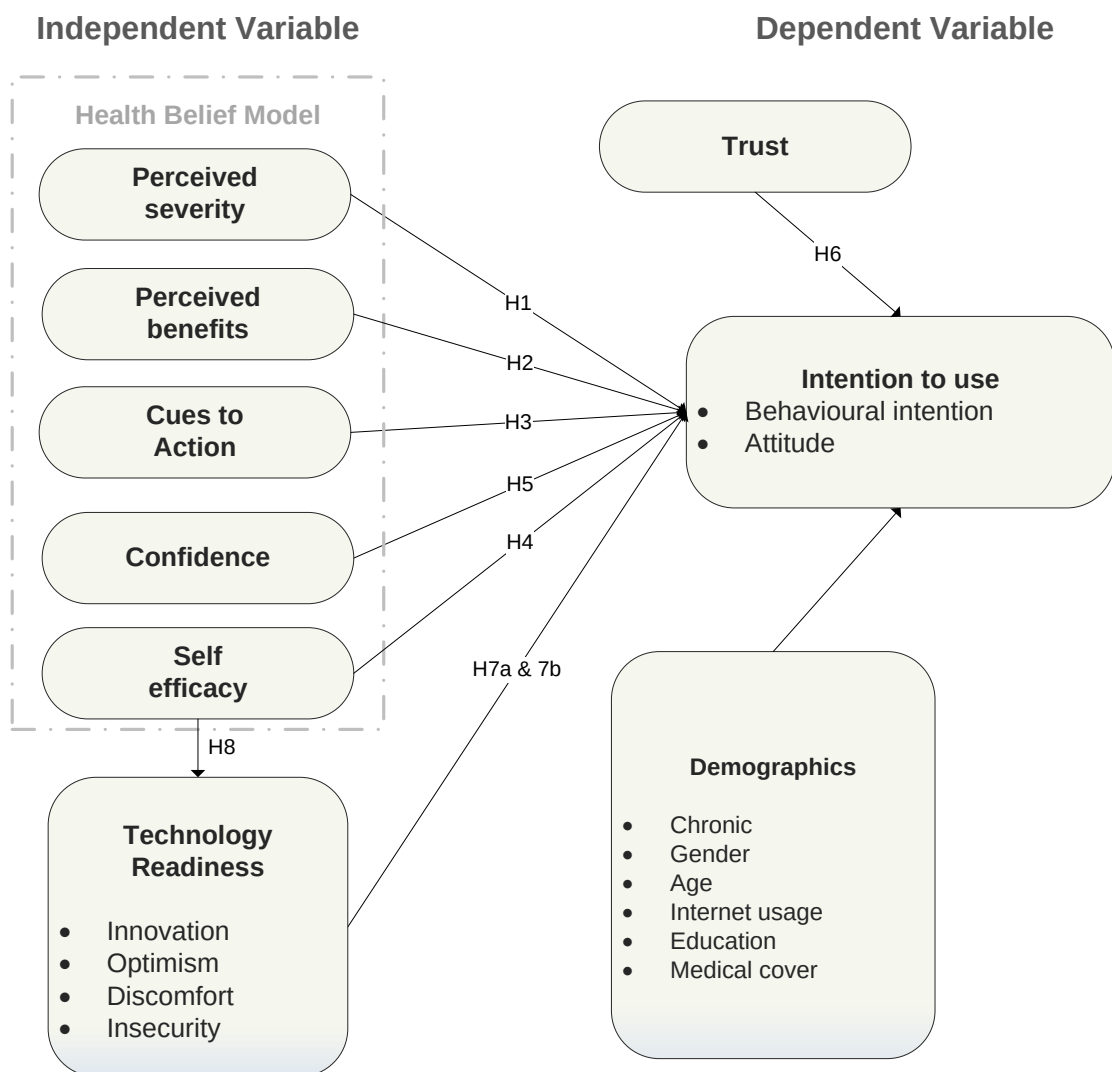


Figure 3: Research Model

The dependent variable of this study is the health consumer's attitude toward virtual health communities and the health consumer's intention to participate in the use of a virtual health community.

The first dependent variable, attitude, refers to a user's perception and evaluation of the use of technology as a good or a bad initiative (Bashir & Zakaria, 2010). In this study, the consumer's attitude reflects their evaluation of a virtual health community as favourable, pleasant and beneficial. Consumers are inclined to have more positive attitudes toward a virtual health community if they perceive them as beneficial (Lanseng and Andreassen, 2007).

The second dependent variable is the consumer's behavioural intention to participate in or use the virtual health community. Intentions are reflected in the consumer's preference for and desire to access and use the technology (Lin & Lu, 2000).

Both attitude and behaviour intention to participate typically constitute the dependent variables employed in IT usage research (Lanseng & Andreassen, 2007; Bashir & Zakaria, 2010; Porter & Donthu, 2006). Together, these two dependent variables (i.e. a positive attitude and a behavioural intention to participate) are considered to represent the technology's adoption by the health consumer.

The determinants of this adoption are explored in the following sections.

2.7 Health belief model

2.7.1 Background

The Health Belief Model (HBM) is grounded in psychological and behavioural theory (Shumaker, Ockene & Riekert, 2009). The model explains an individual's health related behaviour as a function of "the belief, that following a particular health recommendation would be beneficial in reducing the perceived health threat" (Rosenstock, Strecher & Becker, 1988:177).

The HBM, illustrated in Figure 4, identifies that an individual's perceptions of the severity or perceptions of their susceptibility to their disease will influence their health behaviours (Buglar et al., 2010). Moreover, the behavioural evaluation refers to an individual's perception of the benefits and the barriers which will have an effect on their action. Self efficacy is an individual's self perception of his or her own ability to perform a task and the confidence or belief that they have in order to achieve a desired action.

The HBM has been incorporated into extensive health behaviour research in an attempt to understand an individual's health beliefs or attitudes within a specific context (Mackert, Whitten & Garcia, 2008).

The concept of health related behaviour is central to HBM. A health behaviour can be understood as the actions which an individual or group will take, based on their beliefs, to improve their quality of life (Champion & Skinner, 2008). In previous studies, health behaviours examined have been as varied as dental behaviours such as brushing and flossing (Buglar et al., 2010), to self care behaviours of diabetics (Harvey and Lawson, 2008), to contraceptive usage (Godeau, Gabhainn, Vignes, Ross, Boyce & Todd, 2008). Figure 4 illustrates the factors of the Health Belief Model.

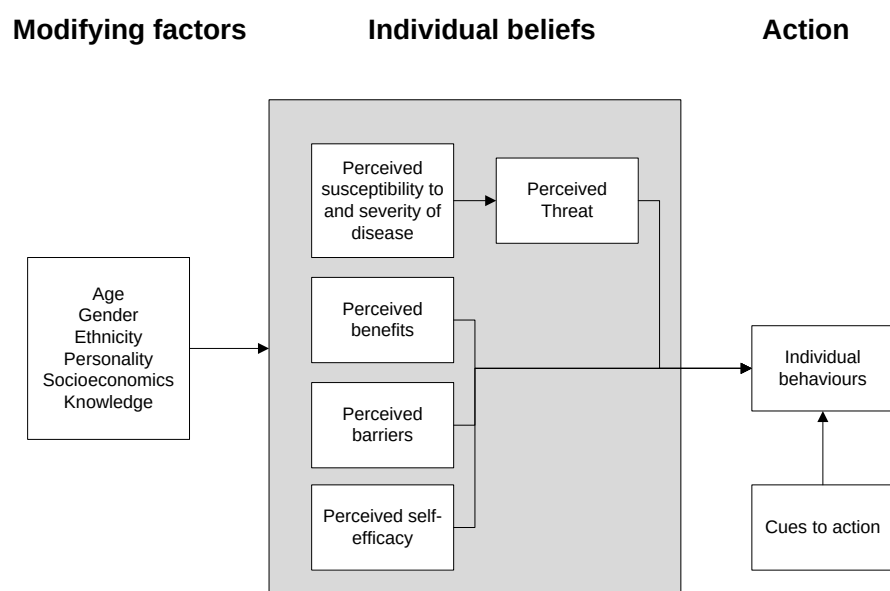


Figure 4: Health Belief Model

Champion & Skinner (2008:9)

Figure 4 was used to develop the research model. TR constructs of discomfort and insecurity, Trust and technology related self-efficacy were variables which were used to extend the Perceived barriers factor. Self-efficacy, in relation to health management, was termed Confidence (Strecher, Devellis, Becker & Rosenstock, 1986: 74).

One of the advantages of using the Health Belief Model to predict health related behaviours is that its variables provide for a clear approach to assessing educational needs and developing targeted messages for different individuals (Jette, Cummings, Brock, Phelps & Naessens, 1981:83). There has however been some criticism of the HBM. The HBM has been criticized for being overly reductionist and not recognising that human behaviour is a consequence of many factors, and not only a person's awareness of what is beneficial to their health (Searl, Borgi & Chemali, 2010).

None the less, the HBM has been supported in numerous empirical studies. These studies include Becker, Kasl & Maiman (1977) which examine the compliance with a medical regiment for asthma. In another study, the sexual behaviours and HIV risk amongst Taiwanese immigrants is studied (Lin, Simoni & Zemon, 2005). Furthermore, McClenahan, Shevlin, Adamson, Bennett & O'Neil (2007) use the HBM, together with the Theory of planned behaviour, to predict testicular self examination behaviour (Becker, Radius, Rosenstock, Drachman, Schubert & Teets, 1978; Lin et al., 2005; McClenahan et al., 2007).

The aforementioned studies provide evidence that the HBM has successfully been used in prior research. Hypotheses relating selected HBM variables (as shown in Figure 3) to consumer attitudes and their intention to participate in virtual health communities are developed next.

2.7.2 *Perceived severity*

Perceived severity is the negative consequence or potential damage to an individual which imposes a health threat perception (Harvey & Lawson, 2008; Laing & Xue, 2010; Workman, 2008). It is described "as being the individual's perception of the seriousness of the given disease or of disease in general"

(Weissfeld, Brock, Kirscht & Hawthorne, 1987:2). Although Perceived Severity is not as strong in comparison to the other HBM variables, it is powerfully connected to sick-role behaviour (Strecher & Rosenstock, 1988). Moreover, this variable includes “evaluations of both medical/clinical consequences (e.g., death, disability, pain) and possible social consequences” (Becker & Janz, 1985:42). These perceptions are expected to motivate an individual towards performing behaviours that will mitigate these consequences.

In the context of this study, the perceived severity construct will refer to the consumer’s perception of their health and how problematic they perceive it will be to their health if they do not have access to information about their health condition, and if they do not get regular health advice.

The HBM theorizes that if an individual perceives their health condition to be very serious, then they will be more likely to take the proposed preventative measures or actions based on the level of severity.

The following can be therefore be hypothesized:

Hypothesis 1: The greater the perceived severity of the consumer’s health, the more positive will be the consumer’s attitude and the greater will be their intention to participate in a virtual health community.

2.7.3 Perceived Benefits

Perceived benefits are another dimension within the HBM. It is defined as the probability of effectiveness compared to the cost, which leads to a certain health behaviour (Janz & Becker, 1984; Rutter & Quine, 2002; Weissfeld et al., 1987). Thus, “The benefits provide a preferred path of action.” (Janz & Becker, 1984:2).

In this study, the perceived benefits refers to the consumer’s perception of the extent to which a virtual health community improves the availability of reliable health-related information, facilitates self-management, and reduces the costs and time incurred in accessing health care services.

According to the HBM theory, if a health consumer perceives that performing a particular behaviour will result in them benefitting, they will be more likely to take action. An American study by Wicks, Keininger, Massagli, de la Loge, Brownstein, Isojärvi & Heywood (2011) examined the perceived benefits of an epilepsy community on the PatientsLikeMe virtual community website. It was found that Perceived benefits such as learning from each other's experiences about epilepsy seizures, may have the potential to improve a patient's self-management and therefore be more likely to partake in online activity (Wicks et al., 2011).

Therefore, following is hypothesized:

Hypothesis 2: The greater the Perceived Benefits to health from the use a virtual health community, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.

2.7.4 Cues to action

The HBM's suggest that a trigger or cue should instigate an appropriate health action (Jette et al., 1981; Huang, 2012). They can be separated into two categories, namely internal (physical pain or feelings of isolation) and external (an educational poster or a discussion with a medical practitioner) (Huang, 2012). Although the Cues to action dimension is a newer construct in the HBM and therefore not tested as thoroughly as the other constructs, it still holds validity (Kamal et al., 2010) and are excellent ways of ensuring appropriate action (Riley, Rivera, Atienza, Nilsen, Allison & Mermelstein, 2011).

According to the HBM, it is theorized that health consumers are more likely to engage in health behaviour if they received a prompt which encourages them to take action. An example of this can be found in a study by Huang (2012), which examined the adoption of telecare. The HBM was shown to be correct where the cues to action proved to be the most significant contributor to positive attitude towards using telecare.

It is therefore hypothesized that:

Hypothesis 3: The greater the cues to action, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.

2.7.5 Self-efficacy

There are two forms of self-efficacy which make up the research model. The first Self-efficacy variable is about using a technology based service and participating in the virtual community. Confidence is the second self efficacy form and is about self managing health. Confidence is discussed in the next section.

Within this study, Self-efficacy is defined as a health consumers self beliefs, or self-judgement in their capability to use and participate effectively in a technology based virtual health community. Health consumers are more likely to engage in health related behaviour if they consider themselves able to perform an identified task.

Previous studies have defined Self-efficacy as “beliefs about capabilities of performing specific behaviours in particular situations” (Strecher et al. 1986: 74). Furthermore, it refers to a person's beliefs in their abilities to achieve a goal (Bandura, 2006). Self efficacy has been found to be a predictor of IT usage behaviour (Meuter, Bitner, Ostrom & Brown, 2005) and has been found to be a key success factor in promoting technology based self-service trial (Beuningen, de Ruyter, Wetzels & Streukens, 2009).

An example where Self-efficacy has been found to influence use of numerous technology based services, including for example online investment trading. An example of this is from a study by Beuningen et al (2009), where higher levels of Self-efficacy amongst novice customers create higher levels of usage intentions for technology based self-service for online investment trading (Beuningen et al. 2009).

It is therefore hypothesized that:

Hypothesis 4: The greater the health consumer's self-efficacy the more positive will be their attitude and the greater will be their intention to participate in a virtual health community.

2.7.6 Confidence

While self efficacy is a user's belief in their ability to participate and engage in the use of virtual health community, Confidence is defined as the health consumer's ability engage in the self-management of their health. This includes confidence to gather, interpret and use health information thereby taking responsibility for one's own health care.

Although confidence is not always included in the original HBM as a construct, it has been supported with the Health Belief Model in prior empirical work (Strecher et al., 1986). According to the HBM, it is theorized that a health consumer with a higher level of confidence for self-management is more likely to participate in the associated health related behaviour and perform the required tasks. It was theorized in previous studies which include health behaviour, that consumers with greater confidence will take preventative action. An example of this includes a study which examines Turkish woman's confidence in their ability to self-examine their breasts. It was found that those with higher levels of confidence were more likely to perform this examination (Nahcivan & Secginli, 2007).

It can therefore be hypothesized that:

Hypothesis 5: The greater a consumer's confidence the more positive will be their attitude and the greater will be their intention to participate in a virtual health community

For the purpose of this study, relationship between the attitude and intention to participate is not studied.

In addition, to the HBM, this study theorizes that consumer trust perceptions will play an important role in influencing virtual health community usage. The role of Trust is hypothesized next.

2.7.7 Trust

“Trust is viewed as a set of specific beliefs, dealing primarily with integrity, benevolence and ability” (Chiu, Hsu & Wang, 2006:1877). Trust, in the context of virtual communities is difficult to achieve because the environment is not a physical one and there is a lack of verbal communication / social cues between members (Blanchard & Horan, 1998). Responsiveness, reliability and assurance are therefore important characteristics for increasing trust in an online context (Gefen, 2002; Gefen, Karahanna & Straub, 2003).

It has similarly been found that consumers show greater willingness to give and receive information, through a virtual community, when the presence of trust exists (Ridings et al., 2002; Porter & Donthu, 2009). In a previous study, it was found that where there is trust amongst participants, they will be more willing to engage in the action. Trust has also been found to directly impact online consumer purchasing behaviours (Gefen et al., 2003).

Trust has been shown to be the main driver of encouraging voluntary user participation in a virtual health community (Ridings et al., 2002) and is the most important attribute for a successful virtual health community (Leimeister et al., 2005). In a study by Chryssanthou et al. (2009), security and trust was examined across existing virtual health communities. It was found that many of these communities did not successfully foster trust (Chryssanthou et al., 2009). Trusting relationships between all participants of a community contribute to the success of community (Beijnum et al., 2009). There are however barriers which deter trust within a community. Deception not only affects trust but can also affect a participant's health care status (Demiris, 2006).

It is theorized that the higher the levels of trust, the more likely a positive attitude and participation.

It is therefore hypothesized that:

Hypothesis 6: The greater a health consumer's trust in the virtual health community, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community

2.7.8 Technology Readiness

Technology readiness is defined as "people's propensity to embrace and use new technologies for accomplishing goals in home and at work" (Lai, 2008 and Parasuraman & Colby, 2001). It is classified into four Technology Readiness dimensions, of which there are motivators and inhibitors which ultimately have an effect on the readiness for the use of technology (Chen & Li, 2010).

There is also a measurement component to Technology Readiness (TR). Lin, Shih & Sher (2007) and Walczuch, Lemmink & Streukens (2007) discuss the Technology Readiness Index (TRI) as a measurement of people's beliefs in technology. The four dimensions are divided into the *contributors* and the *inhibitors* to technology readiness.

Contributors	Innovativeness: An inclination to be one of the first users of the new technology.	Optimism: Positive view on technology with increased control, flexibility and efficiency.
Inhibitors	Discomfort: Distrusting technology for security and privacy reasons.	Insecurity: Having a need for power and a sense of being overwhelmed.

Figure 5: Technology Readiness Dimensions

Chen & Chen (2009:1251)

Customer satisfaction is much more difficult to achieve with technology based innovations (Parasuraman & Colby, 2001). For this reason, it is important for the

concept of Technology Readiness to be understood. It is a combination of positive and negative emotions that will determine whether a person is ready for technology (Parasuraman, 2000).

Anxiety is one of the common threats to self-service technology adoption. For this reason researchers need to understand whether users will be feeling anxious, or have similar negative emotions about the virtual health community (Zhao et al., 2008). Furthermore, it has been highlighted that previous studies have found significant correlations between innovativeness and technology usage intentions (Drennan & Mort, 2004:3). This study's research model will therefore include innovation, optimism, discomfort and insecurity as TR factors influencing the intentions of consumers toward participation in a virtual health community.

Incorporating TR constructs into a research model complements the earlier described HBM constructs as it allows for a deeper understanding of consumer acceptance of the virtual health community. This is because TR considers the consumer's behaviour in technology usage (Land, 2006), while the HBM considers the consumer's health management behaviour.

The study will make use of TR questions, from the generic TR questionnaire by Parasuraman & Colby (2001), to assess the consumer's readiness to use and participate in the technology-enabled, virtual health community.

Based on TR arguments, the following are hypothesized:

Hypothesis 7a: The greater the health consumer's technology readiness motivators (Innovativeness and Optimism), the more positive will be their attitude and the greater will be their intention to participate in a virtual health community.

Hypothesis 7b: The greater the health consumer's technology readiness inhibitors (Discomfort and Insecurity), the more negative will be their attitude and the less will be their intention to participate in a virtual health community.

Lastly, as mentioned previously in this chapter, self-efficacy refers to a health consumer's belief in their ability to engage with virtual health communities. However, it must be noted that a consumer's self-efficacy could also relate to whether they believe they are capable of using technology. Past research has found that there is a correlation between Self-efficacy and Technology Readiness (Lai, 2008). In a previous study, computer self-efficacy and technology was studied in relation to kiosk usage. However, the study did not consider the relationship between these two constructs (Chan & Lin, 2009b). In another study, it was found that Canadian managers and professionals' computer Self-efficacy significantly influenced their computer usage (Compeau & Higgins, 1995). Consequently, the relationship between self-efficacy and TR will be included in this research.

Therefore, it is hypothesized that:

Hypothesis 8: The greater a health consumers self-efficacy, the greater will be their technology readiness (i.e. greater innovativeness and optimism and lower discomfort and insecurity).

2.8 Controls

The model will be studied across different demographics.

Firstly, consumers are assessed as chronic or non-chronic based on whether they refill medication regularly and report as a chronic disease sufferer. The reason these are compared is because chronic condition patients are considered more likely to need to engage in self-management and may benefit more from the community support of a virtual health community because they could be more aware of monitoring their own health than a non-chronic consumer group.

Secondly, respondents will be asked about their medical cover benefits. It is assumed that those who are on certain types of medical cover (e.g. medical savings) may be more likely to consider the use of virtual health communities as a way to avoid exhausting their medical savings account on unnecessary

consumption of health care services. The variable also partially controls for socio-economic conditions as medical cover is usually related to employment.

Additional demographics include:

- Age
- Gender
- Education
- Internet access

These variables have been found important in previous IT adoption research because the demographic profiles have produced differing results and make it possible to characterise the respondent population and the results according to the demographics (Laing & Xue, 2010; Claar & Johnson, 2010; Porter & Donthu, 2006; Leroy, Helmreich & Cowie, 2010; Gustafson et al., 1999; Leimeister, et al., 2005). In a study by Leimeister, et al (2005), age and gender were controls included in a study to understand the design of a virtual health community for breast cancer patients (Leimeister, et al, 2005).

Due to the fact that the virtual health community is Internet enabled, it is imperative to know whether consumers have access to the Internet or not and to eliminate it as a barrier to usage intentions.

2.9 Conclusion of Literature Review

This chapter presented and discussed the literature supporting this research study. The literature review culminated in the development of a research model which is underpinned by Technology Readiness research, components from the Health Belief Model, and trust from literature about online consumer behaviour. The research model was introduced and variables were discussed by introducing the hypotheses for the study.

CHAPTER 3: RESEARCH METHODOLOGY

This section of the research report describes the methodology which was followed in addressing the hypotheses in order to achieve the research objectives which were presented in the preceding chapters. It also provides a motivation for the approach to the research that was carried out in this study.

This chapter discusses the research methodology/approach, research design, population and sample, administration of the questionnaire, ethical considerations, strategy for the data analysis and limitations and assumptions of the study in separate sections.

3.1 Research methodology / approach

There are differing research paradigms set out in Table 1 below which define views on “the axioms of epistemology, ontology, axiology, generalizations and causal linkages” (Laine, 2006:31). Additionally within the IS discipline, there are two main philosophical traditions, namely, positivism and interpretivism (Lee & Baskerville, 2003:228).

Positivist studies are based on fixed relationships which are conventionally studied with structured instrumentation (Orlikowski & Baroudi, 1991:5). Thus the positivist approach relies primarily on quantitative approaches to data collection and analysis and concerns itself with issues of reliability, validity and generalizability (or external validity) (Straub, Boudreau & Gefen, 2004). The quantitative study is typically relational i.e. focused on testing the relationship between variables (Walker, 2005). Within quantitative research, the emphasis is upon set measurements and hypothesis testing based on techniques from the natural sciences (Bryman, 1984). On the other hand, the interpretivists approach is the focus on knowledge being gathered from actors in a social environment (Skok and Legge, 2001).

In that type of study, reliance is on qualitative research and is focused on understanding situations and perspectives of people by studying their

behaviour. It therefore uses observations and interviews to gather data (Kaplan & Maxwell, 2005).

Table 1: Research Dimensions

	Positivism	Postpositivism	Pragmatism	Constructivism
Methods	Quantitative	Primarily quantitative	Quantitative + qualitative	Qualitative
Logic	Deductive	Primarily deductive	Deductive + inductive	Inductive
Epistemology	Objective point of view. Knower and known are dualism.	Modified dualism. Findings probably objectively “true”.	Both objective and subjective points of view.	Subjective point of view. Knower and known are inseparable.
Axiology	Inquiry is value-free.	Inquiry involves values, but they may be controlled.	Values play a large role in interpreting results.	Inquiry is value-bound.
Ontology	Naïve realism	Critical or transcendental realism	Accepted external reality. Choose explanations that best produce desired outcomes.	Relativism
Causal linkages	Real causes temporally precedent to or simultaneous with effects.	There are some lawful, reasonably stable relationships among social phenomena. These may be known imperfectly. Causes are identifiable in a probabilistic sense that changes over time.	There may be causal relationships, but we will never be able to pin them down.	All entities simultaneously shaping each other. It is impossible to distinguish causes from effects.

Laine (2006:32)

Although there are regular debates between the positive and interpretivist traditions and between the qualitative and quantitative approaches (Gregor, 2006), it must be emphasised that when conducting research one should use a methodology which is most suitable for the research problem (Bazeley, 2004). This study attempts to understand health consumer intentions to participate in a virtual health community.

More specifically, the study is relational in nature i.e. the purpose of the research is to test hypothesized relationships between pre-specified independent variables and the dependent variable. The variables are part of a

model which has been constructed deductively from theories forming the health belief model, technology readiness and trust.

The theories are complimentary to each other because TR explains the behaviour from a technology usage perspective, while the HBM considers health management beliefs. Trust has been included because it could have an effect on the model, considering the context of the study. Integrating these theories provides an opportunity to assess participation in a virtual health community as both a technology behaviour and health management behaviour.

Consequently, this research study takes a positivist approach and uses quantitative methods in the form of a structured questionnaire to collect data on each of the variables from a large, convenience sample of health consumers.

The details of the research design will be discussed in the next section.

3.2 Research Design

This research is a quantitative design. A structured questionnaire was considered the most appropriate instrument to collect the data in order to determine the relationships between attitude and intention (the dependent variables) and the independent variables conceptualised from previous theories (Technology readiness, trust and the Health belief model). The hypothesized relationships were presented in the study's research model which was discussed in the previous chapter.

The following section discusses the construction of the research instrument.

3.2.1 Measurement and Construction of Research Instrument

All the constructs in the research model have been operationalised by using multi item scales adopted from the literature. A 7-point Likert scale was used which was anchored by 1 (strongly disagree) and 7 (strongly agree) (Ng, Kankanhalli & Xu, 2009).

The variable, Perceived Severity was measured using four items. These items were operationalized using Becker & Janz (1985) and captured respondents' perceptions about the severity of their health and how problematic it will be to their health if they do not get regular health advice.

Perceived Benefits, from the HBM, was measured using eight items. The majority of these items were operationalized after Constantiou & Papazafeiropoulou (2009). These items captured the respondents' perceptions of the benefits of a virtual health community. Only a minor portion of these items were self-developed. The self-developed questions about virtual health community usage referred to benefits such as making a user feel better about their health, providing complete information and being helpful, were derived from previous studies (Eysenbach et al., 2004; Demiris, 2005; Dannecker & Lechner, 2006).

Trust was measured using three items. These items were self-developed and captured the respondents' propensity to believe the validity of the information provided by a virtual health community (Chryssanthou et al., 2009).

Cues to action were measured using five scale items. These items were operationalized after Ng et al (2009) and captured respondents' attitude to possible triggers which encourage virtual health community participation. An example of this would be whether educational posters would promote an intention to participate in a virtual health community.

Another HBM variable, Self-efficacy was measured using five items. These items were operationalized using research from Sam, Othman & Nordin (2005). The items captured respondents' confidence in their ability to participate in a virtual health community.

Confidence was measured using ten items. These items were operationalized using self-developed questions. For example the self-developed questions captured consumer's beliefs in their level of confidence to self manage their own health, interpret health information and to judge when to visit a doctor (Champion & Skinner, 2008).

Technology Readiness was measured using twenty six items. These items are spread across motivators (Optimism and Innovativeness) and inhibitors (Discomfort and Insecurity). These items were operationalized after literature from Parasuraman (2000) and Parasuraman & Colby (2001). The items employed captured the respondents' propensity to embrace new technology as well as their discomfort and insecurity.

Attitude towards virtual health communities was measured using four items on a semantic differential scale. The items reflected respondents' perceptions of whether the use of a virtual health community was a good idea-bad idea, pleasant-unpleasant, harmful-beneficial and favourable-unfavourable.

Intention to use was measured using six items reflecting respondents' willingness, likelihood and preference for using a virtual health community. These items were extended from Lanseng & Andreassen's (2007) scale.

An aggregate of Adoption and Intention to Use (also referred to as behavioural intention) will form an Overall Adoption Intention measure.

All the scale items are detailed in Appendix A.

3.2.2 Demographic questions

In addition to the items measuring each of the model's variables, a number of demographic questions were also included. These were: Gender, Age, Education level, and Access to the Internet. Respondents were also asked if they were on Medical aid and if so what type of cover (between Hospital Plan and day to day cover). An additional important aspect of this study is to compare health consumers with chronic conditions to those not having chronic health conditions. To address this, two questions were added to the instrument. These asked respondents whether they were taking medication that required regular refilling, and if so, whether it was for a chronic condition.

These demographics may have important influences on participation (adoption) intention. For example, different genders might require different types of cues to action to encourage them to use a virtual health community. Moreover,

education might influence adoption in that those who are more educated might be more inclined to use technology of this nature.

3.2.3 *Pre-testing*

This study follows the approach taken by Jeffers, Muhanna & Nault (2008). The questionnaire was pre-tested to ensure content validity and this was validated by a small group of respondents. This was done by emailing the questionnaire to ten (10) academics and their comments were requested in addition to completing the survey.

The pre-test comments suggested the following changes. These included the deletion of redundant questions, and the inclusion of an additional medical cover option. The order of the questions was also rearranged to list the general health related questions prior to specific questions about the virtual health community.

3.2.4 *Pilot testing*

The questionnaire was then also tested on a small, convenience scale of health consumers to gauge their responses. This was done to ensure that the approach to the survey would be successful and that the respondents would understand the questions and instructions. Based on the responses received, minor changes were made to ensure that the questions were posed in the best possible manner.

These changes included corrections to the age grouping (adding the 65 year age group). Some of the items were also amended to make it more readable. For example, "I feel confident in my ability to interpret health information" was amended to read "I am confident in my ability to interpret health information." The final questionnaire is included as an Appendix.

3.3 Population and sample

3.3.1 *Sample and sampling method*

Teddlie & Yu (2007) distinguish between two approaches to sampling. These are probability sampling e.g. random sampling; and non-probability sampling e.g. convenience sampling. Random sampling is an ideal approach because it ensures that all members of a population have the opportunity to participate in a survey. However, the non – probable / convenience sampling approach involves a selection of a group based on the ease of the availability and low cost. This approach does lead to bias and an inability to generalize the results (Teddlie & Yu, 2007).

Furthermore, the concept of hidden populations is considered. These are those groups that do not exist in institutional settings and therefore it is not easy to draw a random sample. Populations, such as health consumers are an example of a hidden population, not easily sampled in institutional settings. Consequently, drawing a non-random sample is sometimes unavoidable. Because this research is exploratory in nature, a form of non-random sampling, known as convenience sampling, was chosen. Limitations to generalizability will result from studying health consumers from a non-random convenience sample. However it is believed that the sample will fairly reflect a cross-section of private health care consumers in South Africa.

The specific convenience sample selected for this study was a sampling frame of 900 health consumers employed by a large private logistics company operating throughout South Africa. Amongst other functions, this company engages in the distribution and warehousing of pharmaceutical products and the company sees itself as playing an important role in the health supply chain. All these employees are members of the company's approved medical aid

scheme in which employees opt for either a hospital plan or a medical savings plan².

3.4 Administration of the Questionnaire

An invitation in the form of a covering letter to participate (Included as Appendix: Covering letter) was distributed to potential respondents via email. The purpose of the covering letter was to briefly explain the intention of the survey and to assure respondents that the study was not recorded by their company. They were also informed that their responses were entirely anonymous and would be treated confidentially.

The questionnaire (Included as an Appendix: Questionnaire) was administered through an online survey system, called Survey Monkey which allowed for self-completion of the instrument and assured respondents of complete anonymity. Since the survey is online, self selection bias needs to be noted as a possible limitation (Wright, 2005).

The company's national employee email list was sourced from the company's Information Systems department. The survey was initially sent out to a small number of the larger email list and then to the entire list. The approach was staggered in this way to ensure that the survey system was correctly recording data.

No time limit or deadline was stipulated for completion and weekly emails were sent to the email list as a reminder to those who had not completed the survey. The survey was closed after a month of being open to the national employee email list.

² A hospital plan is the basic medical aid whereby all in-hospital medical costs are covered by the insurance. A medical savings plan is a medical aid cover which, in addition to the hospital cover, includes a medical savings account which is then used to cover health care costs such as medications and doctor visits.

3.5 Ethical considerations

This topic can be considered very sensitive, particularly when one considers that colleagues employed at a company are to be emailed and asked whether they are taking chronic medication. Permission to email company employees was sought and granted by the company Chief Executive Officer. Refer to the Appendix – Approval letter.

All data collected in the study was treated as confidential and will not be used other than for the purpose of this study. No identifying information was collected and no response was associated with a specific health consumer's identity in any way, thereby ensuring complete anonymity. Respondents were not asked to reflect on their chronic illness and the type of medication was not requested. Respondents only answered questions on whether or not they had a chronic condition and their intention toward the use of a virtual health community.

Participation was completely voluntary and those who did elect to participate were free to withdraw from completion of the questionnaire at any stage. Participants were also not incentivised in any way. It was however imperative that ethical approval be obtained prior to conducting the research. It was also very important that respondents were made well aware that by not completing the survey they would in no way be negatively affected in their place of employment. Clearance and approval was granted by the relevant institutional ethics committee (Included as an Appendix) and the company's consent was also obtained prior to the questionnaire's administration.

3.5.1 Data Storage

The data is archived and stored securely in the University department with no unauthorised access and will be destroyed after a required length of time. Only aggregate data and results of tests of hypotheses are reported in this research report.

3.6 Strategy for Data analysis

The data is to be analysed using SPSS (Statistical Package for Social Sciences) version 17.0 statistical software and Microsoft Excel. The strategy for the analysis is to first test the measurement model (i.e. the reliability and validity of the measures) and then to test the structural model (i.e. testing hypothesized relationships between the study's variables).

Each of the steps of the analysis is discussed below:

3.6.1 *Data cleaning, missing values, outlier detection*

The data will initially be cleaned to ensure the analysis is accurate. Those questionnaires which had more than 10% of the answers omitted will be removed from the dataset. The mean replacement strategy will be used to deal with respondents missing less than 10% of their values. Due to the fact that the responses could be different between chronic and non chronic respondents, the means for these respective groups will be used as the basis for imputing missing data.

The data will also be checked for outliers. An outlier can be defined as an observation that deviates so much from other observations that it arouses suspicion that the observation is not from the same population. Outliers should be eliminated from the dataset prior to analysis. To detect the outliers, data will be examined by omitting those items which have z scores above / below ± 3 (Breuning, Kriegel, Ng & Sander, 2009).

3.6.2 *Reliability and validity*

First, principal components factor analysis will be used to confirm unidimensionality and construct validity. Careful attention will be paid to check for any items that have a small, non-significant factor loading (< 0.40) and for items which cross-load highly against more than one factor. These items will be eliminated. The intention is to obtain a clear dominant loading for each item which converges onto the expected factor.

Cronbach's Alpha will then confirm scale reliability, with alpha scores above 0.7 considered an accepted cut-off.

3.6.3 Hypothesis testing

Hypothesis testing will be handled by conducting correlation and linear multiple regression testing for each hypothesis. The correlation matrix will study each variable against the dependent variable. The results are then referred to the hypothesis to establish whether the relationship is significant or not.

Linear multiple regressions are then performed to establish the relative impacts of the multiple independent variables on the dependent variable. It also examined the total variance explained by the independent variables (an indicator of the model's strength) as given by the R^2 statistic.

3.7 Limitations and assumptions of the study

The assumptions for this research study are listed below:

- The research will be conducted under the assumption that the respondents understand the concept of a virtual health community, as defined in the questionnaire, and that they have the ability to envisage their use of a virtual health community and answer the questionnaire accordingly.
- The respondents will be reporting their usage intentions rather than their actual usage or participation. It is therefore assumed that intention is an important predictor of actual usage.
- Respondents find the questionnaire simple enough to avoid responding ambiguously.
- The survey respondents will provide answers to the questions honestly.

This study has a number of additional limitations, which are important to note. Not all health consumers may be familiar at the moment with virtual health communities and it may be difficult for potential users to be able to visualise the virtual community and subsequently answer questions relating to this.

Teddlie & Yu (2007) mention that convenience sampling does not necessarily represent the entire population, and therefore sample bias needs to be acknowledged. It must also be noted that due to the fact that a convenience sampling approach was taken for this study, threats to external validity (i.e. the generalizability of the findings) need to be acknowledged.

However, it remains important to establish how receptive South African users, especially chronic health consumers, would be to participating in an online virtual health community. This understanding is important to determining the likelihood of successfully implementing health information technology self-service solutions for health consumers and chronic condition patients.

3.8 Summary to research methodology

This chapter has discussed the research method and approach. The research design, population and sampling method were documented. The methods for the construction and administration of this questionnaire were detailed and the associated ethical considerations were highlighted. Finally, the data analysis approach and assumptions were discussed.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

The following chapter discusses the results of the analysis undertaken on the questionnaire data. Firstly initial data screening is carried out and the demographic profile of the respondents is presented.

Thereafter, principle component analysis (PCA) is used to check the validity of all multi-item scales. The reliability is then assessed using Cronbach's alpha prior to the calculation of composite scores. Finally, correlation analyses and multiple regressions are used to test the study's hypotheses.

4.1.1 Data screening, Missing values and Outlier detection

As described in Chapter 3, the questionnaire was sent to an email group of 900 employees of a large South African company as a convenience sample of health consumers which have formal employment and health insurance / medical aid (Refer to Chapter 3 for more detail on the sampling approach). 133 responses were received. The raw data was captured into SPSS version 17.0. Each entry was checked for correctness and missing data carefully noted. There were 72 items / questions in total.

A number of respondents (n=34) chose not to complete the questionnaire in its entirety (omitting more than 10% of the questionnaire items). These responses were therefore omitted from the dataset. This is not surprising for a study of this nature, which addresses personal health issues about whether a consumer has a chronic condition or not. For this reason, it is expected that some consumers will choose to omit answering all questions.

A total of 99 responses with sufficient complete data for meaningful analysis were retained. This represents an effective response result 11% (99/900) for the target group. These results are similar to Gans, Kralewski, Hammons & Dowd (2005) research about medical groups' adoption of electronic health records and information systems (13.6% response rate), and Thakkar & Davis (2006)

study about the risks, barriers, benefits of electronic health record systems (10% response rate).

These 99 responses were further screened for missing data. Table 2 shows the missing data per variable.

Table 2: Missing Variables

	Valid	Missing		Valid	Missing
Refil	99	0	SELF3	96	3
Chronic	69	30	SELF4	97	2
Age	99	0	SELF5	97	2
Gender	97	2	OPT1	97	2
Education	97	2	OPT2	98	1
Internet	96	3	OPT3	98	1
Medical	99	0	OPT4	98	1
CON1	99	0	OPT5	98	1
CON2	98	1	OPT6	98	1
CON3	99	0	OPT7	98	1
CON4	98	1	INN1	97	2
CON5	99	0	INN2	98	1
CON6	99	0	INN3	98	1
CON7	99	0	INN4	98	1
CON8	99	0	INN5	97	2
CON9	99	0	INN6	98	1
CON10	99	0	DIS1	99	0
SEV1	99	0	DIS2	99	0
SEV2	98	1	DIS3	98	1
SEV3	97	2	DIS4	97	2
SEV4	98	1	DIS5	99	0
BEN1	98	1	DIS6	99	0
BEN2	99	0	DIS7	98	1
BEN3	98	1	INS1	96	3
BEN4	98	1	INS2	99	0
BEN5	97	2	INS3	99	0
BEN6	98	1	INS4	99	0
BEN7	97	2	INS5	98	1
BEN8	98	1	INS6	98	1
TRU1	98	1	ATT1	99	0
TRU2	99	0	ATT2	99	0
TRU3	99	0	ATT3	99	0
CUE1	96	3	ATT4	99	0
CUE2	96	3	INT1	98	1
CUE3	96	3	INT2	98	1
CUE4	96	3	INT3	98	1
CUE5	96	3	INT4	98	1
SELF1	98	1	INT5	98	1
SELF2	97	2	INT6	98	1

In each of the above cases, a mean replacement strategy was used to impute the missing values. Rather than using the full sample mean, mean values on items were calculated for each of the chronic and non chronic category of patients. It was believed that replacing a missing value with the mean response of the demographic group to which that respondent was aligned would more closely estimate the true score.

Table 3: Missing Data per case

Number of items missing	Number of cases
1	16
2	5
3	2
4	-
5	2
6	1
7	-
8	-
9	1
10	1

4.2 Demographic profile of respondents

The following section details the demographic profile of the respondents to the questionnaire. Firstly, the sample is described in terms of the number reporting with and without a chronic condition. Next, these groups are described by gender, age and education as well as by Internet access and medical aid status.

Respondents were also asked to indicate whether they were currently on medication that required refilling and if so, whether the medication was chronic

medication. The responses for these two questions were represented in Table 4 below.³

Table 4: Number of Chronic Care Patients

CHRONIC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	56	56.6	56.6	56.6
	Yes	43	43.4	43.4	100.0
	Total	99	100.0	100.0	

The cross tabulation tables were statistically significant. Table 5 illustrated that two respondents did not complete the gender question. Although there is an even spread of responses from both genders; the table shows that there are more females self reporting as having a chronic condition than males (See Table 6).

Table 5: Chronic Condition Status vs. Gender

GENDER * CHRONIC Crosstabulation

Count			
		CHRONIC	
		No	Yes
	Male	30	13
	Female	25	29
	Total	55	42

³ Those who 'don't refill medication and did not answer chronic were assumed to not be chronic and therefore grouped into the 'Not chronic' group (Marked 'No' on the table). 9 reported refilling but did not consider themselves as chronic conditions and 51 responses did not specifically report to be chronic but were assumed to not be chronic.

Table 6: Chi Square Test - Gender vs. Chronic

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.371 ^a	1	.020
Continuity Correction ^b	4.458	1	.035
Likelihood Ratio	5.457	1	.019
Linear-by-Linear Association	5.316	1	.021
N of Valid Cases	97		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.62.

b. Computed only for a 2x2 table

Table 7 gives a breakdown of the responses per Age group vs. chronic disease. Three respondents did not complete this question. A larger number, between the age group 26 – 45, of responses indicated that they did not have a chronic condition, while a considerably higher number of older respondents reported that they did. This could be expected because chronic conditions such as diabetes, heart disease and hypertension are more prevalent in the elderly.

Table 7: Chronic Condition Status vs. Age**AGE * CHRONIC Crosstabulation**

Count			
	CHRONIC		Total
	No	Yes	
18-25	4	3	7
26-35	22	8	30
36-45	19	10	29
46-55	8	5	13
56-65	2	12	14
66	0	3	3
Total	55	41	96

Table 8: Chronic Condition Status vs. Age (Percentage)

Percentage			
	Chronic		
	No	Yes	Total
18-25	4.17	3.13	7.29
26-35	22.92	8.33	31.25
36-45	19.79	10.42	30.21
46-55	8.33	5.21	13.54
56-65	2.08	12.50	14.58
66	0.00	3.13	3.13
	57.29	42.71	100.00

The previous table (Table 8) illustrates the percentage split of chronic condition across the different age groups. Unsurprisingly, the respondents without chronic conditions were largely in the younger age groupings.

Table 9: Chi Square Test - Age vs. Chronic

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.502 ^a	5	.002
Likelihood Ratio	20.364	5	.001
N of Valid Cases	98		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 1.29.

Figure 6 illustrates diagrammatically the spread of chronic conditions across age groups.

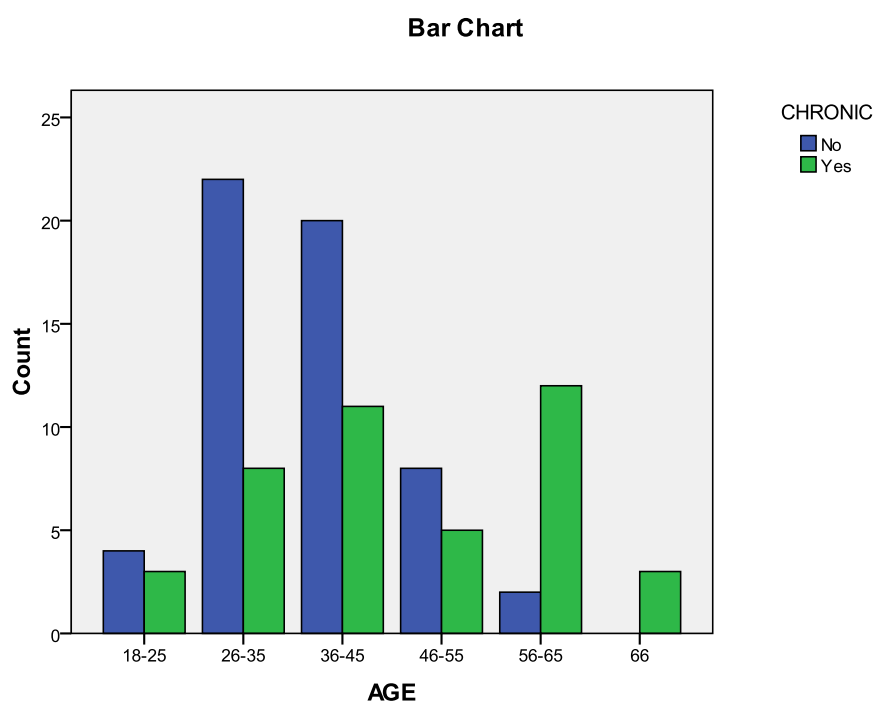


Figure 6: Bar chart Age vs. Chronic

Table 10 below shows the responses grouped according to level of education. Two respondents did not complete the question relating to education. It must be noted that a large proportion of the responses fall within the 'Grade 12' education group. It can be noted that no differences between chronic and not chronic categories were apparent according to education level.

Table 10: Chronic Condition Status vs. Education

EDUCATION * CHRONIC Crosstabulation

Count			
		CHRONIC	
		No	Yes
	Grade 12	22	13
	Diploma	15	15
	Bachelors	8	5
	Honours	7	5
	Masters	2	3
	Doctorate	0	1
	Total	54	42

Table 11 below shows the responses grouped by those who have access to the Internet and those who do not have access to the Internet. An overwhelming majority portion of respondents have access to the Internet. This is important to the study because the lack of access to the Internet is not an initial barrier to preventing the use of an online virtual health community.

Table 11: Chronic vs. Internet

INTERNET * CHRONIC Crosstabulation

Count			
	CHRONIC		Total
	No	Yes	
No Internet	3	1	4
Internet	50	40	90
Total	53	41	94

Table 12 maps the medical aid grouping divided by the chronic sufferers. The majority of the respondents have a savings medical scheme.

Table 12: Chronic vs. Medical Insurance

MEDICAL * CHRONIC Crosstabulation

Count			
	CHRONIC		Total
	No	Yes	
No Insurance	2	2	4
Not sure	2	1	3
Hospital	7	6	13
Savings	44	33	77
Total	55	42	97

Based on the results relating to Internet access and medical cover, it is assumed for the remainder of this study, that the results are mainly representative of consumers who have Internet access and are on a medical savings plan. These demographics will therefore not be analysed further in the report.

4.3 Principal Components Factor Analysis

Principal components factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables (Hair, Black, Babin, Anderson & Tatham, 2006). Given the large number of questionnaire items relative to the total sample size, it was not possible to include all the items in one Principle Component Analysis (PCA) and still ensure that a stable and interpretable solution could emerge. It was therefore decided to carry out three sets of PCAs. One for the Health Belief Model (HBM) items, one for the Technology readiness (TR) items and thirdly, one for the Adoption intention items.

The first sets of items to be considered in a PCA were those reflecting the variables drawn from the Health Belief Model (HBM). These variables were Confidence, Perceived Severity, Perceived Benefits, Trust, Cues to Action and Self-efficacy. A total of 35 items reflected these variables in the questionnaire. An incremental strategy was adopted whereby the unidimensionality of each variable was first assessed using PCA followed by the inclusion of items from across the variables so as to confirm adequate convergent and discriminate validity.

Table 13 presents the results for the final iteration of the PCA. Hair et al. (2006) mention that factor loadings above > 0.6 are considered to be noteworthy whereas factor loadings which are < 0.4 have been removed from the tables. The following items were dropped during the earlier iterations: CON10, SEV3, BEN4 – BEN8, CUE1 – 2 and SELF3. Refer to the survey in the Appendix for reference to the relevant question wording.

The table below shows that the items converged onto their expected factors. Although a few items had loadings slightly < 0.6 ; cross-loadings were acceptably low and each item had a clear dominant loading. The total variance was 73%.

Table 13: HBM Principle Components Analysis

Rotated Component Matrix

	Component					
	Confidence	Self- efficacy	Perceived benefits	Trust	Cues to action	Perceived severity
CON1	.812					
CON2	.578	.403				
CON3	.580	.471				
CON4	.801					
CON5	.661					
CON6	.832					
CON7	.803					
CON8	.884					
CON9	.829					
SEV1						.500
SEV2						.713
SEV4						.712
BEN1			.766			
BEN2			.833			
BEN3			.818			
BEN4			.639			
TRU1				.827		
TRU2				.836		
TRU3				.813		
CUE3					.575	-.408
CUE4					.790	
CUE5					.789	
SELF1		.760				
SELF2		.780				
SELF4		.799				
SELF5		.700				

The next set of items considered were those reflecting the variables drawn from Technology Readiness (TR). These variables were Optimism, Innovativeness, Discomfort and Insecurity. A total of 26 items reflected these variables in the questionnaire.

Table 14 presents the results for the final iteration of the PCA. The following items were dropped during the earlier iterations: OPT7, INN5, and DIS1 because they had low factor loadings.

Table 14: Technology Readiness Principle Components Analysis**Rotated Component Matrix**

	Component			
	Optimism	Discomfort	Innovation	Insecurity
OPT1	.835			
OPT2	.814			
OPT3	.834			
OPT4	.619			
OPT5	.689		.457	
OPT6	.515			
INN1			.746	
INN2			.793	
INN3			.778	
INN4	.524		.641	
INN6			.758	
DIS2		.641		
DIS3		.707		
DIS4		.718		
DIS5		.738		
DIS6		.799		
DIS7		.733		
INS1				.745
INS2				.673
INS3				.778
INS4				.584
INS5				.787
INS6				.621

Refer to the survey for reference to the relevant question wording. The table below shows that the items converged onto their expected factors. Although items (OPT6 and INS4) had loadings slightly < 0.6; cross-loadings were acceptably low and each item had a clear dominant loading. The total variance explained was 63%.

The final set of items to be considered, were those reflecting Attitude and Intention to use. A total of 11 items reflected these variables in the questionnaire. The table presents the results for the final iteration of the PCA. The following item was dropped during the earlier iterations: INT1.

Table 15: Behavioural Intention Principle Components Analysis

Rotated Component Matrix^a

	Component	
	Intention to use	Attitude
ATT1	.455	.803
ATT2		.876
ATT3		.877
ATT4		.888
INT2	.838	
INT3	.864	
INT4	.800	
INT5	.843	
INT6	.797	

4.4 Reliability analysis

Cronbach's alpha is a measure of internal consistency used to test for the reliability of each of the scales. "The closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale." (Gliem & Gliem, 2003:87). Table 16 lists the Alpha for each variable with each of those items surviving the previous PCA analysis in the table.

Table 16: Cronbach's Alpha

Variable	Number of items	Alpha
Confidence	9	0.927
Perceived Severity	3	0.638
Perceived Benefits	4	0.875
Trust	3	0.901
Cue to action	3	0.642
Self efficacy	4	0.860
Optimism	6	0.867
Innovation	5	0.678
Discomfort	6	0.859
Insecurity	6	0.825
Attitude	4	0.940
Behavioural Intention	5	0.926

With the exception of three variables (Highlighted: Perceived severity, Innovation and Cue to action) all of the variables are > 0.7 and therefore acceptable. However, according to Hair et al (2006) those variables which have Cronbach's Alpha tests > 0.6 are still adequate for exploratory worth. These scales were therefore retained.

Given the acceptance of the validity and reliability of all scales, composite scores for each variable were calculated. The arithmetic average of each of the surviving items was calculated. For example, confidence was calculated as: (CON1 + CON 2 + CON 3 + CON 4 + CON 5 + CON 6 + CON 7 + CON 8 + CON 9) / 9.

The skewness and kurtosis values for each of the composite index scores were examined to check the assumption of normality of the data. (Bani-Hani & Alhawary, 2009). "Normal data is the one that is symmetrical, bell-shape, with

the greatest frequency of scores in the middle and smaller distribution towards the extreme ends. Normality can be examined by using the values of skewness and kurtosis. While skewness has to do with symmetry, kurtosis indicates the extent to which the data is peak or flat.” (Maiyaki & Mokhtar, 2011:195).

Table 17 shows the mean, standard deviation, skewness and kurtosis values for the composite scores. The results show that the majority of the skewness and Kurtosis fall within the recommended 0 and +- 1 (for skewness) and 0 and +-3 (for kurtosis). Only the confidence variable is somewhat negatively skewed (i.e. towards greater Confidence) but the departure is not particularly problematic (See Appendix for histogram).

In addition, to considering Behavioural Intention and Attitude as separate variables they were also aggregated to form an overall Adoption Intention scale. It was not the intention of the study to focus on the relationship between the two variables, but rather to study the Adoption Intention.

Table 17: Composite Scores

	N	Mean	Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Confidence	99	5.5028	1.14752	-1.239	.243	2.662	.481
PerceivedSeverity	99	5.3737	1.23743	-.971	.243	.819	.481
PerceivedBenefits	99	4.7348	1.40871	-.451	.243	-.211	.481
Trust	99	4.4579	1.40987	-.091	.243	-.481	.481
CueToAction	99	4.3232	1.39846	-.177	.243	-.462	.481
SelfEfficacy	99	5.0354	1.37396	-.705	.243	.262	.481
Optimism	99	5.0741	1.26083	-.550	.243	.185	.481
Innovation	99	4.3899	1.47451	-.343	.243	-.638	.481
Discomfort	99	3.2912	1.30048	.485	.243	-.048	.481
Insecurity	99	4.4141	1.41409	-.024	.243	-.621	.481
Attitude	99	5.2298	1.45365	-.789	.243	.530	.481
BehaviouralIntention	99	4.4869	1.65521	-.311	.243	-.559	.481
AdoptionIntention	99	4.8583	1.41162	-.584	.243	-.032	.481

4.5 Hypothesis testing

The first step in hypothesis testing (to test the study’s research model presented in Chapter 2) was to assess the correlation of the variables. The following section details the correlation between variables. Following that, the multiple regressions were performed.

4.5.1 Correlations

A correlation matrix (Pearson correlations) was produced using the composite scores for each variable. This was done to get an indication as to the relationship between Attitude and Adoption Intention and the independent variables drawn from HBM and TR, as well as to see the extent to which multicollinearity is presented.

Table 18, on the following page, shows high collinearity is not problematic (inter-construct correlations are < 0.65) and therefore it is sufficient to continue with all of the variables presented in subsequent regression testing. The relationships between the independent variables, drawn from HBM and TR, and the dependent Attitude and Intention variables are shown more clearly in Table 19.

Table 18: Correlation Matrix

	Confidence	PerceivedSeverity	PerceivedBenefits	Trust	CueToAction	SelfEfficacy	Optimism	Innovation	Discomfort	Insecurity	Attitude	BehaviouralIntention	AdoptionIntention
Confidence	1	.311**	.307**	.350**	.168	.512**	.358**	.287**	-.016	.039	.339**	.385**	.400**
PerceivedSeverity	.311**	1	.355**	.150	.125	.398**	.280**	.271**	.034	.079	.283**	.270**	.304**
PerceivedBenefits	.307**	.355**	1	.469**	.335**	.363**	.416**	.286**	.047	.012	.552**	.605**	.639**
Trust	.350**	.150	.469**	1	.355**	.384**	.317**	.141	.111	-.093	.536**	.514**	.578**
CueToAction	.168	.125	.335**	.355**	1	.082	.191	.066	.233*	.209*	.516**	.457**	.533**
SelfEfficacy	.512**	.398**	.363**	.384**	.082	1	.440**	.195	-.065	-.079	.430**	.582**	.563**
Optimism	.358**	.280**	.416**	.317**	.191	.440**	1	.626**	-.181	-.085	.503**	.498**	.551**
Innovation	.287**	.271**	.286**	.141	.066	.195	.626**	1	-.284**	-.038	.285**	.314**	.331**
Discomfort	-.016	.034	.047	.111	.233*	-.065	-.181	-.284**	1	.504**	.108	.004	.058
Insecurity	.039	.079	.012	-.093	.209*	-.079	-.085	-.038	.504**	1	.096	-.127	-.025
Attitude	.339**	.283**	.552**	.536**	.516**	.430**	.503**	.285**	.108	.096	1	.648**	.895**
BehaviouralIntention	.385**	.270**	.605**	.514**	.457**	.582**	.498**	.314**	.004	-.127	.648**	1	.920**
AdoptionIntention	.400**	.304**	.639**	.578**	.533**	.563**	.551**	.331**	.058	-.025	.895**	.920**	1

Table 19: Dependent Variable Correlation

		Attitude	BehaviouralIntention	AdoptionIntention
Confidence	Pearson Correlation	.339**	.385**	.400**
	Sig. (2-tailed)	.001	.000	.000
PerceivedSeverity	Pearson Correlation	.283**	.270**	.304**
	Sig. (2-tailed)	.005	.007	.002
PerceivedBenefits	Pearson Correlation	.552**	.605**	.639**
	Sig. (2-tailed)	.000	.000	.000
Trust	Pearson Correlation	.536**	.514**	.578**
	Sig. (2-tailed)	.000	.000	.000
CueToAction	Pearson Correlation	.516**	.457**	.533**
	Sig. (2-tailed)	.000	.000	.000
SelfEfficacy	Pearson Correlation	.430**	.582**	.563**
	Sig. (2-tailed)	.000	.000	.000
Optimism	Pearson Correlation	.503**	.498**	.551**
	Sig. (2-tailed)	.000	.000	.000
Innovation	Pearson Correlation	.285**	.314**	.331**
	Sig. (2-tailed)	.004	.002	.001
Discomfort	Pearson Correlation	.108	.004	.058
	Sig. (2-tailed)	.286	.966	.566
Insecurity	Pearson Correlation	.096	-.127	-.025
	Sig. (2-tailed)	.347	.209	.803

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

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

Table 19 illustrates that the independent variables, with the exception of Discomfort and Insecurity, are positively and statistically significantly correlated with Attitude and Intention. Moreover, the variables which make up the Health Belief Model (Variables: Confidence, Perceived Severity, Perceived Benefits, Cues to Action and Self-efficacy) are all positively correlated with the Adoption Intention variables.

4.5.2 Controls

The relationship between the controls (Gender, Age, Education and Chronic condition) are studied against the dependent variables (Adoption Behaviour, Intention to use and Attitude). This analysis was conducted by studying the means (including T tests and Spearman's correlation) across the variables.

a. ***Gender***

A T-test was conducted, to establish the relationship existing between Gender and the dependent variables. The differences between the means are not significant.

There are consequently no significant differences between males and females in their attitudes and intentions toward the use of a virtual health community.

Table 20: T Test - Gender

Group Statistics

	GEN	N	Mean	Std. Deviation	Std. Error Mean
Attitude	Female	54	5.2037	1.59234	.21669
	Male	43	5.2733	1.31363	.20033
IntentionToUse	Female	54	4.4259	1.68368	.22912
	Male	43	4.5256	1.65502	.25239
AdoptionIntention	Female	54	4.7716	1.53406	.20876
	Male	43	4.8579	1.32345	.20182

Table 21: T Test - Gender continued

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Attitude	Equal variances assumed	3.616	.060	-.231	95	.818	-.06955	.30160	-.66831	.52920
	Equal variances not assumed			-.236	94.865	.814	-.06955	.29510	-.65542	.51631
IntentionToUse	Equal variances assumed	.224	.637	-.292	95	.771	-.09966	.34155	-.77771	.57840
	Equal variances not assumed			-.292	90.853	.771	-.09966	.34088	-.77678	.57747
AdoptionIntention	Equal variances assumed	2.195	.142	-.292	95	.771	-.08628	.29529	-.67249	.49994
	Equal variances not assumed			-.297	94.357	.767	-.08628	.29037	-.66278	.49023

b. **Age**

Spearman's correlation was used to understand the Age relationship with the dependent variable (Attitude and Intention to use). Non Parametric correlations were selected due to the use of an ordinal scale to measure Age.

Table 22 shows that Age is not significantly correlated to Attitude, Intention to use or Adoption Intention. Therefore, age is dropped as a control variable.

Table 22: Spearman's correlation - Age

Correlations		
		AGE
AGE	Correlation Coefficient	1.000
	Sig. (2-tailed)	.
	N	98
Attitude	Correlation Coefficient	-.050
	Sig. (2-tailed)	.624
	N	98
IntentionToUse	Correlation Coefficient	-.046
	Sig. (2-tailed)	.655
	N	98
AdoptionIntention	Correlation Coefficient	-.050
	Sig. (2-tailed)	.626
	N	98

c. **Education**

The Spearman's correlation, in Table 23, also highlighted that Education is not significantly correlated with the dependent variables of Attitude and Intention. Education is therefore dropped as a control variable.

Table 23: Spearman's correlation - Education

Correlations		
		EDU
EDU	Correlation Coefficient	1.000
	Sig. (2-tailed)	.
	N	97
Attitude	Correlation Coefficient	-.064
	Sig. (2-tailed)	.534
	N	97
IntentionToUse	Correlation Coefficient	-.020
	Sig. (2-tailed)	.847
	N	97
AdoptionIntention	Correlation Coefficient	-.043
	Sig. (2-tailed)	.678
	N	97

d. ***Chronic conditions***

Those with chronic conditions were compared to those without chronic conditions on Attitudes and Intentions (Table 24). There are no significant differences between the two groups, suggesting that chronic patients are not more likely than non-chronic patients to make use of a virtual health community.

To better explain variances in health consumer attitudes and intentions to use a virtual health community, the next section will use multiple regression to examine the cumulative effects of the factors drawn from the Health Belief Model, Technology Readiness and Trust.

Table 24: T Tests - Chronic vs. Non chronic

Group Statistics

CHRONIC		N	Mean	Std. Deviation	Std. Error Mean
Attitude	Not chronic	56	5.1607	1.47126	.19661
	Chronic	43	5.3198	1.44268	.22001
IntentionToUse	Not chronic	56	4.6036	1.62010	.21649
	Chronic	43	4.3349	1.70697	.26031
AdoptionIntention	Not chronic	56	4.8512	1.40774	.18812
	Chronic	43	4.7726	1.46444	.22333

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Attitude	Equal variances assumed	.251	.617	-.538	97	.592	-.15905	.29582	-.74618	.42807
	Equal variances not assumed			-.539	91.369	.591	-.15905	.29505	-.74511	.42700
IntentionToUse	Equal variances assumed	.322	.572	.799	97	.426	.26869	.33624	-.39865	.93602
	Equal variances not assumed			.794	88.033	.430	.26869	.33857	-.40415	.94153
AdoptionIntention	Equal variances assumed	.179	.673	.271	97	.787	.07858	.29047	-.49792	.65509
	Equal variances not assumed			.269	88.661	.788	.07858	.29200	-.50164	.65880

4.5.3 Multiple Regression

Multiple regressions were run to assess the relationship between the dependent and independent variables and in so doing test Hypotheses 1 to 7. The predictive power of the multiple regression models is given by the R-square statistic.

Although it is noted that the *adjusted* R-square is often a more conservative figure to use because it takes into account the quantity of variables and the number of responses, both the R-square and adjusted R-square values are therefore presented in Table 25 along with the standardized Beta coefficients. The bold values have a significant p-value where $p < 0.05$.

The significant Beta coefficient values are highlighted in bold where the p value < 0.05 . Heteroscedasticity was also tested and the results for Model 11 are presented in the Appendix E.

Table 25: Multiple Regressions

		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
				H1,H2,H3,H4A,H4B		H5A,H5B		H6		H1,H2,H3,H4A,H4B, H5A,H5B,H6		
Dependant Variable		Attitude	Behavioural Intention	Attitude	Behavioural Intention	Attitude	Behavioural Intention	Attitude	Behavioural Intention	Attitude	Behavioural Intention	Overall adoption intention
Chronic	Control	0.065	-0.093							0.094	-0.123	-0.025
Gender		-0.039	-0.008							0.102	0.1	0.122
Confidence	Health belief model			0.044	0.017					-0.003	-0.02	-0.015
Perceived Severity				0.007	-0.081					-0.018	-0.031	-0.03
Perceived Benefits				0.314	0.363					0.243	0.236	0.291
Cues to action				0.381	0.306					0.317	0.249	0.341
Self efficacy				0.260	0.448					0.122	0.361	0.302
Trust								0.536	0.514	0.21	0.051	0.153
Optimism	Technology Readiness					0.540	0.477			0.228	0.062	0.171
Innovation						0.000	0.066			0.033	0.105	0.087
Discomfort						0.180	0.203			0.003	0.089	0.059
Insecurity						0.051	-0.187			0.075	-0.202	-0.087
Attitude	Adoption Intention										0.184	
Behavioural Intention												
R square		0.005	0.009	0.498	0.605	0.296	0.283	0.288	0.265	0.592	0.878	0.744
Adjusted R square		-0.017	-0.012	0.471	0.584	0.266	0.252	0.280	0.257	0.534	0.858	0.707

Bold values Significant where $p < 0.05$

a. ***Attitude***

The results of the multiple regressions show that 3 variables from the Health Belief model (Perceived Benefits, Cues to Action and Self-efficacy) are significant when Attitude is the dependent variable (Model 3). Furthermore, the TR (in the form of Optimism) also drives positive attitude when considering a consumers attitude towards a virtual health community (Model 5).

Trust also proved to be highly significant within this context and is a clear driver towards a positive attitude (Model 7). Model 9 groups HBM, TR and Trust variables and the results illustrate that higher levels of the aforementioned variables all have significant independent effects (with the exception of Self-efficacy) and drive a positive attitude towards virtual health communities.

b. ***Behavioural Intention***

The Behavioural Intention / Intention to use dependent variable yielded similar results as discussed in the preceding section. However, higher levels of Self-efficacy were significant in Model 10 as an independent determinant of behavioural intention. It was also found that higher levels of Discomfort created a negative intention towards a virtual health community. Attitude fell just short of being a significant predictor of behavioural intention ($p=0.054$) Unlike Model 9, Optimism and Trust did not have direct effects in Model 10, and may therefore only indirectly impact Behavioural Intention.

c. ***Overall adoption Intention***

Finally, Model 11, considered the Overall adoption Intention. This dealt with the combined aggregate of the dependent variables, Attitude and Behavioural Intention.

Gender, Perceived Benefits, Cues to Action, Self-efficacy, Trust and Optimism were positively significant. Females are more likely to have an intention to use the virtual health community.

These results provide additional evidence that the use of a virtual health community can be understood as partly a health behaviour (due to the

significance of many of the HBM variables), and partly a technology adoption behaviour (due to the significance of certain Technology Readiness variables).

d. ***Multiple regression - Chronic and non-Chronic health consumers***

A multiple regression was completed using only the data from chronic health consumers. The results were compared to a multiple regression for those consumers whose conditions were not chronic. The standardised Beta coefficients and significant p values are presented in Table 26. The blocks show the data results which will be discussed in the following section.

Table 26: Multiple Regressions

	Chronic		Not Chronic	
	Standardised Beta	Sig.	Standardised Beta	Sig.
Gender	0.107	0.237	0.024	0.785
Confidence	-0.069	0.440	0.109	0.354
Perceived Severity	-0.059	0.579	-0.052	0.583
Perceived Benefits	0.208	0.104	0.256	0.021
Cues to action	0.565	0.000	0.182	0.031
Self efficacy	0.345	0.003	0.320	0.015
Trust	0.177	0.118	0.069	0.521
Optimism	0.004	0.977	0.335	0.003
Innovation	0.196	0.142	-0.081	0.452
Discomfort	-0.055	0.645	0.164	0.086
Insecurity	-0.122	0.247	-0.122	0.208
R Square	0.815	\	0.762	\
Adjusted R square	0.748	\	0.7	\

The non chronic patients show significant positive effects on Cues to Action and Self-efficacy. Therefore, higher Cues to Action and Self-efficacy will lead to a higher intention to adopt a virtual health community within this control group. In addition to the above mentioned variables, the non chronic control group also require higher levels of perceived benefits and more TR (in the form of

optimism) to encourage their participation in the virtual health community. Non chronic patients need to feel more optimistic and perceive a higher benefit, before they intend to adopt a virtual health community.

Furthermore, Table 27 illustrates that chronic patients already perceive high levels of benefits and are more optimistic about the potential of the technology to help them self manage their condition.

Results, across both groups (although slightly more important in the chronic consumer group), suggest that motivation is both driven by external drivers (Cues to Action) and internal perceptions of capability (Self-efficacy).

Table 27: Independent Variable T-Test

Group Statistics					
	CHRONIC	N	Mean	Std. Deviation	Std. Error Mean
Confidence	Not Chronic	56	5.5675	1.16258	.15536
	Chronic	43	5.4186	1.13566	.17319
PerceivedSeverity	Not Chronic	56	5.1250	1.28639	.17190
	Chronic	43	5.6977	1.10270	.16816
PerceivedBenefits	Not Chronic	56	4.9241	1.42136	.18994
	Chronic	43	4.4884	1.36926	.20881
Trust	Not Chronic	56	4.4167	1.46784	.19615
	Chronic	43	4.5116	1.34587	.20524
CueToAction	Not Chronic	56	4.4762	1.31634	.17590
	Chronic	43	4.1240	1.49075	.22734
SelfEfficacy	Not Chronic	56	4.8482	1.52902	.20432
	Chronic	43	5.2791	1.11164	.16952
Optimism	Not Chronic	56	5.0565	1.32126	.17656
	Chronic	43	5.0969	1.19259	.18187
Innovation	Not Chronic	56	4.4786	1.45910	.19498
	Chronic	43	4.2744	1.50366	.22931
Discomfort	Not Chronic	56	3.1131	1.22355	.16350
	Chronic	43	3.5233	1.37417	.20956
Insecurity	Not Chronic	56	4.4583	1.46379	.19561
	Chronic	43	4.3566	1.36160	.20764

Table continued on the following page

Independent Samples Test										
		Equality of Variances		t-test for Equality of Means						
									Interval of the	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Confidence	Equal variances assumed	.326	.569	.638	97	.525	.14886	.23338	-.31434	.61205
	Equal variances not assumed			.640	91.530	.524	.14886	.23266	-.31325	.61096
PerceivedSeverity	Equal variances assumed	1.017	.316	-2.334	97	.022	-.57267	.24540	-1.05973	-.08562
	Equal variances not assumed			-2.381	95.776	.019	-.57267	.24047	-1.05003	-.09532
PerceivedBenefits	Equal variances assumed	.009	.924	1.536	97	.128	.43574	.28367	-.12728	.99875
	Equal variances not assumed			1.544	92.105	.126	.43574	.28227	-.12487	.99634
Trust	Equal variances assumed	.052	.819	-.331	97	.742	-.09496	.28718	-.66493	.47501
	Equal variances not assumed			-.334	93.925	.739	-.09496	.28390	-.65866	.46873
CueToAction	Equal variances assumed	1.385	.242	1.245	97	.216	.35216	.28276	-.20904	.91336
	Equal variances not assumed			1.225	84.277	.224	.35216	.28744	-.21943	.92375
SelfEfficacy	Equal variances assumed	4.004	.048	-1.558	97	.123	-.43086	.27658	-.97980	.11808
	Equal variances not assumed			-1.623	96.748	.108	-.43086	.26549	-.95780	.09609
Optimism	Equal variances assumed	.771	.382	-.157	97	.876	-.04035	.25693	-.55029	.46959
	Equal variances not assumed			-.159	94.426	.874	-.04035	.25348	-.54360	.46290
Innovation	Equal variances assumed	.040	.842	.681	97	.498	.20415	.29980	-.39086	.79917
	Equal variances not assumed			.678	89.115	.499	.20415	.30100	-.39391	.80222
Discomfort	Equal variances assumed	.744	.391	-1.567	97	.120	-.41016	.26175	-.92967	.10935
	Equal variances not assumed			-1.543	84.724	.127	-.41016	.26580	-.93866	.11834
Insecurity	Equal variances assumed	.899	.345	.353	97	.725	.10174	.28801	-.46988	.67337
	Equal variances not assumed			.357	93.432	.722	.10174	.28527	-.46470	.66819

e. ***Hypothesis Testing Concluded***

Results of hypothesis testing is summarised in Table 28:

Table 28: Hypothesis Summary

Hypotheses	Supported / Rejected
Hypothesis 1: The greater the perceived severity of the consumer's health, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Rejected
Hypothesis 2: The greater the Perceived Benefits to health from the use a virtual health community, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Supported
Hypothesis 3: The greater the cues to action, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Supported
Hypothesis 4: The greater the health consumers self efficacy, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community.	Supported
Hypothesis 5: The greater a consumer's confidence, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community	Rejected
Hypothesis 6: The greater a health consumer's trust in the benevolence, integrity and ability of a virtual community, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community	Supported
Hypothesis 7a: The greater the health consumer's technology readiness motivators (Innovativeness and Optimism), the more positive will be their attitude and the greater will be their intention to participate in a virtual health community. Hypothesis 7b: The great the health consumer's technology readiness inhibitors (Discomfort and Insecurity), the more negative will be their attitude and the lower will be their intention to participate in a virtual health community.	Partially Supported Rejected
Hypothesis 8: The greater a health consumers self efficacy, the greater will be their technology readiness (i.e. greater innovativeness and optimism and lower discomfort and insecurity).	Na

4.6 Summary of the results

This chapter screened the data and confirmed the reliability and validity of the measures. Correlation and multiple regressions were then performed to test the hypothesized relationships in the research model. In the next chapter, the results are discussed with reference to the literature review set out in Chapter 2.

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

The purpose of this study is to understand how variables drawn from the Health Belief Model, Technology Readiness and consumer trust theories affect the attitudes and intentions of health consumers to making use of virtual health communities. Consumers with chronic health conditions were also compared to those who do not have chronic conditions. The intention of this chapter is to discuss the findings of this research study with reference to the literature.

5.2 Demographic differences

The majority of the respondents had Internet access and a savings medical cover. It was therefore assumed that the results were applicable to this group of consumers.

Among other factors, the sample had varying demographic makeup. However, the Age and Education controls were shown in the analysis not to influence attitude or intention to use virtual health communities. On the other hand, a comparison of the gender results showed that there were slightly higher levels of Perceived benefits to the use of virtual health communities by females than by males. The male group showed a higher dependence on cues to action and were also more likely to trust, and had a higher tendency towards Innovation. This would consequently need to be considered for those implementing a virtual health community. Additional cues to action may be necessary for male consumers.

5.3 Perceived Severity

The results showed that Perceived severity does not have a significant effect on the intention to use and Hypothesis 1 (*The greater the perceived severity of the consumer's health, the more positive will be the consumer's attitude and the*

greater will be their intention to participate in a virtual health community), was rejected.

This finding is contrary to studies which discuss a person's readiness to undertake recommended preventative medical care / health practices (Janz & Becker, 1984; Becker & Janz, 1985 and Becker et al, 1977).

The literature suggests that the more severe a person's health related illness, the more likely their intention to use a virtual health community. Therefore it was expected that health consumers perceiving more need for a platform to self manage their illness, would most welcome using technology that assists them with a convenient and efficient channel to interact with and receive online support, get medical advice from medical practitioners and achieve higher levels of self-efficacy. However, results suggest that perceived severity may not be a necessary condition prior to using a virtual health community.

5.4 Perceived Benefit

Hypothesis 2 (*The greater the Perceived Benefits to health from the use of a virtual health community the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community*) was supported. The results are consistent with a prior study by Wicks et al. (2001) which found that perceived benefits and usage correlated highly with one another.

The results of the study showed that consumers who are more likely to believe that using a virtual health community would benefit their health, are more inclined to have positive attitudes toward, and intentions to participate in the community. More specifically, those who believe that a virtual health community is an efficient means to self-management by providing access to health information and that it will also save time in doctors waiting rooms, will be more prone to using a virtual health community. It is therefore important that those who intend to implement a virtual health community emphasize its benefits.

5.5 Cues to action

Hypothesis 3 (*The greater the cues to action the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community*) is supported, and results are thus consistent with previous literature by Huang (2012). This study found that cues to action do encourage a positive intention to influence health behaviour amongst users.

These results suggest that consumers are more likely to have positive attitudes / intentions with cues to action. Health consumers could be educated by doctors / nurses and there may well be educational posters and training material at hospitals, pharmacies and clinics promoting the use of virtual health communities.

For a virtual community to be adopted and utilised by consumers, a complete guidance and educational approach may possibly be taken. Medical practitioners could be thoroughly trained to engage in the virtual community concept, and there could be sufficient availability of easily understandable training material. In addition to this, appropriate triggers, could be emails, sms's and doctor encouragement, which are aimed at encouraging potential consumers to interact with the virtual health community. These triggers can be specifically targeted to consumers more inclined to need medical advice.

5.6 Adoption Intention

The hypothesis of relating Self-efficacy to Adoption Intention was supported in this study. Hypothesis 4 (*The greater the health consumers self-efficacy, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community*) was consistent with previous literature which found that higher levels of self-efficacy lead to a positive intention to adopt (Strecher, 1986; Drennan & Mort, 2004; Wang, Chou & Chang, 2010; Beuningen et al, 2009; Compeau and Higgins, 1995; Rosenstock et al, 1998).

In a previous study, Wells & Sevilla (2004) highlighted that a higher level of Self-efficacy will lead to better results of adoption intention. Wang et al (2010)

also found that positive correlation of Self-efficacy with Behavioural intention in a study about blog usage, and Drennan & Mort (2004:3) found that “High levels of self-efficacy led to greater use of mobile services.” This study refers to giving the freedom of mobility which relates to the optimism variable in this study.

The importance of Self-efficacy is once again confirmed in this study in the context of virtual health community usage. Consumers, who believe they are capable, are more likely to adopt the virtual health community. It is important, in a situation where a virtual health community is being introduced, that consumers are encouraged and supported with the aim of raising their levels of self-efficacy. This could be achieved by tutorials in pharmacies, clinics and hospitals, intended to give the consumers the opportunity to build up a level of self-confidence when interacting with a virtual health community.

5.7 Confidence

The Hypothesis 5 (*The greater a consumer's confidence, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community*) results (which are illustrated in Table 29) showed that Confidence does not have a significant effect on the intention to use a virtual health community, and was rejected. This was despite initially hypothesizing that consumers, who are more confident in their ability to access, interpret and use health information for self-management would be more likely to use the virtual health community because they are more confident in their ability.

The data showed that most respondents were already quite confident in their abilities to self-manage their health, thereby making this variable less useful as a predictor of consumers' attitudes and intentions. Those consumers were reporting that they had the skills necessary for self-management, and are therefore able to take responsibility for their health. Thus confidence may be a necessary condition but its role is inconclusive given the somewhat skewed sample.

Moreover, because this group of respondents has higher levels of self confidence, the broader results may not be generalised towards less confident health consumer groups.

5.8 Trust

The results relating to trust, Hypothesis 6 (Consumer's trust will have a positive effect on the Behavioural Intention to participate in a virtual health community) are supported and are consistent with past studies (Gefen et al, 2003; Gefen, 2002; Ridings et al, 2002; Porter & Donthu, 2008). Ridings et al (2002) extensively discuss trust in the context of a virtual community. "When trust exists between individuals; they are more willing to partake in shared activity" (Ridings et al., 2002: 279).

It was found that trust is a good predictor of consumers' intention to give and receive information through a virtual community. Those who believe the participants in a virtual community are genuinely concerned and the information is trustworthy and from a reliable source, are more likely to use a virtual health community. Therefore, it is important that virtual communities are constantly monitored by qualified healthcare practitioners and consumers are made aware of this process.

5.9 Technology Readiness

5.9.1 Motivators

The study's results showed that Hypothesis 7a (*The greater the health consumer's technology readiness motivators (Innovativeness and Optimism), the more positive will be their attitude and the greater will be their intention to participate in a virtual health community*) partially supported the Intention to participate in a virtual health community. The relationships were hypothesised because Drennan & Mort (2004) found a significant correlation between innovativeness and usage intentions.

Parasuraman & Colby (2001) highlighted that individuals with high motivation beliefs will believe that they are more advanced with technology and are always interested in learning about the latest technology. Furthermore, they are also more positive in that they believe that technology is convenient, easy, and gives them the opportunity to be mobile. The results of this study suggest that individuals, who are optimistic about technology, value the convenience; mobility and efficiency that technology brings to their lives are more likely to adopt a virtual health community. Practically, it is therefore important for the design of the virtual health community to promote convenience and mobility. For example, consumers could be able to log on after hours in the convenience of their own home to be able to interact with care providers and other health consumers.

5.9.2 Inhibitors

Hypothesis 7b (Technology Readiness inhibitors (Discomfort and Insecurity) are negatively correlated to the intention to participate in a virtual health community) was stated because previous research has found that negative emotions have an effect on adoption (Zhao et al, 2008).

However, results showed that the technology readiness inhibitors were not significantly negatively correlated with attitude or intention to participate in a virtual health community. The hypothesis was therefore rejected. Consumer behaviour seems to be more motivated by the existence of positive beliefs than deterred by negative beliefs.

5.10 Self – efficacy

Hypothesis 8 (*The greater a health consumers self-efficacy, the greater will be their technology readiness i.e. greater innovativeness and optimism and lower discomfort and insecurity*) was partially supported in this study.

The results of the study illustrated that consumers with increased self-efficacy are more optimistic about the use of technology in health. Consumers who have higher levels of self-efficacy are more likely to be optimistic about technology's

potential to give them the freedom to be more mobile and to have more control over their daily lives

5.11 Chronic and Non chronic differences

The chronic consumers' were also compared to those who were not chronic. The results found that the attitudes and intentions of health consumers with chronic conditions were mostly driven by external Cues to action and internal Self-efficacy. The attitudes and intentions of non-chronic patients were additionally impacted by Perceived benefits and technology readiness (in the form of Optimism).

Those implementing a virtual health community need to ensure that clinicians and health service providers promote the use of communities via cues to action and that training and other efforts to improve consumer Self-efficacy will ensure a higher adoption intention. Recommendations from medical practitioners, positive information and educational posters therefore need to target both the chronic and the non-chronic consumer groups.

5.12 Conclusion

This chapter reflected on the study's results. The next chapter will summarize and conclude the research study.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This objective of the research was to develop an understanding of health consumers' attitudes and intentions toward the use of a virtual health community. Adoption intention was examined through both Attitude and Behavioural intention to participate. A research model was developed, which drew from literature surrounding the Health Belief Model, Technology Readiness theory and consumer trust. The model hypothesized the effects of ten variables drawn from those theories on attitude and intention. Furthermore, a comparison between those who have chronic disease conditions and those who do not have such conditions was also considered.

A survey methodology was adopted whereby data was collected using a structured questionnaire (which operationalised the research variables using multi-item scales). The questionnaire was emailed to a convenience sample of health consumers employed at a large private company in South Africa.

The data was analysed using SPSS statistical software and Microsoft Excel. The measures were tested for reliability and validity; data cleaning, missing value and outlier detection was carried out, and finally hypotheses were tested using correlation and multiple linear regressions.

Chapter 6 concludes the research study by highlighting the key findings, listing the limitations of the study and discussing the theoretical and practical significance of the research. Suggestions for future research are also presented. Finally, a conclusion to the study is presented.

6.2 Summary of the results

This section highlights the results obtained in this study and Table 29 highlights the outcomes of the hypotheses that were tested.

Table 29: Hypotheses Results

Hypotheses	Attitude	Intention to use	Overall Adoption Intention
Hypothesis 1: The greater the perceived severity of the consumer's health, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Rejected	Rejected	Rejected
Hypothesis 2: The greater the Perceived Benefits to health from the use a virtual health community, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Supported	Supported	Supported
Hypothesis 3: The greater the cues to action, the more positive will be the consumer's attitude and the greater will be their intention to participate in a virtual health community.	Supported	Supported	Supported
Hypothesis 4: The greater the health consumers self efficacy, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community.	Rejected	Supported	Supported
Hypothesis 5: The greater a consumer's confidence, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community	Rejected	Rejected	Rejected
Hypothesis 6: The greater a health consumer's trust in the benevolence, integrity and ability of a virtual community, the more positive will be their attitude and the greater will be their intention to participate in a virtual health community	Supported	Rejected	Supported
Hypothesis 7a: The greater the health consumer's technology readiness motivators (Innovativeness and Optimism), the more positive will be their attitude and the greater will be their intention to participate in a virtual health community. Hypothesis 7b: The great the health consumer's technology readiness inhibitors (Discomfort and Insecurity), the more negative will be their attitude and the lower will be their intention to participate in a virtual health community.	Partially Supported Rejected	Rejected Partially Supported	Partially Supported Rejected
Hypothesis 8: The greater a health consumers self efficacy, the greater will be their technology readiness (i.e. greater innovativeness and optimism and lower discomfort and insecurity).	This was found to be partially supported		

6.2.1 *Health Belief Model*

The study revealed that the Perceived Benefits is positively correlated to the Behavioural intention. Higher levels of Cues to action were particularly important in explaining variance in attitude and intention. Self-efficacy had a direct effect on intention to participate in a virtual health community, whereas the Perceived benefits were important to both attitude and intention in that it encouraged usage.

Consequently when considering the implementation of a virtual health community one needs to focus on the positive aspects of the virtual health community by promoting the virtual health community benefits, designing appropriate cues to action and improving the health consumer's levels of self-efficacy. Thus focusing on the positive variables, health consumers will be encouraged to be prompted to participate in a virtual health community.

6.2.2 *Technology Readiness*

The Technology Readiness motivator, Innovativeness, and the inhibitor, Discomfort, were rejected as significant predictors of attitude and intention to use. However, higher levels of technology optimism were found to be associated with more positive attitudes toward the use of a virtual health community. The results illustrated that the motivators encouraged higher usage intentions amongst health consumers. Therefore, focusing on the positive aspects of this technology will promote possible usage.

A positive marketing and communication strategy may help build the optimism with the introduction of a virtual health community. Moreover, higher levels of insecurity were associated with lower levels of behavioural intentions to use the virtual community. This suggests that those have more insecure feelings about the virtual health community, as a means to self manage their health, will be less inclined to participate.

6.2.3 Trust

It was found that Trust has an effect on attitude toward a virtual health community, while there is no effect on the overall adoption intention. This highlighted that although higher levels of trust could result in a more positive attitude; this was not enough to encourage an intention to use a virtual health community.

Therefore, initiatives to introduce a virtual health community need to encourage the feeling of trust amongst potential consumers. Issues of anxiety surrounding confidentiality and data validity need to be addressed and the concerns of consumers must be discussed.

The results suggest that consumers are influenced by health beliefs, trust beliefs, and technology readiness when forming attitudes toward the use of a virtual health community.

6.2.4 Chronic / Not chronic

It was found that Cues to action and Self-efficacy are the most important determinants of attitudes and intentions amongst the chronic consumer group. Cues to action, such as a recommendation to participate in a virtual health community, education from medical practitioners and visual aids encouraging participation, need to specifically target the chronic consumer group through a channel which would promote an intention to use a virtual health community.

These same factors are also high with the non-chronic group although in their case Perceived benefits and TR (in the form of Optimism) were also important. The results suggest that motivation, across both groups, is driven by external drivers (Cues to action) and internal perceptions of capability (Self-efficacy). Yet, those who are not chronic consumers perhaps have less motivation to seek out options to improve self-management of health and they need to be more convinced and optimistic about the potential benefits of virtual health communities for their acute care needs. Greater efforts are therefore needed to

ensure virtual health communities also offer convenience and support in those cases.

6.3 Limitations of the study

It is important to mention the limitations of this study. These are listed below.

Consumers who completed the questionnaire might not have participated in a virtual health community prior to completing the survey. This could have made it difficult for them to identify with the use of a virtual health community and thus respond on their attitudes and intentions.

The study was conducted using a convenience sample of health consumers, because of time and cost constraints. The generalisability of results is therefore compromised. It consequently makes it difficult to determine whether the results can be generalized to other health consumers such as those in rural areas, those without private health insurance/medical aid, those without formal employment, those less confident in their self-management abilities and those in lower income brackets. It is therefore cautioned against generalising results beyond the sample used in this study.

Although, anonymity was emphasized in the covering letter, respondents might not have been willing to complete the email survey because the survey was sent from within the company's email system. Respondents might have been concerned that their answers were monitored by the employer and might not have answered truthfully about their health.

6.4 Importance of the research

The study is significant both theoretically and practically. The theoretical and practical importance of this research discussed below.

6.4.1 Theoretical and contextual significance

The current health care environment is changing in that patients are empowering themselves by taking more responsibility for and ownership of the management of their health. The mere act of putting one's chronic symptoms online can be very beneficial, particularly prior to visiting a doctor.⁴ Chronic care, due to the severity and confidentiality of chronic diseases, is an ideal area where virtual health communities could contribute but there is little existing research that assesses the use of a virtual health community by patients with or without chronic diseases. By addressing these issues, this study has made a *contextual* contribution.

Developing a model aimed at predicting the intention of health consumers to adopt virtual communities addresses an important gap in both the health and health IT literatures. The research model was developed from a vast amount of literature on the HBM and TR and the results of this study have thus improved our understanding of virtual health communities. Specifically, the empirical evidence shows that the use of virtual health communities can be considered as health, consumer trust, and technology readiness behaviour. Very few studies have included Technology Readiness, and Trust variables into a Health Belief Model and combining these models within this study offers a significant *theoretical* contribution.

The research model was operationalised by using multi item scales adopted from the HBM, consumer trust, and TR literature. However, a number of these measures were adapted to suit the context of a virtual health community. By confirming the validity and reliability of those measures this study has made an additional *methodological* contribution.

⁴ With thanks to one of the anonymous reviewers of the research

6.4.2 *Practical significance*

The study is also significant from a practical perspective because it provides medical professionals (doctors, pharmacists and nurses), NGOs, consumer health rights groups, community support groups, pharmaceutical companies, government and international medical companies with meaningful data on whether South African health consumers are likely to adopt a virtual health community.

Technology is a convenient and cost effective option for people to consider when managing their health. A wealth of resources and knowledge can be made easily accessible to online communities and thereby make self-management a viable alternative. The results of the study show that there are positive attitudes and intentions toward virtual health communities and they are also viable options to consider.

The study has offered health care providers the opportunity to understand South African consumers' perceptions toward the use of virtual health communities. Based on the findings of the research, it is evident that those within the medical / care giving environment could incorporate virtual health communities into their healthcare strategies particularly as an opportunity to handle chronic diseases. There might be more of a need for two-way online interactions with medical practitioners from a chronic consumer viewpoint. Although results reported here are based on a convenience sample, the study has shown that there is a strong likelihood that consumers have positive attitudes and intentions to adopt a virtual health community and with the appropriate cues to action (e.g. text messages) together with perceptions of benefits and the optimism of health consumers, those technologies can be made to succeed.

Given some different results between genders, a virtual health community should have a gender selection option, prior to entering. This could result in a different virtual community interface design based on the gender type. For example, more motivating language within the online community, and a greater emphasis on the perceived benefits would need to be considered in the virtual

community design for male consumers, while the virtual health community must be more reassuring for females.

Finally, the study found that to promote higher levels of trust, health consumers must believe the participants in a virtual community are genuinely concerned, the information is trustworthy and from a reliable source. Only then are they more likely to form positive attitudes toward a virtual health community.

6.5 Recommendations for further research

There are several avenues for future research studies which emerged from this work. First, the model should also be tested using a more representative sample and therefore overcome the limitation of the convenience sample which was used in the study.

Second, the research model should be tested in a wide range of different contexts, such as a rural or remote community lacking easy access to health providers.

Third, a longitudinal research design could be adopted to examine experience in the use of a virtual health community over time and to examine at what stages of a certain chronic illness consumers rely mostly on a virtual health community.

Fourth, a comparative study of a consumer's preference to use virtual health communities against face to face healthcare consultation, using the HBM as the underpinning model, could also broaden the knowledge of the virtual health community.

Fifth, a qualitative study is needed which aims to understand the consumers desired virtual health community experience and functional requirements. Such a study could assist those who design virtual communities.

Sixth, a closer look at technology readiness consumer groups (These are: Sceptic, paranoid, laggard, explorer and pioneer (Rose & Fogarty, 2010)) could

allow one to understand how these groups differ in the use of virtual health communities.

Seventh, research is needed to examine how the design of a virtual health community can create feelings of trust and to determine factors that might influence other important exploratory variables such as self-efficacy.

Eighth, a study could distinguish between virtual health communities depending on the features and the difference between 'rich' and 'lean' media.

Ninth, an examination of the causal chain between attitudes, intentions and actual participation within virtual health communities, while this study focused on attitude and behavioural intention only.

Tenth, a study which considers the perceptions of perceived threat, and how this could have an effect on the adoption intention (The HBM underpin this research).

Eleventh, conduct a comparative study, of the participation intention of a confident self help management group against a less confident group.

6.6 Conclusion

The study aimed to assess the attitude and behavioural intention of health consumers toward the use of virtual health communities. The study drew on the health belief model, consumer trust and technology readiness theory. Perceived severity, Perceived benefits, Cues to action, Self-efficacy, Confidence, Trust, Innovation, Optimism, Discomfort and Insecurity were examined as the independent variables.

Results based on a survey of a convenience sample of consumers showed that the variables used were good predictors of adoption intention. In particular, differences were found between those with chronic conditions and those without. As a result of the research study, we now have a better understanding of how potential consumers will view a virtual health community and which factors will promote an adoption intention.

Finally, the study is not only beneficial from a theoretical perspective, where it expands on the HBM and TR theory, but also for medical practitioners and companies looking to facilitate self-management of health through the promotion of virtual health communities.

REFERENCES

- Arnold, Y., Daum, M. & Krcmar, H. (2004). Virtual Communities in Health care: Roles, requirements and restrictions. IADIS International Conference Web based Communities. Multikonferenz Wirtschaftsinformatik (MKWI), Universität Duisburg-Essen, 9–11 March.
- Baker, L., Wagner, T., Singer, S. & Bundorf, K. (2003). Use of the Internet and email for health care information. *JAMA*, 289(18): 2400 – 2460.
- Bashir, M. & Zakaria, M. (2010). Hesitation on Adoption self-service technologies. A case study on self payment machines. Available online: <http://umu.diva-portal.org/smash/get/diva2:325738/FULLTEXT01> (Accessed 20 February 2010)
- Bandura, A. (2006). Self-efficacy in Adolescents. Information Age Publishing.
- Bani – Hani, J. & Alhawary, F. (2009). The impact of core competencies on competitive advantage: Strategic challenge. *International bulletin of business administration*, 6(2009): 93 – 104.
- Bazeley, M. (2006). Issues in mixing qualitative and quantitative approaches to research. 1st International Conference: Qualitative research in marketing management. Vienna, 10 April 2002, pp. 1-11. University of Economics and Business Administration: Vienna.
- Beatson, A., Lee, N. & Coote, L. (2007). Self-service Technology and the service encounter. *The Service Industries Journal*, 27(1):75-89.
- Becker, M., Kasl, S. & Maiman, L. (1977). Selected Psychological Models and Correlates of individual health related behaviours. *Medical Care*, 15(5): 27 – 46.
- Becker, M., Radius, S., Rosenstock, I., Drachman, R., Schuberth, K. & Teets, K. (1978). Compliance with a medical regime for asthma: a test of the health belief model. *Public health reports*, 93(3): 269 – 277.
- Becker, M. & Janz, N. (1985). The Health Belief Model Applied to Understanding Diabetes Regimen Compliance. *The Diabetes Educator*, 11(1): 41 – 47.
- Beijnum, B., Pawar, P., Dulawan, C. & Hermens, H. (2009). Mobile virtual communities for telemedicine: Research challenges and opportunities. *International Journal of Computer science and application*, 6(2): 19 – 37.

- Bender, J., Grady, L. & Jadad, A. (2008). Supporting Cancer patients through the continuum of care: A view from the age of social networks and computer mediated communication. *Current Oncology*, 15(2): 42 – 47.
- Bennett, K., Reynolds, J., Christensen, H. & Griffiths, K. (2010). E-hub: an online self – help mental health service in the community. *MJ*, 192(11): 48 – 52.
- Berndt, A., Saunders, S. & Petzer, D. (2010). Readiness for banking technologies in developing countries. *South African Business Review*, 14(3): 47 – 76.
- Beuningen, J., de Ruyter, K., Wetzels, M. & Streukens, S. (2009). Customer Efficacy in Technology based Self-service. *Journal of service research*, 11(4): 407 – 428.
- Bitner, J. (2001). Service and technology: opportunities and paradoxes. *Managing service quality*, 11(6): 375 – 379.
- Bitner, M., Ostrom, A., & Morgan, F. (2007). Service Blueprinting: A practical tool for service innovation. *California Management Review*. Available online: <http://www.acaire.org/alveart/Readings/ServiceBlueprinting.pdf> (Accessed 20 May 2010).
- Blanchard, A. & Horan, T. (1998). Virtual Communities and Social Capital. *Social Science Computer Review*, 16(3): 293:307.
- Bodenheimer, T., Lorig, K., Holman, H. & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Journal of American Medical Association*, 228(19): 2469 – 2475.
- Breuning, M., Kriegel, H., Ng, R. & Sander, J. (1999). Optics – of: Identifying local outliers. *Computer Science*, 1704 (1999): 262 - 270.
- Bryman, A. (1984). The debate of quantitative and qualitative research: A question of method and epistemology. *The British Journal of Sociology*, 35(1): 75 – 92.
- Buglar, M., White, K. & Robinson, N. (2010). The role of self-efficacy in dental patients' brushing and flossing: Testing and extended Health Belief Model. *Patient education and counselling*. Available online: <http://eprints.qut.edu.au/> (Accessed 13 February 2010).

- Burger, F. (2008). The impact of warehousing and transportation optimization on supply chain effectiveness. University of Johannesburg. Available online: <http://hdl.handle.net/10210/1252> (Accessed 20 May 2010).
- Calabretta, N. (2002). Consumer-driven, patient centred health care in the age of electronic information. *Journal of Medical Library Association*. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC64755/> (Accessed 13 February 2010).
- Champion, V. & Skinner, C. (2008). Health Behaviour and Health Education. Josey – Bass. Available online: <http://mirror.lib.unair.ac.id/> (Accessed 14 February 2011).
- Chan, C. & Lin, C. (2009a). Determinants of satisfaction and Intention to use self-service technology – Technology and Computer self-efficacy. Hawaii International Conference on System Sciences, Los Alamitos, 3-6 January 2007, pp. CA: USA.
- Chan, C. & Lin, C. (2009b). Determinants of satisfaction and Intention to use self-service technology – Technology readiness and computer self-efficacy. *Fifth international conference on Intelligent information hiding and multimedia signal processing*, Kyoto, 12-14 September 2009, pp. 893 – 897. Japan: Kyoto.
- Chang, H. & Chang, C. (2008). An assessment of technology based service encounters & network security on the e-health care systems of medical centres in Taiwan. *BMS Health services research*, 8(87): 1 – 13.
- Chen, S. & Chen, H. (2009). Determinants of satisfaction and continuance intention towards self-service technologies. *Industrial Management and Data Systems*, 109(9): 1248 - 1263.
- Chen, S. & Li, S. (2010). Consumer adoption of e-service: Integrating technology readiness with theory of planned behaviour. *African Journal of Business Management*, 4(16): 3556 – 3563.
- Chiu, C., Hsu, M. & Wang, E. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision support systems*, 42(2006): 1872 - 1888.
- Chryssanthou, A., Varlamis, I. & Latsiou, C. (2009). Security and trust in virtual healthcare communities. *Proceedings of PETRA*

- Chuang, K. & Yang, C. (2010). Helping you to help me: Exploring supportive interaction in online health community. *ASIST 2010*. Pittsburgh, 22-27 October 2009, 99. USA: Pittsburgh.
- Claar, C. & Johnson, J. (2010). Analysing the adoption of computer security utilizing the health belief model. *Issues in Information Systems*, 4(1): 286 - 291.
- Clark, N., Rosenstock, I., Hassan, H., Evans, D., Wasilewski, Y., Feldman, C & Mellins, R. (1988). The effect of health beliefs and feelings of self efficacy on self management behaviour of children with a chronic disease. *Patient education and counselling*, 11(1988): 131 – 139.
- Compeau, D. & Higgins, C. (1995). Computer Self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2): 189 – 211.
- Constantiou, I. & Papazafeiropoulou, A. (2009). Does culture affect the adoption of advanced mobile services? A comparative study of Young Adults perceptions in Denmark and UK. *The database of advances in Information Systems*, 40(4): 132 – 147.
- Dannecker, A. & Lechner, U. (2006). An empirical analysis of the demand for E-services for virtual communities of patients. *19th Bled eConference*. Slovenia, 5 – 7 June 2006, 9. Europe:Slovenia.
- Davino, J. (2011). Complexities of Delivering Health Care. *The Journal of Global Health Care Systems*, 1(4):1 – 5.
- Demiris, G. (2006). The diffusion of virtual communities in healthcare: Concepts and challenges. *Patient education and counseling*, 162(2):178 – 188.
- Drennan, J. & Mort, G. (2004). Consumer acceptance of m-services: Marketing Implications. Available online: <http://eprints.qut.edu.au/> (Accessed 16 February 2011).
- Dyer, J., Costello, L. & Martin, P. (2010). Social support online: Benefits and Barriers to Participation in an Internet support group for heart patients. *The Australian community psychologist*, 22(2): 48 – 63.
- Epping – Jordan, J., Pruitt, S., Bengoa, R. & Wagner, E. (2004). Improving the quality of healthcare in chronic conditions. *Quality and safety in healthcare*, 13: 299 – 305.
- Eysenbach, G. (2000). Consumer Health Informatics. *British Medical Journal*, 320(7251): 1713 – 1716.

- Eysenbach, G., Powell, J., Englesakis, M., Rizo, C. & Stern, A. (2004). Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions. *British Medical Journal*, 328: 1 – 6.
- Flexner, W., McLaughlin, C. & Littlefield, J. (1977). Discovering what the health consumer really wants? *Health care management*, 2(4): 43-49.
- Fordsberg, E. (2001). Do financial incentives make a difference? Comparative Study of the Effects of Performance-based Reimbursement in Swedish Health Care. Sweden: Acta Universitatis Upsaliensis.
- Gans, D., Kralewski, J., Hammons, T. & Dowd, B. (2005). *Health affairs*, 24(5): 1323 – 1333.
- Gefen, D. (2002). Customer Loyalty in Ecommerce. *Journal of the Association in Information Systems*, 3:27 - 51.
- Gefen, D., Karahanna, E. & Straub, D. (2003). Trust and TAM in online shopping: An Integrated Model. *MIS Quarterly*, 27(1): 51 – 90.
- Gliem, J. & Gliem, R. (2003). Calculating, interpreting, and reporting Cronbach's Alpha Reliability Coefficients for Likert – Type Scales. *2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education*. Columbus, 8 – 10 October 2003. Columbus: OH.
- Godeau, E., Gabhainn, S., Vignes, C., Ross, J., Boyce, W. & Todd, J. (2008). Contraceptive use by 15 year old students at their last sexual intercourse. *Archives of paediatric and adolescent medicine*, 162(1): 66 – 73.
- Goldzweig, C., Towfigh, A., Maglione, M. & Shekelle, P. (2009). Costs and benefits of health information technology: New trends from the literature. *Health affairs*, 28(2): 282 – 293.
- Gorini, A., Gaggioli, A., Vigna, C. & Riva, G. (2008). A second life for ehealth: Prospects for the use of 3d virtual worlds in clinical psychology. *Journal of medical Internet research*, 10(3): 1-14.
- Goudge, J., Gilson, L., Russel, S., Gumede, T. & Mills, A. (2009). Affordability, availability and acceptability barriers to health care for the chronically ill: Longitudinal case studies from South Africa. *BMC Health Services Research*, 9(75):1 – 18.

- Gregor, S. (2006). The nature of theory in information systems. *MIS Quarterly*, 30(3):611 – 642.
- Gustafson, D., Hawkins, R., Boberg, E., Pingree, S., Serlin, R., Graziano, F. & Chan, C. (1999). Impact of patient centred, computer based health information / support system. *The American Journal of Preventative Medicine*, 16(1): 1 – 9.
- Hair, J.F. Jr., Black, W.C., Babin, B., Anderson, R.E. & Tatham, R.L. (2006). *Multivariate Data Analysis*, 6th Edition. New Jersey: Pearson Prentice Hall.
- Harvey, J. & Lawson, V. (2008). The importance of health belief models in determining self-care behaviour in diabetes. *Diabetic Medicine*, 26(2009):5 – 13.
- Hesse, B., Nelson, D., Kreps, G., Croyle, R., Arora, N., Rimer, B. & Viswanath, K. (2005). Trust and sources of health information. *Arch intern med*, 165(12): 2618 – 2624.
- Ho, S. & Ko, Y. (2008). Effects of self-service technology on customer value and customer readiness. *Internet Research*, 18(4):427 – 446.
- Holman, H. & Lorig, K. (2004). Patient self-management: A key to effectiveness and efficiency in care of chronic disease. *Public health reports*, 119: 239 - 243.
- Hofman, K., Ryce, A., Prudhomme, W. & Kotzin, S. (2006). Reporting of non communicable disease research in low- and middle- income countries: a pilot biometric analysis. *Journal of Medical Library Association*, 94(4): 415-420.
- Huang, J., Hsiao, T. & Chuang, S. (2009). The role of virtual community in disseminating electronic word of mouth. *Pervasive Computing*, 755-760.
- Huang, J. (2012). Using the adoption healthcare information adoption model to predict the adoption of telecare. *African Journal of business management*, 6(2): 562 – 272.
- Janz, N. & Becker, M. (1984). The Health Belief Model: A decade later. *Health Education Quarterly*, 11(1): 1 - 47.
- Jeffers, P., Muhanna, W. & Nault, B. (2008). Information technology and process performance: An empirical investigation of the interaction between IT and Non-IT resources, *Decision Sciences*, 39(4): 703 - 735.
- Jette, A., Cummings, A., Brock, B., Phelps, M. & Naessens, J. (1981). The structure and reliability of health belief indices. *Health services research*, 16(1): 81 - 97.

- Johnson, C. (2001). A survey of current research online communities of practice. *The Internet and higher education*, 4(1): 45 – 60.
- Jordan, J., Briggs, A., Brand, C. & Osborne, R. (2008). Enhancing patient engagement in chronic disease self-management support initiatives in Australia: the need for an integrated approach. *MJA*, 189(10): 9-13.
- Kamal, N., Fels, S. & Ho, K. (2010). Online Social Networks for Personal Informatics to Promote Positive Health Behaviour. Workshop on Social Media 2010, Firenze, Italy, October 25--29.
- Kaplan, B. & Maxwell, J. (2005). Qualitative research methods for evaluating computer information systems. Available online: <http://www.springerlink.com/content/kx844713q7321300/> (Accessed 25 February 2011).
- Koonce, T., Guise, D., Beauregard, J. & Giuse, N. (2007). Toward a more informed patient: bridging health care information through an interactive communication portal. *Journal of Medical Library Association*. Available online: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1773042/> (Accessed 27 October 2011).
- Kralik, D., Koch, T., Price, K. & Howard, N. (2004). Patient involvement in clinical nursing. Chronic illness self-management: taking action to create order. South Australia: Blackwell.
- Lai, M. (2008). Technology Readiness, Internet self-efficacy and computing experience for professional accounting students. *Campus-Wide Information Systems*, 25(1): 18 - 29.
- Lau, F. (2011). Benefits of health information technology – Are we there yet? *iHealth connections*, 1(2): 148 – 150.
- Laine, M. (2006). Key success factors of virtual communities. Available online: http://users.tkk.fi/~molaine3/ml_mastersthesis_310506_public.pdf (Accessed 15 November 2011).
- Land, M. (2006). Improving customer acceptance of 3rd generation mobile services. *Technische Universiteit Eindhoven*. Available online: <http://en.scientificcommons.org> (Accessed 25 February 2011).

- Lanseng E. & Andreassen, T. (2007). Electronic healthcare: A study of people's readiness and attitude toward performing self – diagnosis. *International Journal of Service Industry Management*, 18(4): 394 – 417.
- Lee, A. & Baskerville, R. (2003). Generalizing Generalizability in Information Systems research. *Information Systems Research*, 14(3): 221 – 243.
- Lee, M. (2009). Factors influencing the adoption of Internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*. Available online: www.elsevier.com/locate/ecra (Accessed: 21 January 2012)
- Leimeister, J., Ebner, W. & Krcmar, H. (2005). Design, Implementation and evaluation of trust supporting components in virtual communities for patients. *Journal of Management Information Systems*, 21(4): 101 – 135.
- Leimeister, J. (2008). Do virtual communities matter for the social support of patients? *Information technology and people*, 21(4): 350 – 374.
- Leroy, G., Helmreich, S. & Cowie, J. (2010). The influence of text characteristics of perceived and actual difficulty of health information. Available online: [10.1016/j.ijmedinf.2010.02.002](https://doi.org/10.1016/j.ijmedinf.2010.02.002) (Accessed: 21 February 2012).
- Laing, H. & Xue, Y. (2010). Understanding security behaviours in personal computer usage: A threat avoidance perspective. *Journal of the Association for Information Systems*, 11(7): 394 - 413.
- Liljander, V., Gillberg, F., Gummerus, J. & van Riel, A. (2006). Technology readiness and the evaluation and adoption of self-service technologies. *Retailing and Consumer Services*. Available online: [http://www.palaloi.web.id/jurnal/ibanking_jurnal/sdarticle\(11\).pdf](http://www.palaloi.web.id/jurnal/ibanking_jurnal/sdarticle(11).pdf) (Accessed 21 May 2010).
- Lin, P., Simoni, J. & Zemon, V. (2005). The health belief model, sexual behaviours and HIV risk among Taiwanese immigrants. *AIDS education and prevention*, 17(5): 469 – 483.
- Lin, J. & Hsieh, P. (2006). The role of technology readiness in customer's perception and adoption of self-service technologies. *International Journal of Service Industry Management*, 17(5): 497 - 517.

- Lin, J. & Lu, H. (2000). Towards an understanding of the behavioural intention to use a website. *International journal of information management*, 20(2000): 197 – 208.
- Lin, C., Shih, H. & Sher, P. (2007). Integrating Technology Readiness into Technology Acceptance: TRAM. *Psychology and Marketing*, 24(7): 641 - 657.
- Logue, E. & Bourguet, C. (2010). The method for obtaining an unbiased sample of family medicine patients for research purposed. *J Am Board Fam Med*, 24(1) 583 – 588.
- Mackert, M., Whitten, P. & Garcia, A. (2008). Interventions of low health literate audiences. *Journal of Computer-mediated communication*, 13: 504 – 505.
- Maiyaki, A. & Mokhar, S. (2011). Determinants of customer behavioural responses: A pilot study. *International business research*, 4(1): 193 - 197
- Mao, Y., Vassileva, J. & Grassmann, W. (2007). A system dynamics approach to study virtual communities. Hawaii International Conference on System Sciences, Los Alamitos, 3-6 January 2007, pp. CA: USA.
- Markey, P. & Wells, S. (2002). Interpersonal perception in Internet chat rooms. *Journal of research in personality*, 36(1): 134 – 146.
- Mayosi, B., Flisher, A., Lalloo, U., Sitas, F., Tollman, S. & Bradshaw, D. (2009). The burden of non-communicable diseases in South Africa. *The Lancet*, 374: 934 – 947.
- Meuter, M., Bitner, M., Ostrom, A. & Brown, S. (2005). Choosing alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing*, 69(2005): 61 – 83.
- McClenahan, C., Shevlin, M., Adamson, G., Bennett, C. & O’Neil, B. Testicular examination: a test of the health belief model and the theory of planned behaviour. *Health education research*. 22(2): 272 – 284.
- Nahcivan, N. & Secginli, S. (2007). Health beliefs related to breast self-examination in a sample of Turkish woman. *Oncology Nursing Forum*, 34(2): 425-432.
- Newman, S., Steed, L. & Mulligan, K. (2004). Self-management Interventions for Chronic Illness. *Lancet*, 364(9444): 1523 – 1537.

- Ng, B., Kankanhalli, A. & Xu, Y. (2009). Studying users' Computer Security Behaviour: A Health Belief Perspective, *Decision Support Systems*, 46(4): 815 – 825.
- Or, C. & Karsh, B. (2009). A systematic review of patient acceptance of consumer health information technology, *Journal AM Medical information association*, 16(2009): 550 – 560.
- Orlikowski, W. & Baroudi, J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research*, 2(1): 1 – 24.
- Parasuraman, A. (2000). Technology Readiness Index (TRI): A multiple item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4): 307 - 320.
- Parasuraman, A. & Colby, C. (2001). *Techno-Ready Marketing: How and Why Your Customers Adopt Technology*. New York: The Free Press.
- Parks, M. (2010). A networked self: Social network sites as virtual communities. Available online:
<http://viralmedia.pbworks.com/w/file/45052678/A%20Networked%20Self-Identity%2C%20Community%20and%20Culture%20on%20Social%20Network%20Sites%20%5B2011%5D.pdf> (Accessed 21 November 2011).
- Perchonok, J. & Montague, E. (2012). The need to examine culture in health technology. Proceedings of the human factors and ergonomics society 56th annual meeting, Boston, 22 – 26 October 2012, pp. 1847 – 1851. USA: Boston
- Porter, C. & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics, *Journal of business research*, 59(9): 999 – 1007.
- Porter, C. & Donthu, N. (2008). Cultivating trust and harvesting value in virtual communities, *Management Science*, 54(1): 113 - 128.
- Preece, J. & Maloney-Krichmar, D. (2005). Online communities: Design, theory, and practice. *Journal of Computer-Mediated Communication*, 10(4): 1 – 17.
- Rheeder, P. (2006). Type 2 diabetes: The emerging epidemic. *SA Family practice*, 48(10): 20-21.

- Robertson, N. & Harrison, P. (2009). What's wrong with me: concerns about online medical self-diagnosis. *Proceedings of ANZMAC*, Melbourne, 30 November – 2 December 2009, pp. 1-9. Australia: Melbourne.
- Rose, J. & Fogarty, G. (2010). Technology readiness and segmentation profile of mature customers. *Academy of world business, marketing & management development conference proceedings*, 4(1): 57 - 65.
- Rosenstock, I., Strecher, V. & Becker, M. (1988). Social Learning Theory and Health Belief Model. *Health Education Quarterly*, 15(2): 175 – 183.
- Ridings, C., Gefen, D. & Arinze, B. (2002). Some antecedents and effects of trust in virtual communities. *Journal of strategic information systems*, 11(2002): 271 – 295.
- Riley, W., Rivera, D., Atienza, A., Nilsen, W., Allison, S. & Mermelstein, R. (2011). Health behaviour models in the age of mobile interventions: are our theories up to the task? *Translation Behavioural Medicine*, 1(1): 53 -71.
- Rutter, D. & Quine, L. (2002). Changing health behaviour intervention and research with social cognition models. Buckingham: Open University Press.
- Sam, H., Othman, A. & Nordin, Z. (2005). Computer Self-Efficacy, Computer Anxiety, and Attitudes toward the Internet: A Study among Undergraduates in Unimas. *Educational Technology & Society*, 8 (4), 205-219.
- Searl, M., Borgi, L. & Chemali, Z. (2010). It is time to talk about people: A human centred healthcare system. *Health research policy and systems*, 8(35): 1 - 7.
- Shaw, J., Sicree, R. & Zimmet, P. (2009). Global estimates of the prevalence for diabetes for 2010 and 2030. *Diabetes research and clinical practice*, 87(2010): 4 – 14.
- Shumaker, S., Ockene, J. & Riekert, K. (2009). The Handbook of Health Behaviour Change Third Edition. New York: Springer Publishing Company.
- Smith, A. (2007). Chronic disease management and the development of virtual communities. *International journal of electronic healthcare*, 3(3): 329 – 352.
- Skok, W. & Legge, M. (2001). Evaluating enterprise resource planning (ERP) systems using an interpretive approach. *SIGNCOPR2001*. San Diego. 2001, pp. 189 – 197. USA: San Diego.

- Stockdale, R. & Thompson, K. (2008). The role of sociability is developing online health communities for people with diabetes. *Healthcare and Informatics review online*, 12(2): 25-36.
- Stockdale, R. (2010). Sharing and caring: The giving and receiving of information in online chronic disease communities. *23rd Bled Conference eTrust: implications for the Individuals, Enterprises and Society*. June 20 – 23 2010, Bled: Slovenia.
- Srijumpa, R. & Speece, M. (2004). Understanding the technology based self-service encounters: Asian services in the new era. *Asia Academy of Management Fourth Conference*. Available online: <http://jgxy.usx.edu.cn/> (Accessed 03 February 2011).
- Straub, D., Boudreau, M. & Gefen, D. (2004). Validation guidelines in IS positivist research. CAIS. Available online: <http://www.ic.unicamp.br> (Accessed 21 November 2011).
- Strecher, V., Devellis, B., Becker, M. & Rosenstock, I. (1986). The role of self-efficacy in achieving health behavior change. *Health education quarterly*, 13(1): 73 - 91.
- Strecher, V. & Rosenstock, I. (1988). *Cambridge Handbook of Psychology, Health and Medicine*. Cambridge: The Press Syndicate of the University of Cambridge.
- Teddlie, C. & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of mixed methods research*, 1(1): 77 – 100.
- Thakkar, M., & Davis, D. (2006). Risks, Barriers, and Benefits of EHR Systems: A comparative study based on size of hospital. *Perspectives in Health Information Management*, 3(5): 1 – 19.
- Van Uden-Kraan, N. (2008). Online peer support for patients with somatic diseases. Available online: http://doc.utwente.nl/60136/1/thesis_van_Uden-Kraan.pdf (Accessed 15 January 2012)
- Walczuch, R., Lemmink, J. & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information and Management*, 44(2): 206 – 215.
- Walker, W. (2005). The strengths and weakness of research designs involving quantitative measures. *Journal of research in nursing*, 10(5): 571 – 582.

- Wang, C., Chou, S. & Chang, H. (2010). Exploring an individual's intention to use blogs: The role of social, motivational and individual factors. Available online: <http://www.pacis-net.org/file/2010/P02-01.pdf> (Accessed 15 January 2012)
- Warsi, A., Wang, P., Lavalley, M., Avorn, J. & Solomon D., (2004). Self-management education programs in chronic disease. *Arch intern Med*, 164(9): 1641 – 1649.
- Weissfeld, J., Brock, B., Kirscht, J. & Hawthorne, V. (1987). Reliability of Health Belief Indexes: Confirmatory Factor Analysis in Sex, Race and Age Subgroups. *Health services research*, 21(6): 777 - 793.
- Welbourne, J., Blanchard, A. & Boughton, B. (2009). Supportive Communication, Sense of virtual community and Health outcomes in online infertility groups. *Proceedings of fourth international conference on communities and technologies. New York, US*.
- Wells, T. & Sevilla, C. (2004). Design of Web based virtual community supporting adolescents with chronic illness. IADIS International Conference e-Society 2004. Available online: <http://www.mgt.ncu.edu.tw> (Accessed 2 January 2012).
- Wicks, P., Keininger, D., Massagli, M., de la Loge, C., Brownstein, C., Isojärvi, J. & Heywood, J. (2011). Perceived benefits of sharing health data between people with epilepsy on an online platform. Available online: <http://dx.doi.org/10.1016/j.yebeh.2011.09.026> (Accessed 21 February 2012).
- Wild, S., Roglic, G., Green, A., Sicree, R. & King, H. (2004). Global prevalence of diabetes. *Diabetes Care*, 27(5): 1047 – 1053.
- Workman, M. (2008). A test for interventions for security threats for social engineering. *Information Management & Computer Security*, 16(5): 463 - 483.
- Wright, K. (2005). Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. Available online: <http://jcmc.indiana.edu/vol10/issue3/wright.html> (Accessed 25 February 2012).
- Zhao, X., Mattila, A. & Tao, L. (2008). The role of post-training self-efficacy in customers' use of self-service technology. *International Journal of Service Industry Management*, 19(4): 492 – 505.

APPENDIX A

8.1 Measures to support questionnaire

Confidence (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)	
I am confident in my ability to take preventative measures to maintain my health status	Self developed
I am quite confident that I can source most of the information I need about my health problems from an online environment	Self developed
I am confident in my ability to interpret health information	Self developed
I am confident in my ability to ask health professionals (eg. my doctor) about things that concern me	Self developed
I am confident in my ability to manage my health condition so as to reduce my dependence on my doctor	Self developed
I am confident in my ability to manage my health condition so that it does not affect my everyday life	Self developed
I am confident in my ability to judge when I need to see a doctor	Self developed
I am confident in my ability to do all things necessary to manage my health on a regular basis	Self developed
I am confident that I can decide what health information is useful to me	Self developed
I believe that I can communicate effectively with health professionals in an online context	Self developed
Perceived severity (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)	
It is a problem for me if I am not in control of my decisions about my own health	Becker & Janz (1985)
It is a problem for me if I am not able to get regular health advice	Becker & Janz (1985)
I do not usually think about my health	Becker & Janz (1985)
I believe that I will always need help in managing my health	Becker & Janz (1985)
Perceived benefits (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)	
The virtual community is likely to save me some effort in accessing information about my condition	Constantiou & Papazafeiropoulou (2009)
The virtual community is likely to decrease the time I spend visiting doctors and clinics	Constantiou & Papazafeiropoulou (2009)
Participating in a virtual community would make me feel better about my health	Self developed
I would feel more comfortable talking about some health conditions online than in person	Constantiou & Papazafeiropoulou (2009)
I do not believe that a virtual health community will provide me reliable health information	Constantiou & Papazafeiropoulou (2009)
I do not believe that a virtual health community will provide me with complete information	Self developed
Participating in a virtual community would be helpful for me	Self developed
The virtual community will decrease my reliance on doctors / pharmacists / nurses	Constantiou & Papazafeiropoulou (2009)

Trust (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)	
I would trust information I found in a virtual health community site	Self developed
I believe that the participants in a virtual health community are genuinely concerned about each other's wellbeing	Self developed
Virtual health communities are probably a reliable source of information	Self developed
Cues to action (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)	
It has often been recommended to me that I participate in a virtual health community	Self developed
I would probably not use a virtual health community unless my doctor recommended it	Self developed
I have seen a lot of positive information about virtual health communities	Self developed
I am more likely to participate in a virtual health community if there were nurses / doctors educating consumers how to connect to a virtual health community	Ng et al (2009)
I am more likely to participate in a virtual health community if educational posters and training material on virtual health communities was accessible around hospitals, clinics and pharmacies	Ng et al (2009)
Self efficacy (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)	
I feel confident in my ability to participate in a virtual health community	Sam et al (2005)
I have the skills needed to participate in a virtual health community	Sam et al (2005)
I would probably need help before I could get started in a virtual health community	Sam et al (2005)
I am confident that I could participate effectively in a virtual health community	Sam et al (2005)
Participating in a virtual health community would not be difficult for me	Sam et al (2005)

Technology Readiness (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)	
Optimism	
Technology gives people more control over their daily lives	Parasuraman (2000)
Products and services that use the newest technologies are much more convenient to use	Parasuraman (2000)
Technology gives me more freedom of mobility	Self developed
Computers are easier to deal with than people performing the same service	Self developed
I prefer to use the most advanced technology available	Self developed
I like doing business online because I am not limited to regular business hours	Self developed
Technology makes me feel more efficient	Parasuraman (2000)
Innovativeness	
Other people come to me for help on new technologies, for example how to use the internet	Parasuraman (2000)
I am usually the first to acquire the latest technology when it appears	Parasuraman (2000)
I usually figure out new high-tech products without help from others.	Parasuraman (2000)
I am always interested to learn about the latest technological developments	Parasuraman (2000)
I avoid trying new high-tech things because of the time it takes to learn them	Self developed
I usually have fewer problems than others in making technology work for me	Parasuraman (2000)
Discomfort	
Sometimes I think technology is not designed for ordinary people	Parasuraman (2000)
If I buy new technology, I prefer a basic model than one with extra features	Parasuraman (2000)
It is embarrassing if I battle with a high-tech gadgets in public	Parasuraman (2000)
New technology is often too complicated to be useful	Self developed
I get overwhelmed with how much I need to know, in order to use the latest technology	Self developed
I usually hesitate in purchasing the latest technology for fear of not getting value for money	Self developed
New technology never seems to work for me	Parasuraman (2000)

Insecurity	
It is not usually safe to give credit card details over the internet	Parasuraman (2000)
I do not feel confident dealing with an organisation that can only be reached online	Parasuraman (2000)
I worry that information I send over the Internet will be seen by other people	Self developed
When I provide information over the Internet, I often worry that it is not being received	Self developed
I do not consider it completely safe to transact online	Self developed
I always want to receive a confirmation after every transaction I perform online	Self developed
Behavioural Intention	
Attitude	
Participating in a virtual health community would be:	
A very bad idea (1) - A very good idea (7)	Lanseng & Andreassen (2007)
Very unpleasant (1) - Very pleasant (7)	Lanseng & Andreassen (2007)
Very harmful (1) - Very beneficial (7)	Lanseng & Andreassen (2007)
Very unfavourable (1) - Very favourable (7)	Lanseng & Andreassen (2007)
Intention to use (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)	
I would not want to participate in a virtual health community	Self developed
I intend to access a virtual health community when next looking for health advice	Self developed
I would participate in a virtual health community as often as I needed	Self developed
I am likely to participate in a virtual health community within the next six months	Self developed
I would recommend the use of a virtual health community to others	Self developed
I would prefer to participate in a virtual health community if it meant that I would not need to visit a health professional	Self developed

APPENDIX B

9.1 Letter of consent

JANINE A HAYNE

14 Georgian Terrace
3rd Avenue
Morningside
Johannesburg
2196

Mobile Number: 082 726 1976

Email: jhayne@za.go2uti.com

The CEO of UTi Pharma

Attention: Robin Botha

APPLICATION TO CONDUCT RESEARCH USING UTI PHARMA EMAIL LIST

I am currently completing my Masters in Commerce at the University of Witwatersrand. I am required to complete a dissertation which involves understanding a consumer's readiness for a virtual health community and their behavioural intention towards the virtual community.

To obtain a representative sample, permanent and temporary employees from UTi Pharma South Africa will be emailed to ensure a diverse range across all groups. The participants who will be researched will be consumers with a chronic condition. Participants, at any point during the email survey, will be able to opt out of the survey. No under age (< 18 years) participants will be emailed. Participants will not be incentivised. I have attached the questionnaire which is going to be used. This is the only data that is going to be examined.

I look forward to your response.

Yours sincerely

Janine Hayne



16 September 2011

This is to inform you that I have read the above letter and authorised that a Masters research survey can be completed using the UTI Pharma South Africa employee email list.

If you need any clarification, you can contact Janine Hayne (Masters Student) 082 7261976.

Yours sincerely



Robin Botha

UTI PHARMA CEO

Date: 16/9/11

9.2 Ethics clearance certificate



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05 October 2011

Ms J A Hayne
14 Georgian Terrace
3rd Avenue
Morningside
2196

Student Number: 479893

Dear Ms Hayne

I have pleasure in informing you that the **SEBS Post Graduate Degrees Committee** has approved the following change of title for your Research Report:

Intentions to participate in Virtual Health Communities: an empirical study of South African consumers with chronic health conditions".

Furthermore the committee has appointed the following supervisor: **Prof J Cohen**, with whom you should maintain regular contact. Please ensure that the title on the bound copies of your research report is the same as that approved by the Post Graduate Committee.

You will be required to submit to the Faculty Office on submission of the report:

- Two spiral bound copies of the Research Report with a signed declaration
- one copy of the abstract
- one copy of the title page
- the Supervisor's Clearance Form

The ethics number for your research report is **CINFO/1001**. It is very IMPORTANT that you ensure that this number appears on the cover page of your research report when you submit.

Please note that you need to be registered every year until your graduation.

Please note: After confirmation of the final Research Report mark, you will be required to submit two unbound final corrected copies signed and dated, an electronic copy (in PDF format), a signed library clearance form and have completed the full ETD form.
--

We wish you success with your research.

Kind Regards

Ms Ntshepeng Tshabalala
Senior Faculty Officer
Faculty of Commerce, Law & Management

CC Supervisor: Prof J Cohen

APPENDIX C

10.1 Covering letter

Dear Consumer,

I am a Masters student at the University of the Witwatersrand, Johannesburg. As part of my degree, I am required to carry out a research study. My study involves assessing the attitudes of South African consumers with chronic health conditions towards participation in a virtual health community.

A virtual health community in my study refers to a group of people in an online environment who share similar goals of distributing and disseminating knowledge about a shared health related topic.

You are invited to participate in my study by completing a questionnaire.

This is estimated to take fifteen minutes of your time; and you are able to opt out of the survey at any point.

Your participation is voluntary, and there is no loss of benefit in any way for not participating.

All data collected will be kept confidential and will not be used other than for the purposes of the study.

All responses are completed anonymously and you are not asked to provide any identifying information.

This study was approved unconditionally by the School's ethics committee. Protocol number: CINFO/1001

Thank you for considering to participate in the survey.

Should you wish to participate, please access the online questionnaire here: <https://www.surveymonkey.com/s/VWSKZZ5>

Janine Hayne

jhayne@za.go2uti.com | O +27 11 458 2727

10.2 Final Questionnaire

Dermis (2006:179) defines a virtual community as “a social unit that involve members who relate to one another as a group and interacting using communication technologies that bridge geographic distance.” In the case of this study, the topic will be related to chronic health conditions. Chryssanthou et al (2009) adds to the previously mentioned definition by discussing that all of the users are able to submit their online health questions and doctors participate by giving users medical advice in the area of speciality.

Please answer each of the following questions. There are no correct or incorrect answers.
All of the data collected will be kept confidential and you are not asked to provide any identifying information.

QUESTIONNAIRE

Are you on medication that requires regular refilling?	Yes				No		
If yes, is this medication for a chronic condition?	Yes				No		
Please indicate your age?		18-25	26-35	36-45	46-55	56-65	66+
Gender	Male				Female		
What level of education do you have?	Grade 12	Diploma	Bachelors Degree	Honours Degree	Masters Degree	Doctorate Degree	
Do you own or have regular access to the internet?	Yes				No		
Which of the following medical cover options best reflects your plan?	Hospital		Hospital and day to day cover		Im not on medical aid		Not sure

Confidence (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)							
I am confident in my ability to take preventative measures to maintain my health status	1	2	3	4	5	6	7
I am quite confident that I can source most of the information I need about my health problems from an online environment	1	2	3	4	5	6	7
I am confident in my ability to interpret health information	1	2	3	4	5	6	7
I am confident in my ability to ask health professionals (eg. my doctor) about things that concern me	1	2	3	4	5	6	7
I am confident in my ability to manage my health condition so as to reduce my dependence on my doctor	1	2	3	4	5	6	7
I am confident in my ability to manage my health condition so that it does not affect my everyday life	1	2	3	4	5	6	7
I am confident in my ability to judge when I need to see a doctor	1	2	3	4	5	6	7
I am confident in my ability to do all things necessary to manage my health on a regular basis	1	2	3	4	5	6	7
I am confident that I can decide what health information is useful to me	1	2	3	4	5	6	7
I believe that I can communicate effectively with health professionals in an online context	1	2	3	4	5	6	7
Perceived severity (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)							
It is a problem for me if I am not in control of my decisions about my own health	1	2	3	4	5	6	7
It is a problem for me if I am not able to get regular health advice	1	2	3	4	5	6	7
I do not usually think about my health	1	2	3	4	5	6	7
I believe that I will always need help in managing my health	1	2	3	4	5	6	7
Perceived benefits (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)							
The virtual community is likely to save me some effort in accessing information about my condition	1	2	3	4	5	6	7
The virtual community is likely to decrease the time I spend visiting doctors and clinics	1	2	3	4	5	6	7
Participating in a virtual community would make me feel better about my health	1	2	3	4	5	6	7
I would feel more comfortable talking about some health conditions online than in person	1	2	3	4	5	6	7
I do not believe that a virtual health community will provide me reliable health information	1	2	3	4	5	6	7
I do not believe that a virtual health community will provide me with complete information	1	2	3	4	5	6	7
Participating in a virtual community would be helpful for me	1	2	3	4	5	6	7
The virtual community will decrease my reliance on doctors / pharmacists / nurses	1	2	3	4	5	6	7

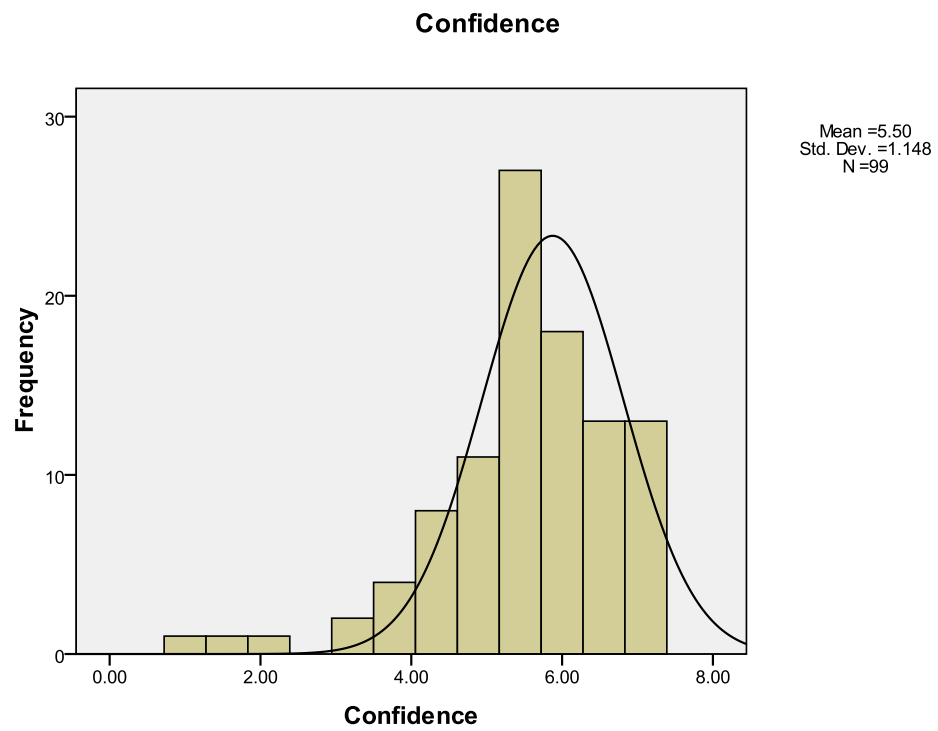
Trust (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)							
I would trust information I found in a virtual health community site	1	2	3	4	5	6	7
I believe that the participants in a virtual health community are genuinely concerned about each other's wellbeing	1	2	3	4	5	6	7
Virtual health communities are probably a reliable source of information	1	2	3	4	5	6	7
Cues to action (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)							
It has often been recommended to me that I participate in a virtual health community	1	2	3	4	5	6	7
I would probably not use a virtual health community unless my doctor recommended it	1	2	3	4	5	6	7
I have seen a lot of positive information about virtual health communities	1	2	3	4	5	6	7
I am more likely to participate in a virtual health community if there were nurses / doctors educating consumers how to connect to a virtual health community	1	2	3	4	5	6	7
I am more likely to participate in a virtual health community if educational posters and training material on virtual health communities was accessible around hospitals, clinics and pharmacies	1	2	3	4	5	6	7
Self efficacy (Likert scale. 1: Strongly disagree; 7: Strongly agree. Please circle the relevant answer)							
I feel confident in my ability to participate in a virtual health community	1	2	3	4	5	6	7
I have the skills needed to participate in a virtual health community	1	2	3	4	5	6	7
I would probably need help before I could get started in a virtual health community	1	2	3	4	5	6	7
I am confident that I could participate effectively in a virtual health community	1	2	3	4	5	6	7
Participating in a virtual health community would not be difficult for me	1	2	3	4	5	6	7
Technology Readiness (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)							
Optimism							
Technology gives people more control over their daily lives	1	2	3	4	5	6	7
Products and services that use the newest technologies are much more convenient to use	1	2	3	4	5	6	7
Technology gives me more freedom of mobility	1	2	3	4	5	6	7
Computers are easier to deal with than people performing the same service	1	2	3	4	5	6	7
I prefer to use the most advanced technology available	1	2	3	4	5	6	7
I like doing business online because I am not limited to regular business hours	1	2	3	4	5	6	7
Technology makes me feel more efficient	1	2	3	4	5	6	7

Innovativeness							
Other people come to me for help on new technologies, for example how to use the internet	1	2	3	4	5	6	7
I am usually the first to acquire the latest technology when it appears	1	2	3	4	5	6	7
I usually figure out new high-tech products without help from others.	1	2	3	4	5	6	7
I am always interested to learn about the latest technological developments	1	2	3	4	5	6	7
I avoid trying new high-tech things because of the time it takes to learn them	1	2	3	4	5	6	7
I usually have fewer problems than others in making technology work for me	1	2	3	4	5	6	7
Discomfort							
Sometimes I think technology is not designed for ordinary people	1	2	3	4	5	6	7
If I buy new technology, I prefer a basic model than one with extra features	1	2	3	4	5	6	7
It is embarrassing if I battle with a high-tech gadgets in public	1	2	3	4	5	6	7
New technology is often too complicated to be useful	1	2	3	4	5	6	7
I get overwhelmed with how much I need to know, in order to use the latest technology	1	2	3	4	5	6	7
I usually hesitate in purchasing the latest technology for fear of not getting value for money	1	2	3	4	5	6	7
New technology never seems to work for me	1	2	3	4	5	6	7
Insecurity							
It is not usually safe to give credit card details over the internet	1	2	3	4	5	6	7
I do not feel confident dealing with an organisation that can only be reached online	1	2	3	4	5	6	7
I worry that information I send over the Internet will be seen by other people	1	2	3	4	5	6	7
When I provide information over the Internet, I often worry that it is not being received	1	2	3	4	5	6	7
I do not consider it completely safe to transact online	1	2	3	4	5	6	7
I always want to receive a confirmation after every transaction I perform online	1	2	3	4	5	6	7

Behavioural Intention							
Attitude							
Participating in a virtual health community would be:							
A very bad idea (1) - A very good idea (7)	1	2	3	4	5	6	7
Very unpleasant (1) - Very pleasant (7)	1	2	3	4	5	6	7
Very harmful (1) - Very beneficial (7)	1	2	3	4	5	6	7
Very unfavourable (1) - Very favourable (7)	1	2	3	4	5	6	7
Intention to use (Likert scale. 1: Strongly disagree; 7: Very Strongly agree. Please circle the relevant answer)							
I would not want to participate in a virtual health community							
I intend to access a virtual health community when next looking for health advice	1	2	3	4	5	6	7
I would participate in a virtual health community as often as I needed	1	2	3	4	5	6	7
I am likely to participate in a virtual health community within the next six months							
I would recommend the use of a virtual health community to others	1	2	3	4	5	6	7
I would prefer to participate in a virtual health community if it meant that I would not need to visit a health professional	1	2	3	4	5	6	7

APPENDIX D

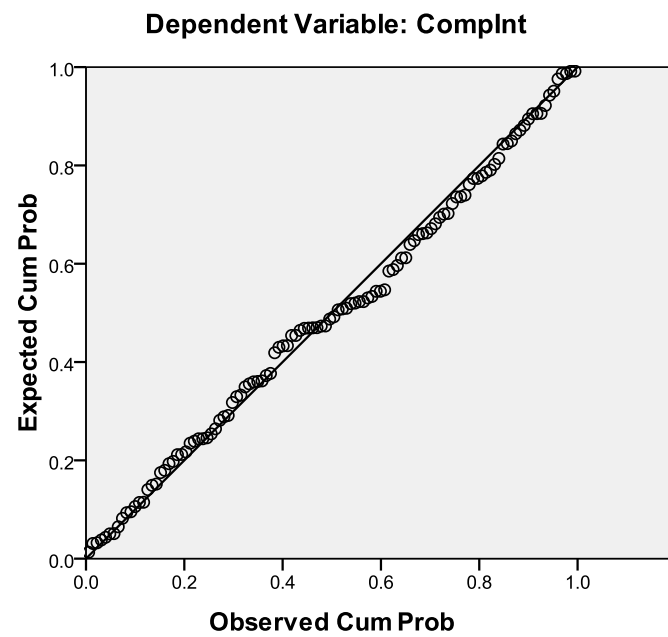
11.1 Composite Scores – Histogram Confidence



APPENDIX E

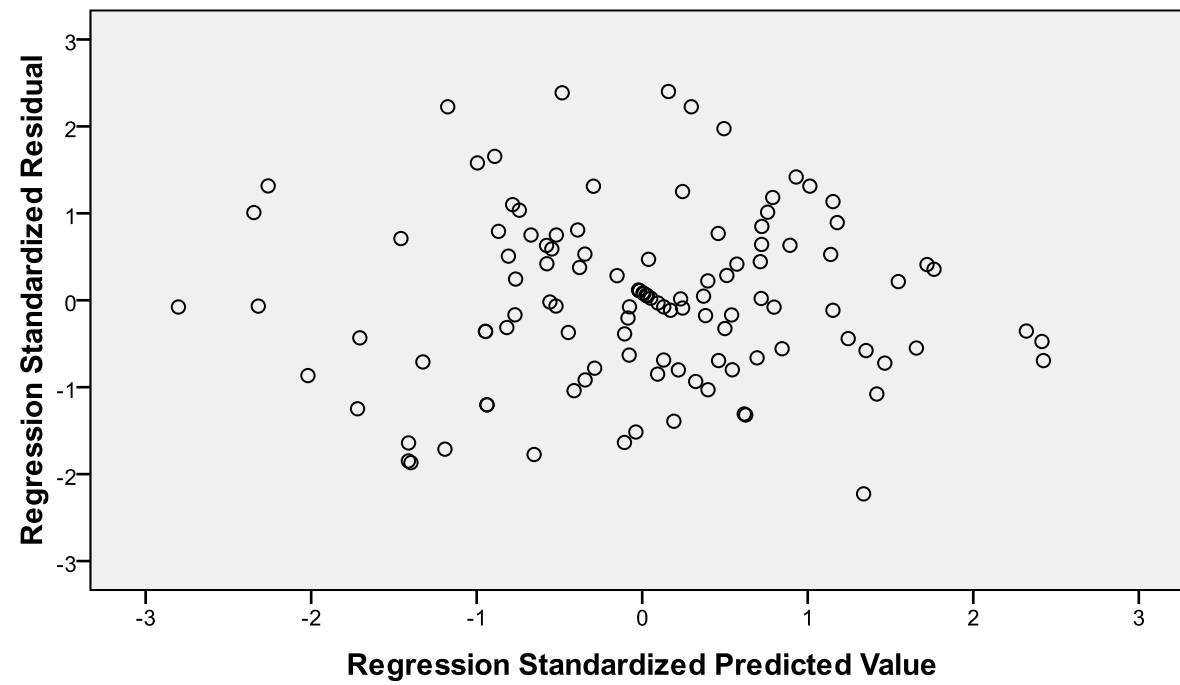
12.1 Heteroscedasticity tests

Normal P-P Plot of Regression Standardized Residual



Scatterplot

Dependent Variable: Complnt



12.2 Testing for multiple regression

12.2.1 Model 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.067 ^a	.005	-.017	1.48052	.005	.213	2	94	.808

a. Predictors: (Constant), GEN, CHRONIC

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.934	2	.467	.213	.808 ^a
	Residual	206.043	94	2.192		
	Total	206.977	96			

a. Predictors: (Constant), GEN, CHRONIC

b. Dependent Variable: Attitude

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	5.139	.596		8.619	.000
CHRONIC	.191	.312	.065	.611	.543
GEN	-.114	.311	-.039	-.367	.714

a. Dependent Variable: Attitude

12.2.2 Model 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.095 ^a	.009	-.012	1.67306	.009	.430	2	94	.652

a. Predictors: (Constant), GEN, CHRONIC

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.406	2	1.203	.430	.652 ^a
	Residual	263.117	94	2.799		
	Total	265.523	96			

a. Predictors: (Constant), GEN, CHRONIC

b. Dependent Variable: IntentionToUse

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4.957	.674		7.356	.000
CHRONIC	-.310	.353	-.093	-.880	.381
GEN	-.027	.352	-.008	-.076	.939

a. Dependent Variable: IntentionToUse

12.2.3 Model 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.706 ^a	.498	.471	1.05678	.498	18.486	5	93	.000

a. Predictors: (Constant), SelfEfficacy, CueToAction, PerceivedSeverity, PerceivedBenefits, Confidence

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	103.223	5	20.645	18.486	.000 ^a
	Residual	103.861	93	1.117		
	Total	207.085	98			

a. Predictors: (Constant), SelfEfficacy, CueToAction, PerceivedSeverity, PerceivedBenefits, Confidence

b. Dependent Variable: Attitude

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.251	.658		.382	.704
	Confidence	.055	.111	.044	.500	.618
	PerceivedSeverity	.008	.098	.007	.079	.937
	PerceivedBenefits	.324	.089	.314	3.657	.000
	CueToAction	.396	.082	.381	4.856	.000
	SelfEfficacy	.275	.097	.260	2.847	.005

a. Dependent Variable: Attitude

12.2.4 Model 4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.778 ^a	.605	.584	1.06728	.605	28.541	5	93	.000

a. Predictors: (Constant), SelfEfficacy, CueToAction, PerceivedSeverity, PerceivedBenefits, Confidence

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	162.557	5	32.511	28.541	.000 ^a
	Residual	105.936	93	1.139		
	Total	268.493	98			

a. Predictors: (Constant), SelfEfficacy, CueToAction, PerceivedSeverity, PerceivedBenefits, Confidence

b. Dependent Variable: IntentionToUse

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	-1.378	.664	-2.074	.041
	Confidence	.025	.112	.017	.822
	PerceivedSeverity	-.108	.099	-.081	.277
	PerceivedBenefits	.427	.090	.363	.000
	CueToAction	.362	.082	.306	.000
	SelfEfficacy	.540	.098	.448	.000

a. Dependent Variable: IntentionToUse

12.2.5 Model 5

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.544 ^a	.296	.266	1.24558	.296	9.869	4	94	.000

a. Predictors: (Constant), Insecurity, Innovation, Discomfort, Optimism

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.248	4	15.312	9.869	.000 ^a
	Residual	145.837	94	1.551		
	Total	207.085	98			

a. Predictors: (Constant), Insecurity, Innovation, Discomfort, Optimism

b. Dependent Variable: Attitude

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.180	.730		1.616	.109
Optimism	.623	.128	.540	4.845	.000
Innovation	.000	.114	.000	-.003	.997
Discomfort	.202	.118	.180	1.712	.090
Insecurity	.052	.104	.051	.498	.619

a. Dependent Variable: Attitude

12.2.6 Model 6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.532 ^a	.283	.252	1.43114	.283	9.273	4	94	.000

a. Predictors: (Constant), Insecurity, Innovation, Discomfort, Optimism

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	75.966	4	18.992	9.273	.000 ^a
	Residual	192.527	94	2.048		
	Total	268.493	98			

a. Predictors: (Constant), Insecurity, Innovation, Discomfort, Optimism

b. Dependent Variable: IntentionToUse

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	1.095	.839	1.305	.195
	Optimism	.627	.148	.477	.000
	Innovation	.074	.131	.066	.573
	Discomfort	.259	.135	.203	.059
	Insecurity	-.218	.120	-.187	.071

a. Dependent Variable: IntentionToUse

12.2.7 Model 7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.536 ^a	.288	.280	1.23307	.288	39.199	1	97	.000

a. Predictors: (Constant), Trust

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.600	1	59.600	39.199	.000 ^a
	Residual	147.485	97	1.520		
	Total	207.085	98			

a. Predictors: (Constant), Trust

b. Dependent Variable: Attitude

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.764	.413		6.694	.000
Trust	.553	.088	.536	6.261	.000

a. Dependent Variable: Attitude

12.2.8 Model 8

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514 ^a	.265	.257	1.42663	.265	34.919	1	97	.000

a. Predictors: (Constant), Trust

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.071	1	71.071	34.919	.000 ^a
	Residual	197.422	97	2.035		
	Total	268.493	98			

a. Predictors: (Constant), Trust

b. Dependent Variable: IntentionToUse

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.794	.478		3.756	.000
Trust	.604	.102	.514	5.909	.000

a. Dependent Variable: IntentionToUse

12.2.9 Model 9

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.769 ^a	.592	.534	1.00288	.592	10.149	12	84	.000

a. Predictors: (Constant), Insecurity, PerceivedBenefits, CHRONIC, Innovation, GEN, Confidence, CueToAction, PerceivedSeverity, Trust, SelfEfficacy, Discomfort, Optimism

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	122.492	12	10.208	10.149	.000 ^a
	Residual	84.485	84	1.006		
	Total	206.977	96			

a. Predictors: (Constant), Insecurity, PerceivedBenefits, CHRONIC, Innovation, GEN, Confidence, CueToAction, PerceivedSeverity, Trust, SelfEfficacy, Discomfort, Optimism

b. Dependent Variable: Attitude

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.577	.854		-1.846	.068
	CHRONIC	.277	.240	.094	1.155	.251
	GEN	.299	.227	.102	1.320	.190
	Confidence	-.004	.112	-.003	-.036	.971
	PerceivedSeverity	-.021	.100	-.018	-.212	.832
	PerceivedBenefits	.251	.096	.243	2.626	.010
	Trust	.217	.092	.210	2.344	.021
	CueToAction	.329	.084	.317	3.918	.000
	SelfEfficacy	.129	.101	.122	1.277	.205
	Optimism	.265	.120	.228	2.215	.029
	Innovation	.033	.099	.033	.332	.741
	Discomfort	.004	.104	.003	.038	.970
	Insecurity	.078	.089	.075	.879	.382

a. Dependent Variable: Attitude

12.2.10 Model 10

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.839 ^a	.704	.657	.97391

a. Predictors: (Constant), Attitude, GEN, Insecurity, CHRONIC, Confidence, Innovation, PerceivedSeverity, CueToAction, Trust, Discomfort, SelfEfficacy, PerceivedBenefits, Optimism

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	186.798	13	14.369	15.149	.000 ^a
	Residual	78.725	83	.948		
	Total	265.523	96			

a. Predictors: (Constant), Attitude, GEN, Insecurity, CHRONIC, Confidence, Innovation, PerceivedSeverity, CueToAction, Trust, Discomfort, SelfEfficacy, PerceivedBenefits, Optimism

b. Dependent Variable: IntentionToUse

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1					
(Constant)	-1.454	.846		-1.718	.090
CHRONIC	-.409	.235	-.123	-1.744	.085
GEN	.332	.223	.100	1.490	.140
Confidence	-.029	.108	-.020	-.265	.792
PerceivedSeverity	-.042	.097	-.031	-.430	.668
PerceivedBenefits	.276	.097	.236	2.860	.005
CueToAction	.293	.089	.249	3.302	.001
SelfEfficacy	.434	.099	.361	4.367	.000
Trust	.060	.093	.051	.644	.521
Optimism	.082	.120	.062	.686	.495
Innovation	.118	.097	.105	1.218	.227
Discomfort	.114	.101	.089	1.129	.262
Insecurity	-.237	.086	-.202	-2.741	.007
Attitude	.208	.106	.184	1.967	.053

a. Dependent Variable: IntentionToUse

12.2.11 *Model 11*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.863 ^a	.744	.707	.77776

a. Predictors: (Constant), Insecurity, PerceivedBenefits, CHRONIC, Innovation, GEN, Confidence, CueToAction, PerceivedSeverity, Trust, SelfEfficacy, Discomfort, Optimism

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	147.656	12	12.305	20.341	.000 ^a
	Residual	50.812	84	.605		
	Total	198.468	96			

a. Predictors: (Constant), Insecurity, PerceivedBenefits, CHRONIC, Innovation, GEN, Confidence, CueToAction, PerceivedSeverity, Trust, SelfEfficacy, Discomfort, Optimism

b. Dependent Variable: AdoptionIntention

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	-1.691	.663	-2.553	.013
	CHRONIC	-.072	.186	-.025	.699
	GEN	.352	.176	.122	.049
	Confidence	-.018	.087	-.015	.834
	PerceivedSeverity	-.035	.077	-.030	.652
	PerceivedBenefits	.294	.074	.291	.000
	CueToAction	.347	.065	.341	.000
	SelfEfficacy	.314	.079	.302	.000
	Trust	.155	.072	.153	.034
	Optimism	.194	.093	.171	.040
	Innovation	.084	.077	.087	.280
	Discomfort	.065	.080	.059	.419
	Insecurity	-.088	.069	-.087	.204

a. Dependent Variable: AdoptionIntention

12.3 Multiple Regressions (Chronic)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	CHRONIC = 2 (Selected)			
1	.903 ^a	.815	.748	.74107

a. Predictors: (Constant), Insecurity, PerceivedBenefits, Confidence, GEN, PerceivedSeverity, Innovation, SelfEfficacy, Trust, CueToAction, Discomfort, Optimism

ANOVA^{b,c}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	72.779	11	6.616	12.047	.000 ^a
	Residual	16.476	30	.549		
	Total	89.255	41			

a. Predictors: (Constant), Insecurity, PerceivedBenefits, Confidence, GEN, PerceivedSeverity, Innovation, SelfEfficacy, Trust, CueToAction, Discomfort, Optimism

b. Dependent Variable: AdoptionIntention

c. Selecting only cases for which CHRONIC = 2

Coefficients^{a,b}

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-1.473	1.106		-1.332	.193
GEN	.337	.279	.107	1.208	.237
Confidence	-.089	.113	-.069	-.782	.440
PerceivedSeverity	-.078	.138	-.059	-.561	.579
PerceivedBenefits	.222	.132	.208	1.676	.104
CueToAction	.553	.113	.565	4.909	.000
SelfEfficacy	.454	.142	.345	3.197	.003
Trust	.192	.119	.177	1.610	.118
Optimism	.005	.163	.004	.029	.977
Innovation	.190	.126	.196	1.507	.142
Discomfort	-.059	.126	-.055	-.466	.645
Insecurity	-.133	.112	-.122	-1.182	.247

a. Dependent Variable: AdoptionIntention

b. Selecting only cases for which CHRONIC = 2

12.4 Multiple Regressions (Not Chronic)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	CHRONIC = 1 (Selected)			
1	.873 ^a	.762	.700	.77739

a. Predictors: (Constant), Insecurity, Innovation, CueToAction, PerceivedBenefits, GEN, Trust, Discomfort, PerceivedSeverity, Confidence, Optimism, SelfEfficacy

ANOVA^{b,c}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	82.973	11	7.543	12.482	.000 ^a
	Residual	25.986	43	.604		
	Total	108.960	54			

a. Predictors: (Constant), Insecurity, Innovation, CueToAction, PerceivedBenefits, GEN, Trust, Discomfort, PerceivedSeverity, Confidence, Optimism, SelfEfficacy

b. Dependent Variable: AdoptionIntention

c. Selecting only cases for which CHRONIC = 1

Coefficients^{a,b}

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-1.109	.860		-1.289	.204
GEN	.068	.248	.024	.274	.785
Confidence	.135	.144	.109	.937	.354
PerceivedSeverity	-.057	.104	-.052	-.554	.583
PerceivedBenefits	.255	.107	.256	2.387	.021
CueToAction	.194	.087	.182	2.229	.031
SelfEfficacy	.295	.117	.320	2.531	.015
Trust	.066	.102	.069	.647	.521
Optimism	.361	.115	.335	3.140	.003
Innovation	-.078	.102	-.081	-.760	.452
Discomfort	.191	.109	.164	1.755	.086
Insecurity	-.117	.091	-.122	-1.279	.208

a. Dependent Variable: AdoptionIntention

b. Selecting only cases for which CHRONIC = 1