THE ADOPTION OF INTERNET TECHNOLOGY AMONG GENERAL PRACTIONERS IN KWAZULU-NATAL

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Submitted in partial fulfilment of the requirements for the degree of

Masters in Business Administration

Business Studies Unit, Durban University of Technology

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July 2008

APPROVED FOR SUBMISSION

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Declaration

This work has not been previously accepted in substance for any degree and is not concurrently submitted for any degree.

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ACKNOWLEDGEMENTS

- To Gareth for his unconditional love, support and tolerance throughout this degree. Thank you.

- To Peter Raap, my supervisor, for his assistance and advice.

ABSTRACT

The pharmaceutical industry is in the midst of a fundamental transformation. Time and cost constraints are forcing marketers to search for new ways to maintain and grow brand awareness. The amount of time that doctors allow for representatives to market their products is becoming less and less and as a result products are not getting the exposure they used to. Organisations that find innovative ways to maintain exposure of their products may gain a competitive advantage over those organisations that rely on traditional marketing methods. The prolific increase in the use of the internet may provide pharmaceutical organisations with a complementary channel to market their products.

The objective of this study is to determine the levels of internet technology adoption among general practitioners. The Technology Acceptance Model (TAM) is one of the most influential research models in studies of the determinants of information systems/ information technology (IS/IT) acceptance. In TAM, perceived usefulness and perceived ease of use are hypothesised and empirically supported as fundamental determinants of user acceptance of a given IS/IT.

Using TAM, this study sets out to determine general practitioners' intention to use the internet as a source of pharmaceutical information. The literature review provides an extensive evaluation on the development of TAM and its application in different technologies. Based on these findings, the researcher developed this study to investigate internet technology acceptance in the pharmaceutical industry.

Use is made of the descriptive survey method and data is retrieved from a sample of 105 general practitioners in Kwazulu-Natal. The observation is made via the benefit of a questionnaire. The process of sampling is that of convenient sampling. The analysis is quantitative and makes use of statistical analysis appropriate for the data.

Analysis of the survey results produces useful insights into the factors influencing internet technology adoption by general practitioners. When analysing the independent variables, respondents were not in strong agreement about the perceived usefulness nor the perceived ease of use of internet technology as a source of pharmaceutical information. However, positive results from the relationships between the independent (perceived usefulness and perceived ease of use) and dependent variables (attitude and intention to use) provide valuable data with which organisations may develop internet-based marketing strategies.

Based on the survey findings, recommendations using the Beynon-Davies (2004) Internet Adoption Model are suggested.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The pharmaceutical industry is highly research-oriented, especially in long-term basic and applied research. The industry requires enormous expenditures in brand image-building and sales promotion. Historically, pharmaceutical companies have tended to focus primarily on developing new products and the business model has been based on the fact that superior products would sell themselves through an effective sales force. As a result of these beliefs and strategies - communication has been one way.

According to Lin and Huarng (2000: 101), two fundamental revolutions now underway are challenging the pharmaceutical industry. One is the profound restructuring of health services, and the other is the information technology revolution. At the core of these challenges is the internet. From the way research is conducted to the way products are marketed, the internet is providing information faster and more efficiently to the end user (Lin and Huarng, 2000: 101). Rogers (1999) commented that the “internet is the fastest growing communication medium in history. However, according to Ruzicic, Haughey and Silber (2001), despite the hype and investment in e-health, the internet has not yet been fully embraced by the pharmaceutical industry for marketing and sales.

There seems to be a gap between innovation in other sectors of the economy such as banking and travel and what seems to be happening within the pharmaceutical industry. In order for the pharmaceutical industry to optimise its service and marketing functions via information technology, customers (medical doctors) need to be willing to utilise the internet (world wide web) as a means to obtain pharmaceutical information.

In a 2008 Pharmasales article, "eDetailing and how it affects you", author Dr Bates, comments that besides the overall development of the internet in everyday life, there are three direct drivers behind the growth of e-detailing, a communication form of e-marketing in the pharma industry:

- Falling effectiveness and increasing costs of employing sales representatives
- Increasingly busy doctors with little time to see representatives
- High connectivity and acceptance of internet by physicians

Resulting from pressures such as the above, this study aims to determine the adoption of internet technology by a group of medical doctors (general practitioners) in Kwazulu-Natal.

1.2 PROBLEM STATEMENT

Faced with an increasingly difficult operating environment, pharmaceutical companies are seeking ways to establish close and sustainable relationships with their customers. Anecdotal evidence from other industry sectors

suggests that the internet may offer pharmaceutical marketers the chance to be innovative in the way they interact with customers.

As the development of IT applications specifically designed to support performance and services within a professional context continues to expand, the need for identifying the factors which would potentially affect individual professionals' technology acceptance decisions, will become increasingly important.

Therefore, before pharmaceutical organisations invest heavily in internet technology, knowledge of the usage and acceptance behaviour of end users (in this research, general practitioners) towards internet technology is important (Chau and Hu, 2002: 193). Once the acceptance levels are known, companies can begin to implement strategies aimed at improving the attitude towards and usage of a particular technology. Using the Technology Acceptance Model (TAM) developed by Davis (1989: 319), this study proposes to determine the adoption of internet technology among general practitioners in Kwazulu-Natal.

1.3 RESEARCH OBJECTIVE AND SUB OBJECTIVES

The objective of this study is to determine general practitioners' adoption of internet technology as a source of pharmaceutical information. Sub-objectives need to be established in order to determine the study objective.

Using the Technology Acceptance Model, the following sub-objectives will be explored:

Sub-objective 1.3.1 To determine general practitioners' perceived usefulness of internet technology as a source of pharmaceutical information

Sub-objective 1.3.2 To identify general practitioners' perceived ease of use of internet technology as a source of pharmaceutical information

Sub-objective 1.3.3 To determine the relationship between general practitioners' perceived usefulness of and attitude towards internet technology as a source of pharmaceutical information

Sub-objective 1.3.4 To determine the relationship between general practitioners' perceived ease of use and their attitude towards internet technology as a source of pharmaceutical information

Sub-objective 1.3.5 To determine the relationship between general practitioners' perceived ease of use and their perceived usefulness towards using internet technology as a source of pharmaceutical information

Sub-objective 1.3.6 To determine the relationship between general practitioners' perceived usefulness and their behavioural intention towards using internet technology as a source of pharmaceutical information

Sub-objective 1.3.7 To determine the relationship between the general practitioners' attitude and their intention to use the internet technology as a source of pharmaceutical information

1.4 RATIONALE FOR THE STUDY

Rising sales force costs and busy 'hard to see' general practitioners are making face-to-face sales calls less frequent, shorter and less effective. The amount of time spent with sales representatives by the average US physician decreased from 12 minutes per day in 1995 to 7 minutes per day in 2000 (King, 2002). An article by Bates (2008) states that 40% of medical representative calls to customers are cancelled or rescheduled and that over 80% of conversations between sales representatives and physicians last around two minutes. A study conducted by OB-GYN.net in North America (www.eyeforpharma.com), showed that of the 380 respondents, 46% said they were spending less time with pharmaceutical representatives (reps) than in the past and more than 14% said they do not see pharmaceutical reps at all. Results such as these indicate that pharmaceutical companies need to search for new ways to communicate effectively and efficiently with their customers.

The internet is a tool that has the potential to greatly affect and improve the quality of healthcare services. It is a vehicle by which pharmaceutical organisations can broaden the accessibility of applications by users, facilitate exchanges of information, reduce costs, enhance revenue, and provide better quality of service to their customers. However, the best website/ service will

not give any pharmaceutical organisation a competitive advantage if the end user does not readily accept the new form of communication. It is therefore necessary for the industry to determine if general practitioners accept this mode of technology to gain pharmaceutical product information and services before spending the resources to develop it.

1.5 SCOPE OF THE STUDY/DELIMITATIONS

This study will be based on a single-study design, researching internet technology in a user group which is specific, both professionally and geographically. This study will be restricted to general practitioners in Kwazulu-Natal. Therefore, caution will need to be exercised when generalising the research results to other professional groups, technologies or other geographical areas.

This study will be limited in the timing and method of data collection. The data will be cross-sectional. The acceptance of internet technology may be time variant or modified as the customers gain more knowledge or experience about the technology.

1.6 IMPORTANCE OF THE STUDY

The growing interest toward internet related healthcare activities is causing significant changes in the US healthcare environment (Kerwin, 2002: 226). The last few years have seen significant changes to the pharmaceutical landscape in South Africa. External forces such as legislation and benchmark pricing are forcing the industry to tighten their budgets. Also, customers

(medical doctors) are getting busier and have less time to spend seeing pharmaceutical representatives. The internet can potentially provide organisations with a complementary marketing tool to increase brand awareness as well as to increase the breadth and depth of their customers. The aim of this study is to determine the adoption of the internet among general practitioners to search the internet for pharmaceutical information. The importance of this is to establish what level customers are at in accepting this new mode of communication. Global trends indicate that the internet is a powerful tool for pharmaceutical marketers to use to market their brands to physicians. If brand managers know the status of their customers in terms of internet adoption, strategies may be implemented accordingly. If customers are accepting of the internet as a marketing tool, marketers can use this medium to gain a competitive advantage over those companies not yet using the internet as a marketing channel.

1.7 ORGANISATION OF THE REMAINDER OF THE STUDY

Chapter One will serve as an introduction to state the research objectives and position it in its relevant context. Chapter Two will provide the literature review. Previous models and studies are explored and compared to assist in solving the research problem. Chapter Three will discuss and justify the research design and methodology used in order to investigate the research objective. Chapter Four will analyse and present the data collected from the study. Chapter Five will summarise, discuss and interpret the main conclusions of the study. Recommendations will be made for further research.

CHAPTER 2

E-MARKETING, THE INTERNET AND THE TECHNOLOGY ACCEPTANCE MODEL

2.1 INTRODUCTION

Driven by service improvement, market competitiveness and enhancement, pharmaceutical companies are likely to invest heavily in information technology (IT) for areas such as marketing, and are likely to continue to do so in the years to come. Li, Browne and Chau (2006: 427) commented in their study that an increasing number of businesses are utilising the World Wide Web as a marketing channel to deliver their products and services. The study also remarks that developing the ability to both attract new customers and retain existing customers on websites presents a major challenge for marketing managers.

Although the healthcare industry has been relatively slow in adopting IT, physicians are increasingly viewing computers as tools that significantly improve the quality of their work practice and patient care (Yi, et al. 2006).

As the development of IT applications specifically designed to support performance and services within a professional context continues to expand, the need for identifying essential factors potentially affecting individual professionals' technology acceptance decisions will become increasingly important.

Therefore, before pharmaceutical organisations invest heavily in IT, knowledge levels of the usage, attitude and acceptance behaviour of the end users (in this research, general practitioners) towards internet technology is essential (Chau and Hu, 2002: 193).

Firstly, the literature introduces a short description of the internet and its role in marketing. Secondly, the evolution of internet use is portrayed. The relevance of these sections is to establish the growing trend of worldwide internet use but also more specifically, use in the pharmaceutical industry. The literature then reviews three different models that have been developed to measure attitude towards technology. The models are described and reasons for not using two of the models are justified. The third model, the Technology Acceptance Model (TAM) is reviewed in depth. The literature explains the model and various studies using the model are analysed. The model, developed by Davis (1989: 319), has been shown to successfully demonstrate usage intentions and behaviour among a variety of technologies. Description of the various variables of TAM and their use in various studies then allowed the researcher to formulate sub-objectives to determine what general practitioners' (medical doctors) behavioural intention/adoption is towards using internet technology as a means of obtaining pharmaceutical information.

2.2 THE INTERNET AND E-MARKETING

The internet, short for inter-network, was initially designed as a medium to exchange research data, but it has now become an essential part of the

technological infrastructure of modern organisations in both the public and private sectors. Some have even claimed it to be the fundamental basis of a global information society (Currie, 2000).

Currently the internet is a set of interconnected computer networks distributed around the globe. The internet can be considered on a number of levels. The base infrastructure of the internet is composed of packet-switched networks and a series of communication protocols. On this layer runs a series of applications such as e-mail and the World Wide Web (Beynon-Davies, 2004: 158).

The internet provides marketers with the ability to interact with people far more. Its key benefits to the marketer include complementary uses besides those of other more traditional direct marketing methods to supply further information. It also provides a means to request information from sources, ask questions or register online (Stone, Bond and Blake, 2003: 257). The internet has the potential to identify, access and develop relationships with customers, thereby enabling organisations to complement traditional ways of "getting to know their customers".

Smith and Chaffey (2003: 13) describe E-marketing as the way in which e-tools such as web-sites, customer relationship management (CRM) systems and databases can be used to get closer to customers which in turn enables marketers to identify, anticipate and satisfy their customers needs efficiently and effectively. E-marketing also assists in directing customers to product

websites, delivers brand messages, creates product awareness and may also act as a gateway to other company products and services.

The IT-driven transformation in the pharmaceutical industry creates strategic opportunities and competitive pressures at the same time. On the one hand, existing and new companies are developing websites and portals for customer interaction as well as for enhanced quality of care (Kerwin, 2002). On the other hand, the internet creates opportunities for pharmaceutical companies to improve the depth and breadth of their interaction with existing and new customer segments. As cited by Alt and Puschmann (2005: 298), both effects emphasise Porter's view that internet technologies are *complementary* to existing interaction channels (eg.sales representatives) and need to leverage a company's existing competencies (Porter, 2001). Porter (2001) emphasises the point that virtual activities, such as e-marketing, do not eliminate the need for physical activities (such as sales representatives) but often amplify their importance. The complementarity's between the internet and traditional activities arises due to the fact that most internet applications have some short-comings in comparison with conventional methods. It is important to realise that while internet technology can do many useful things, it cannot do everything. Limitations include the following:

- knowledge transfer is restricted to codified knowledge, sacrificing the judgement that occurs in the interaction between a healthcare professional and a skilled sales representative
- the lack of human contact with the customer eliminates a powerful tool for encouraging scripting of a particular drug

- delays in obtaining information maybe as a result of navigating sites and finding information
- attracting new customers may be more difficult given the sheer magnitude of information available on the internet.

Porter continues to comment that an internet application and a traditional method benefit each other. Websites that supply product information and support direct marketing may make traditional sales representatives (reps) more, not less, productive and valuable. The sales reps can compensate for the limits of the website by providing personalised, face-to-face advice. Also, the site can make the sales force more productive by automating the exchange of routine information and serve as an effective new channel for leads. The fit between company activities, a cornerstone of strategic positioning, is strengthened in this way by the deployment of internet technology.

2.3 EVOLUTION AND ADOPTION OF THE INTERNET

2.3.1 Internet Usage Trends

Approximately 15% of the world's 6.3 billion population is online (Hanson and Kalyanam, 2006: 14). This incredible achievement creates a valuable global resource with significant additional room for expansion. It creates an infrastructure capable of sharing content and communications nearly instantly around the world. Far from declining of importance, the internet is boosting productivity and supporting entire new industries around the world. According to Hanson and Kalyanam (2007: 14), the United States ranked number 1 in

terms of population internet access. In 2004, 63.9% of the US population had internet access. The United Kingdom had 55.1%. South Africa did not rank in the top 15 countries (nor did any African country). In 2007, internet usage increased to 69.6% in the US and to 62.3% in the UK (www.internetworld stats.com). South Africa shows considerable less penetration than above-mentioned countries with only 11.6% of the population having access to the Internet.

The above statistics may have an influence on the rate at which pharmaceutical information is accepted by medical doctors on the World Wide Web in the UK and USA as opposed to in South Africa.

2.3.2 Internet usage amongst physicians

Lerer commented that "while a growing number of physicians and consumers have internet access, there is considerable controversy over whether internet penetration, in Europe at least, has reached the critical mass to make it a viable channel for selling health-related products and services" (2002: 160).

However, as time has progressed, it appears that internet awareness and usage among physicians is increasing. A 2006 study from by Manhattan Research (www.eyeforpharma.com) examined the top emerging online trends among European physicians. The survey was conducted telephonically among more than 1000 physicians during the fourth quarter of 2005.

The results report that 84% of European doctors use the internet, with most accessing professional information, including online journals, literature

databases and prescription drug information. Also, one third said that they have an email relationship with a pharmaceutical company. Manhattan Research commented that this represented a strategic marketing opportunity for pharmaceutical marketers. In conclusion, the study commented that 49% of European physicians who said they used the internet for professional purposes have visited a corporate pharmaceutical site.

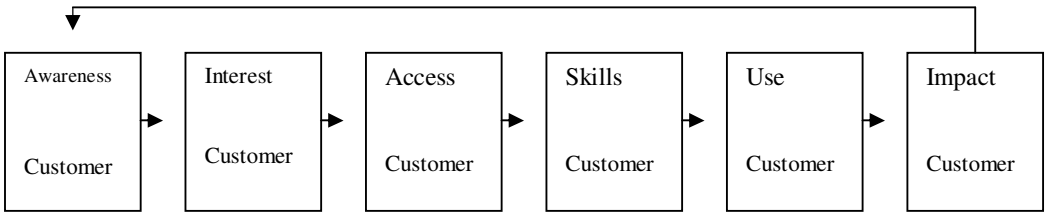
2.3.3 Internet Adoption

Beynon-Davies (2004: 250) comments that there are a number of preconditions that exist for the successful uptake of access mechanisms such as the internet. These preconditions represent the interaction of a range of social factors likely to affect the take-up of access mechanisms (internet) and include:

- Awareness. Customers must be aware of the benefits of using various access mechanisms such as the internet. The goal of this research is to establish general practitioners' adoption of the internet. The results from the study questionnaire should depict the level of awareness amongst customers.
- Interest. Customers must be interested in using the internet . Beynon-Davies (2004: 253) comments that interest from customers is likely to depend on substantial and perceived added value offered by using electronic access over traditional modes of access (such as general practitioners seeing sales representatives in their rooms). Interest is related to both attitude and perceived usefulness of the internet. This is discussed in Section 4.3 using the Technology Acceptance Model.

- Access. Customers must have access to the internet from home or some other convenient location such as their office. Access may be determined by the cost of having connectivity as well as the type of connectivity eg. whether the customer has broadband access or not. This factor is established early in the research questionnaire where interviewees were asked if they have internet and if so, if they had continuous connectivity.
- Skills. Customers must have the skills necessary to use access mechanisms such as the internet-enabled PC effectively. Skills can be related to attitude as well as to perceived ease of use. These factors are discussed extensively under the Technology Acceptance Model (Section 4.3). Customers may or may not become skilled at utilising the internet depending on whether they perceive the internet to be difficult or easy to use.
- Use. Customers must actively use access mechanisms such as the internet on a regular basis in core areas of life.
- Impact. The use of the internet must approach a threshold that encourages the provision of more content and services delivered electronically. For organisations, the aim is that a virtuous cycle is established in which better content and services will encourage greater awareness, or interest in and use of the internet as a preferred method of contact with organisations and their products. Once again, perceived usefulness (to be discussed in Section 4.3) may influence the impact that technology, such as the internet, has on customers who are searching for company's products and services.

Figure 2.1. PRECONDITIONS FOR ELECTRONIC DELIVERY OF PRODUCTS AND SERVICES.



(Source: Beynon-Davies, 2004: 250)

The above model provides a grounding and general overview to determine the intention to use technology, such as the internet, as a source of information. It is clear that many of the preconditions can be related into the Technology Acceptance Model which is discussed comprehensively further in this study.

2.4 WORLD WIDE WEB AS A SOURCE OF PHARMACEUTICAL INFORMATION

The internet is changing rapidly and improving the most important business practice for pharmaceutical organisations (Lin and Huarng, 2001: 101). More and more competitive pharmaceutical companies are developing new and innovative internet applications to boost their position as leaders in the industry (Lin and Huarng, 2001).

Results from a 2005 eyeforpharma survey carried out on pharmaceutical marketers (www.eyeforpharma.com) showed that 69% of respondents

claimed that their online sales and marketing activities would increase significantly over the next 12 months. Pharmaceutical companies are therefore envisaging the internet as a viable channel to market products. However, the survey does not indicate customers' readiness to adopt the internet as a source of medical information.

A study conducted by BCG in conjunction with Harris Interactive (www.eyeforpharma.com) revealed that of the 400 US physicians interviewed, 90% used the internet to research clinical information. The study also found that physicians were using the internet widely to increase their medical knowledge, and the information they were finding online influenced the types of diagnosis they were making, as well as the medications they were prescribing. Doctors also reported spending an average of eight hours each week online, with three of those hours devoted to medical activities. Although, according to BCG (www.eyeforpharma.com), that does not sound like much, it is far more than the less than one hour each week that the average doctor spends with sales representatives. This provides valuable information for pharmaceutical marketers who are contemplating the value of investing marketing spend on product information websites.

2.5 ATTITUDE TOWARDS TECHNOLOGY

Information technology offers the potential for substantially improving an individual's performance. However, performance gains are often obstructed by users' unwillingness to accept and use available systems. Because of the persistence and importance of this problem, explaining user acceptance has

been a long-standing issue in information systems research (Davis, 1989: 319). Numerous models have been developed to determine the factors influencing technology acceptance.

Whilst exploring the literature, the researcher found three significant models that can be used to determine technology acceptance. It was important for the researcher to research different methods in measuring attitude towards technology so that comparisons could be made and the most suitable model could then be adopted for the study. The first two models, Consumer Acceptance of Technology and Technographics will be discussed briefly together with reasons for not using them as a measurement tool in this study. The third model (Technology Acceptance Model), which is the foundation of this study, will be discussed in more depth.

Strauss and Frost (2001), remark that demographics and geographics play vital roles when predicting online behaviour. They continue to comment that more importantly, a customer's attitude towards technology will determine whether a customer will visit a website or not. Since the primary focus of this research is to determine an individual's attitude towards technology, less attention will be paid to the impact of demographics and geographics. These two variables could potentially be researched more extensively in a follow-on study to ascertain the influence that demographics and geographics have on internet usage.

2.5.1 Consumer Acceptance of Technology

As cited by Strauss (2001: 58), the consulting firm SRI (www.sri.future.com) created a model to measure attitudes towards technology known as Consumer Acceptance of Technology (CAT). CAT examines three levels of consumer technology acceptance:

- CAT looks at how technology will benefit the individual in specific life contexts including home, work and community. (This point is indirectly linked to Sub-objective 1.3.1 in this study – the measure of perceived usefulness).
- Secondly, CAT analyses the impact of the technology on the image of the group in which the user associates. Eg. An executive's image may be enhanced by the use of a laptop computer, depicting that they are on top of their business.
- Thirdly, CAT examines potential reactions of society to new technology. There may be significant differences in social values between users and non-users that may impact resistance or acceptance towards the technology.

2.5.2 Technographics

Forrester Research in the US (www.forrester.com) agrees with the importance of attitudes towards technology. However, attitude is measured quite differently where three specific variables are combined (Modahl, 2000):

- Questions are asked to determine if a person is optimistic or pessimistic toward technology.

- Next, a user's income is measured as this is seen as an important determinant of online behaviour (demographics).
- Lastly, questions are asked about a user's primary motivation for going online.

After two years of collecting data, Forrester Research found some interesting points relating to attitude and technographics:

- Older users tend to have a more negative attitude toward technology.
- Men tend to be more optimistic about internet technology, and peer pressure can increase optimism in all demographic groups. However, Hanson and Kalyanam (2007: 116) contradict this by stating that the latest data from the US Census Bureau found that internet usage was slightly higher among females than males.
- In respect of income, 40% of high-income citizens are optimistic about the internet. Hanson and Kalyanam (2007: 116) confirm this commenting that 80% of higher income earners tend to have internet access whilst the number is less than 40% for lower income earners (US Census Bureau 2007 as cited by Hanson and Kalyanam, 2007). If these figures were put into the South African perspective, then of the 11% of internet users in South Africa (see internet usage discussed earlier), it could be assumed that a similar proportion would be high income earning medical practitioners.

The CAT Model and Technographics are useful tools for companies to profile customers who visit websites and to determine where to allocate their resources to gain more of the same. Demographics could also be explored using the Technographics Model. However, the Technology Acceptance Model (to be discussed in the Section 2.6) is capable of providing and measuring a more in-depth analysis of attitude towards technology. Also, there is limited research on the above models.

2.6 TECHNOLOGY ACCEPTANCE MODEL (TAM)

2.6.1 Background: origin and overview of TAM

TAM was developed by Davis (1989) to explain computer usage behaviour. Extensive studies have been completed using TAM to explain and predict user acceptance of information technologies. Yi et al. (2006) confirmed this by stating that of all the various models that information systems researchers have used to explain or predict the motivational factors underlying user acceptance of technology, the TAM of Davis and his colleagues (Davis, 1989 and Davis, Bagozzi and Warshaw, 1989), has perhaps been the most widely applied. Lee, Kozar and Larsen (2003: 752) remarked that the prolific stream of research on information systems use has taken on a variety of theoretical perspectives. Lee, Kozar and Larsen (2003: 752) continue to state that of all the theories, the TAM is considered the most influential and commonly employed model for determining an individual's acceptance of information systems. This evidence provided a solid grounding on which the researcher was able to base this study.

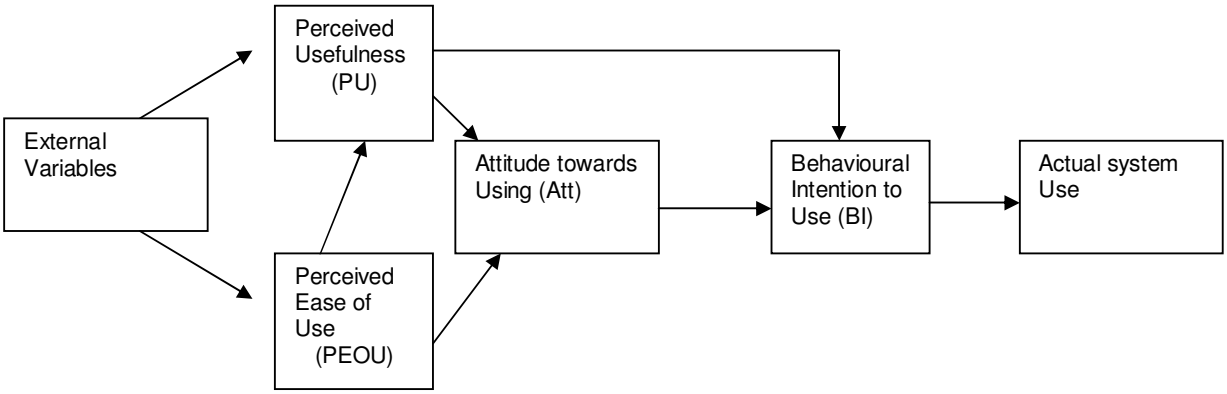
What causes people to accept or reject information technology? According to Davis, Bagozzi and Warshaw (1989: 985), the goal of TAM was to provide an explanation of the determinants of computer acceptance that was general, capable of explaining user behaviour across a broad range of end-user computing technologies (eg. e-mail, internet) and user populations (eg. management, customers), while at the same time being both parsimonious and theoretically justified. Different technologies and user groups in studies that have applied TAM will be discussed under the different variables later in this chapter.

The theoretical grounding for the TAM model was Fishbein and Ajzen's 1975 Theory of Reasoned Action (TRA). TAM is an adaptation of TRA specifically tailored for modelling user acceptance of information systems. According to TRA, beliefs influence attitudes, which in turn lead to intentions, which then generate behaviours (Chau, 1996: 186). Chau and Hu (2002: 195) reinforce this comment in a later study where it is stated, "According to the behavioural-intention approach, an individual's decision to accept/adopt a technology is a conscious act that can be sufficiently explained and therefore predicted by their behavioural intention". TAM (Davis, 1989: 319) adapted this belief-attitude-intention-behaviour relationship to model user acceptance of information technology.

The Expectancy Theory holds that people are motivated to behave in ways that produce valued outcomes (Kreitner, Kinicki and Buelens, 2002: 211). "Self-efficacy is a person's belief about his or her chances of successfully

accomplishing a specific task" (Kreitner, Kinicki and Buelens, 2002: 123). With support from theories such as Expectancy Theory, TAM postulated that computer usage was determined by a behavioural intention to use a system, which was jointly determined by attitude and perceived usefulness, which together with perceived ease of use, explained attitude (Chau, 1996: 186 and Chau and Hu, 2002: 195).

Figure 2.2. TECHNOLOGY ACCEPTANCE MODEL (TAM)



(Source: Davis, 1989: 985)

2.6.2 TAM Variables

TAM posits that two particular constructs, i) perceived usefulness (PU) and ii) perceived ease of use (PEOU) are of primary relevance for computer acceptance behaviours (Figure 2.2). TAM also factors in two dependent constructs: iii) attitude (Att) towards using and iv) behavioural intention (BI) to use a system. TAM posits that behavioural intention determines actual systems use and behavioural intention is determined by both attitude and perceived usefulness (Gardner and Amoroso, 2004: 21). v) External variables are also included as the model describes that user beliefs are determined by

individual characteristics (such as age, gender) and system characteristics (eg. e-mail, internet, software programs).

i) Perceived usefulness

Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Gardner and Amoroso, 2004). Perceived usefulness, which reflects perceptions of the performance-use contingency, has been closely linked to outcome expectations, instrumentality and intrinsic motivation (Venkatesh and Morris, 2000: 117). Perceived usefulness is used both as a dependent and independent variable since it is also predicted by perceived ease of use. A significant body of TAM research has shown that perceived usefulness is a strong determinant of user acceptance, adoption and usage behaviour (eg. Davis, 1989; Davis, Bagozzi and Warshaw, 1989; Mathieson, 1991; Taylor and Todd, 1995). In studying personal computing acceptance in small firms, Igbaria et al. (1997) found that perceived usefulness had a strong direct effect on usage. Szajna (1996) found a significant relationship between perceived usefulness and self-report usage in a study of 61 graduate business students. Darsono's 2005 study involving individual professionals, revealed that lecturers' perception of the internet usefulness is driven to a large extent by their perception of the relevance of the internet technology. The study also showed that the impact of perceived usefulness on attitude towards using the internet is stronger than the impact of perceived ease of use.

Perceived usefulness has been confirmed to be the most important factor affecting user acceptance, with few exceptions (Sun, 2003). Yi, et al. (2006), conducted a study to determine technology acceptance by physicians. Consistent with Chau and Hu (2002), perceived usefulness was found to be the most significant determinant of physicians' intention to accept a technology. In line with sub-objective 1.3.1, this study proposes to determine whether there is a positive or negative perceived usefulness of the internet by general practitioners.

ii) Perceived ease of use

Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989: 320). Davis (1989) further claimed that an application perceived to be easier to use than another is more likely to be accepted by users. Perceived ease of use is therefore both a dependent and independent variable. The variable has been shown to have an effect on intention via two causal pathways: a) a direct effect on behavioural intention and b) an indirect effect on intention via perceived usefulness. The direct effect suggests that perceived ease of use could be a potential catalyst to increasing the likelihood of user acceptance (Venkatesh and Morris, 2000: 118). The indirect effect is explained as stemming from a situation where, other things being equal, the easier a technology is to use, the more useful it can be (Davis et al, 1989).

Prior research has demonstrated that the direct causal pathway (ie. Perceived use of use - attitude - behavioural intention) is most relevant, and the indirect

effect via perceived usefulness is somewhat less important (Davis, Bagozzi and Warshaw, 1989 and Szajna, 1996). Darsono (2005) showed that perceived ease of use has a significant positive impact on perceived usefulness. The Szajna (1994) study found that the perceived usefulness/ease of use (U/E) instrument demonstrates reasonably good predictive validity.

Gardner and Amoroso (2004: 2) comment that users need to perceive a system as being useful or they will not attempt to use it regardless of how easy or difficult it is to use. Gardner and Amoroso (2004) also concluded that ease of use was less important because difficulty in using a system could be overcome if the user thought that the system would be useful to them. Chau's study (1996) revealed that perceived ease of use significantly affected short-term usefulness, but did not significantly affect intention to use. Chau and Hu (2002) reported a non-significant effect of perceived ease of use on behavioural intention via attitude. Yi, et al. (2006) tested PDA (personal digital assistant) acceptance by healthcare professionals and revealed that given their high level of cognitive ability and learning capacity, physicians may tend to adopt a new technology despite perception of its complexity.

With the above research in mind, Sub-objectives 1.3.2, 1.3.4 and 1.3.5 include the measurement of perceived ease of use and its potential impact on a customer's behavioural intention to use the internet as a source of pharmaceutical information.

iii) Attitude

'Attitude toward using' is the user's evaluation of his or her desirability to use the system (Mathieson, 1991). Attitude is an overall evaluation of certain objects, or certain behaviour and it can be positive or negative (Assael, 1998). Sun (2003) found that attitude was not a reliable predictor of behaviour to use or usage. Mathieson (1991) however, found that the attitude construct was statistically valid for explaining intention to use. Based on these findings, Sub-objective 1.3.7 aims to determine the relationship between the general practitioners' attitude and their intention to use the internet technology as a source of pharmaceutical information.

Chau and Hu (2002) found perceived usefulness to be a significant determinant of attitude as well as behavioural intention. These findings show that users are likely to have a positive attitude if they believe that usage of a technology will increase their performance and productivity. Sub-objective 1.3.4 will measure the relationship between attitude and perceived usefulness.

iv) Behavioural Intention

Behavioural intention is a measure of the strength of one's intention to perform a specified behaviour. Sun (2003) reports that behavioural intention is a good predictor of actual usage of a technology. This conclusion has received empirical support from prior studies (Davis, Bagozzi and Warshaw, 1989 and Venkatesh and Davis, 2000). In the 1989 study, Davis, Bagozzi and Warshaw concluded that people's computer use could be predicted

reasonably well from their intentions. The results of Taylor and Todd's (1995) study of inexperienced and experienced users confirmed that there is a stronger correlation between behavioural intention and behaviour (usage) for experienced users.

The perceived usefulness-behavioural intention relationship is based on the notion that, within organisational settings, people form intentions towards behaviours they believe will increase their job performance, over and above whatever positive or negative feelings they may have towards the behaviour per se. According to Davis, Bagozzi and Warshaw (1989), this is because enhanced performance is instrumental to achieving various rewards that are extrinsic to the content of work itself, such as pay increases and promotions (eg Vroom, 1964). Based on the above literature, Sub-objective 1.3.6 will attempt to determine the relationship between general practitioners' perceived usefulness and their behavioural intention towards using internet technology as a source of pharmaceutical information.

v) External Variables

TAM postulates that external variables intervene indirectly by influencing perceived usefulness and perceived ease of use. Davis (1989) proposed that the external factors only have indirect effects on computer acceptance. Legris, Ingham and Collerette's (2003) analysis of past TAM research confirmed that external variables were fully mediated by perceived usefulness and perceived ease of use and the addition of such external variables contributed marginally to the explanation of the variance in system use. The

external variables did, however, provide a better understanding of what influenced perceived usefulness and perceived ease of use and their presence guided the actions required to influence a greater use.

Gefan and Straub (1997) examined gender differences with regards to the IT diffusion model and TAM. The results showed that women purport a higher value for perceived use than men. However, results indicated that men are more at ease using computers than women are. Contrary to these findings, Venkatesh and Morris (2000) concluded that compared to women, men's technology usage decisions were more strongly influenced by their perceptions of usefulness. By contrast, women were more strongly influenced by perceptions of ease of use. Due to inconsistent findings, this element was omitted as a sub-objective in the study. Also, the sampling technique used might not reflect a true representation of gender ratio in the population. As an exploratory exercise, the researcher included one cross tabulation with age and attitude to gauge any correlation between the two variables.

Burton-Jones and Hubona (2005) investigated individual differences and usage behaviour using TAM. The study involved 106 professional and administrative staff in the IT division of a large manufacturing company who voluntarily used email and word processing. The study proposed that age could affect IT usage. The findings showed that older workers (ages ranged from 20 – 60 years) reported lower perceived ease of use for e-mail and Word. Nonetheless, the study found no relationship between user's age and their reported perceived usefulness for either email or word-processing. Older

workers found the systems harder to use but appeared not to find them less useful for their jobs.

In examining IT acceptance by individual professionals, Darsono (2005) found that older respondents, especially those older than 55, had a lower computer self-efficacy and intention to use the internet than younger respondents.

Since this research encompasses the preliminary stage of determining the attitude-behavioural intention of customers towards internet technology, it was not necessary to do an in-depth study on external variables. Since there is a wide age range amongst general practitioners, the researcher included age as an external variable to investigate whether this may have had an indirect influence on behavioural intention via attitude. Further research could include certain external variables relative to health care professionals and their potential influence on technology usage.

2.6.3 Intention to use

The focus of this research is the determination of what individual general practitioners' intentions are to use internet technology for obtaining pharmaceutical information. Similar to many other behaviours, technology acceptance may be measured by actual technology use as well as by intention to use (Szajna, 1996: 88). For the purposes of this study, intention to use took preference over actual usage to measure the technology acceptance. An article published in the Pharmaceutical Executive, October 2000 by Bleicher, stated that despite dozens of physician-oriented websites,

doctors were not using the internet to get up-to-date drug and disease information. However, many physicians expressed interest in using the World Wide Web to source medical information (www.healthtechcentre.org).

The constraint of current low technology usage to obtain product related information, suggests that using actual technology use to generate results will have little statistical significance. Rather, the use of intention to explain or predict actual behaviour has an established theoretical foundation and has accumulated sufficiently strong empirical support (Sheppard, Harwick and Warshaw, 1988 and Venkatesh and Davis, 1996). This provided sufficient support for this study to measure general practitioners' intention to use the internet rather than their actual usage.

2.6.4 Findings of past TAM research

Since 1994 there has been a large block of studies that utilised the technology acceptance model for empirically based research. There have been studies that have used the *original* TAM framework, the one been described in this study, and there have been studies using modified TAM models.

In 2002, Chau and Hu presented a study investigating technology acceptance by individual professionals by examining physician's decisions to accept telemedicine technology. The researchers used TAM as the necessary foundation upon which a more specific research model for telemedicine technology acceptance by physicians could be developed. Due to its technology focus and because of its behavioural intention orientation, Chau

and Hu (2002: 196), found TAM to be appropriate for examining technology acceptance by individual professionals. Due to its intended generality however, the model needed to be supplemented by other theories or models. King and He (2006) conducted a statistical meta-analysis of the TAM using 88 published studies that provided sufficient data to be credible. The results showed TAM to be a valid and robust model that has been widely used, but which potentially has wider applicability.

Since there is limited literature regarding technology acceptance by general practitioners in the South African context, this research has been based on the primary determinants of technology acceptance by general practitioners, using the original TAM framework. Most of the studies researched for this paper were also based on the original model.

A later study could potentially investigate Chau and Hu's (2002) modified TAM framework to account for medical professionals distinct characteristics and the influence such characteristics have on technology acceptance.

2.6.5 Meta-analyses of TAM studies

Legris, Ingham and Collerette (2003) examined Information Systems implementation through an analysis of the TAM studies. The authors referred to 80 articles for analysis of the TAM and found a high proportion of positive results for all relations of the TAM components with few inconsistencies. In many of the studies, self-reporting was used, which might not be a precise measure. The analysis suggests that self-reported use should only serve as a

relative indicator. Lee, Kozar and Larsen (2003) reinforce this by commenting that self-reported usage is known to be subject to bias, which may distort and exaggerate the causal relationship between independent and dependent variables.

This study involved self-employed skilled professionals whose use of the internet to gain pharmaceutical information would offer no extrinsic reward and therefore self-reporting was not foreseen as having a significant influence on the nature of their answers.

A summary of the research findings in the meta-analyses of TAM by Legris, Ingham and Collerette (2003) follows. These findings represent an important base with which the significance of the relationships in the sub-objectives discussed in Chapter 4 will be proved or disproved.

Table 2.1. SUMMARY OF RESEARCH FINDINGS AS CITED BY LEGRIS, INGHAM AND COLLERETTE.

Article	Findings
Davis (1989)	Perceived usefulness was 50% more influential than ease of use in determining use.
Subramanian (1994)	Perceived usefulness and not ease of use is a determinant of predicted future use.
Davis et al (1989)	Individual's perception of a particular system's ease of use is anchored to her or his general computer self-efficacy at all times.

Jackson et al (1997)	Attitude seems to play a mediating role.
Igbaria et al (1997)	Perceived ease of use is a dominant factor in explaining perceived usefulness and system use, and perceived usefulness has a strong effect on use.
Hu et al (1999)	TAM was able to provide a reasonable depiction of user's intention to use technology. Perceived usefulness was found to be a significant determinant of attitude and intention. Perceived ease of use was not a significant determinant.
Venkatesh and Morris (2000)	Compared to women, men's technology use was more strongly influenced by their perceptions of usefulness. Women were more strongly influenced by perceptions of ease of use.

(Source: Legris, Ingham and Collerette, 2003: 194)

Sun (2003) conducted a study analysing the TAM research model and found that perceived ease of use showed significant effect on perceived usefulness in 15 studies. Perceived usefulness was confirmed as the most important factor affecting all of the constructs related to user acceptance of a variety of technologies. Sun (2003) found that overall the construct behavioural intention to use (BI) was a good predictor of usage, however it was noted that many studies did not measure the actual system use construct in their studies. The researcher did not include the above construct. The reason behind this is explained in Section 4.4. Sun also concluded that attitude

towards using could not be considered a reliable predictor of behavioural intention to use, since in seven of the studies analysed, only three found a significant relationship to behavioural intention to use.

2.6.6 Major limitations of TAM studies

According to Lee, Kozar and Larsen's (2003) meta-analysis of one hundred and one articles involving TAM, self-reported usage was the most commonly reported limitation. The analysis remarks that when measuring actual usage, 36 studies relied mainly on self-reported use assuming that self-reported usage successfully reflected actual usage. As previously discussed, this study involved independent general practitioners who had no intrinsic or extrinsic motive to "skew" their responses, the researcher therefore felt that self-reporting would not pose as a major limitation. A significant number of the earlier studies had involved students. The studies may have had slightly different results had they all been performed in a business environment. Nevertheless, the studies provided solid grounding and results with which the researcher was able to build this study. The majority of the TAM studies have been cross-sectional. Since a user's perception and intention can change over time, it may be important to measure these quantities at several points in time. Of Lee, Kozar and Larsen's (2003: 762) meta-analysis of one hundred and one studies, only 13 performed longitudinal comparisons. According to Agarwal and Karahanna (2000), the cross-sectional study's major weakness is that it cannot infer the causality of the research results. This has been noted as a limitation of this research (see Section 1.5). However, since this research is at a preliminary stage of establishing a group of customers'

attitude towards internet technology, a cross-sectional study was not seen as being unfavourable in determining the study objectives.

2.7 CONCLUSION

Due to its significant increase in use over the years, the internet may be an important tool to be used by organisations to market their products and services. In order for organisations to gauge the relevance of this technology, it is important for marketers to be aware of the perception and attitudes of their customers towards a certain technology.

There are a number of models explaining or predicting attitudes towards technology. The Technology Acceptance Model (TAM) however, is one of the most accepted theories for explaining acceptance of technologies. TAM is an adaptation of the theory of reasoned action specifically tailored for modelling user acceptance of information systems.

This literature described TAM and its origin. Studies using the TAM were analysed for model definitions and constructs. The technologies for which TAM was utilised were examined and any significant relationships between each of the variables were revealed. By analysing the literature, it is evident that TAM has proven to be a useful theoretical model in helping to understand and explain usage behaviour in information systems implementation. It has been tested in many empirical researches and the tools used with the model have proven to be of quality and to yield statistically reliable results.

The objective of this research is to determine the adoption of internet technology as a source of pharmaceutical information among general practitioners in Kwazulu-Natal. The literature confirms the relevance of the internet as a potential marketing tool. Despite a few limitations, the examination and analysis of the TAM studies have assured the researcher that the model provides a significant tool in realising this study's objectives.

CHAPTER THREE

METHODOLOGY AND DATA COLLECTION

3.1 THE RELEVANCE OF THE LITERATURE

The literature in Chapter 2 has identified and described the Technology Acceptance Model (TAM) as a useful model that can be implemented in order to provide a solution to the research objective. The TAM variables have provided an important foundation upon which the researcher has been able to establish the sub-objectives for the study. These variables have been used in the development of the questionnaire that will be tested through the survey instrument.

3.2 THE RESEARCH METHODOLOGY OF THE STUDY

A descriptive study tries to discover answers to the questions who, what, where and when? (Cooper and Schindler 2001: 12).

According to Leedy (1997: 191) the descriptive survey has the following characteristics:

- The method deals with a situation that demands the technique of observation as the principal means of collecting the data.
- The population for the study must be carefully chosen, clearly defined and specifically delimited to set accurate parameters for ensuring discreteness to the population.
- The potential to have distortion as a result of bias. Particular attention should be given to safeguard the data from the influence of bias.

- Data must be organised and presented systematically so that valid and accurate conclusions may be drawn.

For the purposes of this study, the researcher is interested in collecting data on intangible behavioural aspects that are difficult to observe directly. The researcher will attempt to define a subject (general practitioners' technology acceptance) by creating a profile of a group of problems (objective and sub-objectives). As this research paper progresses, the above characteristics relating to the descriptive survey will become evident.

The objective of the research is to sample a number of the subjects from the population (at one point in time) and quantify the data in order to generate results. The type of research analysis will be quantitative.

3.3 TARGET POPULATION AND SAMPLE SELECTION

As previously discussed, the population for the study must be carefully chosen, clearly defined and specifically delimited to set accurate parameters for ensuring discreteness to the population.

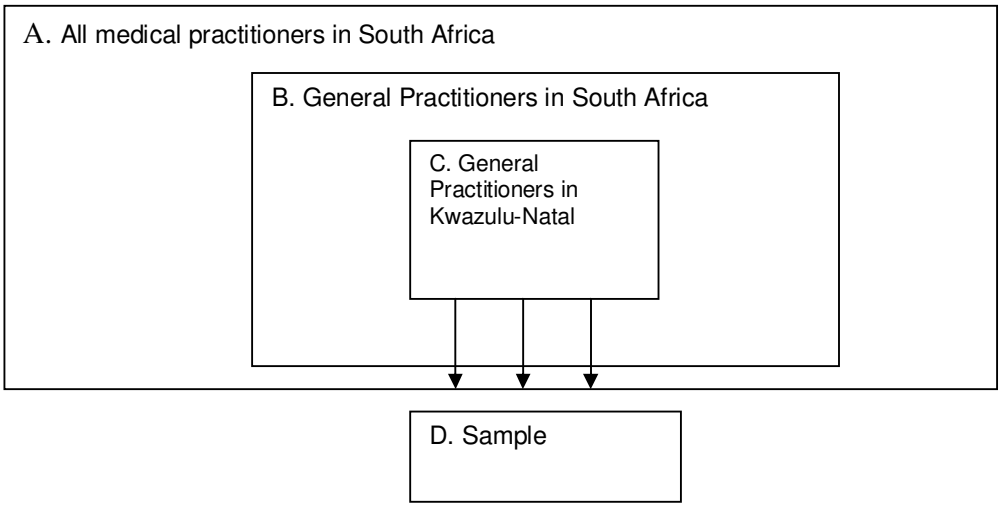
3.3.1 Target Population

In general, the population is the larger group of all events of interest (people, occurrences etc) from which a sample is selected. The target population is the subset in which the researcher is ultimately interested. The sample is the smaller number of events (people, occurrences etc) drawn from that target population and used in a specific study as if the sample adequately

represents the general population of interest (Graziano and Raulin 1997: 213).

In respect of this research, the general population represents all medical doctors (general practitioners and specialists) in South Africa. The target population in this study represents all general practitioners in South Africa. However, due to time constraints and accessibility it is not possible to collect data from the target population and the researcher has selected an "accessible population". Graziano and Raulin (1997: 213) define the accessible population as " that subset of a target population that is available to the research". The researcher resides in Kwazulu-Natal and has access to the data of general practitioners within Kwazulu-Natal (latest data November 2007). For this reason, the accessible population are the general practitioners that fall within the Kwazulu-Natal boarders measured at 1 November 2007. The sample in respect of this study is selected from the accessible population. Figure 3.1 illustrates the relationship between the general population, the target population, the accessible population and the sample. This will be discussed further in this chapter.

Figure 3.1. THE RELATIONSHIP OF THE GENERAL POPULATION TO THE TARGET POPULATION, THE ACCESSIBLE POPULATION AND THE SAMPLE.



(Source: Graziano and Raulin, 1997: 213)

Based on customer profiles (number of patients per practice, income level of patients and geographics), AstraZeneca's Kwazulu-Natal region currently has a total of 573 general practitioners/ customers on its database. There are more than 573 general practitioners in KZN, however the organisation has identified these as having the most potential to generate business and are the ones on whom the sales representatives call.

The accessible population for the study will be the 573 practising customers available on AstraZeneca's database that fall within the Kwazulu-Natal borders as of November 2007.

Graziano and Raulin (1997: 213) comment that when using the accessible population for research, results can confidently be generalised for that

accessible population. However, caution must be exercised about generalising the results to the larger, target population. The above authors suggest that replication must be carried out on different accessible populations. As discussed in the sampling sections following in this study, the researcher will attempt to achieve representative results by: justifying the representative sample, ensuring randomisation and attempting to minimise bias. However due to time constraints, accessibility and lack of data, replication of this study on other accessible populations is beyond the scope of this study.

3.3.2 Sampling Procedure

3.3.2.1 Sampling Technique

Sampling is the process of selecting a representative subset of observations from a population to determine characteristics of the random variable under study (Wegner, 2002: 170). This study has followed a non-probability sampling procedure whereby the selection of sample elements have been based partly on the judgement of the interviewer. Using this procedure, there will be no known chance of selection and no straightforward means of calculating sampling error.

A convenience sample is selected on the basis of the convenience of the researcher/ interviewer (Moutinho, Goode and Davies, 1998: 26). Sample elements are either self-selected or selected because they are easily available, and so it may be unclear how representative the sample is of the population (Moutinho, Goode and Davies, 1998: 26). The primary aim of this

research is to explore attitudes of customers and not to secure a representative cross section of the medical doctor population. Convenient sampling therefore provides an acceptable means of selecting the elements. In-house fieldworkers interviewed those customers that they were able to see and who were willing to participate.

Leedy (1997: 205) comments that convenience sampling makes no pretence of being representative of the population and that no attempt is made to control bias. Leedy defines bias as "any influence, condition, or set of conditions that singly or together distort the data from what may have been obtained under the conditions of pure chance" (Leedy, 1997: 219). Reliability and validity are two factors that are taken into consideration as a means of reducing bias. These factors are discussed in more depth in Chapter Three and Four.

Although a convenience sample has no controls in place to ensure precision, it may be useful in this research to gain insight and ideas about the perceptions of general practitioners.

3.3.2.2 Sample selection

Using the pharmaceutical company, Astra Zeneca's in-house customer database, the sample has been conveniently selected from the accessible population of general practitioners within the Kwazulu-Natal region. Choice of this sample was made primarily on the basis of accessibility, willingness of

customers to participate in the questionnaire and the likelihood of general practitioners being or becoming technology adopters in the near future.

Cooper and Schindler (2001: 164) state that the "ultimate test of a sample design is how well it represents the characteristics of the population it purports to represent". For the purposes of this study it may be beneficial to be selective when choosing customers to interview (ie. Only general practitioners in Kwazulu-Natal will be interviewed). If the concept does not pass favourably with this group, the chances of success within other specialities or other areas (eg.physicians or Gauteng) may not be so positive either.

3.3.2.3 Sample Size

The sample for this research was drawn from Astra Zeneca's customer population database of 573 general practitioners. This accessible population represents all the business generating customers in Kwazulu-Natal. For the purposes of this study, it was not necessary to determine the entire Kwazulu-Natal general practitioner population and the sample from this population was deemed satisfactory.

According to Cooper and Schindler (2001: 172), "how large a sample should be is a function of the variation in the population parameters under study and the estimating precision needed by the researcher". This study is involved in the early stages of research whereby the researcher is interested in gaining ideas and attitudes about internet technology. Hence controls to ensure precision may not be necessary. Once the results from this research have been analysed, there may or may not be evidence that the topic requires a

more sophisticated sampling procedure. For the exploratory purposes of this study, convenient sampling provides a satisfactory technique. Leedy (1997: 211) comments that if the population is around 500, 50% of the population should be sampled. According to Leedy's (1997) recommendation, a sample of 286 (50%) would be optimal for this research. Nel et al (1990: 310) comment that only when a population is relatively small is the sample size affected. Nel et al (1990: 310) continues to comment that time constraints and accessibility may reduce the sample number. Since the population consists only of general practitioners, the accessible population is 573 and the researcher does not need absolute precision, a sample size of 170 (30%) was considered to be an acceptable representation of the total population. Fieldworkers would be conducting the questionnaires during working hours, resulting in time constraints. Accessibility to the population would also be a limiting factor as not all general practitioners are willing to see sales representatives. These two contributing factors also reduced the sample size.

3.4 QUESTIONNAIRE FORMAT AND DESIGN

3.4.1 Questionnaire development

For the purposes of this study, a questionnaire was developed as a series of questions, each one providing a number of alternative answers from which the respondent could choose. The responses were then quantified, categorised and subjected to statistical analysis. These items will be discussed later in data collection and analysis.

White (2000: 50) comments that irrespective of the format, there are points about questionnaires and their construction that apply to all. During the design and development of the questionnaire, the researcher took cognisance of White's descriptors:

- good, easy to understand questions that will engage the respondents and encourage accurate results
- each question should only deal with one issue
- questionnaire should be as short as possible
- keep jargon to a minimum
- do not ask leading questions

The questionnaire comprised twenty-one items. The first three questions in the survey instrument are nominal scaled and dichotomous. The researcher was interested in collecting information that could be grouped into two categories that were mutually exclusive and collectively exhaustive, namely 'yes' and 'no'. The answer to these first three questions would determine whether continuing with the questionnaire with the interviewee was relevant to the research or not.

Question four is an ordinal-scaled question determining the interviewee's age group. Although this question does not relate to the sub-objectives of this study, the researcher was interested in identifying whether there was a positive or negative correlation between age and attitude towards using the internet as a source of pharmaceutical information. Question four and a

question using the 'attitude' variable (question 6) were cross tabulated to identify any relationship between them.

Question five is a nominal scaled question determining the interviewee's gender. Although this question does not relate to the sub-objectives of this study, the researcher was interested in identifying whether there is a positive or negative correlation between gender and attitude towards using the internet as a source of pharmaceutical information. Question five and a question using the 'attitude' variable (question 9) were cross tabulated to identify any relationship between them.

Questions six to twenty-one were measured using a five point Likert scale. Likert scales are the most commonly used variation of the summated rating scales which consist of statements that express either a favourable or unfavourable attitude toward the object of interest (Cooper and Schindler, 2001: 234). White (2000: 51) reiterates this by stating if the researcher wants to gauge a degree of opinion, then ranking questions using the Likert Scale may be suitable. Since this research is interested in a defined group of general practitioners and their acceptance level of internet technology, the Likert scale provided a suitable measurement tool.
The Likert scale approach provides interval scaled data.

Question items six to twenty-one, used to operationalise the constructs included in the research model, were adapted from relevant past studies (Gardner and Amoroso, 2004; Chau and Hu, 2002; Burton-Jones and

Hubona, 2005), with changes in the wording to make them appropriate for internet technology and to target health care professionals.

The following questions were used to measure the independent TAM variable **Perceived usefulness** and Sub-objective 1.3.1.

Question 7: Using the internet as a source of pharmaceutical information could improve my practice and patient care

Question 11: I would find using the internet as a source of pharmaceutical information useful in my job

Question 14: Using the internet as a source of pharmaceutical information would enable me to do my job more efficiently

Question 17: Using the internet as a source of pharmaceutical information could enhance my effectiveness in my practice and patient care

Question 20: Using the internet as a source of pharmaceutical information would make my job easier

The following questions were used to measure the independent TAM variable **Perceived ease of use** and Sub-objective 1.3.2.

Question 10: I find pharmaceutical product websites easy to navigate and obtain clinical information

Question 12: Using the internet as a source of pharmaceutical information would be easy for me

Question 15: My interaction with the internet as a source of pharmaceutical information is clear and understandable

Question 16: It would be easy for me to become skilful at using the internet as a source of pharmaceutical information

Question 21: Interacting with the internet to search for pharmaceutical information is often frustrating

The following questions were used to measure the dependent TAM variable **Attitude**. These questions were used to determine whether any relationship existed between attitude and perceived usefulness and attitude and perceived ease of use (Sub-objectives 1.3.3 and 1.3.4).

Question 6: Using the internet as a source of pharmaceutical information is a good idea

Question 9: Using the internet as a source of pharmaceutical information would be beneficial to my practice

Question 18: I would enjoy using the internet to search for pharmaceutical information

The following questions were used to measure the dependent TAM variable **Behavioural intention.** These questions were used to determine any relationship between perceived usefulness and behavioural intention attitude and behavioural intention (Sub-objectives 1.3.6 and 1.3.7).

Question 8: I intend to use the internet as a source of pharmaceutical information as often as needed

Question 13: I would frequently use the internet as a source of pharmaceutical information in my practice

Question 19: I plan to use the internet as a source of pharmaceutical information in the future

To ensure the desired balance and randomness, all the questions were randomly arranged to minimise a potential ceiling effect that may have provoked monotonous responses to multiple question items designed to measure a particular construct.

3.4.2 Questionnaire Testing

Since the question items had been tested in previous studies, it was not necessary to extensively pilot test the questionnaire. Cooper and Schindler (2001: 399) state that pilot testing is intended to reveal errors in the design. The instrument was pre-tested by the researcher with one general practitioner

who was a member of the sample. The respondent was verbally questioned after completion of the questionnaire and asked about the following:

- levels of understanding of the questions
- structure and flow – did the questions make sense
- any other comments?

The level of understanding was good. Structure and flow was easy to understand. However, the respondent felt that because searching the internet was a frustration for him and some of his peers, this variable needed to be included more clearly in the questionnaire. The researcher adjusted the questionnaire to modify one of the questions to include 'frustration' (Question twenty-one). Pre-testing the instrument allowed refinement before the final questionnaire was administered.

3.4.3 Validity and reliability

According to Cooper and Schindler (2001:210) validity and reliability are two major criteria for evaluating a measurement tool.

"Validity refers to the extent to which a test measures what we actually wish to measure" (Cooper and Schindler, 2001: 210). The literature relating to the Technology Acceptance Model refers to four important constructs in determining technology acceptance. The test measures will use these constructs for testing in the research sample.

An approach originally suggested by Fowler (1995: 138) was used in this research to evaluate validity of the survey - Comparing alternate question

forms: Survey questions can be measured by essentially asking the same question in two differing forms and comparing the results. This measure was factored into the questionnaire as a means of testing validity.

"Reliability has to do with the accuracy and precision of a measurement procedure" (Cooper and Schindler, 2001: 210). Internal consistency is one approach that can be used to measure reliability. Cronbach's coefficient alpha measures the degree to which instrument items are homogeneous and reflect the same underlying constructs. According to Cooper and Schindler (2001: 217), Cronbach's coefficient alpha is effectively utilised for multi-item scales at the interval level of measurement and is therefore the index used in this study to secure the reliability estimates.

The researcher also endeavoured to improve consistency by using well-informed, supervised and motivated fieldworkers to conduct the research.

3.5 DATA COLLECTION

3.5.1 Questionnaire administration

Data was collected via a structured questionnaire that in-house fieldworkers administered personally. The questionnaires were implemented from 1 February 2008 – 15 March 2008. General practitioners are busy professionals and it was anticipated that using an external fieldworker would result in decreased accessibility and therefore limited response. The advantage for choosing in-house fieldworkers was that customer relationships would enable greater accessibility and therefore greater responses. However, this posed as a potential limitation to the study due to the potential for the

Hawthorne effect. Mouton and Marais (1990: 89) describe the Hawthorne effect, as "most persons will try to give answers that will make themselves appear well adjusted, rationale….etc". Anonymity was ensured to all interviewees, which may offset any potential Hawthorne effect. Unlike in a performance related situation, there would be no extrinsic benefit for the respondents to skew their responses. This could also offset any potential Hawthorne effect.

3.5.2 Questionnaire Reponses

Of the one hundred and seventy surveys distributed to the fieldworkers, one hundred and five were returned. Of those returned, one was incomplete due to respondent leaving out a page. One survey was returned incomplete as respondent did not own a computer and therefore questions were not relevant to his practice. The 103 completed surveys represents 18% of the accessible population of 573. This is 12% less than the expected sample size of hundred and seventy responses (as discussed in Section 3.3.2 on sample size).

The response rate was lower than anticipated for the following reasons:

- Three of the internal fieldworkers resigned within a two-week period prior to conducting the survey. This was unexpected and resulted in a lack of interest of the interviewees in conducting the survey. This resulted in half the amount of fieldworkers being available from what had originally been planned. The researcher attempted to compensate by extending the fieldwork

by two weeks to enable the remaining fieldworkers to try and conduct more questionnaires.

- Time constraints – feedback from the fieldworkers was that many of the customers were on tight time schedules and were fitting company representatives in between patients. This confirmed the notion described in Chapter One, Section 1.4 that doctors are becoming harder to see and that their time spent with representatives is getting shorter. This lent a certain irony to the research: as the researcher is attempting to find alternate ways for doctors to gain pharmaceutical information, however the time constraints restricted the responses the researcher was aiming for.

Although the responses are lower than expected, this research is an exploratory survey where a convenience sample has been utilised. The primary aim of this research is to explore the attitudes of customers and not to secure a representative cross section of the medical doctor population. The response rate provides a satisfactory base from which the researcher is able to extrapolate data in order to realise the objectives of this study.

CHAPTER FOUR

DATA ANALYSIS AND CONCLUSIONS

4.1 INTRODUCTION

The first part of this chapter provides an overview on the method of data capturing and the statistics used to analyse the data. The data is presented and analysed. The first stage of the analysis involved an assessment of the reliability of the measures used to operationalise the variables in the study. Secondly, the sample characteristics are described and analysed. The research objectives 1.3.1 to 1.3.7 are analysed and reported on.

4.2 DATA CAPTURING

Data was captured onto an Excel spreadsheet. Each question and option was numbered uniquely and occupied a single field in the database. With the guidance of a qualified statistician, the researcher captured the data. The first three questions in the survey instrument were dichotomous and either a 'Y' for yes or an 'N' for no could be allocated to each response. Question four was an ordinal-scaled question determining the interviewee's age group. Age data was captured in categories. Each category was assigned a numerical value of 1 to 5.

Preferences or perceptions are assumed to be measured on a continuum from one extreme position to the opposite extreme position. The Likert scale response mechanism allowed for five responses, namely, 'strongly disagree',

'disagree', 'neither agree or disagree', 'agree' and 'strongly agree'. Numerical values of 1 to 5 were allocated to each response in respective order. Numerical values with a value of less than three represent a negative perception to the questions and numerical values greater than three reflect a stronger perception. The value three offers a neutral response. As discussed in Section 3.4.2, item twenty-one was modified following pre-testing of the questionnaire. The researcher made an error in the formatting of the question in that it was in reverse to the other questions testing the same dimension. To rectify this error and ensure more accurate results, the scale for item twenty-one was reversed. All results reflected are using item twenty-one reversed.

4.3 DATA ANALYSIS

4.3.1 Descriptive Statistics

This research makes use of descriptive statistics. Wegner (2002:5) states that descriptive statistics "condenses large volumes of data into a few summary measures". This method is applicable to this research due to the need to summarise large volumes of data.

According to Leedy (1997: 253), the use of descriptive statistics may assist in the following ways:

- It can indicate the central point around which the data revolve.
- It may indicate how broadly the data are spread.
- It may show the relationship of one kind of data to another kind of data.

Wegner (2002: 54) comments further that observations of a random variable tend to group about some central value. A central location statistic represents a typical value or middle data point of a set of observations and is useful for comparing data sets. This will be useful for the interval scaled data to be created from the study. The researcher will use the following measures of central location:

- **The Mean**

The mean is the arithmetic average. It is the sum of the observed values in the distribution divided by the number of observations. According to Cooper and Schindler (2001: 442), the mean is the location measure most frequently used for interval-ratio data but can be misleading when the distribution contains extreme scores, large or small.

- **The Median**

The median is that value of a random variable that divides an ordered dataset into two equal parts. Half the observations will fall below this median value and the other half above it (Wegner, 2002). Wegner (2002) comments that an advantage of the median is that it is unaffected by outliers and is a useful measure of central location when the distribution of a random variable is severely skewed. The disadvantage of the median is that it is inappropriate for categorical data. It is best suited as a central location measure for interval-scaled data such as the rating scales used in this research.

- **The Mode**

The mode is the most frequently occurring value. When there is more than one score that has the highest yet equal frequency, the distribution is bimodal or multimodal. When every score has an equal number of observations, there is no mode. The mode is a point of reference along with the median and mean for examining spread and shape (Cooper and Schindler, 2001: 443).

- **The Standard Deviation**

"Spread (or dispersion) refers to the extent by which the observations of a random variable are scattered about the central value" (Wegner, 2002: 84). The researcher will use the standard deviation as a measure of dispersion to describe how the observations are spread about the mean. Standard deviation is an important concept for descriptive statistics because it reveals the amount of variability of individuals within a data set (Cooper and Schindler, 2001).

4.3.2 Correlation Analysis

Pearson's coefficient of skewness measures the degree of departure from symmetry based on the difference between the mean and the median, or between the mean and the mode. According the Wegner (2002: 95), this is a useful measurement tool that is valid only for quantitative random variables where the data are interval- or ratio-scaled. Since the questionnaire design in this study is Likert scaled, it is a valid measure.

Pearson's skewness will be used to describe the shape of the distribution of the observations. The Pearson correlation coefficient varies over a range of

+1 through to 0 to –1. Correlation coefficients reveal the magnitude and direction of relationships. The magnitude is the degree to which variables move in unison or opposition. The coefficient's sign signifies the direction of the relationship. The direction indicates whether large values on one variable are associated with large values on the other variable (and small values with small values). This signifies a positive relationship between the two variables: as one increases so does the other. Variables may be inversely related: Large values on the first variable are associated with small values on the second and vice versa (Cooper and Schindler, 2001: 533). The closer to zero the more symmetrical the observations and the stronger the measure of central location (Wegner, 2002: 96). Pearson's Correlation will be used to determine the relationships between the dimensions described in the Technology Acceptance Model.

The remainder of this chapter focuses on determining the sub-objectives discussed in Chapter 3.4.1. All the results that included item 21 were calculated using the reversed scale.

4.4 DATA RESULTS

4.4.1 Reliability and validity

Using the collected responses, the reliability of the factors contained in the research model were evaluated. Reliability was assessed using Cronbach's alpha. The purpose of Chronbach's alpha is to measure the internal consistency and reliability of scale. As summarised in Table 4.1, most of the investigated variables exhibited an alpha value close to or greater than 0.7,

with an overall result of 0.966, suggesting a high degree of internal consistency (Nunnally, 1978). For items relating to Perceived ease of use, the original Cronbach's alpha was 0.560, indicating a moderate degree of internal consistency. Question twenty-one was the contributing factor to the lower value. As discussed in Section 4.2, the scale for item twenty-one has been reversed providing a more satisfactory degree of consistency with a Cronbach alpha value of 0.857.

Table 4.1 Reliability Statistics

Construct	Number of Items	Cronhach's Alpha
Perceived usefulness	5	0.955
Perceived ease of use (C21 reversed)	5	0.857
Attitude	3	0.879
Behavioural Intention	3	0.922
Overall	**16**	**0.966**

In order to test validity, two questions measuring the same item were tested. The correlation was calculated for question items seven and eleven. Both of these questions were intended to measure Perceived Usefulness. The correlation value is 0.823 and is significant at the 95% level ($p<0.05$). The correlation value shows a strong linear relationship between question seven and question eleven, indicating that question seven can be predicted from question eleven and vice versa representing acceptable level of validity for the question items.

4.4.2 Characteristics of the sample

4.4.2.1 Computer Usage

One hundred and five questionnaires were administered. Of these, 98% of respondents owned a computer. All of the respondents that owned a computer had access to the internet. However, only 73% had internet broadband connection. One respondent who did not own a computer proceeded to complete the questionnaire. This response was still used in the study since the aim is a measure of one's intention to use the internet, and the response could still provide a valid perception of one's acceptance level of the internet. The other respondent that did not own a computer did not complete the questionnaire.

The high level of internet access indicates a positive potential situation in terms of general practitioners adopting this mode of technology. The lower frequency of broadband connection however, indicates that respondents may not use the internet as regularly as those with broadband connection. The reasons for this could be greater expenses incurred with dial up connection (pay per minute) and dial up problems, which are not generally problematic with continuous connectivity.

4.4.2.2 Age

Question four and a question using the 'attitude' construct (question six) were cross-tabulated to identify the relationship between age and intention to use the internet. The majority of respondents (72%) were younger than 55. Of the 72% respondents who were younger than 55, 66% felt that using the internet as a source of pharmaceutical information was a good idea (agree or strongly agree). As discussed in Section 2.6.2, research has dictated that older users tend to have a more negative attitude toward information technology. In respect of this research, 40% of the respondents over 54 years old agreed that the internet was a good idea and 23% were in disagreement contradicting prior research. According to TAM (Davis, 1989), attitude is a dependent variable and therefore cannot be viewed in isolation (the relationships with the independent variables are discussed in the next section). However, it must be noted that the predominantly positive attitude across the age groups towards the internet as a source of pharmaceutical information, indicates significant potential for pharmaceutical marketers to use the internet as a complementary marketing channel in order to gain competitive advantage.

Table 4.2 Cross tabulation of attitude and age

Jsing the internet as a source of pharmaceutical information is a good idea * What is your age group? Crosstabulation

			What is your age group?					Total
			25-34	35-44	45-54	55-64	65+	
Using the internet as a source of pharmaceutical information is a good idea	Strongly disagree	Count	0	0	3	2	0	**5**
		Column %	.0%	.0%	7.3%	8.0%	.0%	**4.9%**
		Total %	**.0%**	**.0%**	**2.9%**	**1.9%**	**.0%**	**4.9%**
	Disagree	Count	0	1	4	5	0	**10**
		Column %	.0%	4.2%	9.8%	20.0%	.0%	**9.7%**
		Total %	**.0%**	**1.0%**	**3.9%**	**4.9%**	**.0%**	**9.7%**
	Neutral	Count	1	3	13	9	2	**28**
		Column %	11.1%	12.5%	31.7%	36.0%	50.0%	**27.2%**
		Total %	**1.0%**	**2.9%**	**12.6%**	**8.7%**	**1.9%**	**27.2%**
	Agree	Count	3	14	16	8	2	**43**
		Column %	33.3%	58.3%	39.0%	32.0%	50.0%	**41.7%**
		Total %	**2.9%**	**13.6%**	**15.5%**	**7.8%**	**1.9%**	**41.7%**
	Strongly agree	Count	5	6	5	1	0	**17**
		Column %	55.6%	25.0%	12.2%	4.0%	.0%	**16.5%**
		Total %	**4.9%**	**5.8%**	**4.9%**	**1.0%**	**.0%**	**16.5%**
Total		Count	**9**	**24**	**41**	**25**	**4**	**103**
		Column %	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
		Total %	**8.7%**	**23.3%**	**39.8%**	**24.3%**	**3.9%**	**100.0%**

4.4.2.3 Gender

Among the respondents, 82 % of them were male and 18 % were female. Gender and a question using the 'attitude' variable (question nine) were cross-tabulated to identify whether there was a relationship between gender and attitude towards the internet. 15% of the females and 20% of the males were in disagreement that using the internet as a source of pharmaceutical information would be beneficial to their practice. 57% of the females and 45% of the males were in agreement that the internet would benefit their practice.

As discussed further in the paper (Section 4.4.3), attitude has a significant direct effect on behavioural intention. These results represent an optimistic situation for pharmaceutical organisations wishing to embark on an e-marketing strategy. However, since attitude is a dependent variable in the

TAM model, these results cannot be conclusive in isolation of its dependent variables. The relationships will be discussed further in this chapter.

Table 4.3 Cross tabulation of gender and age.

Using the internet as a source of pharmaceutical information would be beneficial to my practice * Gender .Crosstabulation

			Gender		
			Female	Male	**Total**
Using the internet source of information would beneficial to my practice	Strongly disagree	Coun	1	5	6
		Column	5.3%	6.0%	5.8%
		Total %	1.0%	4.9%	5.8%
	Disagree	Coun	2	12	14
		Column	10.5%	14.3%	13.6%
		Total %	1.9%	11.7 %	13.6%
	Neutral	Coun	5	30	35
		Column	26.3%	35.7%	34.0%
		Total %	4.9%	29.1%	34.0%
	Agree	Coun	5	25	30
		Column	26.3%	29.8%	29.1%
		Total %	4.9%	24.3%	29.1%
	Strongly agree	Coun	6	12	18
		Column	31.6%	14.3%	17.5%
		Total %	5.8%	11.7%	17.5%
Total		Coun	19	84	103
		Column	100.0%	100.0%	100.0%
		Total %	18.4%	81.6%	100.0%

4.4.3 Sub-objective testing

The responses for items relating to perceived usefulness, perceived ease of use; attitude and behavioural intention were averaged to create overall scores for each of the dimensions. Section 3.4.1 describes which questions were used to measure each TAM variable. Measures of central tendency and correlations were computed using the overall scores.

(a) Sub-objective 1.3.1 To determine general practitioners' perceived usefulness of internet technology as a source of pharmaceutical information.

Perceived usefulness as an independent variable was used to determine this sub-objective. Individual items relating to perceived usefulness were grouped together to create an average.

Figure 4.1 PERCEIVED USEFULNESS

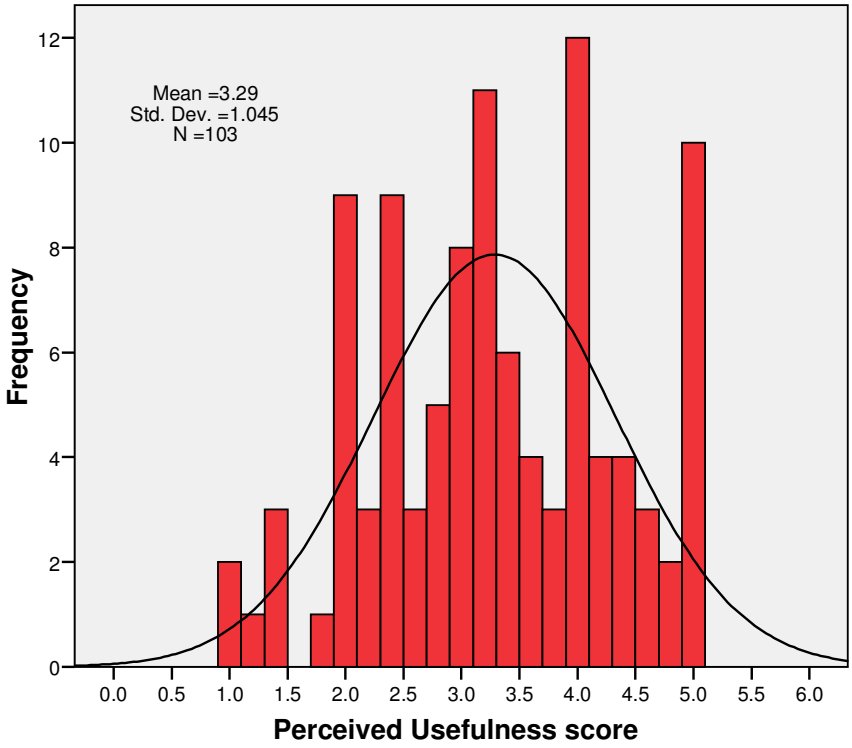


Figure 4.1 has a mean of 3.2854 and a median of 3.2000. This represents a majority agreement in terms of the 'neither agree nor disagree' opinion.

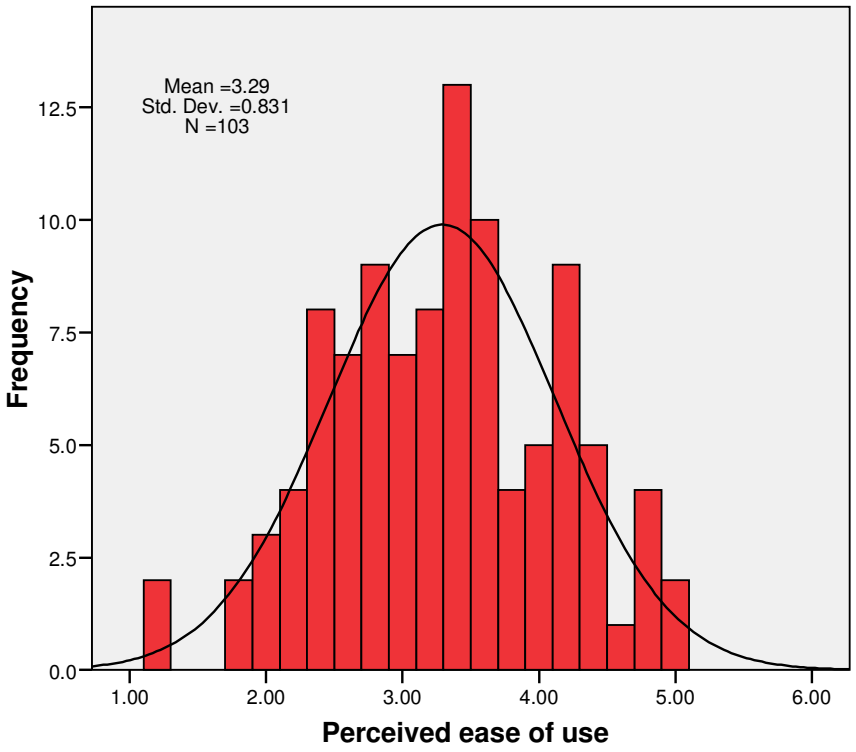
The measure of skewness is –0.084, indicating that the value is close enough to zero to conclude reasonable symmetry thus resulting in an almost equal mean and median.

In respect of sub-objective 1.3.1 one can conclude a reliable measure of central location in the opinion that respondents are neutral in their perceptions about the usefulness of using the internet to search for pharmaceutical

information. Although there is a lack of strong agreement on this point, the results will have significant consequences on the results of sub-objectives 1.3.3 and 1.3.6. This will be discussed in the results of sub-objectives 1.3.3 and 1.3.6.

(b) Sub-objective 1.3.2 To identify general practitioners' perceived ease of use of internet technology as a source of pharmaceutical information. Perceived ease of use as an independent variable was used to determine this sub-objective. Individual items relating to perceived ease of use were grouped together to create an average. The results from the reversed scale of Item twenty-one were used.

Figure 4.2 PERCEIVED EASE OF USE



Analysis of the graph in Figure 4.2 gives a mean of 3.29 and a median of 3.4 indicating that the majority of respondents are neither in agreement nor disagreement that they perceive the internet to be easy to use in order to source pharmaceutical information. The skewness of –0.064 indicates a

similar result as sub-objective 1.3.1 concluding in an almost equal mean and median.

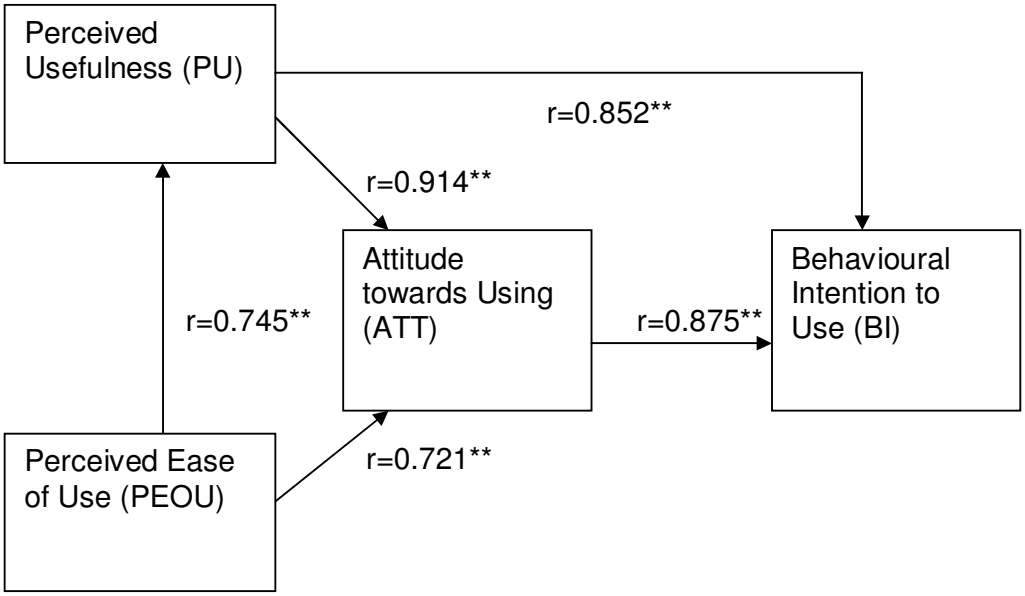
Similarly to sub-objective 1.3.1, respondents appear neutral in their perceptions of the ease of use of using the internet to source pharmaceutical information. As previously discussed in Section 4.3.2, perceived ease of use is also a dependent variable with a direct effect on behavioural intention and also an indirect effect on intention via perceived usefulness. The significance of determining the perceived ease of use as an independent variable and its relationship with the above variables will be discussed in the conclusion at the end of the chapter.

In respect of sub-objective 1.3.1 and 1.3.2 the high number of neutral responses must be noted. The concept of using the internet as a medical information source as well as e-marketing among general practitioners in South Africa is relatively new and the lack of knowledge of the benefits could result in a sense of neutrality. However the fact that the minority of responses reflected a negative reaction provides an optimistic platform from which marketers can develop internet based marketing strategies. Increasing a more positive attitude towards the usefulness of the internet as a source of pharmaceutical information will be discussed in Chapter five.

(c) Sub-objectives 1.3.3 – 1.3.7

Pearson's correlation coefficient was used to determine the following sub-objectives. The Pearson correlation values show strong positive relationships between the dimensions (r/Pearson correlation values >0.6) (Nunnally, 1978). All pairs of correlations are significant at the 95% level ($p<0.05$). Figure 4.3 illustrates the correlations between the tested variables. The relationships between the variables and their significance in determining general practitioners' behavioural intention to use internet technology as a source of pharmaceutical information will be discussed in the following section.

Figure 4.3 Pearson's correlation coefficients



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

Sub-objective 1.3.3 To determine the relationship between general practitioners perceived usefulness and their attitude towards internet technology as a source of pharmaceutical information.

A very strong positive relationship exists (0.914) between general practitioners' perceived usefulness and their attitude towards internet technology as a source of pharmaceutical information.

Sub-objective 1.3.6 To determine the relationship between general practitioners perceived usefulness and their behavioural intention towards using internet technology as a source of pharmaceutical information.

A strong positive relationship (0.852) exists between general practitioners' perceived usefulness and their behavioural intention towards using internet technology as a source of pharmaceutical information

Based on the correlation results, the survey shows that perceived usefulness may be the most significant determinant of general practitioners' levels of acceptance of internet technology. In addition to its strong direct effect on intention (see sub-objective 1.3.6), perceived usefulness also exhibited a considerable effect on intention via attitude. These results are consistent with Lee, Kozar and Larsen's (2002) meta-analysis, which comments that 73% of the studies analysed showed a significant relationship between the perceived usefulness and behavioural intention. These studies stated that perceived usefulness is a stronger determinant of behavioural intention, noting that users willingly use a system that has a critically useful functionality (eg. Davis, 1989). In respect of this research, the observed significant effect of perceived usefulness on internet acceptance may reflect, and therefore reinforce a

general practitioners' tendency of taking a 'tool-oriented' view of internet technology. The findings in sub-objective 1.3.1 indicated a sense of neutrality around the perceived usefulness. However, as depicted in sub-objective 1.3.3, a positive attitude towards the internet has a positive relationship with perceived usefulness. As discussed in Section 4.4.3.2, both males and females had a positive attitude towards the internet would benefiting their practice.

In respect of sub-objectives 1.3.3 and 1.3.6, several implications may be derived from the above findings. Firstly, general practitioners appear to be fairly pragmatic in their internet technology evaluation and selection by focussing on practical usefulness rather than on ease of use (refer sub-objectives 1.3.4 and 1.3.5) or technological novelty. Thus, general practitioners are likely to accept internet technology as a source of pharmaceutical information when it provides considerable usefulness to their practices.

In order to be accepted as a source of pharmaceutical information, internet technology needs to demonstrate satisfactorily sufficient uses for supporting and improving practice and patient care. Secondly, the observed significant indirect effects of perceived usefulness through attitude on internet technology acceptance suggests the relevance of attitude management through communication and articulation of favourable perceived usefulness. Hence, pharmaceutical organisations may need to consider formulating strategies that encourage internet technology acceptance through favourable attitude

cultivation. As stated by Chau and Hu (2002), communicating internet technology's usefulness is important, especially in situations where perceived usefulness alone cannot directly bring about a desired level of technology acceptance.

Sub-objective 1.3.4 To determine the relationship between general practitioners' perceived ease of use and their attitude towards internet technology as a source of pharmaceutical information.

The path analysis results show there is a positive relationship (0.721) between general practitioners' perceived ease of use and their attitude towards internet technology as a source of pharmaceutical information, indicating a strong positive relationship (Nunnally, 1978). These results differ considerably from Lee, Kozar and Larsen's (2003) meta-analysis, which reported that only approximately 50% of the studies analysed, showed a significant relationship between perceived ease of use and behavioural intention (via attitude). Chau and Hu's (2002) study, also reported that perceived ease of use, in the investigated professional context, appeared to have limited effects on attitude.

In respect of sub-objective 1.3.4 a positive attitude will have a direct positive influence on one's perceived ease of use. The majority of respondents were in younger than 55 years old, which was also the group with most positive attitude. However, a predominantly positive attitude across all the age groups and a positive relationship with perceived ease of use provides significant data for pharmaceutical marketers. Once again, strategies that encourage

internet technology acceptance through favourable attitude cultivation will have a direct influence on perceived ease of use and behavioural intention to use the internet as a source of pharmaceutical information, regardless of age group.

Sub-objective 1.3.5 To determine the relationship between general practitioners' perceived ease of use and their perceived usefulness of using internet technology as a source of pharmaceutical information.

There is a direct correlation (0.721) between general practitioners perceived ease of use and their perceived usefulness towards using internet technology as a source of pharmaceutical information.

The results of the relationship between perceived ease of use and perceived usefulness also challenges previous studies. As cited in the meta-analysis (Lee, Kozar and Larsen, 2003), "no amount of perceived ease of use will compensate for low usefulness". The concept of sourcing pharmaceutical information via the internet is still relatively new in the health-care industry. The opposite observed effects in this study compared to Chau and Hu (2002) and the aforementioned meta-analysis might be attributed to the fact that the majority of the previous studies were conducted on Information Systems and not necessarily the internet. By and large, general practitioners are busy professionals who will potentially visit a internet product website if they find it useful (as discussed above) and easy to use. As many as 61% of respondents agreed that "using the internet as a source of pharmaceutical information would be easy for them". This, coupled with the strong positive

relationship with attitude, represents a significant strength with which marketers can begin to formulate internet based product-marketing strategies.

Chau and Hu (2002) found that perceived ease of use appeared to have no significant effects on perceived usefulness. The authors suggested that physicians are not likely to consider a technology useful simply because is it easy to use. Davis, Bagozzi and Warshaw (1992) found that perceived ease of use could indirectly affect acceptance through perceived usefulness. In respect of this survey, there is a positive relationship between perceived ease of use and perceived usefulness.

In respect of sub-objective 1.3.5, it can be concluded that essentially, general practitioners will more readily find the internet useful as a source of pharmaceutical information if they find it easy to use.

However, neutral results from sub-objectives 1.3.1 and 1.3.2 present a strategic challenge for pharmaceutical marketers if they foresee the internet as a potential marketing tool. The internet is aimed at providing a complementary alternative to obtaining pharmaceutical information. Alternative options such as contacting sales representatives or reading hardcopy journals will continue to exist. There needs to be a value-added reason for a customer to search the internet to obtain pharmaceutical information. They will hesitate to use the internet if they do not perceive it to be useful or easy to use. As discussed earlier in this study, there is no extrinsic reward for a doctor to visit a pharmaceutical product website. Unlike

a consumer visiting a website to purchase “a gift for themselves”, a pharmaceutical website is purely academic. It is crucial therefore that the doctor perceives the website to be useful and easy to use. The encouragement of a positive attitude towards the internet will prove to be an important element in a pharmaceutical e-marketing strategy. Marketers need to take cognisance of this aspect when developing product websites.

Sub-objective 1.3.7 To determine the relationship between the general practitioners attitude and their intention to use the internet technology as a source of pharmaceutical information.

Attitude shows a significant direct effect on behavioural intention (r= 0.875**) and appears to be the second most important determinant of intention, next to perceived usefulness. This result is largely consistent with results from previous studies (such as Karahanna, Straub and Chervany, 1999) that have examined the relationship between attitude and behavioural intention.

In respect of sub-objective 1.3.7, forming a positive attitude toward accepting internet technology under discussion is crucial for professional users such as general practitioners. Pharmaceutical organisations should be attentive to individual attitudes and the need to proactively promote positive attitudes toward internet technology acceptance.

4.5 CONCLUSION

As doctors become busier in their practices and have less time to see pharmaceutical representatives, marketers must look at new channels to

sustain and complement the same levels of contact as before. As various information technology applications that support the work and services of professionals continue to be rapidly developed, adopted and implemented, the examination of factors critical to technology acceptance, such as the internet, is becoming increasingly important.

The Technology Acceptance Model has been used in this study to assess certain factors that have previously been utilised to investigate the acceptance of technology. The basic constructs from TAM; perceived ease of use, perceived usefulness, attitude and behavioural intention were retained in this study.

The results from the survey present valuable data in respect of the above factors. Previous studies have found perceived usefulness to be the most significant determinant of intention to accept a technology. Based on the findings discussed in each of the sub-objectives, marketers need to adopt strategies to improve the perception of the usefulness of the internet as a value-added tool for general practitioners. This may require a change in strategy for marketers to encourage a more positive perception among general practitioners. As Porter (2001) emphasises in "Strategy and the Internet", the internet is a tool that should be used as a complement to traditional ways of competing. Internet initiatives should not be set apart from established operations. The implications of the findings of the internet as a marketing channel to source pharmaceutical information as well as recommendations will be discussed in the following chapter.

CHAPTER FIVE

CONCLUSION, RESEARCH IMPLICATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The internet is an important aspect of technology that organisations may potentially apply in their marketing strategy in order to maximise product exposure and competitive advantage. Reasons for the need to adopt a new complementary marketing channel have been discussed. These include factors such as increasing costs of employing/retaining representatives and less time for face-to-face calls. The literature review also discusses the importance of establishing a customer's acceptance status in order to validate the internet as a viable marketing tool. The objective of this study is to determine general practitioners' potential adoption of internet technology as a source of pharmaceutical information. The study results suggest that customers are neutral in their feelings about the perceived usefulness and slightly positive in their feelings about the perceived ease of use. Regardless of gender or age however, the respondents had a positive attitude about the internet as a source of pharmaceutical information. Positive relationships were revealed for all the dimensions.

Beynon-Davies's (2004: 250) preconditions for internet adoption, as discussed in the literature review, are applied to the results to provide recommendations.

5.2 RESEARCH IMPLICATIONS AND RECOMMENDATIONS

The observed results of perceived usefulness as an independent variable have important implications for internet technology development and implementation, so marketing managers need to devise strategies that establish and communicate assurance of the value add of product websites. As discussed in the literature review, Beynon-Davies (2004: 250) commented that awareness is a precondition for the successful uptake of access mechanisms such as the internet. Another precondition is that customers must be interested in using the internet. Interest from customers is likely to depend on substantial and perceived added value. The high level of perceived usefulness in determining technology acceptance validates this point. To promote the acceptance of the internet as a marketing channel, marketers need to place a high priority on increasing awareness of the benefits and demonstrate the usefulness of the internet and communicate its support in improving practice and patient care. In the case of the internet, sales representatives could set up initial information sessions with customers, providing details about the benefits that the company product websites offer.

From a managerial standpoint, the findings of this study also reveal the importance of attitude cultivation and solidification in managing internet technology acceptance by general practitioners. A positive attitude among general practitioners may subsequently result in an increased intention to include the internet as a source of pharmaceutical information routinely in their practice. Again, diffusion and communication of positive perceptions of the technology's usefulness are fundamental. The technology's ease of use

will also play a vital role in determining its successful adoption. The majority of respondents (61%) felt that the internet would be easy for them to use. A positive relationship between ease of use, attitude and perceived usefulness provides a strong grounding to raise a more positive perception of usefulness. Another precondition for internet adoption is access. Customers must have access to the internet from the home or some other convenient location such as their office. Access may be determined by the cost of having connectivity as well as the type of connectivity. The survey results in respect of this research showed that 98% of the respondents had access to the internet and 73% of the respondents had broadband connection. These figures show positive results in terms of accessibility. As broadband costs continue to reduce, it is anticipated that more people will be connected in this manner, increasing accessibility even further. Accessibility therefore does not pose as a limiting factor in respect of this research.

According to Beynon-Davies (2004), the existence of skills is another fundamental precondition in determining adoption of technology. Customers must have the skills necessary to use access mechanisms such as the internet-enabled PC effectively. Based on the fact that the majority of respondents already used the internet, it can be assumed that they had some level of skill at using the internet to source information. Skills can be related to attitude as well as to perceived ease of use. Customers may or may not become skilful at utilising the internet depending on their attitude towards the internet and whether they perceive the internet to be difficult or easy to use. This reinforces the fact that positive attitude cultivation as well as a perception

of ease of use, will be fundamental in determining acceptance levels amongst customers.

Customers must actively use access mechanisms such as the internet on a regular basis in core areas of life. Research reported on in the literature review found that doctors reported spending an average of eight hours each week online, with three of those hours devoted to medical activities. No South African figures could be sourced, however, the above indicates that the more a doctor spends on the internet, the more likely he/she is to search for medical information. Attitude and ease of use towards using the internet may have an influence on the amount of time spent on the internet. If an individual has positive feelings about the internet, chances are he/she will utilise it more often, hence increasing the chance of visiting pharmaceutical websites.

The use of the internet must approach a threshold that encourages the provision of more content and services delivered electronically. The aim for organisations is that a virtuous cycle is established in which better content and services will encourage greater awareness, or interest in and use, of the internet as a preferred method of contact with organisations and their products. This concludes once again, that the perception of the level of usefulness the internet provides in terms of medical information, will determine the impact on a general practitioners' behavioural intention to use the technology. It is therefore crucial that perceptions that the internet is a beneficial tool for the healthcare professional are increased. A positive

perception of usefulness will foster a positive attitude and hence an intention to use the internet.

5.3 CONCLUSION

Changing dynamics in the pharmaceutical industry are forcing marketers to search for new ways to maintain and improve customer relationships as well as gain competitive advantage. The internet is a tool that has the potential to fulfil the above challenges as well as greatly affect and improve the quality of healthcare services. Porter (2001), comments that companies have no choice but to deploy internet technology if they want to stay competitive. However, it must be emphasised that the internet will not replace traditional marketing, but complement it.

Through extensive literature research, this study has shown the importance of four dimensions and their influence in determining internet technology acceptance. The findings also have implications for decision-making practices concerning both technology use and marketing strategies. It has become evident that the doctors in this study are fairly impartial to the usefulness of the internet as a source of pharmaceutical information. Perceived usefulness has been proven to be a strong determinant of intention to use. This study showed a strong relationship between perceived usefulness and attitude as well as perceived usefulness and behavioural intention. Also, a strongly positive relationship between attitude and behavioural intention was concluded. The internet is still a growing phenomenon and doctors can be resistant to change. As doctors become

more exposed to and familiar with the internet as a general source of information, they may become more positive about the benefits it may offer in terms of pharmaceutical information. In order to increase the perceptions of usefulness and overall intention to use the internet as a source of pharmaceutical information, effective communication strategies and attitude cultivation will need to be implemented.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

In summary, important implications for practice have resulted from this research. Certain limitations of this study have, however resulted in possible areas where the research could be expanded:

- This study has focussed on one target group in a restricted area. Owing to the growing evidence of the use of the internet as a marketing channel, further studies could shed light on the adoption of internet resources by other doctor groups in different areas.
- This study explored the adoption of the internet by a specific group. Recommendations were suggested based on an adoption strategy model. A comprehensive change management strategy was not in the scope of this study. Based on this study's findings, further research could expand on an organisation change management strategy appropriate for internet adoption.

- In 2000, the original TAM model was modified and elaborated upon. The new version, TAMII, defines the impact of external variables on intention to use more clearly. Since this research was an exploratory study, the researcher did not find it necessary to expand on the original TAM variables. Further research could expand on the newer TAMII variables and their influence on intention to use a particular technology.

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APPENDIX ONE : SAMPLE QUESTIONNAIRE

Interviewer Name	
Date of Interview	

Section A: Introduction

A colleague is currently undertaking a research study to determine what our customers acceptance is towards using internet technology as a means of obtaining pharmaceutical product information.

I would greatly value your participation to assist in gathering information regarding the above.

Please note that:

- your responses will be treated with the strictest of confidence
- your responses will be collated and the combined responses will be reported upon
- the researcher is only interested in your opinion which cannot be regarded as incorrect
- in this context, “pharmaceutical information” relates to all pharmaceutical sites relating to disease areas/ product information/ doctors forums etc

With this in mind please may I ask you a few questions?

NO Would it be possible for me to ask you next time I see you?

YES Continue

Section B: Demographics

1. Do you own a computer? Yes No

   If "yes" ask question 2

2. Do you have access to the internet Yes No

   If "yes" please continue to question 3

3. Do you have a broadband internet connection? Yes No

4. What is your age group?

1	2	3	4	5
25-34	35-44	45-54	55-64	65+

5. Please indicate your gender

Male	Female

Section C: Measurement scales from modified Technology Acceptance model

Please rate the following statements in terms of your agreement or disagreement with them, where "1 is Strongly Disagree" and "5 is Strongly Agree".

1 = Strongly Disagree

2 = Disagree

3 = Neither Agree nor Disagree

4 = Agree

5 = Strongly Agree

6. Using the internet as a source of pharmaceutical information is a good idea

   1 2 3 4 5

7. Using the internet as a source of pharmaceutical information could improve my practice and patient care

   1 2 3 4 5

8. I intend to use the internet as a source of pharmaceutical information as often as needed

   1 2 3 4 5

9. Using the internet as a source of pharmaceutical information would be beneficial to my practice

   1 2 3 4 5

10. I find pharmaceutical product websites easy to navigate and obtain clinical information

    1 2 3 4 5

11. I would find using the internet as a source of pharmaceutical information useful in my job

    1 2 3 4 5

12. Using the internet as a source of pharmaceutical information would be easy for me

1 2 3 4 5

13. I would frequently use the internet as a source of pharmaceutical information in my practice

1 2 3 4 5

14. Using the internet as a source of pharmaceutical information would enable me to do my job more efficiently

1 2 3 4 5

15. My interaction with the Internet as a source of pharmaceutical information is clear and understandable

1 2 3 4 5

16. It would be easy for me to become skilful at using the internet as a source of pharmaceutical information

1 2 3 4 5

17. Using the internet as a source of pharmaceutical information could enhance my effectiveness in my practice and patient care

1 2 3 4 5

18. I would enjoy using the internet to search for pharmaceutical information

1 2 3 4 5

19. I plan to use the internet as a source of pharmaceutical information in the future

1 2 3 4 5

20. Using the internet as a source of pharmaceutical information would make my job easier

1 2 3 4 5

21. Interacting with the internet to search for pharmaceutical information is often frustrating

1 2 3 4 5

APPENDIX TWO : FREQUENCY TABLES

Frequency Tables

Do you own a computer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	102	99.0	99.0	99.0
	No	1	1.0	1.0	100.0
	Total	**103**	**100.0**	**100.0**	

Do you have access to the internet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	102	99.0	99.0	99.0
	No	1	1.0	1.0	100.0
	Total	**103**	**100.0**	**100.0**	

Do you have a broad band connection?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	76	73.8	73.8	73.8
	No	27	26.2	26.2	100.0
	Total	**103**	**100.0**	**100.0**	

What is your age group?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-34	9	8.7	8.7	8.7
	35-44	24	23.3	23.3	32.0
	45-54	41	39.8	39.8	71.8
	55-64	25	24.3	24.3	96.1
	65+	4	3.9	3.9	100.0
	Total	**103**	**100.0**	**100.0**	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	19	18.4	18.4	18.4
	Male	84	81.6	81.6	100.0
	Total	**103**	**100.0**	**100.0**	

Perceived Usefulness

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Total	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
C7 Using the internet as a source of pharmaceutical information could improve my practice and patient care	6	5.8%	12	11.7%	24	23.3%	41	39.8%	20	19.4%	103	100.0%
C11 I would find using the internet as a source of pharmaceutical information useful in my job	5	4.9%	20	19.4%	34	33.0%	28	27.2%	16	15.5%	103	100.0%
C14 Using the internet as a source of pharmaceutical information would enable me to do my job more efficiently	9	8.7%	23	22.3%	29	28.2%	26	25.2%	16	15.5%	103	100.0%
C17 Using the internet as a source of pharmaceutical information could enhance my effectiveness in my practice and patient care	7	6.8%	24	23.3%	27	26.2%	29	28.2%	16	15.5%	103	100.0%
C20 Using the internet as a source of pharmaceutical information would make my job easier	4	3.9%	26	25.2%	34	33.0%	24	23.3%	15	14.6%	103	100.0%

Perceived ease of use

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Count	%	Count	%	Count	%	Count	%	Count	%
C10 I find pharmaceutical produ websites easy to navigate and ob clinical information	3	2.9%	18	17.5%	47	45.6%	23	22.3%	12	11.7%
C12 Using the internet as a sour of pharmaceutical information wo be easy for me	5	4.9%	11	10.7%	24	23.3%	48	46.6%	15	14.6%
C15 My interaction with the Inter as a source of pharmaceutical information is clear and understandable	5	4.9%	12	11.7%	37	35.9%	34	33.0%	15	14.6%
C16 It would be easy for me to become skilful at using the intern as a source of pharmaceutical information	4	3.9%	11	10.7%	26	25.2%	40	38.8%	22	21.4%
C21reversed Interacting with the internet to search for pharmaceu information is often frustrating	15	14.6%	40	38.8%	19	18.4%	25	24.3%	4	3.9%

Attitude

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
C6 Using the internet as a source of pharmaceutical information is a good idea	5	4.9%	10	9.7%	28	27.2%	43	41.7%	17	16.5%
C9 Using the internet as a source of pharmaceutical information would be beneficial to my practice	6	5.8%	14	13.6%	35	34.0%	30	29.1%	18	17.5%
C18 I would enjoy using the internet to search for pharmaceutical information	6	5.8%	18	17.5%	44	42.7%	22	21.4%	13	12.6%

Behavioural Intention

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
C8 I intend to use the internet as a source of pharmaceutical information as often as needed	7	6.8%	13	12.6%	29	28.2%	36	35.0%	18	17.5%
C13 I would frequently use the internet as a source of pharmaceutical information in my practice	9	8.7%	21	20.4%	35	34.0%	26	25.2%	12	11.7%
C19 I plan to use the internet as a source of pharmaceutical information in the future	9	8.7%	17	16.5%	21	20.4%	44	42.7%	12	11.7%

APPENDIX THREE : DESCRIPTIVES

Descriptives

			Perceived Usefulness	Perceived ease of use	Attitude	Behavioural intention
Statistic	Mean		3.2854	3.2913	3.3722	3.2136
	95% Confidence Interval for Mean	Lower Bound	3.0813	3.1289	3.1856	3.0045
		Upper Bound	3.4896	3.4536	3.5587	3.4227
	5% Trimmed Mean		3.3057	3.2964	3.4017	3.2373
	Median		3.2000	3.4000	3.3333	3.5000
	Variance		1.091	.690	.911	1.145
	Std. Deviation		1.04473	.83067	.95464	1.07010
	Minimum		1.00	1.20	1.00	1.00
	Maximum		5.00	5.00	5.00	5.00
	Range		4.00	3.80	4.00	4.00
	Interquartile Range		1.60	1.40	1.00	1.50
	Skewness		-.084	-.064	-.237	-.415
	Kurtosis		-.736	-.352	-.071	-.334

APPENDIX FOUR : CORRELATIONS

Correlations

		Perceived Usefulness	Perceived ease of use	Attitude	Behavioural intention
Perceived Usefulr	Pearson Correla				
	p				
	N				
Perceived ease of	Pearson Correla	.745**			
	p	.000			
	N	103			
Attitude	Pearson Correla	.914**	.721**		
	p	.000	.000		
	N	103	103		
Behavioural intent	Pearson Correla	.852**	.701**	.875**	
	p	.000	.000	.000	
	N	103	103	103	

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

APPENDIX FIVE : RELIABLITY AND VALIDITY

Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.966	16

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
C6	49.31	178.471	.830	.963
C7	49.31	176.020	.858	.962
C8	49.43	176.384	.831	.963
C9	49.48	175.938	.865	.962
C10	49.64	183.566	.685	.965
C11	49.57	175.090	.901	.962
C12	49.31	181.177	.734	.965
C13	49.76	175.578	.858	.962
C14	49.70	173.252	.883	.962
C15	49.46	183.152	.654	.966
C16	49.23	181.435	.701	.965
C17	49.64	174.762	.852	.963
C18	49.69	179.373	.782	.964
C19	49.54	176.466	.811	.963
C20	49.67	177.184	.828	.963
C21reversed	50.22	186.430	.485	.969

Validity

Correlations

		C7	C11
C7	Pearson Correlation		
	p		
	N		
C11	Pearson Correlation	.823**	
	p	.000	
	N	103	

**. Correlation is significant at the 0.01 level