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A SURVEY OF GENDER DIFFERENCES IN TECHNOPHOBIA AND IN THE ADOPTION OF HIGH-TECHNOLOGY CONSUMER PRODUCTS

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Dedicated to my mother, Anna.

For everything you sacrificed in life to make this possible

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ABSTRACT

A SURVEY OF GENDER DIFFERENCES IN TECHNOPHOBIA AND IN THE ADOPTION OF HIGH-TECHNOLOGY CONSUMER PRODUCTS

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Despite the advent of technology into consumers' daily lives, many consumers are plagued by feelings of fear towards complex technology-related products. Feelings of anxiety and fear often lead to the avoidance of technology; in other words, so-called 'technophobia'. This study aims to establish whether gender differences in technophobia and the adoption of high-technology consumer products continue to exist in this digital age, or whether they have indeed changed over time.

Further, this study also aims to uncover the main social reasons that gender differences in technophobia can occur. The results of this study provide new insight into gender differences towards technology purchases. The findings should assist marketers by providing a clearer understanding of how men and women adopt new technology products in the 21st century. By understanding gender differences in attitudes towards technology, marketers are better able to target and communicate technology benefits that consumers can relate to and appreciate.

Following a review of the available literature, the theory of the diffusion of innovation was presented as a foundation to studies of gender differences in technophobia. The Technology Readiness Index (TRI) was introduced as a sound means of measuring technophobia, based on an in-depth study of the available measurement scales to measure for technophobia. The study included men and women, aged between 25 and 35 years, of higher socio-economic classes, residing in the Northern Johannesburg regions of South Africa. Gender differences in levels of technophobia are studied in relation to three different technologies (computers, DSLR cameras and home automation technology) in order to compare gender differences towards technologies at different stages of the diffusion curve. Future research avenues regarding studies in to technophobia are also presented.

The results indicate that traditional differences between genders towards technology still exist amongst South African consumers. Women continue to experience higher levels of technophobia towards new technology than men. However, the degree of these differences changes, depending on the technology used. Regarding *why* these gender differences may occur, levels of optimism, risk taking and cognitive involvement between genders were measured. In general, the results indicate that traditional gender differences towards technology continue to exist in South Africa.

Thus, although marketers may assume that in the modern digital age, men and women are consuming electronics in the same manner, this study shows that this is not necessarily the case, and as a new product is introduced to the market, marketers need to employ differentiating strategies in order to target both men and women successfully. By tailoring the manner in which technology is advertised and shared to the female consumer, marketers are better able to capture this more 'technophobic' consumer. The advertising of technologies exasperates the gender divide by confirming established sex role stereotypes, and managers need to learn to differentiate and cater for both genders when advertising technology products.

This study illustrates that the degree of technophobia women possess towards technology depends on the technology and its 'inherent gender bias' and marketers need to adapt their communications according to the technology being sold. Marketers in the electronics industry cannot have a 'one-hat-fits-all' assumption of women and technology, and need to analyse the 'technology fit' and communicate it to the market accordingly. By uncovering the social reasons *why* gender differences continue to exist, advertisers can use these inherent gender differences to test and design advertisements that improve female beliefs about the technology. Marketers are encouraged to experiment with different communication strategies that improve inherent beliefs based on social norms.

This study found that women are less optimistic than men, exhibit higher levels of risk aversion, and higher cognitive-processing than men when considering technology purchases. The greatest challenge in stimulating the adoption of high-technology products is the perceived risk that a consumer undergoes when making a purchasing decision. Increasing levels of consumer resistance are also attributed to the sheer volume of new information in the digital era and managers thus need to employ simplifying strategies in order to help break through the messaging clutter and alleviate the information overload that the consumer is experiencing. Managers need to find a balance between being seen as innovative market leaders, and successfully introducing the technology at a pace that invites consumer adoption and acceptance.

This study provides strong empirical support for managers attempting to successfully target technology products to men and women. By uncovering gender differences in the way that one reacts to technology, one is better able to understand the consumer and marketing efforts are strengthened. This study not only sheds some light on consumer attitudes, feelings and reactions to new technologies, but it also provides important insight into how men and women accept technology in the market.

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1.1. INTRODUCTION

Despite a phenomenal growth in the global consumer technology industry over the past decade, research findings suggest that many consumers, especially women, remain apprehensive of new technologies that are introduced in the marketplace (Hogan, 2005:67). This apprehension towards new technology products is becoming more pronounced as consumer electronics are expected to rapidly redefine modern life (Datamonitor, 2006).

Undeniably, the global electronics market is evolving rapidly, with many products being rendered obsolete by more recent technological advances. The fast pace of technological progress has traditionally fuelled the development of newer, more advanced products (Style-Vision, 2004). However, the technology race also brings with it two major risks: the permanent threat of obsolescence and the never-ending escalation of innovative technical features. The digitalisation of consumer electronics has brought with it new challenges, not only for technology firms, but also for the consumers themselves (Style-Vision, 2004).

Globally, technology is changing continuously, along with consumer attitudes towards technology (Style-Vision, 2004). The rate at which new technologies are entering the consumer market is increasing exponentially. The continual introduction of new technology products, characterised by both their rapid change and extreme complexity, threatens to plague many consumers with fear, uncertainty and doubt (Yadav, Swami & Pal, 2006:60).

1.2. DEFINITION OF TECHNOPHOBIA

Many consumers fail to cope with this ever-changing technical environment, while the more innovative, risk-taking consumers embrace it (Style-Vision, 2004).

Amongst those who fail to cope with new technologies in a healthy or positive manner, a deep paranoia or fear towards the use and adoption of technology may develop. This fear, known as technophobia, has been defined as "an anxiety about present or future interactions with computers or computer-related technology; negative global attitudes about computers, their operation or societal impact and/or specific negative cognitions during computer usage" (Hogan, 2005:59).

Although the aforementioned definition is computer-specific, technophobia applies to all new forms of technology and care should be taken not to limit the context of technophobia to that of computer technology. Previous research typically concentrated on innovation adoption and the reasons why consumers adopt certain products. Resistance to innovation and the reasons why consumers are prevented from adopting new technologies are largely under-researched. In addition, the role of technophobia in the adoption of technology-related products remains under-researched (Laukkanen, Sinkkonen, Kivijärvi & Laukkanen, 2007:419).

Technophobia, identified by feelings of insecurity and the fear of not being able to keep up with technological changes, has started to impact on the daily lives of many consumers (Sami & Pangannaiah, 2006:430). Deep-seated technology anxieties adversely affect performance and acceptance of computer-related technologies amongst certain consumer segments (Hogan, 2005:59). The very success of organisations in the future may not depend on their ability to adapt and incorporate new technological advances into their products and services offering, but rather the market's ability, or readiness, to accept and adapt to the digital revolution (Hendry, 2000:509).

Consumers who exhibit high levels of technophobia and resistance to new technologies will have an influence on the adoption of technology on society as a whole, as well as the development of new technologies, by simply avoiding interaction with such technology altogether (Hendry, 2000:511).

1.3. THE IMPORTANCE OF GENDER IN THIS CONTEXT

Since sufferers of technophobia do their best to avoid contact with technology, the various causes of technophobia, and the consumer segments that are most affected by it, have to be understood (Sami & Pangannaiah, 2006:429). According to Tolle (2006:49), the most basic form of identification with one's self is with the body being either male or female. Gender identifies a person more than any other collective identification such as nationality, religion, race, social class or political allegiance (Tolle, 2006:60). Thus, in order to understand technophobia at the very basic of human differences, one needs to understand these differences at the most basic of levels – that of gender differences.

As gender also remains the single most important organising category for marketers, gender differences in attitudes towards technology has become even more important to understand (Bain & Rice, 2006:119). Demographic trends relating to technology adoption continue to influence marketing and business strategies in the information era (Laukkanen *et al*., 2007:419). By discerning gender differences in technophobia, marketers of high-technology products are better able to target men and women in advertising and communication campaigns based on their general attitude towards new technologies (Wolin & Korgaonkar, 2003:375). If gender differences are found to exist, marketers of new innovative goods will be able to provide the necessary perception-changing educational communication to the right gender group at different stages of the new technology's life cycle.

1.4. IMPORTANCE OF THE STUDY

Uncovering men's and women's general propensity and attitude towards the adoption of new technologies may help marketers make important predictions and recommendations regarding the future of the market (Packaged Facts, 2006). Marketers may also be in a better position to capitalise on future trends in terms of men's and women's differences towards new technologies. Indeed, a thorough understanding of how men and women view and use technology, and the trends affecting new product innovations, remains critical in understanding high-technology markets.

1.5. LITERATURE REVIEW OF TECHNOPHOBIA AND GENDER

Past studies on gender differences in computer-related technophobia have concluded that significant differences in levels of technophobia exist, with a higher percentage of women exhibiting high to moderate levels of technophobia (Hogan, 2005:67). More recent studies into gender differences in technophobia conclude, however, that these differences no longer exist, and if they are found, then the results are mixed and varied (Broos, 2005:22). Other studies conclude that while gender differences existed in the past, the 'gender gap' has narrowed to the point that women are no longer more technophobic in terms of computer-related technologies than men (Rainer, Laosethakul & Astone, 2003:108). Recent studies propose that gender attitudes to computers change over time. This may provide one explanation for the inconsistent research results of previous studies on gender differences in technophobia (Rainer *et al*., 2003:108).

A review of the literature finds that studies into gender and technophobia remain riddled with inconsistencies and gaps. Firstly, the topic of gender is inadequately studied, with the concept of gender in the information technology sector largely lacking theorisation (Adam, Howcroft & Richardson, 2004:222).

A major gap in the research into technophobia is that a limited amount of research has considered gender in the context of technology adoption and usage rate (Elliott & Hall, 2005:99). Through a review of the literature, it is found that research has failed to apply a sound theoretical foundation of technology adoption in order to compare research results with new products that are relevant at different time periods.

Past studies have also failed to account for the changing nature of technology products and incorporate this into the study of technophobia. Inconsistent research results into gender differences in technophobia may be attributed to the failure of past research to integrate theories of changing product innovation and the temporal nature of technology by restricting measures of technophobia to one technology, such as computers (Yadav *et al*., 2006:58-60).

Classic definitions of technophobia used throughout past and recent research studies typically confine technophobia to the fear of *computer*-related technologies (Hogan, 2005:59). This, it may be argued, fundamentally skews results of technophobia between genders over time, as computer technology becomes obsolete and loses its innovativeness and complexity due to the ever-evolving technology market (Yadav *et al*., 2006:58-60).

1.6. THE THEORY OF THE DIFFUSION OF INNOVATION

Taking the current limitations of previous research into account, this study proposes a more theoretical look into the study of technophobia through the theory of the diffusion of innovation. This theory explains the adoption of new technology products entering the mass market, and consumer reactions to these new technologies (Carr, 2004). The context for the purposes of this study will remain new, high-technology consumer goods which, based on the diffusion of innovation theory, are entering the consumer market, and which consumers normally identify as high-risk, high-involvement products which induce uncertainty and fear (Hirunyawipada & Praswan, 2006:183).

By refining the definitions of new technologies and technophobia, the changing nature of new technology products will be accounted for in this study. By clearly factoring in the temporality of technophobia - the fact that new technologies are ‘new’ one day and then ‘obsolete’ the next, and as such evoke different feelings of fear or confidence at different stages of the innovation curve - will provide a firm basis for accurately revealing whether the gender gap in technophobia is indeed narrowing, widening or whether it exists at all. The provision of a sound theoretical core on which to base studies of technophobia will also provide a consistent means of measuring changing gender differences in technophobia over time. The findings of this study may indeed lend themselves to the argument that women are ‘technological laggards,’ adopting technologies at a later stage of the innovation curve than men.

1.7. RESEARCH PURPOSE

The main purpose of this study is to thus to determine whether men and women differ in their willingness to adopt new technologies based on their feelings of technophobia to those technologies. This research also aims to uncover the core social reasons *why* these differences in attitudes towards technologies may exist.

1.8. RESEARCH OBJECTIVES

As this study is motivated by conflicting evidence in the literature regarding gender differences in technology use, adoption and anxiety, the following research objectives have been formulated:

- To determine whether men and women differ in levels of technophobia towards high-technology consumer products at different stages of the diffusion of innovation curve.
- To investigate gender differences in the adoption of new technologies based on differences in levels of optimism towards new technologies, willingness to take technological risks, and cognitive involvement when considering or purchasing new high-technology consumer products.

1.9. RESEARCH METHODOLOGY

In order to quantify possible gender differences in technophobia, an adaptation of the Technology Readiness Index (TRI), developed by Parasuraman (2000:307-320) was used. The TRI's ability to assess a consumer's propensity to adopt technology products and measure a consumer's relative levels of technophobia and innovativeness, make this scale ideal for the purposes of this study (Parasuraman, 2000:310-314).

1.10. STRUCTURE OF THE STUDY

The remainder of the study is structured as follows: First, a conceptual framework of new technology adoption and the concept of technophobia will be introduced. The diffusion of innovation, as a theoretical foundation for the study of technology adoption and technophobia will then be discussed.

Findings into gender differences in technology adoption and technophobia, as well as the proposed social reasons for any differences in technophobia will then be highlighted. This is followed by a description of the research methods and procedures used in the study. The results of the research are then discussed, and finally the implications, limitations and direction for future research are offered.

CHAPTER 2. CONSUMER ADOPTION OF HIGH-TECHNOLOGY PRODUCTS

2.1. INTRODUCTION

This chapter provides a clear definition of high-technology products and how it differs in complexity to everyday consumer products. The complexity of high-technology products poses unique marketing challenges in its adoption by consumers, which is discussed in this chapter.

The adoption of high-technology products is discussed in detail by reviewing theoretical explanations for the diffusion of high-technology products. Three theoretical explanations are discussed including macro-level, market-level and individual-level theories. The theory of the diffusion of innovation is introduced and discussed in detail as the foundation for the research into technophobia. Finally, an overview is provided of demographic factors that influence the adoption of high-technology products.

2.2. HIGH-TECHNOLOGY PRODUCTS DEFINED

The world is at the forefront of a ‘technology boom’ with consumer electronics taking centre stage as the hottest new category in the technology industry (Simba, 2004:1). Global sales of consumer electronics were expected to exceed $135.4 billion in 2006, with an 8% increase in 2005 (RNCOS, 2006). Indeed, the consumer market, only one subset of the total technology industry, has achieved a compound annual growth rate of 6.2% globally over the 2001-2005 period (Datamonitor, 2006). As the demand for better and more advanced electronic goods continues to grow, the digital revolution sets its sights on even greater global profit margins.

Consumer spending on electronic goods is forecasted at $42 billion over 2008 to 2009, with the consumer electronics industry set to grow to $700 billion by 2009 (Reuters, 2008). This indicates that the technology revolution is set to break ground as the need for newer, more technically advanced products and services becomes the 21st century paradigm (RNCOS, 2006). The consumer electronics industry has witnessed a phenomenal growth over the past few years; a growth which has been attributed to the high standards in new digital technologies (RNCOS, 2006).

The growth of technology is also evident in academic institutions. In the United States, it is predicted that e-Learning will grow by more than 38% within the next few years. This 'e-Learning boom' is likely to continue as more people use the Internet as a communications medium (van der Rhee, Verma, Plaschka & Kickul, 2007:127).

The acceleration of technology development is not only affecting the complexity of tangible products. The way in which consumers experience service delivery is also undergoing a major transformation as more service providers turn to technology to better their service offering (Matthing, Kristensson, Gustafsson & Parasuraman, 2006:288). Global trends do not only hint towards expansion into high-end technology, they command it. In South Africa, the growth of high-technology is set to escalate to unprecedented heights due to the heavy investments committed to technology by various government departments (Anderson, 2007:60-61).

However, despite the optimism with which technology is being incorporated into everyday life, the result, however, is not always positive. The introduction of technology-related products and services is problematic, and research suggests signs of growing consumer frustration and disappointment with new technology-based services (Matthing *et al*., 2006:228). Whilst both public and private organisations focus on the digitisation of products and services, little research has actually been conducted on the readiness and willingness of consumers to use and adopt these new technologies (Hendry, 2000:509). The adoption of technology by more organisations is changing the very nature of the consumer market, as well as the behaviour of the consumers.

Some consumers embrace technological change, whilst others resent having to continuously adapt to high-technology products (Matthing *et al*., 2006:228).

High-technology products refer to the intellectual property embodied in a physical product, such as the micro-processor in the personal computer (Glazer, 2007:122). Care needs to be taken in distinguishing between innovation and technology, as not all technology products are innovative (Glazer, 2007:2002). For the purposes of this study, an innovation is defined as, "the creation of any sort of novelty in art, science or practical life and consists to a substantial extent of a recombination of conceptual and physical materials that were previously in existence" (Yadav *et al*., 2006:57-63).

For the purpose of this research, a high-technology product will be defined as a new consumer technology boxed product that is currently entering the innovation curve (Carr, 2004). The innovation curve, which refers to the process through which consumers adopt new technologies, is discussed in detail in section 2.4.2.1.

High-technology products have certain characteristics that differentiate them from other consumer products, with rapid change, extreme complexity and market uncertainty at the heart of these differences. In order for a product to be regarded as 'high-technology,' it has to possess three key characteristics of high-technology industries; namely, market uncertainty, technological uncertainty and environmental uncertainty (Yadav *et al*., 2006:59).

Market uncertainty refers to the structure, changes and dynamics of a market in which new technological innovations take place (Rajamäki, 2008:226). Technological uncertainty stems from technological novelty that is created by combining unknown components to create a new product (Yadav *et al.*, 2006:57-58). Environmental uncertainty refers to the uncertainty which is often caused by changing technological products in the market (Bstieler, 2005:268).

According to Bstieler (2005:267), the greater the complexity of the product being developed, the higher the degree of technological uncertainty which impacts on future product development and adoption.

Perceived technological uncertainty refers to a consumer's perception that he or she is unable to fully understand or use a new technology (Song & Montoya-Weiss, 2001:61). According to Song and Montoya-Weiss (2000:64), technological uncertainty is the inability to completely understand a new product or some aspect of a new technological environment.

Technological uncertainty refers to a changing market where product evolutions are difficult to predict and a person has an inability to completely understand the new product innovation (Bstieler, 2005:268). Not only restricted to large-scale technical deployments, high-technology products generally refer to any product, ranging from sport shoes to genetic engineering, whose functioning is beyond the reach of common understanding (Yadav *et al*., 2006:57-58). Profound technological uncertainty is thus a key characteristic of high-technology products (Rajamäki, 2008:225). Examples of high-technology consumer products that meet these conditions are the personal computer, DSLR cameras with face detection and live-view, as well as advanced home automation technology (Sony, 2007:3-39).

For the purposes of this study, only technology products which are characterised by both market and technological uncertainty are included.

These include new-to-market products such as personal computers, DSLR cameras with face detection features, and home automation technology. These products have all been considered highly innovative when introduced to the market for the first time. In order to ensure that levels of technophobia can be measured over time for future studies, the technologies used in studies need to remain 'durable' in that they are capable of a long, useful life (Rundle-Thiele & Bennett, 2001:30).

High-technology is typically defined as the uncertainty the product brings as well as the amount of information it takes for the average consumer to understand the product (Saaksjarvi, 2003:91).

Based on these characteristics, it is high-technology products specifically which garner the most resistance from consumers. The more innovative the technology, the more unreliable and costly the technology appears to consumers when first introduced to the market. Technology products generally face low initial acceptance due to high technological uncertainty (Min, Kalwani & Robinson, 2006:16).

Ironically, market uncertainty accelerates product development as more firms compete for new product development and first-to-market successes, thus further fuelling the temperamental technology market (Bstieler, 2005:280).

The high degree of market, technological and environmental uncertainty of high-technology products makes their adoption by consumers more complex. Consumers are known to resist the adoption of certain technologies altogether, resulting in failing product and service launches, despite the inherent perceived usefulness or innovativeness of the product or service (Min *et al*., 2006:16). Resultant feelings amongst consumers of fear and anxiety to such technological change have meant that in today's world, technophobia is regarded as the biggest barrier to the technology revolution (Hogge, 2006:56). The challenges faced by marketers in stimulating the adoption of high-technology products will be discussed in the next section.

2.3. MARKETING CHALLENGES IN STIMULATING THE ADOPTION OF HIGH-TECHNOLOGY PRODUCTS

As the rate of technological advancements continues to increase, recent studies aim to highlight the consumer's reactions, expectations and purchase experiences in the new digital age. Recent reports indicate that for many consumers, the very benefits of technological innovation are problematic and negative emotional reactions, such as anxiety, are commonly associated with a failure to use new technologies (Anthony, Clarke & Anderson, 2000:32). According to Wood and Moreau (2006:44), reports indicate that perceptions of usage difficulty have caused up to 48% of consumers to delay the purchase of digital cameras.

Technophobia reduces the positive outcomes that an individual may derive from new technology encounters, resulting in overall dissatisfaction and rejection of the technology (Niemelä-Nyrhinen, 2007:306). The economic effect for large manufacturers that results from consumer resistance to, and rejection of, innovative consumer technologies is enormous and cannot be underestimated.

According to Yadav *et al*. (2006:63), the following factors challenge the marketing and adoption of high-technology products:

- The high-involvement nature of high-technology products generates higher perceived psychological, monetary and social risk.
- Consumer understanding remains limited and the marketing of high-technology products requires high information content and communication.
- The fear, uncertainty and doubt that are created through new technological innovations are major barriers to the adoption of high technology products.

Consumers tend to lack confidence in high-technological products when first introduced to market, resulting in many cases of immediate product failure (Bstieler, 2005:272). High-technology products typically face the constant threat of redundancy, difficulty in convincing a new market to adopt the product, and difficulty in assessing the size of the new market (Rajamäki, 2008:225).

In many cases the marketer does not truly understand what the new customer's needs are, with the customer experiencing high technological anxiety towards the product's ability to satisfy his or her needs (Rajamäki, 2008:226). The threat of obsolescence is also very real as firms need to dispel consumer fears that the technology will continue and not be replaced with a new technology too quickly, thus incurring high monetary and switching costs for the consumer (Rajamäki, 2008:227).

The greatest challenge in stimulating the adoption of high technology products is thus the perceived risk, anxiety or stress that a consumer undergoes when making a purchasing decision, and which occurs when the buyer has little or no experience of the new product (Deacon, Forrester & Cole, 2003:190). Whether adoption of a new product occurs or not is directly related to the perceived risk the consumer experiences when considering the purchase (Mitchell & Boustani, 1993:18).

Perceived risk is a multi-dimensional construct which includes financial, functional, psychological, social and time risks (Snoj, Korda & Mumel, 2004:159-160). A consumer considers all costs when purchasing a new product, including the opportune and physical costs of the product, as well as the social price, which includes the time, effort and lifestyle changes that the purchase requires (Snoj *et al*., 2004:159). A switching cost refers to the once-off cost a consumer bears in order to purchase and use a new product (Pereira, 2004:321).

Resistance to technology adoption occurs due to the perceived risks which are associated with trying a new, unknown technology.

Innovation requires change, and resistance to change is a normal consumer response which occurs before successful adoption of a new product can begin. The greater the change in product innovation, the greater the consumer resists the adoption of that product (Laukkanen *et al*., 2007:424).

When faced with a new technology, consumers are uncertain as to the value they will be receiving over the risks involved in adopting the new technology. The prime restraint to new product adoption is the monetary cost involved in switching over to a new technology, as well as the psychological risks that the consumer perceives the new technology will bring (Castano, Sujan, Kacker & Sujan, 2008:321).

Interestingly, negative emotions of fear are more common with technology products than any other consumer product, creating unique challenges for the marketers of technological innovations (Castano *et al*., 2008:322).

Increasing levels of consumer resistance are attributed to the sheer volume of new information in the digital era which is leading to increasing levels of frustration as consumers find it more difficult to make product comparisons and thus decision-making becomes more difficult (Herbig & Kramer, 1994:46). Information overload occurs when the amount of relevant and useful information a consumer requires to make a purchase decision becomes a barrier to adoption rather than an aid in the purchase of a product (Bawden, Holtham & Courtney, 1999:249).

As computers proliferated in the market in the 1990s, information overload was recognised as a major problem to new technology adoption.

The personal computer (PC) is a prime example of consumer risk aversion in the 1980s due to product information overload. During this period, there was a global aim to have a PC on every desk in every home, but the immediate information and skills this required from consumers proved too much for many consumers to handle and the bubble burst in 1980 (Herbig & Kramer, 1994:49).

Introduced too quickly to the market, at too fast a pace, the PC was resisted due to the consumers' underlying fears of the unfamiliarity of the functions of the PC, previous negative experiences, as well as the fear of being undermined by the PC's capabilities in the workplace. This all occurred too much, too soon, and consumers experienced an information overload (Herbig & Kramer, 1994:49).

As high-technology products result from innovation, whether evolutionary or revolutionary, they are typically complicated and require greater customer education, persuasion and product information (Yadav *et al*., 2006:63). The adoption of technologies involves a process of high involvement decision-making which either results in approval or disapproval of the technology by the consumer. The factors considered by the consumer include concerns of pricing, technical functionality and ease of use, as well as evidence of product longevity (Deacon *et al*., 2003:188).

The greatest challenge in stimulating the adoption of high-technology products remains the emotional influence that product uncertainty brings to the purchase decision-making process (Wood & Moreau, 2006:45). Consumer uncertainty, which includes consumers' fears and doubts as to whether the technology will meet their changing needs, challenges the adoption of technology goods as consumer anxiety delays the adoption process.

Consumer anxiety deters consumers from adopting new technologies as the complexity of the product induces stress (Herbig & Kramer, 1994:49).

Another challenge in stimulating adoption is also that of technological uncertainty itself, which is derived from the lack of clear standards for new innovations as well as the speed at which innovations occur (Slater, Tomas, Hult & Olson, 2007:6). The time between new product developments is also decreasing, exasperating the rate of new technological innovations (Song & Montoya-Weiss, 2001:61-62). Technological uncertainty manifests itself through consumer uncertainty that the technology can deliver on its promises and meets specific needs (Yadav *et al*., 2006:60).

The majority of consumers are unaware of all the features and functions that technology offers, with one fourth of consumers still experiencing anxiety when setting their digital alarm clocks (Sinkovics, Stöttinger, Schlegelmilch & Ram, 2002:477-478).

At the core of the emotional investment required to adopt new technologies, the inability of some consumers to cope with the ever-evolving, ever-turbulent, high-technology market has resulted in increasing levels of 'technophobia,' a term used to describe any negative human attitudes, thoughts and behaviours that directly or indirectly result from technology (Tu, Wang & Shu, 2005:77). Technophobia, traditionally confined to computer anxiety, manifests itself in a struggle to accept new computer-related or other technologies (Tu *et al*., 2005:78). A detailed explanation of technophobia, its causes, process and impact on technology adoption is provided in section 3.2.

The widespread use of technology has led to a need for understanding why people accept or reject the use of certain technologies (Smith & Oosthuizen, 2004:353). In certain cases, where 'feature fatigue' and fear develop, simply getting consumers to the point of trial is a difficult process (Wood & Moreau, 2006:44). The adoption of high-technology products is complex as, by definition, high-technology market conditions are rapidly changing.

The dynamism and complexity of high-technology products necessitate a changing target market over its life-cycle which impacts on market acceptance in different ways (Yadav *et al*., 200:63).

The process of product diffusion within a society provides a comprehensive explanation of new technology adoption and the reaction of consumers to complex technology products at different stages of the product's life-cycle (Carr, 2004). The theory of the diffusion of innovation aims to shed some understanding on consumer adoption and how best to overcome the obstacles created by the new digital era. This theory, along with other theories of technology adoption, is discussed in detail in the following section.

2.4. THEORETICAL EXPLANATIONS FOR THE DIFFUSION OF HIGH-TECHNOLOGY INNOVATIONS

The diffusion of high-technology innovations can be explained from three perspectives: a macro-level perspective which focuses on differences in technology adoption between nations; a market-level explanation which focuses on the diffusion of innovation in the marketplace; and a micro-level explanation which focuses on explaining the innovativeness of individual consumers. These 'three levels' of theoretical explanations will now be discussed in detail.

2.4.1 Macro-level explanations: Differences in technology adoption between nations

Understanding the differences in adoption between nations and cultures remains important and relevant when uncovering how new technologies are adopted (Hogan, 2005:60). Technology adoption differences at a macro socio-cultural level need to be defined before understanding individual differences at the micro-level. This is based on the finding by Beetles and Crane (2005:238) that technology adoption differs in various cultural and national contexts.

A recent survey reveals that technophobia manifests itself in up to 50% of many populations, implying critical global levels of computer-related anxiety which cannot be marginalised (Korukonda, 2005:310). Differences in technology adoption amongst countries are generally explained and defined through Internet usage.

Statistics regarding Internet usage across Asia show that less than two in 10 000 Cambodians have access to the Internet, whilst in Singapore, more than 3 000 in every 10 000 use the Internet actively (Paul, 2002:17). Internet usage in the West has increased to 25% over the past few years, with the proliferation of the Internet as high as 50% in the United States and Scandinavia (Cullen, 2001:311).

However, even within developed nations, where access to Information Communication Technology (ICT) is huge, there remain sub-cultures within the country who do not adopt these ICTs. In America, for example, these include the Latin-Americans and North American Indians (Cullen, 2001:312). In Great Britain, only 7% of rural areas are connected (Hubregste, 2005:167).

According to Ono (2006:117), a gap between those who have access to technology and those who do not has emerged between demographic groups and countries. This gap, coined the ‘digital divide’, includes individuals and countries that are at different stages with regard to their access to new technologies.

According to Hill, Beynon-Davies and Williams (2008:247), the digital divide refers to the gap between individuals as well as communities that own, have access to, and use information and technologies and those who do not. Interestingly, the digital divide may be seen as a continuum between technology adoption and non-adoption (Hill *et al*., 2008:247).

The gap between technology adoptions depends on the time period, country and demographic group under study (Ono, 2006:124). The gap between those individuals who have access and those who do not is moderated by demographic variables, which include education, income and socio-economic status (Hill *et al*., 2008:247). Specific groups are particularly slow in their use of ICT, and include people of low incomes, low education levels, the unemployed and people living in rural areas (Cullen, 2001:312). Ethnic migrant groups and minority ethnic groups are also identified as having very low levels of technology adoption. As such, each study into technology adoption and technophobia needs to cater for socio-cultural differences within a society. According to Cullen (2001:312), there remains a very strong correlation between a country’s socio-economic status and its participation in the digital economy.

In terms of gender differences in technology adoption within nations, a recent AC Nielsen survey found that in developed countries, the differences in Internet access between genders is not large. However, differences between men and women regarding Internet usage are much greater in developing countries, with women's level of involvement is as low as 5% (Cullen, 2001:314). Importantly, the study also finds slower technology adoption amongst women than men in the majority of social groups (Cullen, 2001:312).

According to Hatfield, Tegarden and Echols (2000:63), emerging nations experience greater levels of technological uncertainty and technology anxiety than First World countries. As a result, developing nations generally experience a slower rate of new product adoption than developed nations (Talukdar, Sudhir & Ainslie, 2002:97). Ono (2006:122) supports this view through the conclusion that the extent of the digital divide within countries depends on the stage of the technology's diffusion process.

The successful diffusion and adoption of new technologies thus not only depends on the ability of individuals within a certain society to absorb new technologies, but also on the macro-level adoption and diffusion of a specific technology into the country (Ono, 2006:136). These country-specific factors need to be accounted for when proposing differing levels of technophobia between consumer groups.

Differences in product adoption between First and Third World countries are clear. The average penetration potential of a new product is only about one-third compared to half for that for First World countries. Developing countries also take on average 17.9% longer to realise maximum sales on a new technology product compared with developed nations (Talukdar *et al*., 2002:97). Noticeably, the benefits of the global technological revolution are disproportionately distributed between the developed and developing nations (Paul, 2002:13). One of the greatest challenges in bridging the digital divide are the barriers brought about by social norms, changes in lifestyles and overcoming cultural inhibitions towards a specific technology (Paul, 2002:15).

However, the existence and consequences of this so-called ‘digital divide’ has given rise to considerable debate in the research. As more consumers use new technologies, claims are being made that the digital divide is rapidly disappearing in many countries (Scott & Nolan, 2007:92). If the argument for a narrowing digital divide between nations is true, does this imply that the gender divide in technology adoption is also narrowing?

The majority of research shows that the digital divide between developed nations is narrowing based on specific technologies, such as computer technologies. What is proposed is that the shifting digital divides between countries on a more macro level may be attributed to the diffusion of that technology into society. What is required is further study into new technologies that have *not* diffused into society in order to accurately judge whether a digital divide still exists or not. This is supported by the fact that different social groups face different technology constraints and in such contexts technologies have an uneven impact on different societies (Southerton, 2007:114).

According to Yeniyurt and Townsend (2003:391), culture, economic conditions, literacy levels and urbanisation structures of countries affect their acceptance of new technologies. Understanding that each country accepts and adopts a new product differently will aid in the management of new technologies and perceived uncertainties in foreign environments.

The technology gap between First and Third World countries is widening, not only due to the investment of governments into information technology, but also importantly due to the cultural and psychological readiness of technology adoption of individuals themselves. In many cases, the availability of information technology does not solely impact on technology use, but also that some consumer groups simply choose not to use technology (Hubregste, 2005:165). The resistance of consumers to the adoption of new technologies being introduced to the market, and the process of product diffusion will be discussed in detail in the following section.

2.4.2 Market-level explanations: The theory of the diffusion of innovation

According to Korukonda (2005:312), a variety of theoretical frameworks have been proposed to explain the prevalence of technophobia, but these efforts have been diffuse, contradictory and lacking in explanatory ability. A review of the literature suggests that the theory of the diffusion of innovation provides a sound theoretical explanation for technophobia. The theory of the diffusion of innovation will be introduced and explained as a conceptual framework to account for the adoption of new high-technology consumer products as well as accompanying feelings of technophobia.

2.4.2.1 The adoption of innovation curve

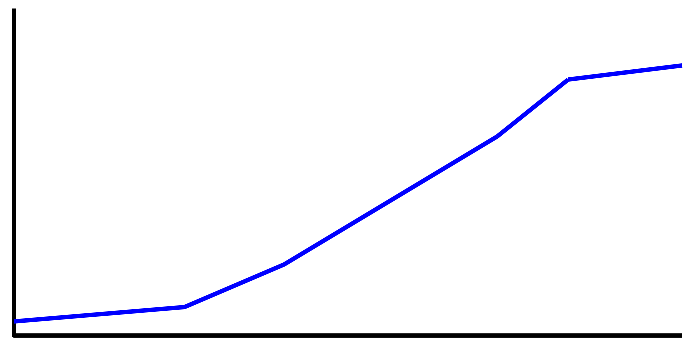
An innovation is a technology product that is perceived as being new to a consumer, whether it is new to the market or whether it is simply new to the individual (Lamb, Hair, McDaniel, Boshoff & Terblanche, 2001:254).

In the context of this research, the focus will remain on innovative products that are typically new-to-market as a whole. An innovation, or something new, is typically 'diffused' through a population through communication, trial and adoption in a pre-determined diffusion process (Yadav *et al*., 2006:64).

High-technology products exploit and create change and are characterised by dynamism, innovation and complexity (Yadav *et al*., 2006:63). The theory of the diffusion of innovation proposes that when first introduced, the complexity of high-technology products captures the uncertainties or risks in the market which enhance consumers' resistance to adoption (Hirunyawipada & Praswan, 2006:183). The theory of the diffusion of innovation aims to identify and understand different consumer segments based on the consumers' time of product adoption.

As is shown in Figure 1 below, the diffusion of innovation process has been portrayed graphically through the shape of an elongated S, which plots the adoption of new technologies over time (Carr, 2004).

Figure 1: The 'S curve' of innovation adoption



Source: Adapted from Carr (2004).

The 'S' curve represents the number of adopters on a cumulative basis. The diffusion model represents the rate of speed of new product adoption by a group of adopters as a mathematical function dependant on time (Martinez & Polo, 1996:34). Consumers do not all adopt a new technology at the same time, and it is these differences in rates of adoption that enable researchers to group consumers into categories based on their propensity to adopt technologies relatively quickly (Martinez & Polo, 1996:34).

According to Lamb *et al*. (2001:255), the rate at which a new product is diffused into a market and is accepted by consumers is predicted by the degree of difficulty involved in understanding and using the product. The more complex the technology, the slower the rate of adoption and the greater the level of technophobia across certain consumer segments. This is supported by Wood and Moreau (2006:44) whose study indicates that the more complex the innovation in terms of perceived learning costs, the slower the diffusion rate into the mass consumer market.

It is further proposed that resistance by certain consumers to new product innovations stems from novel attributes of new products embodying features with unexpected side effects (such as unknown technological risks) which disrupts a consumer's established routine. Perceived risk is therefore said to be a function of the unexpected results of new product adoption and an outcome that deviates from expectations (Hirunyawipada & Praswan, 2006:187).

According to Mukherjee and Hoyer (2001:462), high-complexity products, such as high-technology goods entering the innovation curve, actually reduce product evaluation because of negative learning cost inferences about these products. A key implication for the study of technophobia is that novel attributes (found especially in new high-technology products) have been found to contribute to technophobia or consumer resistance towards technological innovation and adoption (Mukherjee & Hoyer, 2001:462).

Previous research has suggested that perceived risk, which is theorised as instigating resistance to the adoption of innovation, also significantly impacts on innovation adoption. It is claimed that perceived risk leads to uncertainty which holds consumers back from technology adoption (Hirunyawipada & Praswan, 2006:193). According to Deacon *et al*. (2003:190), perceived risk is inversely related to the adoption rate of a new product.

According to Robinson and Min (2002:120), the greatest market and technological challenges are experienced by the first adopters of a new technology. The risks faced by these early pioneers include uncertainty regarding the benefits of the technology itself, as well as higher monetary and switching costs. Indeed the first-to-market is generally referred to with the phrase, 'the market pioneer is the one with arrows in its back' (Robinson & Min, 2002:121).

Market pioneers typically encounter greater technological uncertainty and technophobia than early followers and late adopters of a technology do.

However, they generally overcome these based on their greater levels of innovativeness and risk-taking characteristics in order to reap the rewards of new product ownership (Robinson & Min, 2002:126). New technologies need to overcome the consumer's inherent product uncertainty, and the risk that the new technology performs as stated and will satisfy the consumer's needs (Rajamäki, 2008:226).

Thus, as a technology is introduced to consumers, resistance is met through fear of the technology (technophobia). However, as the consumer learns more of the technology, technophobia is replaced with adoption. In other words, high-technology products that have just been introduced to consumers draw the most resistance and hence heightened levels of technophobia, compared with low-complexity products, or products already 'diffused' into society (Carr, 2004).

For example, as personal computers first entered the innovation curve, they were seen by consumers as high-technology and innovative goods, and were thus met with resistance by certain consumer segments. However, as computer technology diffused through widespread usage and adoption, the level of innovation of these products decreased, and with that so did levels of consumer resistance and anxiety (Hirunyawipada & Praswan, 2006:184).

Another example includes the initial resistance of many consumers to digital cameras. Primarily used by hobbyists and professional photographers, these cameras were perceived as too complex by consumer groups. As the perceived complexity of the product diminished over time through the diffusion process, consumers began to adopt the technology more readily (Lamb *et al*., 2001:255).

According to Hynes and Lo (2006:31), the theory of the diffusion of innovation goes some way in explaining the initial adoption of new technologies.

There are, however, some notable limitations to the use of this theory in accounting for all measures of technology adoption. The theory of the diffusion of innovation does not account for consumer adoption decisions for those technologies that are in the mature stage of the diffusion process. In this instance, other constructs such as consumer involvement may be better predictions of consumer adoption.

Hynes and Lo (2006:32-33) also argue that a critical issue in measuring innovativeness is that individual innovativeness differs between product categories. For example, a consumer may show great interest in technology, but very little in other product categories such as clothing.

Taking these potential limitations into consideration, this study focuses on the adoption of high-technology consumer products across domain specific categories, such as specific consumer electronics. In this way some of the limitations of the use of the diffusion of innovation theory are negated.

2.4.2.2 The segmentation of technology adopters

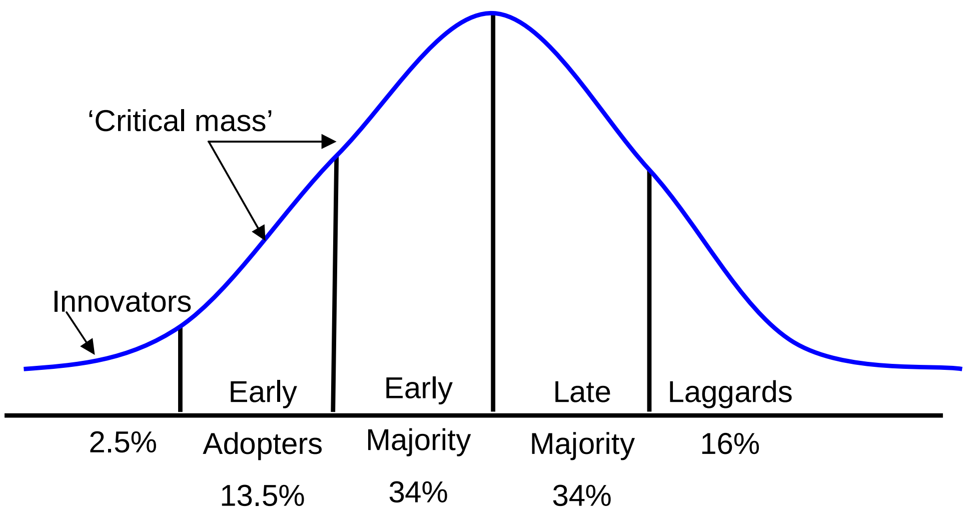
One of the greatest aims of business strategy remains the identification and targeting of consumer market segments that best create value for the firm and consumers (Slater *et al*., 2007:5). Key to this achievement in the high-technology market is the identification of the innovators and early adopters who thrive on new product innovations and features. One approach to segmenting markets for high-technology products is based on the categorising of consumers in terms of innovation adoption (Slater *et al*., 2007:6).

Innovativeness has been described as the extent to which consumers are relatively early in adopting new products compared with other consumers. Importantly, the *time of adoption* is a major criterion that distinguishes early adopters from late adopters (Hirunyawipada & Praswan, 2006:184-185).

In the context of technology products, innovativeness is defined as the tendency of a person to be a thought leader or technology pioneer; one who is considered technically adept with abundant technological knowledge (Saaksjarvi, 2003:93-94).

New product adoption behaviour refers to the process a consumer undertakes in order to adopt a new product before most others within his or her social network (Wang, Dou & Zhou, 2008:240). For the purposes of this study, adoption is defined as, 'the continuous, voluntary use of a product or service' (Saaksjarvi, 2003:94). The adoption of new technologies is graphically portrayed by the bell-shaped curve in Figure 2 below which represents the frequency of consumers adopting a product over time.

Figure 2: Stages of technology adoption



Source: Adapted from Verleye and De Marez (2004:141).

As illustrated in Figure 2, as new technologies are introduced to society they remain unproven and adoption remains limited as consumers are apprehensive towards the product. The graph includes a graphic depiction of the consumer segments or 'techno-types' which vary in terms of their propensity to adopt new technologies (Verleye & De Marez, 2004:140).

The five categories of adopters are described as the degree to which one consumer segment is relatively earlier in adopting new products, services or ideas than other consumer segments (Saaksjarvi, 2003:93). The adoption of a technology by a consumer is a process which begins with the initial knowledge of the new product, to creating an attitude towards the product, and then finally deciding whether or not to adopt the product (Saaksjarvi, 2003:90).

According to Wikipedia (2007), the bell-shaped curve not only describes the adoption of new products, but also defines adopters of new products according to specific demographic and psychological characteristics. During the initial stage, only the most innovative and 'technically adept' first movers begin experimenting with the technology.

The theory of the diffusion of innovation defines innovators as those consumers who adopt a new technology during its first introduction to the market (Matthing *et al*., 2006:289). These individuals are typically referred to as the 'innovators' and represents about 2.5% of consumers (Verleye & De Marez, 2004:140-141).

The rest of the market comprises the early adopters, early majority, late majority and laggards, each exhibiting unique purchasing characteristics. According to Lamb *et al*. (2001:254-255), the five consumer categories, defined by time of new product adoption, exhibit the following characteristics:

- **Innovators:** Also known as 'explorers', these consumers are the first to try a new product, service or idea. These consumers continuously seek new products to try, almost obsessively, and are typically high risk-takers and thrive on innovation.
- **Early adopters:** Also referred to as 'pioneers', these consumers are typically opinion leaders and although they are not the first to adopt new products, they do try new products early in the product's life-cycle.

- **Early majority:** Also described as 'sceptics,' these consumers are more cautious when adopting new products and rely heavily on information and word-of-mouth before trying anything new.

- **Late majority:** Also known as 'paranoids,' these consumers are characterised by scepticism and only adopt products that have been in the market for a long time and that have proven to be reliable.

- **Laggards:** The final consumer group to adopt, laggards typically adopt products that are widely diffused and generally outdated. Laggards have the longest adoption time and tend to be highly suspicious of new technologies and feel alienated from new innovations.

According to Lamb *et al*. (2001:254), the innovators are characteristically more eager to experiment with new ideas and products and are usually the target market during the introductory phase of any new product. Later in the diffusion process, once the high-complexity of the product has reached common understanding and acceptance, the adoption curve rises upward as the more sceptical, 'technophobic' consumers learn to trust the technology. Eventually the technology becomes universal, with only a few technological 'laggards' resisting adoption (Carr, 2004).

The importance of understanding which type of consumer seeks out new technologies cannot be overstated and is of significant importance to manufacturers. Being able to predict which consumer segment will adopt an innovation first allows marketers to more specifically target their potential consumers through all elements of the marketing mix (Hynes & Lo, 2007:32).

In order to truly understand and uncover gender difference in technophobia and technology adoption, it is importance to understand where men and women are generally segmented in terms of late or early technology adoption.

A useful segmentation index, the Technology Readiness Index (TRI), divides consumers into five different segments based on their innovativeness and willingness to adopt new technologies (Yadav *et al*., 2006:66-67). The TRI has been used in several studies as a key factor in the measure of adoption of innovative technologies and the technology readiness of potential adopters (Elliot & Hall, 2005:98-100; Liljander, Gillberg, Gummerus & van Riel, 2006:180; Parasuraman, 2000:308; Rust & Kannan, 2003:38).

The greatest contribution of the TRI to the field of technology adoption research is the scales that have been developed.

The scales categorise consumers into five ‘technology adoption types.’ These categories vary in the consumers’ demographics, psychographics and the rate at which they adopt new technologies (Parasuraman & Colby, 2001:3).

Based on the consumer’s TRI score, each consumer is easily identified as belonging to one of the following five categories: explorer, pioneer, sceptic, paranoid, or laggard.

According to van der Rhee *et al*. (2007:129), the explorer is the consumer who scores highest on the TRI, who is optimistic about technology, exhibits the highest level of innovativeness and is the least uncomfortable and insecure when faced with new technologies. The laggard, on the other hand, is that consumer who scores lowest on the TRI, who is least optimistic and innovative about technology, and is the most uncomfortable and insecure, to the point of being fearful and resistant towards new technologies. It is the laggard that experiences the highest levels of technophobia towards new technologies.

One criticism raised against the TRI is that these categories do not exactly mirror the ones described in the literature on the diffusion of innovation. The TRI’s introduction of a new set of category names are, however, only marginally different from those used by other researchers and should not be discarded due to superficial name changes (Parasuraman & Colby, 2001:3).

Indeed, this means of segmenting consumers based on their propensity to embrace new technologies allows for the clear classification of 'technophobes,' with the most technologically-fearful consumers falling into the 'laggards' category (Yadav *et al*., 2006:66-67).

This study aims to focus on these segments when comparing differing levels of technophobia between genders. Gender differences are studied in this research based on differences in men's and women's propensity to adopt new technologies in the innovation curve.

Individual-level explanations for technology adoption and technophobia, as proposed by the TRI, are discussed in detail in the next section.

2.4.3 Individual-level explanations: Consumer innovativeness and technophobia

Innovativeness has been defined as the extent to which an individual is relatively earlier in adopting new products, ideas or services than other members of a social system (Yadav *et al*., 2006:65).

Hirunyawipada and Praswan (2006:182) define consumer innovativeness as an individual consumer's enthusiasm to accept change and try new products before other individuals. These innovative consumers actively seek out novelty from new, unknown products and technologies. Innovation remains a personal and subjective attitude towards new products and depends on the consumer's level of confidence towards new products (Saaksvarji, 2003:91).

According to Chiu, Lin and Tang (2005:419), innovativeness is a personality construct that is possessed to a lesser or greater degree by all consumers, as everyone, at some point, adopts new products.

Personal innovativeness reflects this willingness for new product consumption and is regarded as a precursor for the adoption and use of new technologies; hence the importance of innovation theories in explaining technology adoption and technophobia (Chiu *et al*., 2005:419).

Research suggests that there may be a strong link between personality and technophobia, although the results of such studies are generally mixed and contradictory. The mixed nature of the results has led to a call for further research on the relationship between personality and technophobia (Korukonda, 2005:311-312). According to Anthony *et al*. (2000:32), studies suggest that computer attitudes may be directly related to personality.

The role of the consumer's personality in accounting for individual acceptance or rejection of new high technology has been most popularly employed through the theoretical perspectives of the Technology Acceptance Model (TAM) and the Technology Readiness Index (TRI).

At the individual-level, the two most popular conceptual frameworks for explanation of the adoption of new technologies are the TAM and the TRI. The TAM has been widely accepted as an explanation for the acceptance or avoidance of technology by consumers (Korukonda, 2005:312). The TAM measures consumer attitudes towards, and the use of, technology. The TAM proposes that beliefs about technology, perceived usefulness and perceived ease of use directly affect a person's attitude towards a technology (Hendry, 2000:509).

According to the TAM, the antecedents to the actual use of technology are sought in the consumer's attitude to technology as well as 'external' variables which include personality, cognition, and socio-cultural variables (Korukonda, 2005:312).

Despite the TAM's widespread use, major criticisms have been levelled against it, including the model's failure to account for and explain technophobia as a negative reaction to technology adoption (Korukonda, 2005:312-313).

The TAM has been created as a general explanation of the determinants of computer acceptance, rather than specific behavioural implications of non-acceptance, such as technophobia (Chiu *et al*., 2005:418). The TAM also fails to account for innovativeness as a core factor in the adoption of new technologies.

The TAM has thus been found to be too limiting in its abilities to account for levels of technophobia (negative reaction to technology) and innovativeness (positive reaction to new technologies). Another limitation of the TAM is that although this model explains why a consumer may accept or reject technology, the model fails to explain the actual adoption and use of technology (Hendry, 2000:509-510).

In order to measure the propensity of an individual to adopt a new technology, as based on the theory of the diffusion of innovation, a model that does factor in the innovativeness of a consumer is critical (Im, Mason & Houston, 2007:63-66). A model that achieves this is the TRI.

According to Verma, Victorino, Karniouchina and Feickert (2007:7), the TRI measures, 'a person's propensity to embrace and use new technologies for accomplishing goals in home life and at work.' The TRI is capable of measuring a consumer's overall willingness to adopt new technology, as well as the consumer's inherent resistance towards new technology (Hendry, 2000:510).

The TRI, developed by Parasuraman (2000:307-320), is based on the principle that the adoption of technology products is inherently different due to varying individual levels of optimism about technology, individual propensities to be innovative, discomfort towards technology, as well as technology-based insecurities. The TRI acknowledges and accounts for the complex nature of technology adoption by discerning between technology innovativeness (positive feelings towards new technologies) and technophobia (negative feelings towards new technologies).

The TRI evaluates an individual's propensity to embrace new technology products by measuring consumer attitudes, both positive and negative, towards new, innovative technology products (Elliott & Hall, 2005:98). According to a study by Matthing *et al*., (2006:288), those respondents who score high on the TRI scale are more innovative, and are also more willing to participate in new technology and service developments.

According to van der Rhee *et al*. (2007:128), technology readiness 'describes the behaviour process behind the adoption of technological products and services.' Parasuraman and Colby (2000:307-320) further define technology readiness as consisting of four main constructs, namely optimism and innovativeness, which are positive constructs, as well as discomfort and insecurity which are negative attitudes towards technology.

Technology readiness refers to a person's propensity to adopt and use a new technology. The less techno-ready an individual is, the more technophobic that consumer is towards technology (Hendry, 2000:510).

Table 1 below summarises the definitions of the four TRI dimensions as defined by Verma *et al*. (2007:7) and Parasuraman and Colby (2000:307-320).

Table 1: TRI construct definitions

Construct	Definition
Optimism	'A positive view of technology and a belief that it offers people increased control, flexibility and efficiency in their lives.'
Innovativeness	'A tendency to be a technology pioneer and thought leader.'
Discomfort	'A perceived lack of control over technology and a feeling of being overwhelmed by it.'
Insecurity	'Distrust of technology and scepticism about its ability to work properly.'

Source: Verma *et al*. (2007:7); Parasuraman & Colby (2000)

Consumer adoption of new technologies is an emotional process, consisting of negative emotions such as fear, as well as positive emotions such as optimism.

These dichotomous emotions are the most likely components of the decision to purchase a new technology (Castano *et al*., 2008:322). The advantage of the TRI for the purposes of this study is the fact that the scale accounts for the measure of innovativeness as well as technophobia at a specific level across four constructs which gives a holistic view of technology readiness in terms of positive technology adoption, as well as negative technophobia which manifests itself through non-adoption or technology avoidance (Parasuraman, 2000:307-320).

The TRI measures technophobia across its two main facets. Through the discomfort dimension, technophobia is measured through the anxiety, apprehension and fear towards new technology usage and adoption. Through the insecurity sub-dimension of the TRI, the distrust and scepticism of the consumer towards a technology is measured (Parasuraman, 2000:311).

A person’s positive attitude towards technology is also measured in the TRI through the optimism sub-dimension of the TRI, providing a comprehensive measure of a person’s propensity to adopt new technologies (Parasuraman, 2000:311).

A criticism raised against the TRI includes the scale’s limiting insight into how marketers can actually identify techno-ready individuals and *why* consumers vary in their levels of technophobia and/or innovativeness (Parasuraman & Colby, 2001:5). Although the TRI does not explain why different individuals adopt technology, the TRI does deepen the understanding of how consumers vary in their technology readiness across innovativeness and technophobia (Elliott & Hall, 2005:100).

This lends the TRI as being an ideal instrument in discerning differences between consumer groups, including gender differences. The scale is relatively new in its use of measuring gender differences in technophobia and innovativeness specifically.

The TRI's greatest success is its ability to segment consumers based on their preferences towards technology. By segmenting consumers, the TRI enables marketers to differentiate based on the technological-readiness of each consumer group (Verma *et al*., 2007:4-12).

The TRI identifies users who exhibit both innovative *attitudes and behaviours* (Matthing *et al*., 2006:288). The TRI identifies consumers with innovative attitudes, which in turn translate into actual innovative behaviours, such as the adoption and purchase of new technology products.

According to Matthing *et al*. (2006:289), people have an innate dichotomy of both favourable and unfavourable views towards new technology, and both positive and negative attitudes need to be considered in order to fully understand why consumers do / do not adopt new technology. The TRI specifically addresses this dichotomy and identifies consumers based on both their favourable and unfavourable views of technology. A detailed discussion of the use of the TRI to achieve the research objectives of this study is provided in section 3.4.

At this point, individual-level factors of innovativeness and technophobia have been introduced as potential explanations for either the rapid or slow diffusion of innovation amongst consumers at the micro-level. Other individual factors, such as age, income, socio-economic status, gender, race and education levels may also influence the rate at which certain technologies diffuse in certain consumer markets. An overview of these demographic factors is provided next

2.5. An overview of demographic factors as related to the adoption of high-technology products

According to Ono (2006:116), a clear divide in access to technology exists among various demographic groups; with income, education and gender as the key determinants of digital inequality within nations.

The question posed, however, is whether demographic factors, other than gender, can account for or significantly contribute to differences in levels of technophobia between men and women. This section provides an overview of the demographic factors that influence the adoption of high-technology products.

As has been discussed, innovativeness is a personality construct that is assumed to remain constant throughout a person's life. Hynes and Lo (2006:33) however, argue that this 'allocated innovativeness' does not exist in a vacuum and that innovativeness is found to be highly correlated with variables such as education, socio-economic status and urbanisation. In terms of socio-economic findings, less educated, poorer consumers are less likely to comprehend complex technical information and are more likely to suffer from information overload.

More well-to-do, economically active consumers are more likely to adopt high-complexity technological innovations (Walsh & Mitchell, 2005:283). This is supported by Im *et al*. (2007:73) who found that younger, more educated and affluent consumers tend to demonstrate higher levels of innovativeness, and that income is the *single largest factor* in predicting product ownership. According to Paul (2002:13), demographic variables such as levels of income, socio-economic status and education directly impact on how technology is used amongst specific consumer segments.

Technology anxiety correlates with demographic variables such as age, gender and socio-economic class (Gilbert, Lee-Kelley & Barton, 2003:253).

In terms of age, studies show that there is a significant gender difference amongst older consumers and that the level of technophobia will be higher as the age of a consumer increases (Hogan, 2005:66-72). Age remains a significant factor in discerning differences between consumers who own new technologies, and those who avoid technology (Hill *et al*., 2008:249).

In this study, it is found that people over the age of 50 experience much higher levels of 'cognitive technophobia' or thoughts about technology than younger consumers. Supporting this is the finding that Internet engagement decreases with age, with older consumers being less interested in the Internet than younger individuals (Hill *et al*., 2008:244). A severe example of technophobia amongst older consumers is the fear of being watched by technology, or a 'Big Brother' take-over.

Current stereotypes of older consumers generally define them as technophobic and anxious about adopting any new technologies (Niemelä-Nyrhinen, 2007:305). A less dramatic finding concludes that elderly consumers do not necessarily completely avoid new technologies. Mature consumers try new products only if it meets a specific need, rather than because it is innovative and trendy (Laukkanen *et al*., 2007:420).

Elder consumers adopt technological innovations for different reasons than younger consumers. According to Wang and Cole (2008:942), elder consumers base their purchasing decisions on the emotive information and younger consumers base theirs on the factual, technical information provided. Elderly consumers also associate a higher level of risk in determining the value of a new technology, which delays their adoption compared with younger consumers (Laukkanen *et al*., 2007:423).

Importantly for this study, amongst older adults, higher levels of technophobia are associated more with women than with men. This is traditionally argued to be a result of older adults being more likely to adopt traditional gender roles that stereotype men as more technically adept and less technophobic than women (Hogan, 2005:66-72).

It may thus be argued that within the older consumer age group, men and women experience and adopt new technologies differently. For the purposes of this study, the aim is to decide whether men and women differ in levels of technophobia across different consumer age groups, or generations, in a younger age segment, where traditional stereotypes of men and women are breaking down through modern traditions.

The question is, however, which of the demographic factors impact the most in determining a consumer's inherent innovativeness and technophobia. Contrary to the arguments raised by many researchers, a recent study found that occupation, education and ethnicity do not have a confounding effect on the role of gender in terms of technology-related stress (Ndubisi, 2006:55). This finding is again supported by Brunner (2005:221) who found that computer anxiety is more associated with gender differences than with differences in class or race.

The strongest determining factor of technology adoption is argued across the literature to be that of gender and age first, then socio-economic class, with race playing the least important role (Brunner, 2005:221; Gilbert *et al*., 2003:253; Hill *et al*., 2008:249; Hogan, 2005:66-72; Hynes & Lo, 2006:33; Im *et al*., 2007:73; Ndubisi, 2006:55; Niemelä-Nyrhinen, 2007:305; Ono, 2006:116; Paul, 2002:13; van der Rhee *et al*., 2007:133-134).

A study by van der Rhee *et al*. (2007:133-134) into differences in technology readiness between student groups found the technology adoption of students to be generally higher than that of the average population. Research findings indicate that early adopters of a new product are typically wealthier, younger consumers with higher education (Wang *et al*., 2008:240). According to Wang *et al*. (2008:248), of these influencing demographic variables, education is the least interactive with consumer innovativeness, whereas age and income are directly related to consumer innovativeness and new product adoption. New product avoidance is found to be greater among elder consumers as well as families with lower income levels.

These findings are confirmed by Dwivedi and Lal (2007:666) whose research indicates that the greatest correlations for technology adoption are between age, education, income and occupation. The lowest adoption of new product scores in this research were found to be elderly consumers with less disposable income and the lowest listed levels of education.

Based on these findings and a review of the literature, considerable support is given that age and gender are the two prime influencing factors in technophobia; more so than race, education or occupation. However, the strong association of other demographic factors, other than gender and age, cannot be dismissed. Thus, in order to accurately test for gender differences, the sample of this study was controlled to ensure a relative homogeneity in terms of age and socio-economic class. This was based on a finding that the level of gender differences in technophobia will differ in different cultural and national contexts and studies thus need to be tailored for the specific context (Beetles & Crane, 2005:238).

In the South African context, gender differences can be assumed to be numerous, based on South Africa's stage of the technology innovation process nationally compared with Europe, Asia and the American countries (Ono, 2006:124). The South African situation in terms of technology adoption and technophobia will be discussed in more detail in section 4.6.

2.6. CONCLUSION

In this chapter, the consumer adoption of high-technology products was discussed, along with the challenges in adopting these high-uncertainty products.

Consumer adoption of high-technology was discussed at a macro, market and individual level. At the individual level, consumer innovativeness and the process of technology adoption was described. Importantly, the theory of the diffusion of innovation was reviewed as a firm foundation into the study of technology adoption and technophobia.

The TRI was also introduced as an important measure of technophobia, based on positive and negative views towards technology. The demographic and psychographic segmentation of consumers into technology adopter classes was also discussed.

Noteworthy, in this chapter, was the finding that age, gender and socio-economic class play an important role in determining the innovativeness of a consumer and their willingness to adopt new technologies.

In the next chapter, specific attention will be given to technophobia as an important inhibitor of the consumers' adoption of high-technology products. The concept of technophobia, in the context of the diffusion of innovation and technology adoption, are discussed in detail. Studies into the segmentation of consumers based on their innovativeness and levels of technophobia, as well as the theory of the diffusion of innovation, are integrated.

This is in order to achieve an overall, cohesive theoretical foundation for studies into gender differences in levels of technophobia.

CHAPTER 3. TECHNOPHOBIA AS AN INHIBITOR OF CONSUMERS' ADOPTION OF HIGH-TECHNOLOGY PRODUCTS

3.1. INTRODUCTION

Chapter three provides a greater understanding of technophobia by describing the condition as well as its consequences. The definition of technophobia varies across past and present studies. This chapter reviews existing definitions of technophobia and attempts to provide an accurate modern-day definition of the condition. The definition is based on the finding that technology always changes and therefore technophobia is temporal and context-specific which is discussed in detail in this chapter. Various methods of measuring technophobia are presented in detail and the method that best suits the purposes of this study is discussed.

3.2. UNDERSTANDING TECHNOPHOBIA AND ITS CONSEQUENCES

New, high-end technologies may have revolutionised modern day life, but at what cost? According to Yadav *et al*. (2006:60), high-technology products create uncertainties which typically lead to fear and doubt amongst consumers. These 'uncertainties' may manifest themselves in a wide range of negative emotions such as anxiety, fear, stress and apprehension (Hogan, 2005:58). Indeed, the so-called 'technology boom' has brought with it new problems impacting on consumers which include feelings of insecurity, fear of not being able to keep up with technological changes and a form of 'technology fatigue' (Sami & Pangannaiah, 2006:430).

When faced with a new technology, consumers subconsciously decide whether to continue with their current behaviour or discontinue their behaviour and adopt new ones in order to accommodate a new technology (Castano *et al*., 2008:320). The complexity of many new technology products causes many consumers anxiety towards these products, to the point where they avoid the technology all together (Sinkovics *et al*., 2002:477).

Insecurity relating to the new technology results in the consumer being less open to changing past behaviours and adopting the new technology. For many consumers, the resistance to the technology is so severe that they develop an anxiety towards the product, known as technophobia, and in extreme cases avoid the use of the technology completely (Sinkovics *et al*., 2002:478). According to Sinkovics *et al*. (2002:490), technophobia develops from an underlying personal fear which stems from the distrust of the ambiguity of technology products and the inconvenience of having to learn a new technology.

Such feelings of insecurity, and the fear of not being able to use and benefit from technological changes, impact on the daily lives of consumers (Sami & Pangannaiah, 2006:430). Deep-seated technology anxieties are being found to adversely affect performance and acceptance of technologies amongst certain consumer markets (Hogan, 2005:59). Technophobia is increasingly being accepted as a debilitating fear, and as the proliferation of technology into home and business continues to grow, technophobia has gathered more attention in recent years.

Technophobia is regarded by many as a serious clinical condition and is comparable in severity to traditional phobias in that it has a profound effect on a person's quality of life (Brosnan & Thorpe, 2006:1080). Technophobia is a heightened level of anxiety brought about by information technology. Technophobia, like other phobias, invokes an intense fear of technologies and has traditionally been defined as an "anxiety about present or future interactions with computers or computer-related technology; negative global attitudes about computers and or specific negative cognitions during computer usage" (Hogan, 2005:59). In numerous studies conducted to determine the extent of technophobia, it was found that such anxiety prevents a healthy acceptance and adoption of new technologies, impacting on the ability of an individual to reap the rewards of the new information age (Sami & Pangannaiah, 2006:429).

Where there is an inability to accept new technology, frustration mounts as consumers struggle to adapt to a seemingly rapidly changing and increasingly complex digital world (Tu *et al*., 2005:78).

Studies conducted on the topic conclude that psychological factors such as anxiety or negative attitudes could prevent interested individuals from using new technologies altogether (Gilbert *et al*., 2003:254).

This is further supported through research conducted on the extensive consequences of negative reactions to certain technologies. According to Sami and Pangannaiah (2006:429), users who experience extreme levels of technophobia and anxiety are less likely to adopt computer technologies as readily as their more technologically innovative counterparts. Interestingly, according to this study, technophobes attempt to avoid future contact with computers altogether, employing an avoidance strategy that is highly impractical in the modern world.

During the past decade there has been a heavy infusion of computer technology in everyday life, an infusion with negative impacts that need to be accounted for (Korukonda, 2005:310). Technophobia has been identified in almost every population, with research indicating that as many as one third of all consumers suffer from technophobia to varying degrees (Brosnan & Thorpe, 2006:1081). The magnitude of this issue hints towards universal proportions. Understanding and treating the cause and effects of technophobia have thus taken on a global magnitude.

However, the consumer impact of this changing technological environment, and consumers' willingness to adapt to and adopt these new technologies, has yet to be measured (Hendry, 2000:509).

For many who depend on new technologies daily and for whom the proliferation of technology has become the norm, the idea of fear and anxiety towards technology as a reaction to the global technology revolution, may seem almost alien. Nevertheless, the consequences of such anxieties are set to have major repercussions as technophobia has been cited as the single biggest barrier to the Internet revolution (Hogge, 2006:56).

Moreover, the reason why individuals either accept or reject technologies is perceived to be one of the greatest challenges of the new millennium (Sami & Pangannaiah, 2006:430).

It is for these reasons that technophobia should be studied and impractical fears altered to that of technology acceptance and adoption across all consumer groups. By defining technophobia accurately, the next section attempts to create the foundation of a sound theoretical understanding of technophobia.

3.3. TECHNOPHOBIA DEFINED

3.3.1 A review of existing definitions of technophobia

As based on a literature review, the majority of literature conducted on technophobia confines the definition of technophobia to that of popular consumer electronic goods, such as computers and computer-related technologies. Various terms abound to describe technophobia, including ‘technostress’, ‘cyberphobia’, ‘computer aversion’ and ‘computer anxiety’, with the majority of these terms defining technophobia as computer-specific (Sinkovics *et al*., 2002:479).

Earlier research equates technology anxiety to that of computer anxiety, which is considered an example of anxiety towards a specific technology (Niemelä-Nyrhinen, 2007:306). Niemelä-Nyrhinen (2007:305) defines computer anxiety as the “complex emotional reactions that are evoked in individuals who interpret computers as personally threatening.”

Technology anxiety and technophobia differs from computer anxiety in that technophobia refers to the fear evoked by technology in general, not only that of computers. Erroneously, technophobia has restrictively been categorised to become synonymous to ‘computer phobia’ (Smith & Oosthuizen, 2006:353).

According to Korukonda (2005:310-311), technophobia may best be seen as a broader attitude applicable toward technology in various forms and that computer phobia is one such instance of technophobia applicable specifically to computer technology.

Table 2 below summarises the definitions of technophobia used in previous studies.

Table 2: Definitions of technophobia

Reference	Definition	Technology medium focus
Brod (in Sami & Pangannaiah, 2006:429)	"A modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner."	Computers
Gilbert *et al*. (2003:254)	"A complex interplay of behavioural, emotional and attitudinal components. 'A resistance to talking about computers or even thinking about computers; fear or anxiety towards computers; hostile or aggressive thoughts about computers.' 'Anxiety about current or future interactions with computer or computer-related technology."	Computers
Hogan (2005:59)	"Anxiety about present or future interactions with computers or computer-related technology; negative global attitudes about computers, their operation or societal impact and or specific negative cognitions during computer usage."	Computers
Broos (2005:22).	Technophobes are "People that have held especially negative attitudes towards computers."	Computers
Sami & Pangannaiah (2006:429)	"The inability to cope with the new computer technologies in a healthy or positive manner."	Computers
Tu *et al*. (2005:77)	"Any negative effect on human attitudes, thoughts, behaviour and psychology that directly or indirectly results from technology."	Technology
Wikipedia (2007)	"Technophobia is the fear of or revulsion to modern technology and is the opposite of technophilia. Sometimes the term is used in the sense of an irrational fear while others defend that the fears are justified."	Technology
Hill *et al*. (2008:254)	"Mild, moderate and severe discomfort experienced in the use of technology."	Technology
Smith & Oosthuizen (2006:353)	"Technophobia can be defined as negative attitudes towards technology or computers."	Computers / Technology

As is indicated in Table 2, Brod (in Sami & Pangannaiah, 2006:429) first defined technophobia as a manifestation of computer-specific anxiety. In 1984 personal computers were still considered a new technology that had just entered the mass consumer innovation curve (Sami & Pangannaiah, 2006:429). Surprisingly, in the majority of the research conducted on technophobia, the definitions of technophobia have continued to be confined to, “the tendency of an individual to be uneasy, apprehensive, or fearful about the current or future use of *computers”* (Rainer *et al*., 2003:108).

A careful analysis of the literature on technophobia indicates that the majority of research on technophobia has been confined to personal computers or to other ‘older’ more ‘diffused’ technologies such as television sets and radios.

The problem with this is that over time, these technologies, through their widespread adoption, marketability and usage, no longer meet the definition of ‘high-technology,’ ‘high-complexity’ goods that remain ‘beyond common understanding’ (Yadav *et al*., 2006:58). Indeed, the majority of these products no longer meet the technical complexity characteristic upon which technophobia is based.

By limiting the definition of technophobia to that of computer anxiety, and not general technology anxiety, the ability to measure technophobia across different technologies is restricted. A need is recognised to define technophobia based on an overall fear of *new technologies*, and not restrict it to older technologies such as computers which, over time have since lost the characteristic of being a new, innovative technology. By developing a clearer definition of technophobia to include new, innovative technologies, the emphasis on computer-based technophobia is avoided. The definition of technophobia will be refined in the following sections.

3.3.2 Contextualising technophobia: Computer anxiety versus technophobia

The majority of research into technophobia has adopted the definition of technophobia as a fear of computers specifically, regardless of the stage of computer technology in the diffusion process and practically ignoring the changing nature of the technology market.

Unfortunately, even where definitions of technophobia are non-computer specific, studies still continue to use personal computers as the context for comparing levels of technophobia between genders. It is important to understand that technophobia is not defined through feelings towards computers specifically alone. According to Brunner (2005:221), technology anxiety is a very powerful gender difference which the computer is only a *part of*. It is thus important to define the technology context under study as the technology is not always a computer, and could be any technology product.

One explanation for the seemingly narrowing gender divide in terms of technology resistance is that, through usage and general societal adoption of computers, women are no longer ‘computer-phobic’ compared to men. This, however, does not automatically prove that women are always less ‘technophobic’ than men, providing the study is conducted in the right context (new, innovative technologies that have not diffused into society). Indeed, according to Meeds (2004:315), although consumers are becoming more neutral in purchasing habits and marketers are adopting dual-gender positioning strategies, consumer attitudes towards many high-technology product categories may still be influenced by gender depending on the technology context being studied. The temporality of technophobia, as an important aspect of contextualising the measure of technophobia accurately, will now be discussed.

3.3.3 The temporality of technophobia

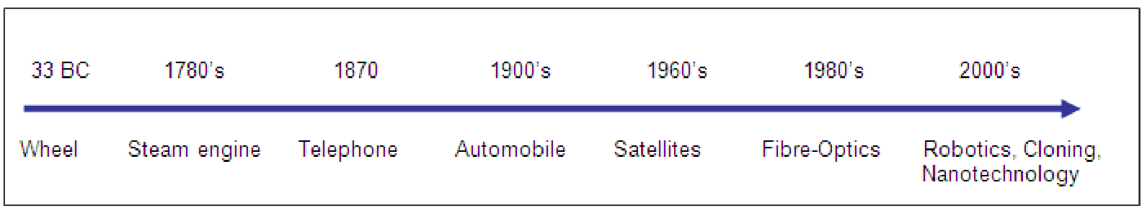
According to Ono (2006:124), differences in levels of technophobia between genders depend on the *period of diffusion* of a technology, making technophobia a temporal construct.

This temporal dimension complicates the ability to compare men and women based on levels of technophobia over time. This discussion proposes that high-technology products evolve, which gives them a temporal dimension that complicates their adoption.

For example, while a telephone might have been considered a high-technology product in the late 19th century, genetic engineering, home automation or robotics might be considered as high-end technology in today's context (Yadav *et al*., 2006:63).

Figure 3 below provides a time-based view of the evolutionary and temporal nature of high-technology products.

Figure 3: Temporal dimension of high-technology products



Source: Yadav *et al*. (2006:63)

In today's context, 'new' technologies include large-scale industrial technologies, such as nanotechnology, biometrics, robotics, cloning and Radio Frequency Identification (RFID), and new consumer technologies, such as face detection features in digital imaging products or home automation technologies.

The most important gap in the research into gender differences in technophobia, and indeed technophobia as a whole, is that a limited amount of research has examined gender in the context of *new* technology adoption and usage (Elliott & Hall, 2005:99). A review of the literature shows that the majority of research fails to account for the temporal nature of technology and that gender differences in technophobia may depend on the stage of technology diffusion, and hence the technological context and the time period in which the research is conducted.

This study attempts to bridge this gap and uncover whether gender differences in technophobia exist in terms of *new* high-technology products that have not yet diffused through society. This approach is based on the failure of the current literature to define technophobia in terms of the diffusion of innovation theory and contextualise technophobia as dependant on the life cycle stage of the product under study.

The context for this study will thus remain new, high-technology consumer goods which, based on the theory of the diffusion of innovation, are currently entering the consumer market, and which consumers normally identify as high-risk, high-involvement products which induce uncertainty, fear and technophobia (Hirunyawipada & Praswan, 2006:183). Until these technologies are 'diffused' into society, adopted and used generally, they remain the context in which technophobia should be measured.

By combining the theory of the diffusion of innovation, with the concepts of the temporality of technophobia and the TRI, this study aims to provide a new foundation upon which technophobia may be successfully researched in future. The first step in this theoretical foundation for research into technophobia and gender differences is to redefine technophobia, based on its inherent temporality and provide a context-neutral definition for future studies.

3.3.4 Technophobia redefined

Based on a review of available literature, it can be concluded that the definition of technophobia has largely remained limited in its context and scope by focusing purely on computers and computer-related consumer electronics. These definitions have virtually ignored other 'new technologies.'

Based on these conclusions, as well as the broader definitions of technophobia by Wikipedia (2007) and Tu *et al*. (2005:77), technophobia is defined as:

The irrational fear, anxiety and apprehension towards new modern technologies entering the innovation curve, manifested in the unwillingness of an individual to adopt the technology. Technophobia can further be defined as negative attitudes, thoughts and behaviours that directly or indirectly result from new technology goods, services or ideas.

In section 2.4.3 the TRI was introduced as one measurement instrument that can be used to study gender differences in technophobia. In the following section, the scale's ability to factor in the temporality of technology and the theory of diffusion of innovation will be discussed. This is seen as the ideal way in which to study gender differences in technophobia.

3.4. MEASURING TECHNOPHOBIA

The limitations of previous studies to properly account for gender differences in technophobia within a standardised technology context are reflected in the measurement instruments used to measure technophobia. To assess computer anxiety (and in effect differing levels of technophobia with regard to computers), the Computer Anxiety Rating Scale (CARS) was developed (Gilbert *et al*., 2003:254).

Upon examination of the available literature, the most accepted instruments for measuring gender differences in technophobia are the Computer Anxiety Rating Scale (CARS), the Computer Thoughts Survey (CTS) and the General Attitudes Towards Computers Scale (GATCS) (Hogan, 2005:62). Indeed, the majority of the research consulted in the literature review has made use of the above-mentioned measuring instruments.

The TAMS was also introduced in section 2.4.3 and is popularly being used in the research to measure technology acceptance by consumers.

Unfortunately, although popular, the CARS, CTS, GATCS and TAMS remain *computer specific* and do not include measures of technophobia based on other forms of technology. Indeed, these scales limit the ability to measure technophobia across any consumer technology products other than computers. This is despite the fact that computer-related consumer electronics are older, more 'diffused' technologies that have gained general consumer acceptance and hence no longer qualify as a complex technology that may invoke fear (Yadav *et al*., 2006:58-60).

By limiting technophobia to consumer electronics such as computers, software, DVDs and CDs, technophobia in the context of new high-technology products is practically ignored.

In order to understand technophobia as a fear of *new* technology products, the research context and temporality of technology need to be refined in future research. Standard technophobia measurement scales focusing on only one technology could indeed skew results over time as they do not factor in changing attitudes to a certain technology over time. Another limitation of the CARS and CTS scales is that they are shown to be unreliable in past studies with regards to their application across multiple countries, and have only really been found applicable to the United States (Sinkovics *et al*., 2002:481).

Introduced earlier in section 2.4.3 as the ideal instrument to measure technophobia based on the diffusion of innovation, the TRI once again resolves the issue of measuring technophobia on a more 'generic', 'technology-neutral' level. The argument for the use of the TRI as a context-neutral measurement instrument is that research results may be found to differ substantially based on the context and period in which the study is undertaken.

Measuring levels of technophobia for new technology markets should vary and researchers need to be warned against using outdated technology-specific scales to measure consumers' response to new technologies that have recently been introduced to the market.

Clearly defining the specific technology under study is important because the very nature of new technology markets indicates that the scales used to measure technophobia should be very different (Rundle-Thiele & Bennett, 2001:25).

A single measure of technophobia for all technology products needs to be guarded against due to the temporality of technology products. As the TRI does not rely on computers specifically, and rather tailors the technology medium to that of current innovative technologies in a specific country, it makes the TRI ideal for this study.

The TRI provides a sound theoretical measure of technophobia across both positive constructs of willingness to adopt technologies (innovation) as well as negative reactions to new technologies (technophobia) by tying in very closely to the theory of the diffusion of innovation (Parasuraman & Colby, 2001:5). The TRI assesses a consumer's propensity to embrace and use new technologies, which correlates strongly with levels of technophobia and innovativeness (Parasuraman, 2000:310:314).

The TRI measures technophobia as a general consumer trait that is not specific to a particular technology, making it the ideal scale to measure for technophobia across a range of technology products as this study requires. In addition, these specific measures can be summed to provide an overall measure of the levels of technophobia an individual exhibits (Elliott & Hall, 2005:100). This is due to the finding that consumers' attitudes to technology correlate highly with their propensity to embrace technology, or 'technological readiness' (Parasuraman, 2000:309-310).

According to Matthing *et al*. (2006:290), technology readiness is defined as an overall state of mind resulting from these positive and negative thoughts that together determine a consumer's overall predisposition towards technologies. This may be either an overall willingness to embrace and accept technologies (adoption), or an overall fear or apprehension of technologies (technophobia).

In a study conducted by Matthing *et al*., (2006:290-293), the following were supported in their research concerning technology readiness:

- Technology readiness is positively correlated with the propensity of an individual to actively seek new technologies. This propensity is found to be highest for explorers and lowest for laggards.
- Technology readiness is positively correlated with willingness to participate in technology-services and technology products. This willingness is found to be highest for explorers and lowest for laggards.
- Technology readiness is positively correlated with the adoption of new technologies.

This is further confirmed in a study by Hendry (2000:509) which found that students who scored high on the TRI index have a greater propensity to adopt and use new technologies, whereas those students who scored low on the TRI have a lower willingness to adopt new technologies.

As the TRI has been developed to measure consumers' propensity to embrace new technologies based on consumers' favourable and unfavourable attitudes towards technology, and has a theoretical core based on the diffusion of innovation, the TRI is ideal for the purposes of this study. More specifically, the scale's positive constructs of optimism and negative constructs of insecurity make the TRI a useful measurement index in uncovering gender differences in technophobia and/or innovativeness.

In a review of the literature, a growing number of studies are adapting the TRI to measure technophobia, although only one study was found in which the TRI was used to measure gender differences in technology adoption specifically (Elliott & Hall, 2005:98-107). The benefits of the TRI and the fit that this scale has for the purposes of this research make it the ideal measurement tool in uncovering gender differences in technophobia across multiple technologies at different stages of the diffusion of innovation curve.

Once the technophobia levels of a group of males and a group of females have been measured, the levels of technophobia of the two groups can be compared. Thus although relatively new in its use in uncovering gender differences in technophobia, the TRI will be used in this research.

3.5. CONCLUSION

This chapter covered technophobia in further detail and important distinctions were drawn between computer anxiety and technophobia. The temporality of technophobia was presented and the importance of understanding the context in which technophobia occurs was discussed.

As technology changes, so the definition of technophobia needs to be adaptable to this fundamental characteristic of technology and innovation. Technophobia was therefore redefined in this chapter. In the final section of this chapter, a review of measurement instruments used to measure technophobia was presented. The TRI was discussed in further detail as the ideal measurement instrument to measure technophobia.

In the following chapter, the current research findings in gender differences in technophobia will be discussed in greater detail. Thereafter, gender differences, as contextualised in the diffusion of innovation theory, will be discussed and gender differences amongst South African consumers uncovered.

CHAPTER 4. GENDER DIFFERENCES IN TECHNOPHOBIA, BASED ON THE THEORY OF THE DIFFUSION OF INNOVATION

4.1. INTRODUCTION

In previous chapters, the focus was placed on the theory of the diffusion of innovation and technophobia. In this chapter, gender, as an important segmentation tool for marketers, is discussed. Gender is defined and distinctions are made between biological and psychological gender. This chapter then provides a detailed review of previous studies on gender differences in technophobia and highlights important similarities and discrepancies that occur in previous research findings.

Inconsistencies in past findings are analysed in order to provide a better understanding for the reasons that variances in results may have occurred. The theory of the diffusion of innovation is then presented as a possible explanation for the gender divide in technology adoption. The proposal that gender differences in levels of technophobia change over time is also discussed. Finally, technophobia amongst South African consumers specifically is discussed in detail.

4.2. GENDER AS AN IMPORTANT SEGMENTATION TOOL

Despite the negative consequences of technophobia on individuals and society as a whole, few studies have analysed the relationship between technology adoption and demographic variables, such as gender (Sami & Pangannaiah, 2006:431).

Since gender is a prime segmentation variable, a study of gender differences in technophobia remains highly relevant. Gender is also one of the most fundamental ways of organising and classifying social experiences and can, therefore, not be ignored (Adam *et al*., 2004:223).

Recently changing gender roles have also accentuated the need to investigate whether gender differences in technology adoption (and hence technophobia) exist. In the technology sector, female buying power is greater today than it has ever been, with women responsible for global annual computer-related technology purchases totalling $55 billion by 2006 (Packaged Facts, 2006). The percentage of women using mass-market consumer electronics (such as PDAs, cell phones and iPods) is also continuing to increase at an exponential rate.

Surprisingly, past studies have neglected to consider the role of gender in Information Technology behaviour research, and specifically that of gender-based technophobia (Chiu, *et al*., 2005:417). As discussed in section 2.5, where research on demographic variables were reviewed, computer anxiety is more associated with gender differences than any other segmentation variable, including class or race (Brunner, 2005:221). Although the topic of gender inequality may seem dated, it remains crucial for current times. Despite the progress made in certain areas of equality, marked gender differences still exist (Scott & Nolan, 2007:93).

This view is supported by the fact that researchers have been reporting gender differences for many years, and despite the modern tendency to downplay these findings, research shows that men's and women's attitudes to technology differ on many levels (Coley & Burgess, 2003:282). In order to account for gender differences in technophobia and achieve a fuller understanding of gender attitudes to new technologies generally, gender as a concept will be defined in the following section.

4.3. GENDER DEFINED: A DISTINCTION BETWEEN BIOLOGICAL AND PSYCHOLOGICAL GENDER

Although a seemingly simple concept, the literature is surprisingly inconsistent when it comes to defining gender. This 'inconsistency' stems from two main perspectives concerning gender; namely gender as biological sex (i.e. male or female) and gender as psychological sex (i.e. the degree to which a person exhibits masculine or feminine traits).

Research on gender in technology is problematic as the concept of gender is under-researched (Adam *et al*., 2004:235). Where specific research into gender and gender identity is undertaken, there are conflicting results within these studies with respect to the relative importance of masculinity and femininity in defining one's 'true gender identity' (Ndubisi, 2006:50). As a result of the lack of conceptualisation of gender in theory, the extent to which individuals exhibit masculine or feminine traits, and its impact on the true definition of men and women remains inconclusive (Catterall, Maclaran & Stevens, 2005:491).

The issue of contention in previous research pertaining to gender is based on the fact that many studies focus on *biological* sex as an independent variable. Criticisms are raised that gender identity, in terms of the degree of masculinity and femininity that an individual identifies with, is overlooked (Bakewell & Mitchell, 2004:237). It is argued that consumer behaviour research concerning gender differences should be based on measures using psychological gender (degree of masculinity and femininity) rather than biological sex (Gilbert *et al*., 2003:254).

This idea was first put forward through the New Consumer Culture Theory which argues that sex refers to the biology of a person and that gender is a socio-cultural category, which holds more value when discerning differences between genders than something as 'ethereal' as masculinity and femininity (Catterall *et al*., 2005:492). The idea is that gender is more than just a descriptor for the sex of an individual; but can be viewed as a social structure which symbolises perceived dichotomies between men and women (Backhans, Burström, Lidholm & Mansdotter, 2009:1388).

The failure of the literature to provide a clear delineation between genders has led to the proposition that while someone can be biologically female, they may adopt a gender role more commonly assigned to males. This has directed many feminist researchers to enforce the importance of studying consumer behaviour in terms of 'gender identity' where gender is seen on a continuum, rather than as 'biological sex' (Beetles & Crane, 2005:239).

This view is adopted in recent research and the failure of results to account for many gender differences is attributed to the failure of researchers to measure gender as more than a dichotomous variable or ‘bipolar extreme’ (Chiu *et al*., 2005:428). This is supported by the fact that gender research in recent years has focused on fixed, biological, male and female characteristics and has failed to account for masculine and feminine characteristics (Adam *et al*., 2004:228-229).

The difficulties in accounting for varying levels of gender identity have spilled over into the way in which gender is measured statistically. Statistical studies of gender necessarily dichotomise men and women in order to account for measurable differences. Statistical methods that require gender to be polarised into two extremes has often been blamed as exaggerating any differences between genders that may exist (Adam *et al*., 2004:229).

Despite the concerns raised that not all biological men (or women) depict sociological male (or female) traits, ultimately a basic measure of classic male and female dichotomisation has proven to be significant (Wolin & Korgaonkar, 2003:383).

When referring to the case of a developing country such as South Africa, where the nation has been traditionally seen as more ‘conservative,’ the continuum of masculinity and femininity may prove inconsequential as traditional gender roles are more readily adopted.

More importantly, gender defined in terms of biological sex remains a key variable for marketing analysis, and although levels of masculinity and femininity exist, it is not always practical or meaningful to assess gender as a psychological variable. Advertising research results are also generally alike, whether gender is defined as a binary or continuous construct (Wolin & Korgaonkar, 2003:376). Postmodern research supports this with the argument that gender categories have become so fluid between masculine and feminine that segmenting individuals on the basis of psychological sex has proven impractical. Indeed, gender as viewed simply as ‘male’ or ‘female’ has remained too important an organising category to ignore (Catterall *et al*., 2005:493).

In acknowledgement of the above arguments, this study will focus on gender as a 'biological' construct, where gender refers to the biological sex of the individual, either male or female. This will facilitate the ability to measure for differences in technophobia between genders based on sound statistical analysis as well as provide for a generic basis to confirm results with any future studies being undertaken.

4.4. CRITICAL EVALUATION OF PREVIOUS GENDER DIFFERENCES IN TECHNOPHOBIA

4.4.1 Gender differences in technophobia

The majority of studies on gender behaviour consistently indicate differences between genders in terms of computer use (Broos, 2005:21).

Interestingly, where significant differences in levels of technophobia are reported, a higher percentage of women are shown to exhibit higher levels of technophobia than men (Hogan, 2005:67). In the majority of the research conducted, it is women who experience the most anxiety when using computers (Sami & Pangannaiah, 2006:431).

As with many phobias, females are over represented within phobic groupings. According to Brosnan and Thorpe (2006:1082), reports into the majority of phobias indicate that up to 90% of those exhibiting phobic tendencies are female; a finding which has remained consistent in technophobic and computer-related anxiety research. In fact, it is this very finding that led researchers to coin the 'digital divide' discussed previously, and which describes the general reluctance of women to adopt new technologies.

This view is supported by several studies with results showing noteworthy differences in men's and women's scores in their attitudes towards computer technologies. In a study conducted by Chiu *et al*. (2005:421), women are reported to exhibit higher levels of computer anxiety than men.

In another study conducted by Elliott and Hall (2005:101-102), it is found that men are more innovative than women, with women reporting higher levels of insecurity regarding computer technology. The study also concludes that men demonstrate higher levels of confidence in using new technologies. Interestingly however, men are more willing to share technology and provide support than females (van de Wijngaert & Bouwman, 2009:90).

Other research also confirms that attitudes toward technology differ significantly between men and women, with men indicating greater interest in and knowledge of computers (Bain & Rice, 2006:119). As concluded by Coley and Burgess (2003:292), men are more likely than women to purchase technology-related products, with the most popular items including consumer electronics such as computer software, CDs and DVDs.

Such gender differences in attitudes towards technology are further confirmed through studies regarding Internet usage.

Wolin and Korgaonkar (2003:375-380) argue that men react more positively towards web advertising than women, who prefer traditional media over technology-based advertisements. This research is supported by the finding that men and women differ in how they use computers online, with men using computers more for entertainment purposes, and women more for functional purposes (Kay, 2009:731). According to Dabholkar and Sheng (2009:757), women react more negatively to bad Internet experiences than men and also perceive their own skills to be inferior to men's when it comes to computer usage. Recent research indicates that women are more likely to perceive technology as more complicated and have lower confidence in the use of technology than men, which leads many women to avoid interaction with technology altogether (Vekiri & Chronaki, 2008:1393).

According to Jackson, Zhao, Qiu, Kolenic, Fitzgerald, Harold and von Eye (2008:2818), findings into gender differences in terms of technology acceptance over the years can be summarised as follows: Men have more favourable attitudes to computers than women, both men and women feel that the use of computers is typically a male domain, and women are far less interested than men in pursuing IT-related careers. According to Imhof, Vollmeyer and Beierlein (2006:2825), women harbour higher levels of fear that computers may have negative side effects and control their daily lives.

Women also exhibit lower levels of confidence in their computer skills than men, as well as generally higher computer anxiety levels (Imhof *et al*., 2006:2825-2826). According to Sieverding and Koch (2009:696), computer anxiety has been attributed as one of the major reasons that women do not participate as actively in technology-related careers as men.

Studies which focus on different aspects of innovation and technophobia, whether it is knowledge, interest, anxiety or insecurity towards technology, generally measure the 'technology readiness' of a consumer (Matthing *et al*., 2006:289). As discussed, technology readiness is defined as an overall state of mind resulting from positive and negative thoughts and actions that together determine a consumer's overall predisposition towards technologies. Thus, although these studies seemingly measure differences between genders on different behaviours towards technology, directly or indirectly, these studies may be combined to provide an overview of gender differences regarding technophobia.

As discussed in section 2.4.3, all these seemingly interrelated constructs of anxiety towards technology, innovation, insecurity and interest in technology, all tie in closely and are measured, either directly or indirectly through the four main constructs of the TRI. Since the TRI identifies consumer technology adoption based on both their innovative attitudes and behaviours, the TRI addresses and incorporates both favourable and unfavourable attitudes, views and behaviours that lead consumers to adopt or reject new technologies (Matthing *et al*., 2006:289).

From the combined findings in the literature, it is evident that previous research findings indicate higher levels of technophobia associated with women than with men. However, there are increasing numbers of studies that have shown contrasting results, with some studies indicating gender differences, while others not (Hogan, 2005:72). Indeed, the literature abounds with conflicting evidence regarding gender differences in computer use and anxiety (Rainer *et al*., 2003:109).

There are even indications that some technology-related areas exist, such as domestic appliances and white goods, in which women rate measurably higher in positive attitudes than men (Christensen, Knezek & Overall, 2005:35). The next section further analyses the potential reasons for these inconsistencies in research findings.

4.4.2 Inconsistencies in previous research on gender differences in technophobia

Research into gender differences in technophobia generally find that women have stronger negative feelings towards technology than men, and women exhibit higher levels of computer anxiety specifically than men (Baloğlu & Çevik, 2008:2640). However, a review of the literature indicates inconsistent results with regards to gender differences in technophobia and computer anxiety (Baloğlu & Çevik, 2008:2645).

The results of a 2006 survey conducted to compare gender differences in computer use show that the gender gap is narrowing between men and women (Imhof *et al*., 2006:2823). Another study amongst college students finds that there are no discernable differences between genders in terms of computer attitudes, although gender differences do exist in terms of the computer usage (Kesici, Sahin & Akturk, 2009:532). However, some recent research still finds gender differences in attitudes to technology. In a 2009 study in gender differences between attitudes towards mathematics and technology, it was found that boys express more positive attitudes towards mathematics and technology than girls (Barkatsas, Kasimatis & Gialamas, 2009:562). According to this study, girls are more anxious, fearful and less confident in technology than boys (Barkatsas *et al*., 2009:563).

Major findings of recent research include arguments that gender differences in attitudes, perceptions and uses of computers are actually *not* found to be significant. Inconsistent results are especially noticed when the same study done in the past indicated that significant gender differences in attitudes, perceptions, and uses of computers did exist, and then later found that differences do not exist (Bain & Rice, 2006:128).

In order to address changing computer attitudes and usage in computers between genders, numerous cross-sectional studies have been undertaken.

The results of these studies indicate that gender gaps in usage and attitudes towards computers have narrowed, and altogether disappeared within a seven year period (Rainer *et al*., 2003:108).

A study conducted by Rainer *et al*. (2003:112), into the changing gender gap, concludes that between 1995 and 2002 the gender gap narrowed and that gender differences in various aspects of computing have altogether disappeared. Interestingly, the study has also found that this gap has diminished due to the increasing exposure of women to computers over time.

A similar study conducted in South Africa shows comparable results. The study conducted in 1997 repeated an earlier study and measured computer attitudes of two groups of university students. In direct contrast to the 1987 results, the study showed no significant differences in technophobia between men and women and a great shift in female students' attitudes towards technology from fear to appreciation (Smith & Oosthuizen, 2006:353).

Another study in gender differences in computer attitudes conducted in 1994 showed that male South African matric students had a far higher positive attitude to computers than female students. However, the same study conducted in 1999 revealed no differences between genders regarding acceptance of technology. A further study conducted in 2005 shows that both male and female students enjoy working with computers, and are exceptionally positive towards the technology (Bovée, Voogt & Meelissen, 2005:1764).

However, despite the obvious arguments for a narrowing gender gap, and the assumption that the gender gap in terms of technophobia is diminishing, conflicting evidence renders these assumptions inconclusive. Disparate findings in the literature have led to confusion as to whether this is indeed the case.

Several recent studies indicate that differences in technophobia between men and women still exist and that the reduction in computer anxiety over time assumes different patterns for men and women (Broos, 2005:22-23).

Although theories have been proposed to explain the differences in technophobia between genders and why the technology gap may be closing, these efforts have been diffuse and lacking in consistency (Korukonda, 2005:328). A key explanation for such inconsistencies may be that while there may have been gender differences in the past, these differences in levels of technophobia no longer exist as genders adapt dual gender roles in a more modern society (Hogan, 2005:67).

The question of whether gender attitudes towards technology differ may need to be replaced, or at least expanded to the question as to whether these differences are *changing over time*. Previous studies have attempted to account for changing gender attitudes in technophobia; however these have remained restricted to that of computer technologies.

Contrary to all expectations that gender differences would disappear over time, gender differences continue to be reported in more recent research, although mixed results are being obtained (Broos, 2005:22). This confusion in the research has led to the identification of a need for a more theoretical explanation of changing gender reactions to new technologies. The next section offers one such theoretical explanation through the theory of the diffusion of innovation.

4.5. DIFFUSION OF INNOVATION AS AN EXPLANATION FOR THE GENDER DIVIDE IN TECHNOLOGY ADOPTION

4.5.1 Diffusion of innovation

In section 2.4.2.1 the theory of the diffusion of innovation was proposed as a foundation for future studies into new technology adoption and technophobia, based on the fact that different consumers accept and adopt new technologies at different stages of the diffusion process. In the context of high-technology products, the importance of segmenting consumers in terms of their adoption of technology has remained instrumental due to its ever-changing target market over the product life cycle (Yadav *et al*., 2006:63).

The high complexity of technology markets has traditionally resulted in the targeting of innovators first, then those more 'technically uncertain' consumers later. In high-technology markets, the initial target segments have always been the innovators and the risk takers. Marketers of high-technology products have long identified these as being male consumers (Yadav *et al*., 2006:58). According to Niemelä-Nyrhinen (2007:305), marketers traditionally focus on younger male buyers when promoting technological products and services. This has essentially fuelled the gender divide and the differing levels of technophobia between male and female consumers of technology products.

This may explain the results of a study conducted into changing gender gaps in technophobia which concluded that between 1995 and 2002, the gender divide narrowed in various aspects of computer anxiety (Rainer *et al*., 2003:112). Interestingly, the study confirms that as more women are exposed to computer usage, the gap that existed in 1995 had disappeared by 2002. Recent computer usage statistics confirm this. In 2004 over 51% of Internet users were women, a percentage which is expected to increase to almost 53% by 2008. Currently, almost 31% of women use a personal computer at work, and more than 21% admit that the Internet has improved the way they work (Packaged Facts, 2006).

In South Africa, Internet usage statistics indicate that in 2007, five million South African consumers had access to the Internet. Of these, over 2.7 million were female Internet subscribers (Internetworldstats.com, 2007).

From these statistics one could deduce that the technology divide in general is indeed narrowing as more women are embracing computer technology. However, once this finding is viewed within the context of the diffusion of innovation, and the segmentation of consumers based on their propensity to adopt new technologies at different stages of the innovation curve, it is evident that the gender gap in technology adoption and technophobia is not necessarily narrowing at all.

In the case of computers, disparate findings regarding gender differences in technophobia may be explained by the proposition that genders adopt new technologies at different stages of the innovation curve. As the basis for measuring technophobia has remained computer-specific in previous studies, results fail to account for the possibility that the narrowing gender gap in technophobia is a result of women adopting computer technology *later* than men in the innovation curve. The assumption of previous studies that the gender gap in technophobia is narrowing could be based on the failure of that research to account for gender differences in 'early' versus 'late adoption' of technology.

Indeed, what may be proposed is that *computer* technologies between 1995 and 2002 have diffused into society and that women accept and adopt computer technologies at a later stage of diffusion than their male counterparts. Therefore, while women may become less 'computer-phobic' through the usage of computers over time, women are not necessarily less 'technophobic' in general. This is once the measure of technophobia has been properly defined as new, high-technologies just entering the consumer market.

This proposal may indeed lend itself to the argument that women are 'technological laggards,' adopting technologies at a later stage of the innovation curve than men. The theoretical arguments for this proposition are presented in the following section.

4.5.2 Changing gender differences over time

The enjoyment of a new technology depends highly on the context in which it is being used, and importantly, the time of adoption. Generally, people that use computers over a period of time, are more likely to try new applications than those who are still new to the technology (van de Wijngaert & Bouwman, 2009:88-90). According to Yadav *et al*. (2006:57-63), a consumer's uncertainty peaks when first introduced to a new product, and then decreases over time as the benefits of the technology become clear and understanding develops. The question here is whether men and women differ in terms of the time that it takes to overcome the initial uncertainty when faced with a new technology.

According to Jackson *et al*. (2008:2820), men have been using computers and the Internet longer than females, although the frequency of use has remained the same over recent studies. The longer a person spends on the Internet, the more diverse the applications that are used (Park, 2009:99). With regards to new technologies, men are generally more positive about learning about new technological products than women.

In contrast, women generally experience higher levels of anxiety than men, regardless of the inherent complexity of the product, and thus take longer to accept new technologies (Kay, 2009:737).

Another study concludes that while male computer users almost immediately show less computer anxiety when introduced to a new computer technology, women only start showing diminished levels of anxiety at a later stage. To be more specific, anxiety only starts to diminish noticeably when women use computers for one year (Broos, 2005:27). The study also reaches the same conclusions regarding Internet usage, with women only accepting the technology after men (Broos, 2005:29). Bain and Rice (2006:120), in their study of computer-related technophobia, report that female attitudes towards computers become more positive only when they spend more time using the technology.

In a recent study regarding the acceptance and use of new technology products in hotel rooms, the TRI index was used to measure guests' attitudes towards new technology products. The findings show that the percentage of males who scored high in the TRI is far greater than women, who scored low on the TRI index. This further implies gender differences in technology acceptance, with women being more adverse to new technologies being introduced for the first time (Verma *et al*., 2007:12).

Interestingly, recent studies show that the genders use technology differently over time and as women use computers, their anxiety lessens over time (Bain & Rice, 2006:129). According to Park (2009:98-100), women's use of computers and the Internet are becoming more in line with men's over recent years. The gender gap is found to be decreasing as women start to use computers as readily as men. The study shows that differences in Internet use between men and women have started to decline as more women spend more time on the Internet.

This is found in studies in younger generations which show that the gender gap in Internet and computer usage has practically disappeared, mainly due to the increased time that women spend online (Park, 2009:105).

Other research also suggests that women are coping just as well as men in terms of computer-related careers, compared with 20 years ago when noticeable differences were found between the genders (Vekiri & Chronaki, 2008:1392). Interestingly, in a recent study on the perceived self-efficacy of women and computer use, it was found that women no longer doubt their use of computers and have gained confidence in using this technology (Sieverding & Koch, 2009:700). The usual gender stereotypes in this study are no longer supported.

According to Imhof *et al*. (2006:2823), research findings indicate that the gender gap in computer access and usage is indeed narrowing. Importantly to stress at this stage, however, is that all these studies refer to a narrowing gender divide in *computer* usage specifically, and not technology use in general.

These findings are paramount in the explanation of gender differences in technophobia and the disparities in the literature concerning the seemingly ‘narrowing gender divide’. Based on the proposition that women are ‘technological laggards’ it may be argued that women are late adopters of technology, while men are the innovators and early adopters. Indeed, it may be proposed that as a new technology is introduced to the market and ‘diffuses’ through society, the technology becomes more familiar and is perceived to be less complex.

At this stage (which is proposed to be at a later period than men), women’s levels of technophobia and anxiety reduce. In this way, the ‘gender divide’ in terms of technophobia as related to that specific technology can be seen to have ‘narrowed.’ This is supported further by the fact that when men discover a new technology, they react more enthusiastically towards the product, while women take longer to appreciate a new technology (Broos, 2005:29).

In this way, women may be regarded as ‘technological laggards’ adopting new technologies at a later stage then men.

The temporality of high-technology products and the diffusion of technology could indeed aid in the explanation of the erratic findings regarding gender differences in technophobia, where differences continue to be reported in more recent research, although with mixed results (Broos, 2005:22). The aim of this study is thus to investigate gender differences in technophobia in today’s context by using new technologies currently entering the innovation curve. In this way recent gender differences may be reported if the technology is new-to-market.

For the purpose of this study, the identification of genders as being either new or late adopters of a specific technology may aid in the explanation of the inconsistencies in research concerning gender differences in technophobia.

If men and women are found to differ in terms of the adoption of new technologies entering the innovation curve, then the narrowing of gender gaps in technophobia may be accounted for, based on the different time it takes each gender to accept a specific technology.

As discussed earlier, the rate of the diffusion of innovation is influenced to a large extent by the macro-level dynamics of the specific country which is being studied (Ono, 2006:122). As was argued, South Africa as a developing country experiences a slower rate of diffusion than most New World countries (Southerton, 2007:114-115).

This is evident in the slow rate of Internet diffusion in South Africa, with only 10.3% of South African consumers having Internet access, as compared with 70.2% in North America (Worldinternetstats.com, 2007). The huge disparity between nations in technology adoption reflects the nation's cultures, levels of literacy, and balance of rural and urban communities (Cullen, 2001:315).

As traditional gender roles in developing countries are more pronounced, South Africa's gender divide may be assumed to be wider in terms of men and women's general attitudes towards new technologies than most First World countries. As such, South African consumers may experience greater levels of gender differences in technophobia towards new technologies. The South African case for technophobia will be described in detail in the following section.

4.6. TECHNOPHOBIA AMONG SOUTH AFRICAN CONSUMERS

This research aims to uncover gender differences in technophobia amongst South African consumers. In order to do this, technology adoption as relevant to South Africa needs to be understood. Low participation by women in computing is a worldwide phenomenon that has also manifested itself in South Africa, with South Africa women making up only one-third of IT employees (Galpin, Sanders, Turner & Venter, 2003:44).

According to Heather Third (2007), Business Executive at Microsoft South Africa, the South African IT industry remains male-dominated, in spite of resources being aimed at developing women in the IT sector. It is further estimated that only about 20% of the current South African ICT workforce is female. South Africa's IT skills shortage, as well as the lost talent of skilled women is fuelling the digital divide between South Africa and developed nations (Third, 2007). In the case of gender inequalities, women continue to remain seriously under-represented in the science and technology fields in South Africa (Bovée *et al*., 2005:1763).

According to Ono (2006:123), gender inequality in technology acceptance is greater among the developing economies, given greater overall degrees of inequality and low rates of technology diffusion in these countries. South Africa's use of ICT is rapidly growing, however with the lack of ICT skills and the diminishing ICT labour market, the digital divide within South Africa between those who have access to ICT and those who do not is widening (Bovée *et al*., 2005:17623). According to Czerniewicz and Brown (2009:122), South Africa is experiencing high levels of ICT shortages and many ICT educators feel constrained by the lack of ICT support from both the government and other institutions.

A study conducted by the World Summit in 2003 found that the digital divide within developing countries is widening (Hubregste, 2005:167). What is occurring is a 'domestic divide', which apart from an urban and rural division, shows that there is also a noticeable division between consumers of different socio-economic status and genders (Hubregste, 2005:167).

There remains a large disparity between South Africa and the developed world in terms of technology use, as well as a large disparity within the nation, or 'domestic digital divide' (Fink & Kenny, 2003:16). For example, amongst primary and secondary South African learners, those from wealthier urban and upper to middle class schools showed more positive computer attitudes than those from township schools (Bovée *et al*., 2005:1762).

Thus, whatever differences currently exist between South African consumers in terms of technology adoption, these differences can be expected to increase between urban/rural and gender criteria. This may be attributed to the fact that consumers in disadvantaged communities are often prevented from making use of technology due to low computing, technology and literacy skill levels (Cullen, 2001:314).

Another study supports this, with the finding that although the digital divide is widening within developing countries, this gap refers mostly to the gap between the rich and poor, and that consumers within higher income groups are in fact utilising technology more than ever before (Fink & Kenny, 2003:16-17). In the case of South Africa, this is evident in the differences between urban dwelling higher socio-economic consumers, versus those urban dwellers residing in the townships. Studies into the differences between genders in South Africa thus need to ensure that these differences are properly accounted for and respondents segmented based on their socio-economic grouping.

This is due to the fact that major differences in technology adoption exist between different socio-economic groups in South Africa (Galpin *et al*., 2003:44). Importantly, as discussed in section 2.5, a South African study into consumer technology adoption supports the overall findings that gender is a greater predictor of technology anxiety than any other demographic variable, including race (Brunner, 2005:221; Gilbert *et al*., 2003:253; Hill *et al*., 2008:249; Hogan, 2005:66-72; Hynes & Lo, 2006:33; Im *et al*., 2007:73; Ndubisi, 2006:55; Niemelä-Nyrhinen, 2007:305; Ono, 2006:116; Paul, 2002:13; van der Rhee *et al*., 2007:133-134).

As a developing country, considerable division in access to and use of technology remains across various demographic groups. South African consumers may also experience high levels of digital inequality, considering that sources of such digital inequality may be rooted in pre-existing societal inequalities, such as the previous apartheid system (Galpin *et al*., 2003:44-45). The lack of women in the field of ICT in South Africa is also attributed to the psychological legacy of the apartheid era, which has left many female black South Africans with a sense of inferiority and the notion that they do not belong to a traditionally ‘white male dominated’ field (Portnoi, 2009:412).

According to Martin (2009:312), black consumers are generally disadvantaged in terms of asset ownership, income, education and occupational status. In rural South Africa, where the involvement of women in ICT is the lowest, women experience many obstacles in pursuing careers in science and technology, including cultural values and beliefs that women should stay at home and care for their extended families.

South African women also face lower levels of literacy skills as well as financial and language barriers that prevent them from participating in ICT-related careers (Dlodlo, 2009:3-5).

Modern day cultural and social attitudes towards technology in developing countries include the belief that technology is for intelligent, young males only, is difficult to use and belongs to the middle-class 'white' culture (Cullen, 2001:314). One of the greatest barriers to technology diffusion in a society is culturally-based attitudinal barriers. Where there is a high value on oral culture, strong family values and kinship, inevitably technology will be regarded as a lower priority (Cullen, 2001:314-315). In South Africa, technology is generally understood to be a masculine activity which does not fit into many women's ideas of vocation. This has, over the years, created a psychological barrier for many girls wanting to undertake a career in ICT. In rural South Africa, boys are generally a lot more positive towards computer technology than girls (Dlodlo, 2009:5).

Various studies have been undertaken in the more affluent communities of South Africa to investigate gender differences in attitudes towards technology, but with conflicting results (Smith & Oosthuizen, 2006:358).

According to Smith and Oosthuizen (2006:358), there is a significant difference between genders with regards to computer-based technophobia, with men being less apprehensive towards computer usage than women.

A study conducted to compare South African men's and women's attitudes to technology over time found that in practically all comparisons there is a greater appreciation of computer technology between genders over time (Smith & Oosthuizen, 2006:364). This change in technophobia over time has also been found in other studies that aim to measure gender differences in technophobia in South Africa.

Early research conducted at the University of the Witwatersrand has shown that male students were more confident in computer usage than their female classmates. A later study done at the University of Natal found no significant differences among male and female students in their attitudes towards computers. This is in direct contrast to an earlier study in which female students exhibited a much higher fear of computers than the male students (Galpin *et al*., 2003:45). Smith and Oosthuizen (2006:353) further conclude that there remains considerable debate regarding inconsistent results into technophobia in South Africa over the past 20 years.

The argument for changing differences in technophobia between genders in South Africa is confirmed in another study that finds that although gender influenced attitudes towards computers 12 years ago, it no longer does (Anthony *et al*., 2000:39). This is in direct conflict with research conducted by Galpin *et al*. (2003:44) who found that South African male university students have greater feelings of self-efficacy with respect to computing in general.

As explained in sections 3.3.2 and 3.3.3, technophobia is a temporal construct and depends largely on the context in which it was measured. As the majority of studies into gender differences in technophobia amongst South African consumers focused purely on computers, the same disparate findings in South African research into technophobia are found.

As based on the arguments provided by Ono (2006:123) earlier, South Africa, as a developing country, is still in its 'early adoption' stage of the innovation curve when compared to First World technology countries and thus experiences a larger digital divide between genders and larger inequalities in the adoption of new technologies.

However, as the technology 'diffuses' through society, the gender gap in South Africa may narrow towards a specific technology (such as computers). However, as a developing country, the diffusion process is very slow and South African consumers may exhibit higher levels of technophobia compared to First World countries such as America. The poor diffusion of new technologies nationally in South Africa may further exasperate the divide in which male and female South Africans experience technophobia.

Based on these findings, evidence suggests that women as a whole have more negative attitudes towards computers than men, and that women tend to approach technology with more anxiety, fear, doubt and apprehension than men (Bain & Rice: 2006:119; Chiu *et al*., 2005:421; Coley & Burgess, 2003:292; Elliott & Hall, 2005:101; Hogan, 2006:67; Sami & Pangannaiah, 2006:431; Smith & Oosthuizen, 2006:353; Wolin & Korgaonkar, 2003:375).

Therefore, based on what seems to be the weight of prior empirical evidence, the following hypothesis is proposed:

H_1: Women experience higher levels of technophobia towards new technology than men.

4.7. CONCLUSION

The question of whether gender differences in technophobia exist was discussed in this chapter. The distinction between biological and psychological gender was presented. For the purposes of this study, gender was defined as a biological construct.

This study provided a detailed analysis of previous research findings into gender differences in technophobia. Inconsistencies in past research were found which have made it difficult to discern whether the gender gap is narrowing, widening, or whether it exists at all. In an attempt to explain these inconsistencies in previous findings, the theory of the diffusion of innovation was presented.

The theory of the diffusion of innovation was proposed as the foundation for studies of technophobia, based on the temporality of new technology adoption. The specific case of technophobia amongst South African consumers was also discussed in detail. Based on the findings in this chapter, the hypotheses was presented that women experience higher levels of technophobia towards new technologies than men.

As noted, there is currently a vast amount of research conducted on the differences between men and women in their willingness to adopt technology. The next chapter aims to uncover *why* these differences in attitudes towards technology may occur. A greater understanding as to the reasons why women may be more technophobic than men is thus presented in the following chapter.

CHAPTER 5. WOMEN AS TECHNOLOGICAL LAGGARDS: A DEEPER UNDERSTANDING

5.1. INTRODUCTION

The importance of social studies in the study of gender differences in technophobia is highlighted in this chapter. Understanding *why* gender differences may occur based on social reasons is crucial to this study and is discussed in detail. This chapter provides an overview of four main perspectives as to why men and women may differ in terms of technophobia and presents key hypotheses for why gender differences in technophobia exist.

5.2. IMPORTANCE OF SOCIAL STUDIES IN TO GENDER DIFFERENCES IN TECHNOPHOBIA

The importance of discovering the origins of technophobia originate from as far back as the 1970s when studies first indicated that computer anxiety is related to the belief that computers are the domain of men and hence women's fear of the technology (Rainer *et al*., 2003:108). Since then several studies have proposed reasons for gender differences in computer attitudes (Christensen *et al*., 2005:24). In certain areas of research, the focus has begun to shift from whether gender differences exist to questions of why the genders hold different attitudes.

Although research abounds which focuses on gender differences in technology use, there is limited research which concentrates on the links between gender differences and social studies (Vekiri & Chronaki, 2008:1393).

The importance of including social reasons in a study into gender differences in technophobia is that technology is not isolated and does impact on people's social habits (Hill *et al*., 2008:257). A need is thus recognised for a deeper understanding of gender differences in beliefs towards technology (Wolin & Korgaonkar, 2003:382).

In order to uncover the existing differences between genders in their propensity to adopt new technologies, it has become fundamental to understand why these differences exist (Elliott & Hall, 2005:105).

More recent studies indicate that women have developed a ‘we can but we do not want to’ philosophy toward technology (Bain & Rice, 2006:120). Although this supports the theory that women may be technological laggards, the reasons *why* women have adopted this attitude are best uncovered through a study of the social sciences. By understanding the origins of technophobia, this study aims to offer theoretical support to the proposition that women may be ‘technological laggards’. According to Dolliver (2005), the proportion of early adopters in the consumer market is rising as the rate of diffusion is faster for new products than in the past. It is proposed that more consumers have grown confident with new products. Although this may be the case in certain research contexts, cultural and social factors need to be taken into consideration before this can be confirmed as a universal trend. Indeed, the cultural and social factors that contribute to the gender divide in technophobia are important in understanding the origins of technophobia.

A review of the literature indicates that there are four main perspectives as to why men and women differ in their levels of technophobia (Bakewell & Mitchell, 2004:223; Dobscha, 2003:91; Meeds, 2004:315; Ndubisi, 2006:54; Rundle-Thiele & Bennett, 2001:32; Sami & Pangannaiah, 2006:431).

These perspectives include:

- The role of gendered social expectations and norms.
- The gendered bias that is inherent in technology products.
- Gender differences in cognitive-thinking styles.
- Gender differences in risk aversion.

These four perspectives are discussed in more detail in the next four sections.

5.3. TECHNOLOGY AND GENDERED SOCIAL NORMS

One of the core reasons for gender differences in technology adoption and technophobia remains the manner in which men and women are socialised. At a fundamental level, gender differences in attitude towards technology have remained a reflection of social experiences and expectations (Sami & Pangannaiah, 2006:431). According to Kulviwat, Bruner and Al-Shuridah (2009:707), social norms and gender expectations have a major influence on the adoption of high-technology products.

The sense of being either man or woman takes up a significant part of most people's sense of self, to the point where gender becomes one's identity. According to Tolle (2006:49), identification as based on a person's gender forces people into roles and conditioned patterns of behaviour that not only affect one's thoughts, but also one's lifetime actions.

Changing social and demographic patterns are putting pressure on traditional gender roles (Bakewell & Mitchell, 2004:223-224). One of the most revolutionary changes in sex-role orientation is the perception of the role of women in society (Sidin, Zawawi, Yee, Busu & Hamzah, 2004:381).

Societal changes of the past decade have impacted on men's and women's lifestyle and family roles, with women reaping benefits such as more political and economic power, as well as greater participation in decision-making (Backhans *et al*., 2009:1388). Through global modernisation, social structures have changed, shifting not only society, but also family decision-making roles, with women making what were previously deemed 'male' decisions (Sidin *et al*., 2004:382). Recent studies are reflecting these changes and even propose that men are becoming more involved in 'traditionally female' shopping activities (Bakewell & Mitchell, 2004:223-224).

Other authors conclude that the influence of the husband is declining as new sex-role orientations are developing (Sidin *et al*., 2004:382). Through such findings, it may be assumed that through shifting societal norms, women's tendencies towards technophobia may also be shifting as women continue to adopt more traditionally male societal roles.

However, recent studies argue that the roles played by a husband or wife differ with regard to the product being purchased. In this way, the relationship between purchasing a product and the sex-role orientation remains product specific (Sidin *et al*., 2004:381-382). Thus, although societal sex-roles may be shifting, the degree to which men and women's roles are shifting when purchasing a product depends on the specific product. A technology purchase, for example, may still induce more traditional sex-roles among men and women.

A study into consumer purchase decision-making regarding the purchase of durable goods found that, whilst the wife plays a key role in the identification of a need for new technology goods, the husband still remains responsible for researching the technical manual and making final technical-related decisions (Erasmus & Boshoff, 2003:338).

According to Kirchler, Hoelzl and Kamleitner (2008:525), men and women are generally balanced in their involvement in purchase decision-making in a household. The differences in genders exist in terms of the content over which the decision is being made. The type of product being purchased in the household is largely dependent on the traditional social norms assigned to each gender. Thus, even in the modern age, women are more likely to make purchase decisions regarding kitchen products, and men more likely to take responsibility for technical items.

This suggests that although women's involvement in purchasing decisions are changing, this may not be the case for new, highly complex technology products, where men still accept final responsibility for these purchases. Indeed, for certain product categories, wives do not exhibit a significant influence in the family decision-making process (Sidin *et al*., 2004:387).

According to Selwyn (2004:64), the process of using a computer at home relies heavily on the dominant partner in the marriage or relationship, who generally introduces the dependant partner to the technology. In the majority of relationships, this dominant partner is generally seen as male.

According to Bovée *et al*. (2005:1765), the majority of men and women still hold the view that computers, science and technology are predominantly a 'male domain.' Society's expectations regarding technology usage have been found to positively affect young boys' usage of computers, and negatively affect girls' usage of computers (Bovée *et al*., 2005:1765). Differences in gender use of technology is not 'natural' but rather the result of social stereotypes and gendered expectations which impacts on girls' and boys' use of technology from a young age. These beliefs include parents' own gender stereotypes that computers and technology are a 'man's domain' (Vekiri & Chronaki, 2008:1393-1394).

Despite seemingly changing societal roles, studies still conclude that men define themselves through traditional material accomplishments, while women do so through the quality of their relationships with others (Ndubisi, 2006:54). Women are stereotypically more geared towards community behaviour and the promotion of caring and nurturing.

These stereotypical female sex roles have led to women using technology for more social means such as communicating and establishing relationships within their network (van de Wijngaert & Bouwman, 2009:91). Recent research confirms that teenage boys continue to associate themselves with traditionally utilitarian traits and young girls with more traditional social traits (Bakewell & Mitchell, 2004:225).

In a study conducted to uncover the reasons for differing levels of technology anxiety on a social level, it was found that women tend to view technology as a tool, while men tend to view technology as a toy (Christensen *et al*., 2005:33). This finding is supported by Imhof *et al*. (2006:2835) who found that male students use computers for personal use such as gaming and entertainment, whilst the majority of female students only utilised computers to achieve study objectives.

According to Coley and Burgess (2003:286), men are also more likely than women to purchase consumer electronics and other technology-related items on impulse. This finding is confirmed by Wolin and Korgaonkar (2003:377), who conclude that women are more likely to use technology for interpersonal and social reasons, while men are more likely to use it for entertainment and functional purposes. According to Coley and Burgess (2003:286), men and women shop for different reasons, with men looking to purchase new products for functional reasons and women for more aesthetic and social reasons.

Another social aspect that may account for different attitudes towards technology between men and women is that different forms of technology influence inequalities in the division of labour (Scott & Nolan, 2007:89-90). Women continue to be significantly underrepresented in technology-related careers, and the fact that the number of women entering science and technology careers has risen in the last 10 years may be attributed to the proposition that women are 'technological late adopters' and have as such 'latched' onto technology-driven careers at a later stage than men (Scott & Nolan, 2007:91). According to Southerton (2007:116), women may continue to be overtaken in technology-related careers as career progression continues to conflict with women's traditional roles of mother and wife.

5.4. THE GENDERED BIAS OF TECHNOLOGY

A second perspective that accounts for the differing levels in technophobia between genders, and which ties in closely with gendered social norms, is the argument that the adoption of technology is gendered due to the inherent gendered bias of technology products (Dobscha, 2003:91). This 'gendered nature' of technology adoption stems from the inherent belief that technology is male-orientated and will continue to be dominated by the masculine sex. According to Christofides, Islam and Desmarais (2009:898), gender differences in attitudes and abilities are not inherent characteristics, but rather a result of different social roles and expectations that a society has for men and women. The core of this theory is that technologies are deeply ingrained into social and cultural structures that are inherently unequal (Dobscha, 2003:92).

Firms generally direct their attention to innovative users, i.e. those users that are first in discovering and acquiring new technologies, and target their product and service delivery based on the needs of this elite segment (Matthing *et al*., 2006:289). As the majority of the innovative users are deemed to be male, it can be assumed that firms target their new product and service development processes around the needs of typical male innovative stereotypes, thus isolating women further from the products and services and creating more fear and resentment (Simon & Peppas, 2005:134).

According to Bovée *et al*. (2005:1765), the majority of men and women still hold the view that computers, science and technology are predominantly a 'male domain.' Dobscha (2003:91) supports this view through the finding that technology games and products continue to be more widely accepted by young boys. Indeed, the study points out that girls continue to be less interested in technology-related gimmicks as they are seen as 'boys' toys.'

Bain and Rice (2006:128) support this view through their finding that, due to accepted social and cultural norms, males are more inclined to gender biased views of technology than females. In addition, traditional sex roles implicate the adoption of technology and technophobia is largely a result of the 'masculinisation' of technology (Gilbert *et al*., 2003:259).

In South Africa, the shortage of skilled women in the ICT industry is further exasperating the gender divide, as women are not involved in the creation and development of the very technologies that affect their lives (Third, 2007). According to Sieverding and Koch (2009:697), there is a gendered bias in male dominated domains such as ICT, which stereotypes women and their ability to perform as well as men in these fields. As women choose to remain excluded from technology-based careers, so the gender imbalances in IT-related fields will be sustained (Bovée *et al*., 2005:1763).

Indeed, one of the greatest contributions from the feminist literature is the finding that gender stereotypes are reinforced through the production and consumption of technology. Traditional gender stereotypes are shaping the design, development and hence adoption of new technologies, as the production of 'male technologies' by men further widen the gender gap. Women are simply not involved in the development of technologies to the same extent as men, based on chosen career paths (Catterall *et al*., 2005:498). The theory of gendered effects is further supported by Simon and Peppas (2005:134), who hold that technologies are at times designed *by men for men*, thus preventing women from adopting the technology.

Even technology-related publications continue to primarily target men who seek the latest in innovative technologies (Simba, 2004:2). The advertising of technologies also exasperates the gender divide by confirming established sex-role stereotypes. Indeed, significant gendered differences in advertising topics are pronounced in sex-role stereotyping (Wolin & Korgaonkar, 2003:377). As a result men's and women's beliefs, attitudes and behaviours towards technology have varied significantly in the past.

Interestingly, where products are not typically masculine, such as a washing machine, fridge or dishwasher, there are no apparent differences between genders in aversion to technology (Gilbert *et al*., 2003:254). One conclusion is that gender in itself may undermine a women's confidence in adopting a 'man's' technology and hence the unwillingness to adopt the technology in the first place (Gilbert *et al*., 2003:255). According to Imhof *et al*. (2006:2826), the inherent gendered effects in computers places women at a disadvantage as it impacts on their self-efficacy; defined as the belief in one's own abilities and skills and the outcomes of these abilities. Women exhibit lower levels of self-efficacy and higher levels of negativism than men related to computer usage which has been attributed to the inherent gender bias in computer technology.

According to Simon and Peppas (2005:137-138), men exhibit more positive attitudes, perceptions and interest towards technology than women as well as less anxiety toward new technology applications.

According to Bovée *et al*. (2005:1765), men are more positive towards computer technology simply because they are more interested in computers and see more value in technology than females.

This positive predisposition towards technology is usually measured in studies of technology adoption as optimism and is strongly tied to the levels of innovativeness that a person exhibits towards a product (Parasuraman, 2000:311). Optimism, defined here as a "positive view of technology," is highly correlated with a person's propensity to embrace and employ new technologies (Parasuraman, 2000:309). Indeed, it may be proposed that, based on the arguments presented through the theories of gendered social norms and the gendered bias effect of technology, men embrace technologies more readily based on a more optimistic and innovative attitude towards technologies than women, who are conditioned through social norms.

Based on the gendered social roles and gendered effects of technology arguments raised above, the following hypothesis is proposed:

H_2: Men are more optimistic towards new technology than women.

The following section discusses another perspective as to why men and women may differ towards technophobia. Section 5.5 proposes that gender differences in cognitive thinking styles exist.

5.5. GENDER DIFFERENCES IN COGNITIVE THINKING STYLES

Another theory that may account for gender differences in technophobia focuses on gender differences in cognitive thinking styles. This theory is based on the finding that the adoption of technologies is different for consumable and durable goods and that technology goods, which are characterised by high complexity, are mostly cognitive purchases (Rundle-Thiele & Bennett, 2001:27-29).

High complexity products are difficult to use and understand and the more complex the product, the more the cognitive effort required to understand the product so that acceptance and adoption may occur (Mukherjee & Hoyer, 2001:463).

According to Tarter and Hoy (1998:212), decision-making is defined as "a rational deliberate purpose for action that often requires the processing of information." Popular research on this theory assumes that decisions are made mechanistically without regard to other factors. However, it is argued that decision-making is a multi-dimensional issue and as such it is impractical to impose a rigid and simplistic model for all consumer purchases (Nwogugu, 2005:153). Models depicting the consumer decision-making process need to be adapted for the product category and the level of potential risk involved for the consumer (Du Plessis & Rousseau, 2003:122).

According to Williams (2002:250), consumers evaluate purchase alternatives based on hedonic (emotional) and utilitarian (rational) benefits. Empirical evidence abounds to support gender differences in decision-making processes, with reports typically concluding that men are more 'objective and logical' than women (Ndubisi, 2006:49-50).

According to Williams (2002:250), numerous studies agree with the suggestion that men and women are likely to attach different degrees of importance to various evaluative criteria and thus differ in their buying behaviour.

Past studies have found that men frequently employ simplifying strategies when experiencing cognitive overload and that the decision-making styles of men are different to those of women (Bakewell & Mitchell, 2004:227). Chiu *et al*. (2005:420-421) conclude that men and women differ in the way in which information concerning new technologies is processed.

How the apparent differences in cognitive thinking styles between genders aids in the understanding of differences in technology adoption and technophobia is now explained.

Product involvement is defined as “an internal state variable that indicates the amount of arousal, interest or drive evoked by a product class.” High product involvement involves high problem solving and an information search (Deacon *et al*., 2003:190). In high technology markets, characterised by high uncertainty, more information regarding the technology is made available to the consumer than those products which are considered low uncertainty products (Bstieler, 2005:272).

According to Song and Montoya-Weiss (2001:62), a consumer’s perceived uncertainty affects the decision-making process. It is found that the greater the perceived technological uncertainty or risk, the more a consumer critically evaluates information and communication exchanges regarding the product (Song & Montoya-Weiss, 2001:73). With the wide range and ever-changing technological products on offer, decision difficulty or ‘confusion’ has resulted. This inevitably hinders the consumer’s decision-making abilities (Walsh & Mitchell, 2005:281-282).

In high-technology markets there is a propensity towards well-established, recognised brands due to the high involvement and risk characterised by the purchase.

In these markets, cognitive measures are better predictors of future behaviour as consumers prefer to think hard about their technology purchase (Rundle-Thiele & Bennett, 2001:32). According to Mukherjee and Hoyer (2001:464-465), consumers are more likely to undergo major cognitive thinking processes when purchasing high-involvement products. Greater cognitive search processes have also been found to accentuate negative evaluations, making it even more difficult for a consumer to make ‘easy decisions’ regarding technology purchases.

These cognitive processing strategies become more complex when purchasing major technology appliances which are novel and technically complex (Erasmus & Boshoff, 2003:333). Decision-making is more difficult with technology goods as poor product manuals, increased product complexity and conflicting ambiguous information renders decision-making more complex (Walsh & Mitchell, 2005:282).

In essence, high-technology products differ from other products in that technological innovations are generally more complex than other products and thus require greater consumer learning and involvement. As such the risk factor in the adoption decision-making process is generally higher (Saaksjarvi, 2003:91). Where a product is new, consumers use existing knowledge to learn about new products or services, transferring knowledge from one product to another in order to form an evaluation. Consumers with an extensive knowledge of a new innovation are more likely to adopt the new technology than novices (Saaksjarvi, 2003:92).

The extent of consumers' knowledge regarding a product innovation thus has a significant effect on their decision-making and their final propensity for technology adoption (Saaksjarvi, 2003:90).

According to Meeds (2004:315), women exhibit more comprehensive information processing strategies than men when evaluating a highly complex product. Women are also more sensitive to negative information concerning technology when making judgements.

Men, on the other hand, purchase highly complex technology products on impulse more readily than women, hinting that subsequent purchase attitudes and intentions vary between men and women. When too much information is shared, information overload occurs, which causes adverse judgmental decision-making, and in many cases impairs the consumer's decision-making abilities. When faced with information overload, consumers either respond by discarding anxiety-filled messages, or by not responding at all (Herbig & Kramer, 1994:45).

According to Blackwell, Rode and Toye (2009:325), consumers generally prefer not to spend a lot of cognitive effort on decision-making and where possible prefer to make shortcut decisions based on previous experiences. In this regard, if a woman has had no prior experience of a technology purchase due to social norms and traditions, a woman may have no choice but to undergo a more rigorous cognitive process. According to Kesici *et al*. (2009:532), there are significant gender differences in cognitive thinking styles. Females typically score higher in cognitive thinking strategies in terms of memorisation and analytical thought processes than men. A recent finding confirms that women engage in a far more comprehensive decision-making process, collecting more data and analysing the information more critically than men (Sanchez-Franco, Ramos & Velicia, 2009:197).

As women's general level of cognitive involvement is higher than men, women are more likely to experience information overload and reject a technology. Interestingly, in a study comparing genders in terms of information processing, women are reported to perceive more information and clutter in advertising than men and engage in the advertisements more intensively than men (Walsh & Mitchell, 2005:283).

As women generally employ a more comprehensive decision-making strategy than men, and hence factor in a lot more negative advertising concerning the product, it can be assumed that women may never regard a new technology as positively as men (Chiu *et al*., 2005:420-421).

According to Mukherjee and Hoyer (2001:470), the evaluation of high-complexity products provides one explanation for technophobia, or consumer resistance towards high-technology innovations. Many technical innovations are perceived as complex in nature and the higher levels of perceived risk engenders extensive search activities. This may overwhelm consumers and foster resistance to the new technology.

As women exhibit higher cognitive search processes when reviewing novel products, it can be deduced that women are more likely to negatively evaluate new technologies than men who apply simplifying decision-making strategies.

This, in effect, can account for one reason why women adopt technologies later in the innovation curve and why women may be inherent 'technological laggards.'

This deduction is supported by studies which conclude that women in general are relatively late adopters of the Internet compared to men, due to the differences in cognitive thinking when confronted with the technology (Simon & Peppas, 2005:137-138). This study further establishes that men exhibit more positive attitudes, perceptions and interest towards technology than women, as well as less anxiety toward new technology applications. According to Meeds (2004:323), men in general illustrate higher confidence towards technology products than women as women engage in elaborate cognitive processes when using technologies.

From the evidence provided above, the following hypothesis has thus been formulated:

H_3: Women experience greater cognitive involvement when purchasing high-technology products than men.

The next section proposes that genders differ in their risk aversion towards technology products.

5.6. GENDER DIFFERENCES IN RISK AVERSION

As has been discussed, high-technology products are characterised by complex product claims and features which plague consumers with fear, uncertainty and doubt. A major element of this uncertainty is that consumers do not know whether the technology can deliver on its promises (Yadav *et al*., 2006:60). According to Hendry (2000:510), consumers with low technology readiness are most concerned about security and the associated risk with technology use.

Resistance to technology adoption stems from both functional and psychological barriers (Laukkanen *et al*., 2007:420). Consumers with high levels of uncertainty avoidance tend to take fewer technological risks and generally adapt to change less easily (Song & Montoya-Weiss, 2001:64). According to Mitchell and Boustani (1993:18), risk-taking and risk aversion reactions to new products are inherent to an individual's personality type, but are also largely influenced by culture, expected social norms and the environment in which the decision is being made.

Risk is a perception, rather than a function, of a product (Laukkanen *et al*., 2007:421). The risks that consumers face include fears of making mistakes while using the product, physical breakage of the technology, security threat, as well as loss of privacy. When a consumer purchases an innovative product, the consumer experiences anxiety in that he or she cannot anticipate the results of that purchase with any certainty, and the possible consequences of the wrong decision (Snoj *et al*., 2004:159). A consumer's perception of risk is found to be one of the key determining factors with regards to a purchase decision (Monat, 2009:23). This finding is supported by another study that concludes that a consumer's risk-taking attitude is directly related to new product adoption (Wang *et al*., 2008:239).

In a recent study, Elliott and Hall (2005:101-102) found that women consistently demonstrate a need for assurance that a technology will operate reliably and accurately.

Ndubisi (2006:54) concludes that when a product or service is new-to-market, men are more willing to be the first in their social circle to adopt the new product. Women, on the other hand, prefer to adopt the product only once it has proved itself in the market. According to Ndubisi (2006:54), men show higher risk-taking propensities compared with women and this may explain the fact that men demonstrate a greater willingness to adopt new 'unknown' technologies before women.

Risk-taking behaviour is generally accepted as a typically masculine trait, with past research confirming that women are on average more risk-averse than men. When faced with the purchase of higher risk assets, such as technology, women are often more cautious in their decision or refrain from the purchase altogether (Meier-Pesti & Penz, 2008:180-182).

For example, women display greater risk aversion and lower levels of trust towards Internet usage than men, while men exhibit high levels of Internet acceptance (Sanchez-Franco *et al*., 2009:196). As women generally underestimate their IT skills, they experience increased anxiety and are slower in trying new technologies and building trust. Men, on the other hand, are more confident in their computer skills and are more willing to take a risk when working with a new technology (Sanchez-Franco *et al*., 2009:197).

According to Harrant and Vaillant (2008:396), women are typically more risk averse than men in general, exhibiting more caution in selecting high-risk assets and are more anxious in trying new product innovations. Another study confirms this with the finding that men boast greater risk-taking behaviour than women who prefer greater control when taking risks (Demaree, DeDonno, Burns, Feldman & Everhart, 2009:3).

According to Masclet, Colombier, Denant-Boemont and Lohéac (2009:481), socio-demographic factors have a strong impact on the propensity of an individual to undertake risky decisions, with gender and socio-economic status playing the largest role.

According to Meier-Pesti and Penz (2008:184), these inherent risk-taking differences between genders are a result of gender roles established through society and may change as women accept more traditional male roles.

This tendency for ‘risk aversion’ by women may account for women’s higher levels of technophobia and later adoption of new technologies. At a later stage of the diffusion process, women may be ‘assured’ of the new technology as more members of society adopt the technology.

Surprisingly, at a socio-cultural level, a study finds that significant gender differences exist in the trust-loyalty relationship, with women being significantly more loyal than men at *higher* levels of trust (Ndubisi, 2006:48). As a technology diffuses into society, women are more 'assured' of the technology and over time exhibit more loyal behaviour as trust in the technology increases. This is supported by the finding that over time, women actually use computer technology more than men, and also report higher levels of computer usage (Broos, 2005:27).

According to Costano *et al*. (2008:321), the closer the decision is to purchasing the product (imminent versus distant future); consumers become more concerned with the risks involved in product adoption. At the stage of actual adoption, women exhibit higher levels of anxiety and are more concerned with the negative product evaluations than men. According to Eggers (2007:2), late adopters of a new technology learn from the early adopters and thus become more loyal to the new technology over time.

These findings are further supported by Booij and van Praag (2009:386) who found that the greatest determinants of the adoption of what are normally considered risky purchases are risk and time factors. The greater the perceived risk, the more risk-averse women will be in adopting the product. However, the longer the product has been available in the market, the less risk-averse women will feel in purchasing the product.

Thus, although women may adopt new technologies later than men, women eventually become more loyal to the technology. At this stage of the diffusion process, the more 'innovative' male consumer may have moved onto the 'next big thing,' thus repeating the innovation cycle.

Based on the preceding discussion, the following hypothesis is proposed:

H_4: Women are more risk averse to new technology than men.

5.7. CONCLUSION

This chapter highlighted the importance of understanding the social reasons why genders differ in technophobia. This chapter focused on why gender attitudes towards technology differ. Three additional hypotheses were formulated based on the findings presented.

The following chapter will deal with the hypotheses of this study in more detail. The methodology used to measure the hypotheses will also be discussed in detail as well as the research design employed.

CHAPTER 6. RESEARCH DESIGN AND METHODOLOGY

6.1. INTRODUCTION

This chapter describes the methodology employed in this study. The study's overall research design is described first, followed by a description of the sampling design and the data collection process used. The measurement scales for each of the core constructs are also discussed. The chapter concludes with a discussion of the ethical issues relevant to the study.

The research design employed in this study is discussed in further detail in the following section.

6.2. DESCRIPTION OF THE STUDY'S OVERALL RESEARCH DESIGN

In this section, this study's overall research design is described, based on the general descriptors of a research design used by Cooper and Schindler (2003:149). Based on clear guiding research objectives and the four hypotheses defined in this study, a *formal* study was conducted in order to provide insight into gender differences in technophobia.

Data for this study were collected from a sample of 200 respondents aged 25-35 years in the northern Johannesburg suburbs. Their responses were recorded based on closed-ended questions contained in a self-administered questionnaire.

The Technology Readiness Index (TRI) was used to uncover feelings of technophobia, and other scales were also utilised to further uncover consumers' different attitudes towards technology.

More specifically, a *communication* study was conducted in the form of a self-administered survey format, with field researchers on hand to assist respondents when necessary.

According to Cooper and Schindler (2003:149), an *ex post facto* design refers to a non-experimental study in which researchers simply report the values of specific variables without manipulating one or more independent variables to determine the influence of such a manipulation on a dependent variable. This study did not make use of an experimental design. This study is purely *descriptive* in that gender differences were investigated without the experimental manipulation of any variables. The study was descriptive as its objective was to describe the extent to which men and women differ in their levels of technophobia, innovativeness, risk-taking and cognitive involvement in decision-making related to the purchase of high-technology consumer goods.

According to Cooper and Schindler (2003:149), a *cross-sectional* study is research which reports the findings at one point in time. As this study aimed to measure levels of technophobia between men and women towards specific technologies at a specific time, a cross-sectional study was conducted. Since technophobia was proposed as being temporal (ever-changing based on the stage of the product's life-cycle), the decision was taken to conduct a cross-sectional study (at one point in time), but to compare the results over three different technologies that are at different points in the respective product's life cycles. This enabled the comparison of technophobia across different technologies in one consistent period. Time and budgetary constraints also necessitated the use of a cross-sectional survey.

In order to accurately compare men and women, based on sound statistical and measurable differences, a *statistical* study was conducted. A statistical study allows for greater comparative abilities between genders, as well as allows comparisons with past and future studies.

This further enabled comparisons of technophobia between different technologies at different stages of the innovation curve across time periods. As the respondents were aware of the fact that they were participating in a research study, the study did not take place within *actual environmental conditions*.

In the following section the sampling design utilised in this study is described in detail.

6.3. SAMPLING DESIGN

In this section, the sampling approach used for this study is described and motivated in detail. This section examines the target population, units of analysis, context of the study and sampling method used. The realised sample and sample size are also described in detail. A demographic profile of the respondents who participated in the study is also provided.

6.3.1 Delineation of the target population

Cooper and Schindler (2003:179) define a population as the total collection of elements that a researcher would like to make inferences about.

The target population for this study included men and women, single and married, of all races, between the ages of 25 and 35 years who fell in the Living Standards Measure (LSM) groups 8-12 and resided within the northern Johannesburg region of South Africa. The reasons why the target population was delineated in terms of these specific demographic, LSM, and geographic characteristics are discussed below.

The decision to limit the target population to consumers between the ages of 25 and 35 years was based on the finding that there are greater gender differences among consumers older than 40 years (with women being more technologically anxious than men) than among younger consumers. Studies also indicate that the level of technophobia will be higher as the age of the consumer advances (Hogan, 2005:66-67).

Although this would mean that gender differences would not be as easily observed in a younger, narrower age range, it would ensure that the sample under study had been exposed to the same, more modern technology for more or less the same period of time. As described through the theory of the diffusion of innovation, technology adoption takes place over time. It thus remained important to include a sample of men and women that were at a relatively similar stage of life and had a similar exposure to the same technologies.

Consumers between the ages of 25 and 35 years are also more likely to purchase technologies due to fewer spousal and dependant commitments and a greater disposable income for technology purchases (Du Plessis & Rousseau, 2003:57-64). In a study conducted by Dwivedi and Lal (2007:666) similar results find that the majority of early new product adopters are between 25 to 54 years of age, most likely due to the economic activity and higher disposable incomes that this age group possesses. According to this finding, the adoption of a new product innovation is most likely to occur by consumers in this age group.

A previous study using the TRI to score guest responses to the use of new technology in hotels showed that the highest technology readiness scores obtained were from relatively young, more educated and affluent respondents (Verma *et al*., 2007:4). Thus by limiting the target population of this survey to consumers who are relatively young (25-35 years) and from higher LSM groups, it was assumed that the respondents would be more aware of technology and would have more informed opinions regarding the technologies used in the survey.

According to Williams (2002:250), numerous studies have found that consumers in different marital classes are likely to be influenced differently in their purchase decisions. Married persons attach different degrees of importance to various evaluative criteria and thus differ in their buying behaviour from single persons. Consumers are assumed to be more influenced by the married partner, who in turn influences the purchase of new technologies.

However, studies show that modern female consumers are taking more responsibility for the purchase of new technology products (Erasmus & Boshoff, 2003:333).

In addition, although a husband may influence the wife's purchase of a technology product, this does not necessarily imply that a husband influences the wife's innate feelings, fears or attitudes toward that technology. Based on this argument, the study included both married and single consumers. Based on a growing trend of co-habitation, 'married' is defined as men and women who are currently married in terms of the marriage contract and/or who are currently living together in an intimate, committed relationship (Rall, 1984:9).

A multi-racial sample was drawn, based on the need to infer from the sample gender differences in technophobia across South Africa, which is multi-racial and a multi-cultural country. This was based on the findings of a study conducted in South Africa by Galpin *et al*. (2003:44) which found that gender predicts anxiety towards technology, not race. A multi-racial sample should thus have no bearing on the final results. According to Martin (2009:316), gender and age are the most important determinants of asset ownership, more so than ethnicity or race. This is supported by a finding that computer anxiety is more associated with gender differences than either class or race (Brunner, 2005:221).

According to Ono (2006:116), income, education and gender remain the key determinants of digital inequality in a country. In addition, technology anxiety has been found to correlate strongly with demographic variables such as age, academic qualifications and gender (Gilbert *et al*., 2003:253). As discussed in section 2.5 the greatest determinants of technology anxiety and digital inequality remain age, gender and socio-economic status. Based on the weight of empirical research, in order to accurately measure gender differences in levels of technophobia, socio-economic status needed to remain constant across the target population for accurate comparison.

One of the issues involved in defining the target market based on socio-economic factors is the difficulty in guaranteeing the right sample. Unlike a person's age, race, sex, ethnicity or location, a person's living standard is far more difficult to ascertain at face value (Lamb *et al*., 2001:40). A simple means of measuring consumers' socio-economic class is to ask them to indicate their relevant income bracket.

However, screening participants based on income may not be the ideal solution due to the sensitivity of the information required. Respondents may choose not to answer, answer untruthfully, or even refuse to continue with the survey at all. The best representation of socio-economic status in South Africa in terms of asset ownership, income and education levels is the LSM (Lamb *et al*., 2001:40).

The LSM measures social class, or living standards, apart from income and enables the classification of consumers regardless of obvious demographic traits (Lamb *et al*., 2001:41). The LSM quantifies the ownership of certain durable goods and access to certain services, to yield an overall measure of social class ranging from LSM Group 1 to 10, with Group 10 representing the highest socio-economic class and 1 the lowest (Lamb *et al*., 2001:41-42). The practicality of the LSM is confirmed by its pronounced use by consumer electronics' companies to target their advertising campaigns.

According to Erasmus and Boshoff (2003:333), consumers in the higher LSM groups (Groups 8-10) have a far greater exposure to the purchase of technology products, and actively purchase new technology goods far more often than the lower LSM classes.

For the purposes of this study, the LSM was used to measure consumer socio-economic class in order to ensure some level of purchase involvement with what are generally considered luxury technology products. A study of the LSM classification indicates that the items with the highest factor loadings which indicate asset ownership and socio-economic classes 8-10 are as follows (South African Advertising Research Foundation, 2008:1-3):

- Hi-fi / music system.
- Computer / laptop.
- Dishwashing machine.
- Clothes washing machine.
- Electric stove.

These attributes were used to screen participants in order to accurately verify the LSM group of the respondent. Screening was based on whether the respondent had answered positively to the ownership of a minimum of four of the five products or services. Only those respondents that met this requirement for definition into LSM groups 8-10 were included in the survey.

The target population was limited to people residing in the northern Johannesburg region of South Africa. Areas within this region specifically included Sandton, Fourways, Cresta, Edenvale and Bryanston. These areas were selected as they remain some of the most affluent areas in Johannesburg with a greater number of people from LSM groups 8-10 residing there.

This study did not include other affluent areas in other parts of South Africa due to budgetary constraints.

The units of analysis for this study are thus the two gender groups, male and female, as described in this section. This is because the focus of this study is on investigating gender differences in technophobia amongst a specific group of consumers. The following section describes in more detail the context within which the study was conducted.

6.3.2 Rationale for the high-technology products included in the study

As was indicated in the literature review, high-technology products have a temporal dimension that complicates the ability to accurately compare men's and women's levels of technophobia towards a certain technology over time. The importance of defining the right products to include in technology research was also discussed in section 3.3.

In keeping with the definitions used in this study, high-technology products are defined as durable consumer technologies, normally out of the reach of common understanding, and which bring with them technological uncertainties when introduced to the market for the first time.

In measuring consumers' levels of technophobia towards specific technologies, care was taken that the technologies on which the comparisons were based between men and women were not too complex or unknown. 'Technology biases' may have occurred if only a small percentage of respondents included in the survey knew of the specific technology, or if only a specific type of consumer was exposed to that technology.

Taking this in to account, it was important to ensure that participants were relatively familiar with the consumer electronics goods used in the survey. However, the technologies also needed to remain 'new' and 'innovative', based on the requirements of the theory of the diffusion of innovation (Yadav *et al*., 2006:62). The best way to fulfil both these seemingly 'opposing' requirements was to base the questions on popular technologies that are readily spoken about, but which are still new to the market. Consumers in LSM groups 8-12 also had to be familiar with all the technologies which boasted innovative features considered as 'more complex' or 'beyond common understanding' and thus evoked feelings of uncertainty or apprehension.

In addition to measuring technophobia between genders based on new, innovative technologies, this study also aimed to measure differences between levels of technophobia across different technologies at different stages of the diffusion of innovation curve. As described earlier, this study aimed to account for the different stages that a technology product goes through in the diffusion of innovation process. In order to measure whether women are indeed 'technological laggards', technophobia had to be measured across a range of technologies at different stages of the innovation curve.

Based on these considerations, the following technologies were included in this study:

- The first consumer electronic product included in the study was the **standard desktop computer**. This technology was introduced into the market in the late 1980s. The computer was selected based on the idea that this technology is readily diffused in the higher LSM groups and demonstrates narrowing differences in technophobia between men and women as suggested by current research.

- The second technology used in this survey was the **DSLR quick auto focus digital camera with automatic face detection features** introduced in the early 2000s (Sony, 2007:37). Although cameras are not new-to-market, features such as quick auto focus and face detection are seen as new technical features that are not readily understood by most consumers.

- In order to measure technophobia as a complete fear of an unknown technology, **home automation technology** was used in this study. Home automation technology, or 'smart homes' integrates systems such as touch screens, mobile technology and intelligent controllers to control everything in the home from the lights to security to audio visual equipment (Omnisol, 2008). Home automation is regarded as an advanced domestic technology that applies artificial intelligence to monitor and enable technical functionalities in the home. The complexity of home automation is also regarded to increase in the future (Blackwell *et al*., 2009:324-325). Home automation as a concept is relatively known amongst affluent consumers, but the use and specifics of the technology remains relatively unknown. As this technology is a high-risk, high-involvement purchase, it may induce high levels of fear and technophobia. Home automation was thus chosen as the final technology with which to measure gender differences in technophobia.

The following section describes the sampling method used in this study in further detail.

6.3.3 Sampling method

This study made use of non-probability, quota sampling in order to gauge gender differences in levels of technophobia. Quota sampling involves the selection of participants based on specific demographic characteristics, and is a means of ensuring that pre-specified participants are presented in the sample (Hair, Bush & Ortinau, 2006:341).

Based on the restrictions imposed on the sample in terms of sample characteristics (LSM 8-12 consumers with higher income and education levels between the ages of 25 and 35 years), a non-probability quota sampling technique was used in this study.

This method provided the greatest control by allowing the researcher to include only those elements that met the sample's characteristics (Malhotra & Birks, 2007:410). Another important issue in the selection of a non-probability sample was the inability to find an appropriate sampling frame from which to draw a probability sample.

In addition, non-probability sampling is a more cost-effective solution than most probability sampling techniques (Burns & Bush, 2006:345). The researcher thus subjectively decided on the size of the quota group based on information available about the population from census data as well as that suggested by similar previous research. Quota sampling was also chosen as the best alternative to stratified sampling, based on the recommendations by Cooper and Schindler (2003:201).

Several criticisms have been raised against the use of non-probability sampling that include reliability, interviewer bias and representation concerns (Cooper & Schindler, 2003:201). According to Malhotra and Birks (2007:410), although non-probability sampling provides control of the sample characteristics, the objectivity of the method is compromised and the results cannot be statistically projected to the population. Another limitation is that the findings cannot be generalised to a larger population. The use of a non-probability sampling approach thus presents a limitation of this study, and is acknowledged as such.

Non-probability, quota sampling, however, best suited the requirements of this study. In order to maintain a relatively accurate and more representative sample, precision control was used when collecting samples (Cooper & Schindler, 2003: 201-202). Responses were gathered from a sample that was split 50:50 between men and women.

Based on a very clear definition of the target sample, as well as readily available and current information concerning the target population's characteristics, relevant quotas raise the overall reliability of this sampling method (Cant, Gerber-Nel, Nel & Kotze, 2005:167). As defined previously, gender was used as a quota variable for the sample.

Potential respondents were screened to ensure that they complied with the age, socio-economic status and geographic limitations set out for the study. The gathered responses were then selected to comply with a 50:50 gender breakdown.

The target population of this study thus lent itself to a non-probability sampling method as the defined population remained homogenous in terms of socio-economic status, age and geographical regions.

In this way gender quota sampling and filtering did provide for a certain amount of sample control. This study also aimed to obtain a broad view of gender technophobia across the population and also provided relief in terms of timing and budgetary constraints (Cant *et al*., 2005:175-176). The next section describes the realised sample size in further detail.

6.3.4 Sample size

As this study aimed to investigate gender differences in a defined geographic region, the target sample size was set at 200. In order to provide fair representation, 100 men and 100 women were included in the study. In a similar study that used the TRI to measure for differences in levels of technophobia between genders, the sample size was set at 236 (Elliott & Hall, 2005:100). Other studies that measured levels of technophobia between genders had sample sizes ranging from 128 to 240 (Bain & Rice, 2006:120; Hogan, 2005:61; Rainer *et al*., 2003:109).

Thus, although this sample size was not calculated on statistical grounds, it is in line with that of similar previous studies.

The final realised sample included a total of 200 useable questionnaires, representing a 43% response rate. All 200 questionnaires were analysed and utilised for the purposes of this study. Details of the respondents who participated in the survey are provided in the following section.

6.3.5 Respondent profile

Table 3 below provides a demographic profile of the respondents who participated in the study.

Table 3: A socio-demographic profile of respondents

	n	*%*
Gender:		
Female	101	50.5
Male	99	49.5
Total	200	100
Age:		
25-29 years	103	51.5
30-35 years	97	48.5
Total	200	100
Socio-economic / LSM group:		
Hi-fi / music system	198	99
Computer / laptop	198	99
Dishwashing machine	156	78
Clothes washing machine	200	100
Electric stove	200	100

In terms of product ownership, the respondents met the conditions needed for higher LSM groups, with all respondents owning at least four of the five assets defining LSM groups 8-12. Although this study aimed for an exact 50:50 split of male and female respondents, a final split of 101 women and 99 men was realised.

This is deemed an acceptable marginal difference for this study and will not impact the results of the study.

The majority of respondents were aged between 25-29 years of age, with 51.5% falling in this age group and 48.5% of respondents between the ages of 30-35 years. The greatest number of respondents, which consisted of 12.5% of the total, was aged 25 years, and the second highest group comprised respondents aged 35 years (11.5%). The age split was thus reasonably evenly divided between the two age groups to provide for more representative results.

Regarding LSM classifications, all respondents owned both a washing machine and electric stove, with only four respondents not owning a hi-fi/music system or computer/laptop. Twenty two percent of the respondents did not own a dishwashing machine. However, all respondents did own at least four of the five assets listed, and thus fell into the LSM group 8-10 based on SAARF's classification (South African Advertising Research Foundation, 2008:1-3).

The respondent profile demonstrates that the sample is homogenous and reflects the demographic characteristics required for the target population of this study. The requirements outlined for accurate quota sampling have thus been met. This section provided an overview of the sample design used. In the next section, the focus shifts to a detailed description of the data collection methods.

6.4. DATA COLLECTION

This section discusses the survey method used in the study. The rational for using survey research, as well as selecting a mall intercept with a self-completion questionnaire is provided. The location and timing of the data collection is also described in further detail.

6.4.1 Survey method

6.4.1.1 Rational for using survey research as a data collection strategy

In order to solve the research problem and address the objectives of this study, primary data was collected through quantitative research. As the research objective was to compare genders on levels of technophobia, this was best achieved through quantitative research that would enable statistical measures and comparisons between genders (Cant *et al*., 2005:88). As the accuracy of the quantitative data was critical for this study, the survey method was conducted to meet the research objectives.

A survey was chosen based on the ability of such data to identify the characteristics (i.e. levels of technophobia) between men and women, measure the genders' attitudes to new technologies, as well as describe technology purchasing patterns (Cant *et al*., 2005:89). According to Cooper and Schindler (2003:319-320), surveys are the best means of uncovering the opinions, intentions, expectations and attitudes of people. As this study aimed to uncover deep-seated attitudes, behaviours and opinions regarding technology in a quantifiable manner, a survey method was deemed ideal.

Another benefit of the survey method is that it provides the ability to cover a larger geographic area both practically and economically (Cooper & Schindler, 2003:319). As this study aimed to uncover differences in technophobia between genders across the northern Johannesburg region of Gauteng, the survey was the most feasible method of gathering data in terms of time, human and financial resources.

As the participants had been qualified in terms of target definition (between the ages of 25-35 years, LSM group 8-12 and residing within a specific geographic region), a survey remained the data collection method of choice for this research. The survey method, however, has its limitations, which have been taken into account. Systematic errors due to either research design or measurement errors are potential limitations to survey research.

Another limitation of this research is that a sampling frame was not used, and selection errors may have occurred if the interviewer selected the wrong respondent to complete the survey. Other potential errors that limit the accuracy of the survey method include response bias, inappropriate interviewer influence, measurement bias and non-response errors (Cant *et al*., 2005:89-94).

The limitations described above were, however, controlled through the following measures in order to ensure that higher levels of accuracy were obtained:

- A detailed definition of the target population was provided to the interviewers, who were properly trained in conducting surveys. Screening questions were also used to ensure that the respondents were from the target population.
- In order to reduce response bias, the questions were drawn up carefully and articulated so that all respondents understood what was being asked. Some questions were also reverse-scored to avoid ‘all positive answers’ bias.
- The interviewers were made aware of the effects of interviewer bias and were trained to avoid such influence.
- Administrative errors were avoided through the careful and diligent editing and coding of data by professional data analysts. Re-checking of edited and coded data by the researcher was also conducted.
- A ‘neutral’ option was provided in the majority of measurement scales where possible so that respondents could more accurately express themselves if they did not have an opinion.

Great care was taken in ensuring that the survey was not biased, the sample represented the population, that the questions were accurate and that the interviewer was trained in conducting surveys in order to negate any major disadvantages of this method.

As discussed, the survey method enabled the collection of data across a large geographic area and sample size, and was thus preferred over other collection methods.

More specifically, in order to gather the information required across a diverse group of cultures and races, a self-administered, mall intercept survey was conducted.

6.4.1.2 Rational for selecting a mall intercept with a self-completion questionnaire as the survey method for the study

Mall intercepts were chosen over personal face-to-face interviews in order to reduce interviewer bias. This study thus made specific use of a mall intercept survey involving the distribution of self-completion questionnaires, with a field worker on hand to assist with any questions and to guide the participants through the process.

According to Cooper and Schindler (2003:341), an advantage to using self-administered personal surveys with a researcher on hand is the anonymity that it provides the participant, providing the respondent the opportunity to respond without feelings of privacy invasion. With mall intercept surveys a greater sample size could also be achieved.

Studies have indicated that better-educated participants are more likely to participate in intercept surveys, thereby limiting the study away from illiterate persons (Cooper & Schindler, 2003:342). As the population had been defined to include consumers from a higher socio-cultural class with greater education levels, this limitation worked in the study's favour.

As this study focused on uncovering levels of technophobia, computer-delivered or e-mail surveys as well as mail surveys were decided against as both could potentially bias the responses. People that exhibit anxiety towards technology (and computers) may not have wanted to participate in a computer-based e-mail study. Users of technology, on the other hand, may have preferred to get all their communications via e-mail, web-send or mobile technology.

The use of the more traditional mail survey via postal delivery may have proven ineffective, as more technically adept persons may no longer use postal delivery. In light of this, a paper-based intercept method was considered the most appropriate neutral method of data collection. This method catered for consumers that are technophobic and avoid technology, as well as innovative consumers who embrace technology.

Based on these motivations, a survey questionnaire (see Annexure A) was compiled and administered to respondents by trained interviewers to gather the necessary primary data. The design of the questionnaire factored in the considerations necessary for an intercept method in that it took less than 10 minutes to complete. As the questionnaire dealt with concepts that may have been unfamiliar to certain respondents, such as computer anxiety and certain technology products, a trained interviewer was present at all times to assist respondents.

According to Cant *et al*. (2005:96), a disadvantage of the mall intercept method is that certain consumers shop at a certain mall during a certain time, which could bias results. For this reason the questionnaires were handed out at various malls, at various times of the day to account for differences in shopping patterns between genders. The location of the distribution of the questionnaire was also considered. ‘Neutral’ spaces such as coffee shops and food store were targeted. Technology stores and spaces that were considered more or less ‘innovative’ were avoided so as not to get biased results.

Upper-income suburban shopping centres and recreational facilities where consumers had time to spend completing the questionnaires were targeted.

6.4.1.3 The location and timing of data collection efforts

Data for the main study was collected during the months of November 2008 to March 2009 with a mall intercept survey. Before conducting the survey, mall management approval had to be obtained.

As the collection of data in the actual malls is not permissible in South Africa, permission was obtained from a Vodago store in the Cresta Mall to conduct the surveys just outside the store opposite the Pick ‘n Pay.

To avoid the potential bias that is inherent in non-probability samples, the intercept surveys were conducted on different days of the week, at various times of the day.

Of the 200 questionnaires gathered for this study, 115 were gathered in Cresta Mall in the Northern Johannesburg region. However, due to the difficulty in gaining permission to gather data in more than one mall, the remaining 85 questionnaires were gathered outside local churches and sporting facilities. This enabled a wider variety of respondents which different interests and backgrounds to participate in the study and also aided in avoiding the response bias inherent in non-probability sampling.

At all venues (in the mall, sporting functions and churches), trained interviewers approached individuals and asked them to complete the questionnaire. The respondents were asked to complete the screening questions first and if the respondents did not fall into the prescribed demographics for this study, they did not continue and their questionnaire was discarded. No incentives were provided to respondents for completing the questionnaire.

In this section, sampling and data collection were discussed. In the following section the pre-testing and design of the questionnaire used for the study are detailed.

6.5. QUESTIONNAIRE DESIGN

The questionnaire used in this study is provided in Annexure A. This section begins by discussing how the questionnaire was pre-tested to ensure its reliability. As this study included multiple research objectives, this section provides an overview of the questionnaire’s design and how it relates back to the research objectives. First, the method of pre-testing is discussed in detail.

6.5.1 Pre-testing

Based on the recommendations by Cooper and Schindler (2003:388-391), the questionnaire (see Annexure A) was pre-tested in the following phases:

- The researcher developed and refined the questionnaire through the continual redrafting and refinement of the questions, design and format of the questionnaire.
- Researcher pre-testing also included the recommendations of professional and qualified researchers, including a lecturer who commented on the questionnaire before it was administered to participants.
- Once a refined draft had been developed based on these recommendations, participant pre-testing was conducted.

At the first stage of pre-testing, a sample of 10 participants (five men and five women) with the characteristics as defined in the target population was selected to complete the questionnaire. These participants included family and friends who were trusted to provide honest feedback on the questionnaire. The researcher took detailed notes of the average time it took for the respondents to complete the survey, as well as noting the sections or questions that took an inappropriately long time to complete. Assistance was only given if asked for by the participant. Any problem areas were then noted and rectified in the questionnaire.

During the second stage of participant pre-testing, a more collaborative pre-test was conducted. Another sample of five men and five women with the same characteristics as defined in the target population was selected. In order to ensure that no additional bias was introduced, relative strangers, or participants that the researcher did not know personally were asked to participate.

The questionnaire was administered to them at a time most suitable for them in the comfort of their homes so that they could go through it at leisure.

The researcher was on hand to provide assistance as well as to probe the participant regarding the details of the survey. More specifically, the researcher engaged with the participants in order to uncover the following key issues in the survey design:

- The participant reaction to questions and whether they maintained interest in the survey.
- Whether any questions were misunderstood or unclear.
- The continuity and flow of the questionnaire.
- Understanding which sections the participants found stimulating or uninteresting.
- Uncovering sensitive questions that participants may not have answered honestly.

After the final phase of participant pre-testing, the measurement instruments were revised and the questionnaire reproduced and prepared for final approval by a qualified lecturer in research questionnaire design. The following section provides an overview of the design of the questionnaire used.

6.5.2 Overview of questionnaire design

The self-completion questionnaire used in this study (refer to Annexure A) consisted of seven questions. Questions 1 and 2 were screening questions that ensured that respondents fitted in to the targeted age and living standards groups defined for the study. Question 3 was a demographic question which captured the respondents' gender.

Questions 4 to 7 consisted of multiple-item rating scales to measure the abstract constructs included in the study. Question 4 measured the respondents' levels of technophobia towards three separate technologies included in the study, namely standard desktop computer, DSLR camera with quick auto focus and face detection, and home automation technology. For each technology, an abbreviated TRI scale measuring technophobia was used.

The final scale was an adaptation of Parasuraman and Colby's 10-item abbreviated TRI scale. Question 5 measured the respondent's optimism towards technology. Questions 6 and 7 measured the respondent's willingness to take risks when trying new technology and the respondent's cognitive involvement when making a technology purchase respectively. These measurement scales are described in more detail in section 6.6.

The questionnaire design, as it aided in the achievement of the research objectives, is discussed in the following section.

6.5.3 Research objectives and related questions

In Table 4 below, the research objectives of the study are matched with the corresponding questions in the questionnaire.

Table 4: Research objectives and related question number and variables

Research objective	Question number and variables in the questionnaire
To determine whether men and women differ in levels of technophobia that they experience towards high-technology consumer products at different stages of the diffusion of innovation curve.	Gender: Q3, V7 Technophobia towards specific high-technology products Standard desktop computer: Q4a, V9 – V18 Digital camera: Q4b, V19 – V28 Home automation: Q4c, V29 – V38
To investigate gender differences in the adoption of new technologies based on differences in levels of optimism towards new technologies.	Gender: Q3, V7 Optimism towards new high technology products: Q5, V39 – V43
To investigate gender differences in the adoption of new technologies based on differences in levels of willingness to take technological risks.	Gender: Q3, V7 Willingness to take technological risks: Q6, V44 – V50

Research objective	Question number and variables in the questionnaire
To investigate gender differences in the adoption of new technologies based on differences in levels of cognitive involvement when considering or purchasing new high-technology products.	Gender: Q3, V7 Cognitive involvement: Q7, V51 – V53

The following section describes the measurement scales used in the study in further detail.

6.6. MEASUREMENT

This section describes the scales used in the questionnaire to measure the abstract constructs in the study. This section also describes and motivates the use of the TRI as a measure of technophobia. A detailed description of how each scale was measured is also provided.

Each construct was measured through a separate set of rating scale items. Table 5 below lists these constructs and the scale items that were used to measure them.

Table 5: Research constructs and related measurement scales

Construct	Measurement scale used to measure the construct	Variable numbers in the questionnaire associated with each scale
Technophobia towards standard desktop computers	An adaptation of Parasuraman and Colby's 10-item abbreviated TRI scale (Verma *et al*., 2007:12).	V9, V10, V11, V12, V13, V14, V15, V16, V17, V18
Technophobia towards DSLR cameras	An adaptation of Parasuraman and Colby's abbreviated TRI scale (Verma *et al*., 2007:12).	V19, V20, V21, V22, V23, V24, V25, V26, V27, V28
Technophobia towards home automation technology	An adaptation of Parasuraman and Colby's 10-item abbreviated TRI scale (Verma *et al*., 2007:12).	V29, V30, V31, V32, V33, V34, V35, V36, V37, V38

Construct	Measurement scale used to measure the construct	Variable numbers in the questionnaire associated with each scale
Optimism	The optimism sub dimension of the original 36-item TRI (Parasuraman, 2000:311-313).	V39, V40, V41, V42, V43
Willingness to take technological risks	Raju's Risk Taker scale (Bruner & Hensel, 1992:494-495).	V44, V45, V46, V47, V48, V49, V50
Cognitive involvement	Ratchford's Involvement scale (Bearden, Netemeyer & Mobley, 1993: 325-326).	V51, V52, V53

The use of the abbreviated TRI scale to measure technophobia is discussed in greater detail in the following section.

6.6.1 Use of the abbreviated TRI to measure technophobia

As discussed in section 3.2, technophobia is the negative reaction to technology and manifests itself through technology non-adoption or avoidance.

The TRI – a 36-item scale originally developed by Parasuraman (2000:310-313) – is an appropriate instrument with which to measure technophobia (see sections 2.4.3 and 3.4). The TRI measures both favourable as well as unfavourable views towards technology products, based on a person's level of optimism, innovativeness, discomfort and insecurity regarding technology (Parasuraman, 2000:309). Ideally, the original 36-item version of TRI should have been used in the questionnaire for each of the three technologies. However, this proved impractical.

One of the key research objectives of this study was to investigate gender differences in technophobia across three different technology products at different stages of the innovation curve. If the original TRI scale had been used, respondents would have had to answer a total of 108 scale items (36 items x 3 technologies). This would have clearly overburdened the respondents.

To overcome this problem, Parasuraman and Colby's (Verma *et al*., 2007:12) 10-item *abbreviated* TRI scale was selected in place of the original 36 item version. According to Verma *et al*. (2007:7), the abbreviated 10-item TRI scale provides reliable results.

However, one problem did arise with the use of the 10-item abbreviated TRI. The abbreviated TRI reported by Parasuraman and Colby (in Verma *et al*., 2007:12) includes references to specific technology products (i.e. computers) in four of the 10 scale items. Two of the scale items also refer to contexts that are not in line with this study's research objectives (such as credit card usage).

It was therefore necessary to amend the abbreviated TRI scale for use in the current study by removing existing items and adding new, more appropriate items from the original 36-item version of the TRI.

Table 6 below summarises the changes made to the abbreviated TRI scale for this study.

Table 6: Changes made to the abbreviated TRI for use in this study

Items removed from the abbreviated TRI	Items added to the abbreviated TRI from the original 36-item version
I like the idea of doing business via computers because you are not limited to regular business hours	You prefer to use the most advanced technology available
When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I'm being taken advantage of by someone who knows more than I do	Technology always seems to fail at the worst possible time
I do not consider it safe giving out credit card information over a computer	Revolutionary new technology is usually a lot safer than critics lead people to believe
I do not feel confident doing business with a place that can only be reached online	It can be risky to switch to a revolutionary new technology too quickly
Technology makes me more efficient in my occupation.	Learning about technology can be as rewarding as the technology itself
If you provide information to a machine or over the internet, you can never be sure if it really gets to the right place	You do not feel confident using the latest technology

Where an item measuring innovativeness was removed from the abbreviated scale, an item from the original TRI scale was added back. This was done in order to keep the ratio of the four sub-dimensions as per the abbreviated TRI and maintain the internal reliability of the scale.

The item added from the original TRI had to meet two objectives before it was added in to the abbreviated scale for use in this study:

- The items had to be generic enough to be able to adopt the phrase to include computers, DSLR cameras and home automation technology as outlined in the study.
- The items included were the items with the highest coefficient alphas in order to maintain high internal consistency reliability.

Based on this, questions 3, 4, 6, 8, 9, and 10 of the abbreviated TRI scale were removed and replaced with more appropriate items from the original 36-item version of the TRI scale developed by Parasuraman (2000:312-313).

This 10-item adapted version of the abbreviated TRI was included in the questionnaire three times; once for each of the three technologies tested in the study. Thus technophobia could be measured across the three selected technologies that are at different stages of the diffusion of innovation curve.

The following sections provide a more detailed description of all the measurement scales used in this study, including the type of scale used, the items that were reverse scored, and the labels used for each of the scales.

6.6.2 The measurement of technophobia

6.6.2.1 Technophobia towards standard desktop computers

Respondents' levels of technophobia towards standard desktop computers were measured through a multi-dimensional scale using the 10-items of the abbreviated TRI. This 10-item, five-point Likert scale (see Annexure A, question 4a) measures the four dimensions of technophobia.

The scale points were labelled as follows; 1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly disagree. Items V10, V12 and V18 were reverse scored. A total composite score for this scale was calculated by averaging the responses in the scale. A high score indicates a high level of technophobia towards standard desktop computers.

6.6.2.2 Technophobia towards DSLR cameras

Respondents' levels of technophobia towards DSLR cameras were measured through a multi-dimensional scale using the 10-items of the abbreviated Technology Readiness Index. This 10-item, five-point Likert scale (see Annexure A, question 4b) measures the four dimensions of technophobia.

The scale points were labelled as follows; 1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly disagree. Items V20, V22 and V28 were reverse scored. A total composite score for this scale was calculated by averaging the responses in the scale. A high score indicates a high level of technophobia towards DSLR cameras.

6.6.2.3 Technophobia towards home automation technology

Respondents' levels of technophobia towards home automation technology were measured through a multi-dimensional scale using the 10-items of the abbreviated Technology Readiness Index. This 10-item, five-point Likert scale (see Annexure A, question 4c) measures the four dimensions of technophobia.

The scale points were labelled as follows; 1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly disagree. Items V30, V32 and V38 were reverse scored. A total composite score for this scale was calculated by averaging the responses in the scale. A high score indicates a high level of technophobia towards home automation technology.

6.6.3 The measurement of optimism towards new technologies

The optimism sub-dimension of the original 36-item multi-dimensional TRI was used to assess a consumer's optimism towards new technologies (Parasuraman, 2000:310:311). Optimism was thus measured through five items of the optimism sub-dimension of the original TRI scale as developed by Parasuraman (Parasuraman, 2000:311-313).

Parasuraman's (2000:311-313) original TRI scale includes 10-items for the optimism sub-dimension. However, not all the items were conducive to this study as not all the items were generic enough to adapt to different technologies, or only referred to computer technology specifically. Therefore, only relevant items were selected from the original TRI for inclusion in this scale. Items were selected after conducting a factor loading analysis of the items for internal reliability (Parasuraman, 2000:315).

Based on the factor analysis, the items that showed the highest factor loadings were included. Another condition for including the items was that the statements were able to be adapted to include computers, DSLR camera's as well as home automation technology.

Table 7 below indicates the items that were included from the original TRI to measure optimism. Table 7 also identifies the items that were reverse-scored.

Table 7: A description of the measurement scale used to measure optimism from the TRI Optimism sub-dimension

Sub-dimension	Representation	Items
Optimism	Positive view of technology and willingness to adopt innovations	V39 – V43

Note: All items (V39, V40, V41, V42 and V43) were reverse scored.

All five items used were five-point Likert type summated rating scale statements (see Annexure A, question 5). The scale points were labelled as follows; 1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly disagree. All five items (V39, V40, V41, V42 and V43) were reverse scored.

A total composite score for this scale was calculated by averaging the responses in the scale. All items were reverse scored during the data analysis process so that a higher score would indicate a high level of optimism.

6.6.4 The measurement of willingness to take technological risks

Raju's Risk Taker (Purchase) scale was used to assess the degree to which a consumer is willing to take a risk by trying unfamiliar new technology products (Bruner & Hensel, 1992:494-495). The scale is a seven-item, five-point Likert scale (see Annexure A, question 6). The scale points were labelled as follows; 1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly disagree. Items V44, V45, and V50 were reverse scored. These items were reverse scored during the data analysis process so that a higher score would indicate a high level of willingness to take technological risks. A total composite score for this scale was calculated by averaging the responses in the scale.

6.6.5 The measurement of cognitive involvement

Ratchford's Involvement (Purchase Decision) scale was used to assess the degree of cognitive involvement a consumer places on a purchase decision for a new, high-technology product (Bearden *et al*., 1993:325-326). The scale comprised a three-item, seven-point semantic differential scale (see Annexure A, question 7). None of the items were reverse scored. A total composite score for this scale was calculated by averaging the responses in the scale. A higher overall score indicates greater cognitive involvement when purchasing new, high-technology products.

This section provided an overview of the measurement scales used. A more detailed discussion regarding each of the constructs and their measurements is provided in Chapter 7. A full description of the internal consistency reliability analysis of each of the scales reported in this study is presented in section 7.2. A full description and motivation of how the scales were calculated is provided in section 7.3.

6.7. DATA ANALYSIS

The data analysis techniques used for the findings will be discussed in detail in the next chapter.

6.8. ETHICS COMMITTEE APPROVAL

Formal approval for this study was obtained from the Research Ethics Committee of the Faculty of Economic and Management Sciences at the University of Pretoria on 29 May 2008.

6.9. CONCLUSION

This chapter discussed in detail the research and sampling design undertaken for this study. The data collection process and questionnaire design were also described. The measurement scales for the constructs, as outlined by the research objectives, were also presented. The target population and realised sample size was reported, and a respondent profile provided. The use of the TRI to measure for technophobia was presented, and details regarding each of the seven questions used to measure for each construct was offered.

This study was identified as an empirical study that is descriptive, cross-sectional and made use of the survey method for primary data collection. The data analysis techniques utilised in this research are discussed in greater detail in the following chapter.

CHAPTER 7. EMPIRICAL FINDINGS OF THE STUDY

7.1. INTRODUCTION

This chapter presents the empirical findings of the study. Firstly the reliability analysis of the study is presented, followed by the presentation of the descriptive statistics collected for this study. The results of the inferential statistical analyses conducted on the data are also reported. Discussions and conclusions regarding each of the findings are included in this section where necessary.

7.2. RELIABILITY ANALYSIS

This study utilises multiple item rating scales to measure six different constructs. The focus in this section is to determine the internal consistency reliability of each of the multiple item scales as a measure of its associated construct. The reliability of these scales is important in ensuring that the results of the study are consistent.

According to Kent (2007:142), internal consistency reliability refers to the degree to which items in a multi-item scale correlate to one another. A popular measure of internal consistency reliability is Cronbach's coefficient alpha, which calculates the average correlation of items in multi-item scales. According to Kent (2007:143), the value of Cronbach's coefficient alpha varies between zero to unity. The accepted minimum Cronbach coefficient alpha value for internal consistency reliability is 0.70. Thus, for the purposes of this study, a Cronbach coefficient alpha value of 0.70 and higher will be deemed an acceptable indication of the scale's internal consistency reliability.

The next section details the results of the reliability analysis conducted for each scale.

7.2.1 Reliability analysis of technophobia towards standard desktop computers

As a multi-item measurement scale, the TRI was subjected to a series of iterative analysis consistent with Churchill's (1979) paradigm for developing scales and was developed to ensure high face and content validity (Parasuraman, 2000:310).

Table 8 shows the results of the internal consistency reliability analysis conducted on the items measuring technophobia towards standard desktop computers.

Table 8: Internal consistency reliability measuring technophobia towards standard computers

Cronbach's alpha for scale	**0.80**	
Item	**Item to total correlation**	**Cronbach's alpha if item is deleted**
V9. I can usually figure out how computers work without help from others.	0.49	0.79
V10. The computer is often too complicated to be useful.	0.43	0.79
V11. I feel confident using the latest computer technology.	0.65	0.77
V12. Computer technology may fail at the worst possible time.	0.27	0.81
V13. Computer technology gives people more control over their daily lives.	0.53	0.78
V14. Learning about computer technology can be as rewarding as the technology itself.	0.43	0.79
V15. In general, I am among the first in my circle of friends to acquire new computer technology.	0.62	0.77
V16. Computer technology is usually a lot safer than people are led to believe.	0.46	0.79
V17. I prefer to use the most advanced computer technology available.	0.68	0.76
V18. It can be risky switching to the latest computer technology too quickly.	0.32	0.81

The Cronbach alpha coefficient for the scale is 0.80, which indicates acceptable internal consistency reliability, as indicated by Table 8. This alpha value is comparable to that reported in Parasuraman's original TRI study where alpha scores range from 0.79 to 0.81 across all the sub-dimensions (Parasuraman, 2000:313). A reliability analysis of the 10-item abbreviated TRI used in this study indicates that items V12 and V18 had lower item-to-total correlations than other items, as evident in Table 8.

However, although items V12 and V18 had low item-to-total correlation compared with the other items, their deletion would not result in any major improvement in the overall reliability of the scale. As the Cronbach alpha is acceptably high, the items were not removed.

The scale measuring technophobia towards standard desktop computers thus had an acceptable level of internal consistency reliability. By not removing the items, the scale was also more comparable with the abbreviated 10-item scale developed by Verma *et al*. (2007:12). This enables the comparison of the results of the study with previous results where the TRI has been used.

7.2.2 Reliability analysis of technophobia towards DSLR cameras

Table 9 shows the results of the internal consistency reliability analysis conducted on the items measuring technophobia towards DSLR cameras.

Table 9: Internal consistency reliability measuring technophobia towards DSLR cameras

Cronbach's alpha for scale	**0.80**	
Item	**Item-to-total correlation**	**Cronbach's alpha if item is deleted**
V19. I can usually figure out how this high-end camera works without help from others.	0.49	0.78
V20. This camera is often too complicated to be useful.	0.48	0.78
V21. I feel confident using the latest camera technology.	0.65	0.76

V22. This camera technology may fail at the worst possible time.	0.22	0.81
V23. The latest camera technology gives people more control over their daily lives.	0.45	0.78
V24. Learning about this camera technology can be as rewarding as the technology itself.	0.48	0.78
V25. In general, I am among the first in my circle of friends to acquire new camera technology.	0.58	0.77
V26. Camera technology is usually a lot safer than people are led to believe.	0.52	0.78
V27. I prefer to use the most advanced camera technology available.	0.65	0.76
V28. It can be risky switching to the latest camera technology too quickly.	0.30	0.81

As indicated in Table 9 above, the Cronbach alpha coefficient for the scale is 0.80, which indicates acceptable internal consistency reliability. This alpha value is comparable with that reported in previous studies on the TRI (Parasuraman, 2000:313). A reliability analysis of the 10-item abbreviated TRI used indicated that items V22 and V28 had lower correlations than other items.

However, although items V22 and V28 had low item-to-total correlation compared with the other items, their deletion would not result in any major improvement in the overall reliability of the scale. As the Cronbach alpha is acceptably high, the items were not removed. The scale thus has an acceptable level of internal consistency reliability.

7.2.3 Reliability analysis of technophobia towards home automation technology

Table 10 next shows the results of the internal consistency reliability analysis conducted on the scale measuring technophobia towards home automation technology.

Table 10: Internal consistency reliability measuring technophobia towards home automation technology

Cronbach's alpha for scale	**0.85**	
Item	**Item-to-total correlation**	**Cronbach's alpha if item is deleted**
V29. I would be able to figure out how home automation technology works without help from others.	0.56	0.83
V30. Home automation technology is often too complicated to be useful.	0.58	0.83
V31. I would feel confident using the latest Home Automation technology.	0.69	0.82
V32. Home automation technology may fail at the worst possible time.	0.38	0.84
V33. Home automation technology gives people more control over their daily lives.	0.48	0.84
V34. Learning about home automation technology can be as rewarding as the technology itself.	0.54	0.83
V35. In general, I would be the first in my circle of friends to acquire new home automation technology.	0.59	0.83
V36. Home automation technology is usually a lot safer than people are led to believe.	0.62	0.83
V37. I would prefer to use the most advanced home automation technology available.	0.65	0.82
V38. It can be risky switching to the latest home automation technology too quickly.	0.42	0.84

As indicated in Table 10 above, the Cronbach alpha coefficient for the scale is 0.85, which indicates acceptable internal consistency reliability. This alpha value is comparable to that reported in Parasuraman's previous study on the TRI (Parasuraman, 2000:313).

A reliability analysis of the 10-item abbreviated TRI scale used in this study indicated that items V32 and V38 had lower correlations than other items. However, although items V32 and V38 had low item-to-total correlation compared with the other items, their deletion would not result in any major improvement in the overall reliability of the scale. As the Cronbach alpha is acceptably high, the items were not removed.

The scale measuring technophobia towards home automation thus has an acceptable level of internal consistency reliability.

It may be noted that in all three of the applications of the TRI, the same two scale items had a lower item-to-total correlation than the rest. These items were not removed in order to enable the comparison of this study's results with other studies. Also, all three scales measuring standard desktop computers, DSLR cameras and home automation technology indicated high acceptable internal consistency reliability, even with the items included.

However, recommendations are given that the inclusion of these two items may have to be reconsidered in future studies based on their low item-to-total correlations. One reason for the low correlation for these two items may be due to the fact that all the other statements make positive pronouncements while these two items deal with negative issues.

7.2.4 Reliability analysis of optimism towards new technologies

Table 11 below shows the results of the internal consistency reliability analysis conducted on the items measuring optimism towards new technologies.

Table 11: Internal consistency reliability of the items measuring optimism towards new technologies

Cronbach's alpha for scale	**0.83**	
Item	**Item-to-total correlation**	**Cronbach's alpha if item is deleted**
V39. I prefer to use the most advanced technology available.	0.64	0.80
V40. Technology gives me more freedom of mobility.	0.66	0.79
V41. I feel confident that machines will follow through with what I instructed them to do.	0.63	0.80
V42. Learning about technology can be as rewarding as the technology itself.	0.61	0.80
V43. I find new technologies to be mentally stimulating.	0.65	0.79

A reliability analysis of the 5-item optimism sub-dimension of the TRI indicated a Cronbach's alpha coefficient of 0.83 for the scale, as illustrated in Table 11. This indicates acceptable internal consistency reliability of the scale. All items showed a high item-to-total correlation, and the internal reliability of the scale could not be improved by altering or removing any items. This alpha value is comparable to that reported in Parasuraman's (2000:313-314) original TRI study which reports an alpha value of 0.80 for the optimism sub-dimension of the TRI. The scale measuring optimism towards new technologies has an acceptable level of internal consistency reliability.

7.2.5 Reliability analysis of the willingness to take technological risks

Table 12 shows the results of the internal consistency reliability analysis conducted on the items measuring willingness to take technological risks.

Table 12: Internal consistency reliability of the items measuring willingness to take risks

Cronbach's alpha for scale	**0.75**	
Item	**Item-to-total correlation**	**Cronbach's alpha if item is deleted**
V44. I like to purchase unusual technology products, even if I am not sure whether I would like it.	0.53	0.71
V45. I am the kind of person that would try any new and unfamiliar technology once.	0.51	0.71
V46. I am cautious in trying new or different products.	0.42	0.74
V47. I would rather stick with a technology I usually buy than try something I am not sure of.	0.55	0.71
V48. I never buy something I don't know about at the risk of making a mistake.	0.46	0.73
V49. If I buy appliances, I will buy only well-established brands.	0.33	0.75
V50. I enjoy taking chances in buying unfamiliar brands just to get some variety in my purchases.	0.49	0.72

As indicated in Table 12, a reliability analysis of the 7-item scale indicated a Cronbach's alpha coefficient of 0.75. This indicates acceptable internal consistency reliability. A reliability analysis of the scale indicated that item V49 had a lower item-to-total correlation than other items. However, although item V49 had a low item-to-total correlation, the item's deletion would not result in any major improvement in the overall reliability of the scale. As the Cronbach alpha is acceptably high, the item was not removed. The scale measuring willingness to take technological risks thus has an acceptable level of internal consistency reliability.

7.2.6 Reliability analysis of cognitive involvement

Table 13 shows the results of the internal consistency reliability analysis conducted on the items measuring willingness cognitive involvement when purchasing technology products.

Table 13: The internal consistency reliability of the items measuring cognitive involvement

Cronbach's alpha for scale	**0.84**	
Item	**Item-to-total correlation**	**Cronbach's alpha if item is deleted**
V51. Very important decision versus very unimportant decision.	0.74	0.77
V52. Decision required a lot of thought versus decision required little thought.	0.72	0.77
V53. A lot to lose if you choose wrong versus little to lose if you choose wrong.	0.69	0.81

The Cronbach's coefficient alpha for the scale is 0.84, which indicates acceptable internal consistency reliability. The scale measuring cognitive involvement thus has an acceptable level of internal consistency reliability.

As these results indicate, all the multiple item rating scales used in this study have acceptable levels of internal consistency reliability. The next section focuses on reporting the descriptive statistics of this study.

7.3. UNIVARIATE DESCRIPTIVE STATISTICS

This section provides a detailed report on the descriptive statistics of this study's overall composite scales. This will enable the identification of gender differences in technophobia across each of the research constructs as outlined by the research objectives.

This study focused on the gender differences in levels of technophobia as well as optimism, willingness to take technological risks, and cognitive involvement relating to technology products. As such, the study aimed to present descriptive statistics on the total scores measured on the various multi-item rating scales described. The descriptive statistics used to achieve this include the mean scores, standard deviations and sample sizes of male and female respondents (Cooper & Schindler, 2003:472-476). Descriptive statistics on the total scores measured on the various multi-item rating scales are thus presented. More detailed inferential statistics are provided in section 7.4.

7.3.1 Univariate descriptive statistics for the composite scale scores measuring technophobia

Table 14 on the following page provides a comparison of male and female respondents' levels of technophobia towards three separate technologies.

The means (M) and standard deviations (SD) of the composite scale scores representing technophobia towards standard desktop computers, DSLR cameras and home automation technology are presented. As one of the key research objectives of this study is to compare the two genders' levels of technophobia across three different technologies at different stages of the innovation curve, the descriptive statistics for the total scale scores are included.

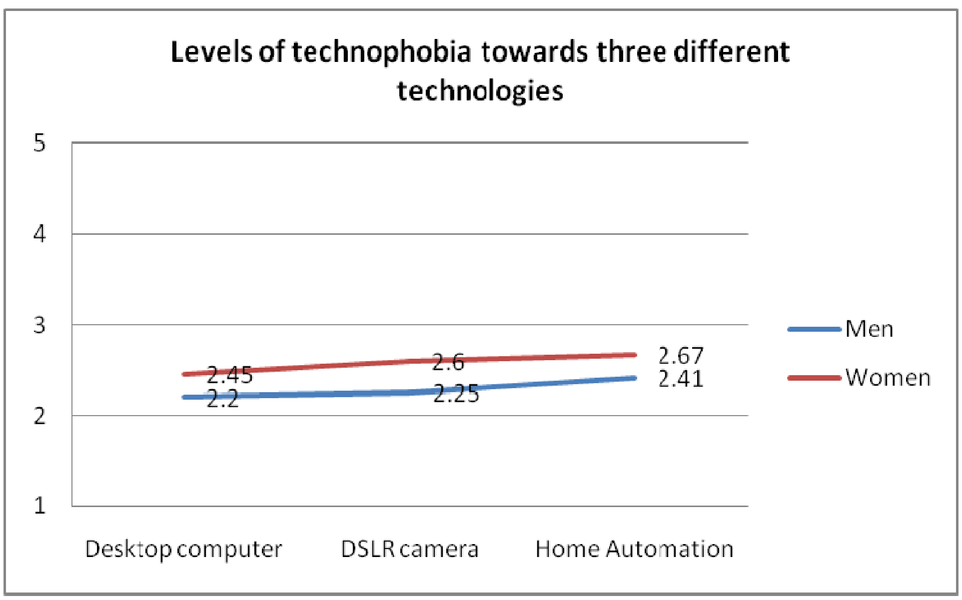
Table 14: Means and standard deviations of male and female responses regarding levels of technophobia towards three separate technologies

	Male (*n* = 99)		Female (*n* = 101)		Mean difference
Technophobia towards:	***M***	***SD***	***M***	***SD***	
Standard desktop computers	2.20	0.50	2.45	0.62	0.25
DSLR cameras	2.25	0.54	2.60	0.52	0.35
Home automation technology	2.41	0.57	2.67	0.66	0.26

Note: Scales range from 1 (Strongly agree) to 5 (Strongly disagree). The higher the score, the higher the levels of technophobia towards the technology.

Figure 4 graphically portrays the findings of the mean and standard deviations in the descriptive statistics of this study.

Figure 4: Mean scores of men's and women's levels of technophobia towards three different technology products



Note: Scales range from 1 (Strongly agree) to 5 (Strongly disagree). The higher the score, the higher the levels of technophobia towards the technology.

A comparison of the mean total scale scores for male and female respondents suggests that there is a difference between genders in levels of technophobia towards each of the three technologies. As the results indicate in both Table 14 and Figure 4, the mean scores of men and women differ towards computers, DSLR cameras and home automation technology.

Findings suggest that women experience higher levels of technophobia towards standard desktop computers (*M* = 2.45, *SD* = 0.62) than men (*M* = 2.20, *SD* = 0.50); higher levels of technophobia towards DSLR cameras (*M* = 2.60, *SD* = 0.52) than men (*M* = 2.25, *SD* = 0.54), as well as higher levels of technophobia towards home automation technology (*M* = 2.67, *SD* = 0.66) than men (*M* = 2.41, *SD* = 0.57). The statistical significance of these gender differences is investigated in section 7.4.3.

As Figure 4 indicates, as the technology is newer to market, the levels of technophobia amongst *both* men and women increase. The results suggest that *both* men and women exhibit higher levels of technophobia towards technologies at different stages of the diffusion curve. Interestingly though, the results suggest that the difference between the two genders' levels of technophobia is greatest in the case of DSLR cameras, even more so than home automation technology which is a newer technology. These results further imply that women's levels of technophobia increase quite suddenly when faced with new, innovative technologies. It is suggested from these findings that the growth in levels of technophobia towards new technologies in the diffusion curve does not necessarily increase exponentially.

Based on the findings, it is suggested that women are more technophobic towards technology than men, and that the levels of technophobia do increase when the product is newer to market. However, it is suggested that the increase in levels of technophobia is not exponential. Rather, gender differences may depend on the specific technology that is being used. The implication is that if men and women do differ as suggested, marketers would be better informed of differences and could better communicate and segment men and women with regards to technology offerings. Marketers could also base marketing decisions on a better understanding of their purchasing behaviours and motivations.

The following section presents the descriptive statistics for the scale measuring optimism towards new technologies.

7.3.2 Univariate descriptive statistics for the composite scale score measuring optimism towards new technologies

The mean rating and standard deviation of optimism towards technology is presented in Table 15. The results indicate that men (M = 4.04, SD = 0.60) are more optimistic towards new technologies than women (M = 3.67, SD = 0.68).

Table 15: Means and standard deviations of male and female responses regarding levels of optimism towards new technologies

	Male (*n* = 99)		**Female** (*n* = 101)	
	M	***SD***	***M***	***SD***
Optimism towards technology	4.04	0.60	3.67	0.68

Note: Scales range from 1 (Strongly agree) to 5 (Strongly disagree). All items were reverse-scored so that a high score indicates high levels of optimism towards new technologies.

While the statistical significance of the gender differences reported in Table 15 are investigated in section 7.4.4, these descriptive findings suggest that men are more confident than women in trying out new technologies and find greater reward in experimenting with unknown technology products. It is also suggested that women are far less optimistic regarding the benefits that technology can offer compared with men.

Management implications include the better communication of all intrinsic and extrinsic benefits of technology to women.

The following section presents the descriptive statistics for the scale measuring cognitive involvement when purchasing technology products.

7.3.3 Univariate descriptive statistics for the composite scale score measuring cognitive involvement when purchasing technology

Table 16 provides a comparison of male and female respondents' levels of cognitive involvement when purchasing technology products. The mean ratings and standard deviations are presented.

Table 16: Mean and standard deviations of male and female responses regarding levels of cognitive involvement when purchasing technology

	Male (*n* = 99)		**Female (*n* = 101)**	
	M	***SD***	***M***	***SD***
Cognitive involvement	4.64	1.46	5.30	1.29

Note: A high mean score indicates high levels of cognitive involvement when purchasing technology products.

The results suggest that women have higher levels of cognitive involvement (*M* = 5.30, *SD* = 1.29) than men (*M* = 4.64, *SD* = 1.46) (see section 7.4.5 for the corresponding inferential statistics). The scores suggest that women place more importance on a purchase decision, believe that technology purchases require more thought, and also believe that there is a lot to lose if the wrong choice is made when purchasing technology products than men.

This finding implies that management needs to consider that women generally weigh up the negative consequences of a technology purchase more than men do.

Management decisions therefore need to factor this in and efforts need to be taken to positively reinforce the technology purchase for women. Any negative messages regarding technology purchases need to be downplayed. Management may also consider using simple, easy to use information and manuals that explain the technology to women in positive terms.

The aforementioned descriptive statistics suggest that there are sizable differences in the two genders' technophobia towards the three technologies tested in the study, in their optimism towards new technologies, their willingness to take technological risks, and their levels of cognitive involvement when purchasing technology. More specifically, the results suggest that males are less technophobic than females, more optimistic towards new technologies, and more willing to take technological risks. Compared with males, females experience higher levels of cognitive involvement when purchasing technology.

The following section presents the descriptive statistics for the scale measuring willingness to take technological risks.

7.3.4 Univariate descriptive statistics for the composite scale score measuring willingness to take technological risks

Table 17 shows the univariate descriptive statistics for the scale measuring willingness to take technological risks. The mean scores and standard deviations are presented.

Table 17: Mean and standard deviations of male and female responses regarding willingness to take technological risks

	Male (*n* = 99)		**Female (*n* = 101)**	
	M	***SD***	***M***	***SD***
Willingness to take technological risks	2.89	0.69	2.52	0.61

Notes: Scales range from 1 (Strongly agree) to 5 (Strongly disagree). All items were reverse-scored so that a high mean score indicates a high willingness to take technological risks.

The findings suggest that men are more willing to take technological risks (*M* = 2.89, *SD* = 0.69) than women (*M* = 2.52, *SD* = 0.61) (see section 7.4.6 for inferential statistics related to these gender differences). It is further suggested that women are more cautious and risk-averse in trying new and unfamiliar technologies than men.

The implication for management is that women are inherently more risk-averse and therefore actions need to be taken to reduce the perceived risk in purchasing technology products. Marketing campaigns and communication need to communicate the benefits and ease of use of technology products in order to downplay the perceived inherent risk by women.

In the next section, the statistical significance of these gender differences is explored through inferential statistics to test the hypotheses stated in Chapters 4 and 5.

7.4. INFERENTIAL STATISTICS

The independent samples *t*-test was used to test the hypotheses formulated in sections 4.6, 5.4, 5.5 and 5.6. This section provides the background to the independent samples *t*-test and why it was chosen for this study. The results of the four hypotheses tests are also presented.

7.4.1 An overview of the independent samples *t*-test

According to Kent (2007:167), the independent samples *t*-test is a tool for determining the statistical significance of the differences between two independent samples on a variable measured at an interval or ratio level of measurement.

The *t*-test is used to determine whether two samples differ significantly on a variable measured at an interval level of measurement so that, if the difference is significant, it can be deduced that the difference observed between the two samples represents a real difference between the two population groups from which the samples were drawn.

The objective of this study was to compare the means of two populations from sample responses measured on an interval scale. The data gathered was quantitative and the samples independent. As such the appropriate parametric technique is the independent samples *t*-test (Cooper & Schindler, 2003:584).

Since all the hypotheses stated in this proposal included comparisons between two groups of respondents – male and female – on an interval level of measurement, the appropriate parametric test for each of the hypotheses is the independent sample *t*-test. The non-parametric alternative to the independent sample *t*-test is the Mann-Whitney *U* test (Cooper & Schindler, 2003:584).

There are two main assumptions underlying the use of the independent samples *t*-test. Firstly, that the variable being tested is normally distributed in each of the two samples, and secondly, that the variances of the normally distributed test variable are equal (Kent, 2007:168). The *t*-test requires that the population be normally distributed. However, the *t*-test does allow for slight departures from normality where the sample sizes are sufficiently large (Cooper & Schindler, 2003: 584).

The assumption of normality, as well as the results of the normality test for each hypothesis, is presented in the following section.

7.4.2 Testing for the assumption of normality

Normality is referred to as the continuous distribution of dependent variables that, when plotted, take the shape of a relatively symmetrical, bell-shaped curve. The most important contribution of the normal distribution is that it describes the spread of numerous random variables that arise between samples (Cooper Schindler, 2003:240-241).

In order to support the use of the independent samples *t*-test, the underlying assumptions that govern the independent sample *t*-test (i.e. normality and equality of variance) are to be tested for each of the hypotheses (Cooper & Schindler, 2003:812-816).

The assumption of normality for each of the overall scales can be assessed through the Kolmogorov-Smirnov test for normality, as well as through a visual inspection of histograms and normal probability plots.

According to Cooper and Schindler (2003:531-538), even if the tests indicate slight departures from normality in the sub-groups, the independent samples *t*-test is robust enough for mild departures from normality within large samples. With a sample size of 200 in this study, the Kolmogorov-Smirnov test was thus not run to test for the assumption of normality. Instead a visual inspection of the histograms was deemed sufficient to test for normality.

The visual inspection of the normal probability plots for each of the models in this study indicated that all the models measured in this study have a relatively bell-shaped curve (see Annexure B). Slight skewing was found on the scales measuring optimism towards technology and cognitive involvement. Thus, upon visual inspection of the histograms, it appeared as though the assumption of normal distribution was violated slightly for two of the variables used in this study.

However, according to Kent (2007:168), the independent samples *t*-test may still yield accurate *p*-values, even when the assumption of normality is violated with a sample size larger than 15. Where the distribution is more skewed, a higher sample size is required in order to yield more reliable *p*-values. Where there is a large sample size, the independent samples *t*-test is relatively robust for slight departures from normality (Pallant, 2001:172).

Thus, although the visual inspection of the histograms indicated that the assumption of normal distribution was violated slightly for certain variables, the samples size of 200 used in this study negates this. As the sample size was large and did not differ significantly for the two samples, the independent samples *t*-test can be trusted for this study (Kent, 2007:168). Due to the large sample size, the assumption of normality was thus deemed to be satisfied.

The results of Levene's test for equality of variance and the independent sample *t*-test with the relevant *p*-values then need to be presented when testing each hypothesis. Levene's test evaluates the assumption of equal variances for the two samples (Cooper & Schindler, 2003:812-816).

If the result of Levene's test is significant, it can be concluded that the assumption of equal variance has been violated (Kent, 2007:171). These findings for each of the hypotheses are presented in the following section.

7.4.3 Hypothesis 1: Gender differences in technophobia

Hypothesis H_1 focused on differences in the levels of technophobia that men and women experience towards three different technologies. The null and alternative hypotheses are stated below:

$H_{1\ (null)}$: There is no difference in the levels of technophobia that men and women experience towards new technology.

$H_{1\ (alt)}$: Women experience higher levels of technophobia towards new technology than men.

H_1 is a composite hypothesis as gender differences in technophobia are being tested for three technologies in this study. Thus, three independent samples *t*-tests were conducted to test this hypothesis, based on three separate technologies. This one-tailed (directional) hypothesis was tested at a 5% level of significance (i.e., $\alpha = 0.05$).

This study included three technologies on which to base the comparison between genders' levels of technophobia; namely, standard desktop computers, DSLR cameras with face detection, and home automation technology.

Since the levels of technophobia for each of the technologies were measured at an interval level of measurement, the appropriate parametric significance test is the independent samples *t*-test (Cooper & Schindler, 2003:584).

According to Cooper and Schindler (2003:584), if the assumptions of normality and equality of variance cannot be satisfied, the Mann Whitney *U* test is the appropriate non-parametric alternative. Since all constructs in this study were measured through an interval level of measurement, all the hypotheses involved the use of a *t*-test.

A visual inspection of histograms was used to test for normality. These tests indicated very slight departures from normality in both sub-samples for the models measuring standard desktop computers, DSLR cameras and home automation technology. However, since the assumption of normality was satisfied for H_1 (section 7.4.2), the independent samples *t*-test used to test H_1. The results of the t-test are presented in Table 18.

Table 16: Results of an independent samples *t*-test for differences in the mean scores of the male and female sub-samples of the overall 'levels of technophobia towards technology' scales

		Levene's Test for Equality of Variances		*t*-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Technology						
Standard desktop computer	Equal variances assumed	2.16	0.1430	-3.13	198	0.0020
DSLR camera	Equal variances assumed	0.03	0.8675	-4.59	198	0.0000
Home automation technology	Equal variances assumed	2.21	0.1389	-2.96	198	0.0035

As is indicated in columns 3 and 4 of Table 18, the *p*-values of Levene's test for equal variances is higher than the significance value of 0.05 for all three the technologies. This indicates that one cannot reject the null hypotheses of equal variances for each of the three technologies.

The *p*-values of the independent samples *t*-test, *assuming equal variances,* should thus be interpreted to test H_1 for all three technologies.

The two-tailed *p*-values of the independent samples *t*-test, assuming equal variances appear, in the last column of Table 18 labelled 'Sig. (2-tailed)'.

Since H_1 is a one-tailed (directional) hypothesis, and since the descriptive statistics reported in section 7.3.1 suggest that the sub-group mean differences are in line with the expectations formulated in H_1, the applicable one-tailed *p*-values were calculated as follows: one-tailed *p*-value = two-tailed *p*-value ÷ 2.

The results for each technology are as follows:

- For standard desktop computers, the two-tailed *p*-value of the *t*-test (assuming equal variances) is given as 0.0020. The appropriate one-tailed *p*-value (0.0020/2 = 0.0005) is smaller than the significance value of 0.05 which thus indicates that there is a significant difference in the mean scores of male and female sub-samples. The null hypothesis is therefore rejected and it is concluded that men and women differ significantly with regards to technophobia towards standard desktop computers, with women experiencing higher levels of technophobia towards desktop computers than men.

- For DSLR cameras, the two-tailed *p*-value of the *t*-test (assuming equal variances) is given as 0.0000. The appropriate one-tailed *p*-value (0.0000/2 = 0.0000) is smaller than the significance value set at 0.05 which thus indicates that there is a significant difference in the mean scores of male and female sub-samples. Therefore the null hypothesis is rejected and it is concluded that men and women differ significantly with regards to technophobia towards DSLR cameras, with women experiencing higher levels of technophobia towards DSLR cameras than men.

- With regards to home automation technology, the two-tailed *p*-value of the *t*-test (assuming equal variances) is given as 0.0035. The calculated one-tailed *p*-value (0.0035/2 = 0.00175) is smaller than the significance value set at 0.05 which thus indicates that there is a significant difference in the mean scores of male and female sub-samples.

Therefore the null hypothesis is rejected and it is concluded that men and women differ significantly with regards to levels of technophobia towards home automation technology, with women experiencing higher levels of technophobia towards home automation technology than men.

As the results of the one-tailed *p*-value indicate, men and women differ significantly in levels of technophobia towards all three technologies. In the case of all three technologies, it was found that women are more technophobic towards the technology under study than men. Thus the stated null hypothesis $H_{1\ (null)}$ is rejected in favour of the stated alternative hypotheses $H_{1\ (alt).}$

The results of the study also indicate that the levels of technophobia increase the newer the technology is to market. More specifically, the results indicate that women are more technophobic the newer the technology is to market. The implications of these findings are studied in detail in the final chapter.

7.4.4 Hypothesis 2: Gender differences in optimism

The second hypothesis (H_2) focused on differences between men and women regarding optimism towards new technology. The null and alternative hypotheses of H_2 are stated below:

H_0: There is no difference in optimism towards new technology of men and women.

$H_{2\ (alt)}$: Men are more optimistic towards new technology than women.

As presented in section 7.3.2, the descriptive statistics suggest that men are more optimistic towards new technology products than women. This is in line with the stated alternative hypothesis.

The assumption of normality was assessed via a visual inspection of histograms (section 7.4.2). Since the independent samples *t*-test is robust for mild departures from normality with large samples it was used to test H_2.

The results of the *t*- test are presented in Table 19 below.

Table 17: Results of an independent samples *t*-test for differences in the mean scores of the male and female sub-samples of the overall 'optimism towards new technology' scale

	Levene's Test for Equality of Variances		*t*-test for Equality of Means		
	F	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**
Equal variances assumed	0.61	0.4340	4.08	198	0.0001

As is indicated in columns 2 and 3 of Table 19 above, the results of the Levene's test for equality of variances (p=0.4340) indicate that the results of the *t*-test assuming equal variances should be interpreted. The results of the *t*-test assuming equal variances (p = 0.0001) indicates a significant two-tailed difference in the mean scores of male and female sub-samples on the overall optimism towards technology scale.

Since H_2 is a directional (one-tailed) hypothesis and since the descriptive statistics in Table 19 suggest that the findings are in line with the expectations formulated in H_2, the one-tailed *p*-value of the independent samples *t*-test was calculated as follows: one-tailed *p*-value = two-tailed *p*-value ÷ 2.

The one-tailed *p*-value (0.0001/2 = 0.00005) is smaller than the significance level of 0.05. $H_{2(alt)}$ can therefore not be accepted. In other words, the null hypotheses $H_{2\ (null)}$ is rejected in favour of the alternative hypothesis, $H_{2(alt).}$ These findings indicate that men are more optimistic towards new technology than women. The managerial implications of these results are discussed in detail in Chapter 8.

7.4.5 Hypothesis 3: Gender differences in cognitive involvement

The third hypothesis (H_3) focused on differences between men and women regarding optimism towards new technology. The null and alternative hypotheses of H_3 are stated below:

$H_{3\ (null)}$: There is no difference in the cognitive involvement when purchasing high-technology products between men and women.

$H_{3\ (alt)}$: Women experience greater cognitive involvement when purchasing high-technology products than men.

As presented in section 7.3.3, the descriptive statistics suggest that women experience greater cognitive involvement when purchasing technology products than men. This is in line with the stated alternative hypothesis.

As presented in section 7.4.2, the assumption of normality was satisfied due to large sample groups. Since the independent samples *t*-test is robust for mild departures from normality with large samples, it was used to test H_4. The results of the *t*-test are presented in Table 20.

Table 18: Results of an independent samples *t*-test for differences in the mean scores of the male and female sub-samples of the 'overall cognitive involvement' scale

	Levene's Test for Equality of Variances		*t*-test for Equality of Means		
	F	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**
Equal variances assumed	2.94	0.0878	-3.40	198	0.0008

As is indicated in columns 2 and 3 of Table 20, the results of the Levene's test for equality of variances (p=0.0878) is higher than the significance value set at 0.05. This indicates that the *t*-test assuming equal variances should be interpreted. The result of the *t*-test assuming equal variances (p=0.0008) indicates a significant two-tailed difference in the mean scores of male and female sub-samples on the overall cognitive involvement scale.

Since H_3 is a directional (one-tailed) hypothesis and since the descriptive statistics are in line with the expectations formulated in H_4, the one-tailed *p*-value of the independent samples *t*-test was calculated as follows: one-tailed *p*-value = two-tailed *p*-value ÷ 2.

The one-tailed *p*-value (0.0878/2 = 0.0439) is smaller than the significance level of 0.05. Therefore the null hypothesis $H_{3\ (null)}$ is rejected in favour of the alternative hypothesis, $H_{3\ (alt).}$ These findings therefore indicate that women experience greater cognitive involvement when purchasing high-technology products than men. The implications of these findings are discussed in further detail in the final chapter.

7.4.6 Hypothesis 4: Gender differences in risk aversion

The final hypothesis (H_4) focused on differences between men and women regarding risk aversion towards new technology. The null and alternative hypotheses of H_4 are stated below:

$H_{4\ (null)}$: There is no difference in risk aversion to new technology between men and women.

$H_{4\ (alt)}$: Women are more risk averse to new technology than men.

As presented in section 7.3.4, the descriptive statistics indicate that women are more risk averse to new technology than men. This is in line with the stated alternative hypothesis.

Since all normality assumptions are satisfied (section 7.4.2), the independent samples *t*-test was used to test H_4. The results of the *t* test are presented in Table 21 below.

Table 19: Results of an independent samples *t*-test for differences in the mean scores of the male and female sub-samples 'risk aversion' scale

	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**
Equal variances assumed	0.39	0.5351	3.97	198	0.0001

As is indicated in columns 2 and 3 of Table 21 above, the results of the Levene's test for equality of variances (*p*=0.5351) indicate that the *t*-test assuming equal variances should be inferred. These results appear in the third row of Table 21. The results of the *t*-test assuming equal variances (*p*=0.0001) indicates a significant two-tailed difference in the mean scores of male and female sub-samples on the overall risk aversion scale.

Since H_4 is a directional (one-tailed) hypothesis and since the descriptive statistics are in line with the expectations formulated in H_4, the one-tailed *p*-value of the independent samples *t*-test was calculated as follows: one-tailed *p*-value = two-tailed *p*-value ÷ 2. The one-tailed *p*-value (0.0001/2 = 0.00005) is smaller than the significance level of 0.05. $H_{4\ (null)}$ is thus rejected in favour of the alternative hypothesis, $H_{4\ (alt)}$.

These findings therefore indicate that women are more risk averse to new technology than men. The implications of these findings are discussed in full detail in the following chapter.

7.5. CONCLUSION

According to the results of the hypotheses testing, there are statistically significant differences between the two genders in terms of terms of their levels of technophobia, optimism, risk taking and cognitive involvement when purchasing high-technology consumer products.

More specifically, women experience higher levels of technophobia, are more risk averse and experience greater cognitive involvement when purchasing high-technology products.

Women are also less optimistic towards new technology than men. The results further indicate that women are more technophobic than men for all three the technologies included in the study.

The next chapter discusses in detail the implications of these findings. As the literature abounds with contradicting results regarding gender differences in technophobia, this study is also compared with previous research. Recommendations for future research are also provided.

CHAPTER 8. CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

8.1. INTRODUCTION

In this final chapter, the main purpose of the current study is restated. The importance of this study in relation to the growing digital era is highlighted. The empirical findings are summarised in relation to each stated research objective and are related back to the findings of past research on the topic. A detailed discussion of the managerial implications of the study follows. The main limitations of the study are also highlighted. Finally, the chapter concludes with recommendations for future research on the topic.

8.2. DISCUSSION

8.2.1 The main purpose of the study

This study aimed to identify whether gender differences continue to exist with regards to levels of technophobia towards new technology products. In order to understand why previous research results varied, this study aimed to provide a sound theoretical foundation for gender studies of technophobia. Thus, this study aimed to determine whether men and women differ in technophobia when faced with different technologies at various stages of the diffusion of innovation curve. This would aid in understanding the conflicting results found in past studies of technophobia by basing the study on various technology products.

Based on social studies, this study also aimed to uncover *why* these gender differences may occur. This study investigated whether gender differences exist in terms of levels of optimism towards new technology, willingness to take technological risks, and cognitive involvement when purchasing new technology products.

The importance of the study and its main contributions to the field of technophobia is discussed in further detail in the next section.

8.2.2 The importance of the study

This study's main conceptual contribution lies in its attempt to provide a theoretical foundation for studies into gender differences in technophobia. Even though a great deal of research has been conducted on gender differences in technophobia, results vary and a definite conclusion has not been reached on whether or not the gender divide is indeed narrowing (Broos, 2005:22). Changing gender differences in levels of technophobia created the need to understand whether differences still occur or whether they change with different technologies. In order to explain the inconsistencies in past research, this study combined multiple theories that provide new insight in to how technophobia should be studied.

Despite the plethora of definitions of technophobia in the literature, researchers have not reached consensus on a clear definition of the construct (Broos, 2005:22; Gilbert *et al*., 2003:254; Hill *et al*., 2008:254; Hogan, 2005:59; Korukonda, 2005:310-311; Niemelä-Nyrhinen, 2007:306; Sami & Pangannaiah, 2006:429; Smith & Oosthuizen, 2006:353; Tu *et al*,. 2005:77).

To the researcher's knowledge this is the first study that attempts to determine whether the gender gap is narrowing by redefining technophobia and factoring in its temporality. This study posits the theory that technophobia is temporal and context-specific. Technophobia is not static and changes depending on the timing of the technology's introduction to the market, as well as the specific technology under investigation.

Despite the large volume of research that has been conducted on gender differences in technophobia, few studies relate technophobia back to the temporality of technology (Ono, 2006:124). By adapting Parasuraman's TRI (2000:313), this study provides a foundation for future research by factoring in the temporality of technophobia.

By redefining technophobia and understanding its temporality, this study provides a consistent means for comparing gender differences; regardless of the technology that is 'new' at the time. This opens new avenues for future research.

Another important contribution of this research is the use of the theory of diffusion of innovation as its theoretical foundation. Moreover, this study empirically validated gender differences in levels of technophobia based on a study of different technologies at different stages of the diffusion of innovation curve. Apart from some notable exceptions (Brunner, 2005:221; Elliott & Hall, 2005:99; Meeds, 2004:315; Ono, 2006:124; Yadav *et al*., 2006:63), studies on technophobia have not focused on generic technology, or related technology back to where it stands on the diffusion of innovation curve.

The incorporation of this theory into the study provided the insight to compare men and women on various technologies at different stages of product innovation. Conceptually, this study provides the insight that studies of gender differences in technophobia at different time periods may yield different results. To the researcher's knowledge, this is the first study that factors in the temporality of technophobia by studying technophobia across three different technology products at different stages of the diffusion of innovation curve at one point in time. As such, this study may provide the answers to researchers looking for solid explanations of past research inconsistencies in gender differences in technophobia.

Another important contribution of this study is that it provides a theoretical explanation for the diffusion of high-technology innovation at a macro, market and individual-level. By contextualising the environment in which the study is undertaken, researchers are better able to compare results between countries, markets and individuals. This study highlighted that countries and markets, like products, are also at different stages of the diffusion of innovation curve. This was incorporated into the study through an analysis of the South African technology context and how technology diffusion may differ in a Third World country.

Based on a review of the available literature, the measurement of the technophobia construct has received little attention in South African studies. Based on Ono's (2006:136) recommendations, this study introduced the study of South Africa's overall macro and market environment. This was used to analyse South Africa's current status quo for technology diffusion. This study provides more information for the South African body of research into technophobia.

To the researcher's knowledge, this is the first study of technophobia that incorporates all these findings and insights in order to provide a new foundation for research in this avenue. This study proposes that women may be technological laggards, adopting various technology types differently to men. Instead of arguing that the gender gap is narrowing, this study proposes that it depends on the technology that is the basis for comparison. This study provides a more social and holistic view of gender differences in technophobia, and not as a one-shot view.

Many past studies failed to answer *why* gender differences in technophobia exist (Vekiri & Chronaki, 2008:1393). This study includes a review of the social sciences to uncover the reasons why men and women differ in terms of technophobia. This study included an analysis of four main perspectives of gender differences, as based on social studies.

The role of gendered social expectations and norms was studied. The gendered bias that is inherent in technology products was investigated, and gender differences in cognitive-thinking styles and risk aversion examined. All this provided new insights into how modern day gender differences in technophobia continue to exist and most importantly, the reason *why.*

This complete, conceptual understanding of technophobia, as described in this section, justifies additional research in this regard.

8.3. SUMMARY OF FINDINGS

This section summarises the findings of this study with reference to the hypotheses that were tested.

As previously stated, this study tested four hypotheses using the independent samples *t*-test. The results of these tests are summarised below.

8.3.1 Summarised results of independent samples *t*-test

The results of the four hypotheses tested through the independent samples *t*-test are summarised in Table 22 below.

Table 20: Results of the four hypotheses tests using the independent samples *t*-test

Wording of the alternative hypothesis	Summary of result
H_1: Women experience higher levels of technophobia towards new technology than men	H_1 accepted
H_2: Men are more optimistic towards new technology than women	H_2 accepted
H_3: Women experience greater cognitive involvement when purchasing high-technology products than men	H_3 accepted
H_4: Women are more risk averse to new technology than men	H_4 accepted

These results indicate that traditional differences between genders towards technology still exist amongst South African consumers. Women continue to experience higher levels of technophobia towards new technology than men. However, as this study highlights, the degree of these differences changes, depending on the technology used. Regarding this study's questions of *why* these gender differences may occur, levels of optimism, risk taking and cognitive involvement between genders was measured.

In general, the results indicate that traditional gender differences towards technology continue to exist in South Africa. What follows is the findings of this study and how they are related to the literature and to the results reported by other researchers.

8.3.2 Relating the findings to the literature

Referring to the findings presented in section 7.3.1, it was found that mean differences in levels of technophobia between men and women varied greatly when it came to high-end innovative technologies such as home automation. However, when it came to computers and DSLR camera technology, the mean difference between men and women was more marginal.

As indicated in this study, there are decreased levels of consumer technophobia towards computer technology. This can be explained by computer technology's wide-spread diffusion and usage in the South African market (Broos, 2005:27; Hirunyawipada & Praswan, 2006:184; Internetworldstats.com, 2007; Lamb *et al*., 2001:255; Packaged Facts, 2006; Rainer *et al*., 2003:112).

The fact that a small gender difference was found, with women exhibiting marginally higher levels of technophobia towards computers than men, may be accounted for by the fact that South Africa, as a Third World country with low Internet usage, still characterises some traditional gender social norms (Bovée *et al*., 2005:1763; Brunner, 2005:221; Cullen, 2001:312; Galpin *et al*., 2003:44-45; Hatfield *et al*., 2000:63; Ndubisi, 2006:55; Portnoi, 2009:412; Third, 2007).

This can account for the slight difference in levels of technophobia between genders, as is suggested by past South African research in technophobia (Bovée *et al*., 2005:1764; Broos, 2005:22-23; Smith & Oosthuizen, 2006:353). These findings are in line with the principles of the theory of the diffusion of innovation whereby the diffusion of computer technology into the South African market has led to lowered levels of technophobia and a smaller gap between genders in levels of technophobia.

The results further indicate that for DSLR cameras, gender differences in levels of technophobia continue to exist, with the differences being more pronounced than with computer technology. This is in line with past findings by Lamb *et al*. (2001:255) who found high initial resistance to cameras due to perceived complexity. Over time, through the diffusion process, female consumers begin to adopt the technology more readily. These findings make sense when one considers that certain technologies may be deemed as either more ‘masculine’ or ‘feminine’ than others (Dobscha, 2003:91). This is in line with past findings that non-masculine technology, such as cameras and home appliances, do not illicit typical female aversions to the technology (Gilbert *et al*., 2003:254).

Cameras, through their widespread female usage and popularity, have diffused into the market and as such, may skew results based on its inherent female bias (Dobscha, 2003:91; Sony, 2007:37; Wolin & Korgaonkar, 2003:377).

Aligned with the study’s proposition, levels of technophobia towards home automation are the highest of the three technologies; with women exhibiting higher levels of technophobia than men. Validated by past studies, home automation technology is the latest and most innovative technology of the three, and as such its diffusion into the market is least pronounced and it invokes higher levels of technophobia (Castano *et al*., 2008:321; Herbig & Kramer, 1994:49; Hirunyawipada & Praswan, 2006:193; Laukkanen *et al*., 2007:424; Mukherjee & Hoyer, 2001:462; Wood & Moreau, 2006:44).

In line with the principles of the theory of the diffusion of innovation, the results of this study indicate that levels of technophobia increase for both men and women the newer the technology. Consistent with recent research by Blackwell *et al*. (2009:324-325), women’s levels of technophobia are highest when faced with a new innovative technology, such as home automation technology. Home automation, as one example of a technology that elicits feelings of fear and anxiety and poses a high risk purchase, induces greater levels of technophobia in women than men; more so than desktop computers or DSLR cameras.

In line with this study's proposal, it is found that women continue to be more technophobic compared with men, with levels of technophobia increasing the more innovative the technology (Elliott & Hall, 2005:101-102; Kay, 2009:737; Yadav *et al*., 2006:58). The results clearly indicate that when the technology is newer to market, the gender gap starts to increase in levels of technophobia, with women being more technophobic than men.

This study further demonstrates how the technology used to measure technophobia can influence the results of the study; a finding which validates past researchers' recommendations to contextualise technophobia and the technology type under study (Brunner, 2005:221; Korukonda, 2005:310-311; Parasuraman & Colby, 2001:5; Parasuraman, 2000:310:314; Rainer *et al*., 2003:108; Smith & Oosthuizen, 2006:353).

This study further confirms the importance of comparing genders on new technology and not just outdated computer technology. By including three different technologies in this study, this study has highlighted that gender differences change over time, depending on the phase the technology is in the diffusion of innovation curve. The findings of this study has thus aided in the explanation of the erratic findings regarding gender differences in technophobia in past research, as initially suggested by Broos (2005:22).

Whether the findings of this research indicate that women are complete technological laggards compared to men may be refuted as across all three technologies the differences may not be substantial enough. Rather, the results show that women can be classified more as '*later* adaptors of technology,' adopting technology after men and once the technology has stabilised in the market (Lamb *et al*., 2001:254-255). This study confirms the finding by Kay (2009:737) that women generally experience higher levels of anxiety than men and thus take longer to accept new technologies. Women may not be complete technological laggards, but depending on the technology used, may be 'late adopters' of technology or fall within another segment of technology adopters. The categorisation of the participants into the quadrants of technophobes is identified as a limitation to this study and is discussed in greater detail in sections 8.5 and 8.6.

The social reasons why gender differences in technophobia continue to exist were also studied. It was found that men continue to be more optimistic towards new technology than women. The findings of this study are congruent with past research which argues that men are generally more positive towards new technology than women (Bovée *et al*., 2005:1765; Dobscha, 2003:91; Simon & Peppas, 2005:137-138). This study confirms that men hold a more optimistic view of technology than women, which is strongly tied to the adoption and usage of the product (Parasuraman, 2000:311).

The level of cognitive involvement between men and women when purchasing technology is also found to be significant, with women experiencing greater cognitive involvement when purchasing technology products than men. The findings support recent research advocating that women tend to undertake a more intensive cognitive decision-making process than men when evaluating high-risk purchases (Bakewell & Mitchell, 2004:227; Chiu *et al*., 2005:420-421; Ndubisi, 2006:49-50; Williams, 2002:250). This study confirms that women tend to more critically evaluate information regarding the product, employing greater cognitive thought processes when purchasing technology products. The implication is that women may always continue to be more sensitive to negative information concerning technology, and that men will more readily purchase technology on impulse (Meeds, 2004:315).

In terms of willingness to take technological risks, the results clearly indicate that men are also more willing than women to take risks when purchasing new technology products. This study confirms that women have higher levels of uncertainty avoidance and tend to take fewer technological risks (Elliott & Hall, 2005:101-102; Harrant & Vaillant, 2008:396; Meier-Pesti & Penz, 2008:180-182; Sanchez-Franco *et al*., 2009:196).

More than any other indicator, the willingness to take risks is the greatest determinant regarding the adoption of innovative products (Booij & van Praag, 2009:386). This further confirms the findings of this study in that women may always inherently adopt new technologies later than men.

This study thus found that inherent attitudinal differences between genders, such as optimism, willingness to take risks, and degree of cognitive involvement provide key explanations as to why gender differences in technophobia continue to exist.

The social findings of this study have highlighted the importance of factoring in the macro environment when conducting research into gender differences in technophobia. These results are shared with numerous past studies which confirm a larger digital divide between men and women in developing nations (Beetles & Crane, 2005:238; Cullen, 2001:312; Hatfield *et al*., 2000:63; Hill *et al*., 2008:247; Hubregste, 2005:165; Ono, 2006:117; Paul, 2002:17; Southerton, 2007:114; Talukdar *et al*., 2002:97; Yeniyurt & Townsend, 2003:391).

The environment in which the study is undertaken impacts on the results. Also, the gendered nature of the technology product included in the study needs to be studied. South Africa, as a young democracy, may continue to show results differently from studies abroad. South African consumers may continue to exhibit traditional gender stereotypes with regards to technology in general until such time that technology diffuses into the market; a notion supported by many researchers (Bovée *et al*., 2005:1763; Czerniewicz & Brown, 2009:122; Fink & Kenny, 2003:16; Third, 2007). The implications of the findings of this study are discussed in further detail in the following section.

8.4. MANAGERIAL IMPLICATIONS

This section highlights the broader managerial implications of this study's findings and the importance of focusing attention on differences in gender attitudes, feelings and purchasing behaviour when it comes to new, high-technology consumer products.

In today's digital age, managers as well as academics recognise the importance of successfully targeting the growing consumer electronics industry, and within it, the growing female market (Hogan, 2005:67).

In line with the empirical findings of this study, it is clear that continual analysis of gender differences in technophobia is important for the consumer electronics industry. The findings highlight that the gender gap continues to exist and that, depending on the specific technology's diffusion, women exhibit higher levels of technophobia than men.

Past research, not accounting for the diffusion process and temporality of computer technology, has implied a narrowing of the gender gap (Broos, 2005:22-23; Korukonda, 2005:328; Rainer *et al*., 2003:112; Smith & Oosthuizen, 2006:353). As a result, gender advertising may become less focused in the future as more practitioners assume that in the modern digital age, men and women are consuming electronics in the same manner. This study shows that this is not necessarily the case, and as a new product is introduced to the market, marketers need to employ differentiating strategies in order to target both men and women successfully.

This strategy can already be seen in practice through the increase in the advertising of technology products in traditionally female-targeted magazines. Most female-targeted publications now include 'technology sections' where the latest technologies are featured (Simba, 2004:2). By tailoring the manner in which technology is advertised and shared to the female consumer, marketers are better able to capture this more 'technophobic' consumer. Technology-related publications that continue to primarily target men may see a decline in sales as they continue to push away a growing female audience (Simba, 2004:2). The advertising of technologies exasperates the gender divide by confirming established sex role stereotypes, and managers need to learn to differentiate and cater for both genders when advertising technology products.

According to Bstieler (2005:273), managers that are entering or developing a new product to the market need to invest more time and resources in order to understand their consumers, and whether they are early or late adopters.

It is further recommended that more attention is paid in understanding inherent gender differences, as this differs depending on the technology product being introduced to the market (Dobscha, 2003:91).

This study has illustrated that the degree of technophobia women possess towards technology depends on the technology and its ‘inherent gender biases’. Marketers need to adapt their communications according to the technology being sold. Selling washing machines? Women may not be laggards, but early adopters. Selling robotics? One may find women right at the back of the adoption-queue. Marketers in the electronics industry cannot have a ‘one-hat-fits-all’ assumption of women and technology, and need to analyse the ‘technology fit’ and communicate it to the market accordingly.

By uncovering the social reasons *why* gender differences continue to exist, advertisers can use these inherent gender differences to test and design advertisements that improve female beliefs about the technology. Marketers are encouraged to experiment with different communication strategies that improve inherent beliefs based on social norms.

Marketers may consider developing several product designs that better cater for gender differences in technophobia and that better meet the consumer’s needs (Gilbert *et al*. 2003:259). Incremental product innovations may also alleviate the information overload causing many consumers to steer clear from technology. In order to successfully ensure new technology adoption amongst the more ‘technophobic’ female consumers, managers are also encouraged to include more women in the innovation process. Technology remains inherently gender biased, with men continuing to influence the technology in the market (Dobscha, 2003:91-92).

However, by getting early consumer commitment to a new innovation, costly product failures can be avoided when the reaction to the technology is negative (Ogawa & Piller, 2006:65).

This study found that women are less optimistic than men, exhibit higher levels of risk aversion, and higher cognitive-processing than men when considering technology purchases. The greatest challenge in stimulating the adoption of high-technology products is the perceived risk that a consumer undergoes when making a purchasing decision (Deacon *et al*., 2003:190).

According to Laukkanen *et al*. (2007:424), communication strategies that include word-of-mouth and intense information-filled advertising are more effective when consumers perceive a psychological risk in the product's adoption. When introducing new technology innovations, managers are encouraged to tailor their advertising, brochures, catalogues and manuals with information that reduces perceived risk for female consumers. Snoj *et al*. (2004:163) further recommend that managers need to concentrate on the reduction of all kinds of perceived risk, including financial, psychological, social and functional. Managers also need to understand that these perceived risks may differ between men and women. In-store assistance, displays and promotions tailored to women may go a long way in reducing risk perception by guiding the consumer through the purchase decision. Friendly, educated promoters are important influencers of impulse buying. Advertising that addresses the fears the consumer has could also lead to less aversion.

Increasing levels of consumer resistance are also attributed to the sheer volume of new information in the digital era (Herbig & Kramer, 1994:46). Information overload has become a barrier to adoption rather than an aid in the purchase of a product (Bawden *et al*., 1999:249). Managers thus need to employ simplifying strategies in order to help break through the messaging clutter and alleviate the information overload that the consumer is experiencing.

Introduced too quickly to the market, at too fast a pace, the personal computer was resisted due to the consumers' underlying fears of the technology.

Managers need to find a balance between being seen as innovative market leaders, and successfully introducing the technology at a pace that invites consumer adoption and acceptance.

This study provides strong empirical support for managers attempting to successfully target technology products to men and women. By uncovering gender differences in the way that one reacts to technology, one is better able to understand the consumer and marketing efforts are strengthened.

This study not only sheds some light on consumer attitudes, feelings and reactions to new technologies, but it also provides important insight into how men and women accept technology in the market. This study provides the understanding that allows companies to manufacture and market technology products to attract and retain consumers, regardless of their stage of technology adoption, by better understanding their fears.

8.5. LIMITATIONS OF THE STUDY

This study had some limitations, which are outlined in this section.

Since a non-probability sampling approach was used, the results of this study may not be generalised to larger populations on statistical grounds. As was highlighted earlier, individuals in different macro and market environments experience and adopt technology differently than other nations and cultures. Therefore, the results of this study cannot be generalised to other contexts. This calls for researchers to take into account that to truly understand the market, independent research has to be conducted for each macro and market environment.

Reactions to innovative technology differ substantially between First and Third World countries and thus gross generalisations are not recommended.

This study was a cross-sectional study which reported on gender differences in technophobia towards three separate technologies at one point in time. Ideally, this study should be replicated amongst the same target population in the future to gauge how time affects the results against the same technologies studied.

This study focused on three technologies; namely, standard desktop computer, DSLR camera, and home automation technology. When deciding which technologies to include in future research, researchers may need to account for the 'gendering effect' of certain technologies and find more 'stereotypically neutral' technologies to include in the study (Dobscha, 2003:91-92).

The findings for DSLR cameras illustrate how the inherent 'gender bias' of a technology can influence the results. This study did not factor in how 'masculine' or 'feminine' a technology is, and this is thus noted as a limitation to the study.

Another potential limitation of the study was that the same scale measuring three different technologies was used. Repetition of the scale may have resulted in respondents potentially repeating their answers. This may have negatively influenced the findings.

8.6. DIRECTIONS FOR FUTURE RESEARCH

An important contribution to the growing literature on technophobia would be to refine the way that the scales measuring technophobia are analysed and interpreted. This study made use of Parasuraman's (2000:312-313) abbreviated TRI scale. The data collected was analysed by averaging the total scores as detailed in section 6.6.

The further analysis of the data through the independent samples *t*-test was conducted in order to gain sound statistical results for making inferences and confirming the hypotheses presented in this study.

In the literature there are ways of calculating the TRI through non-statistical means. Following the approach used by Parasuraman (2000:312-313) and later adapted by Verma *et al*. (2007:12) in their abbreviated TRI, the TRI is calculated by summing the positive sub-dimensions of the TRI provided by each respondent, and then subtracting the total of the negative sub-dimension scores of the TRI. The TRI is thus calculated as follows: (total sum of Innovativeness + optimism sub dimension score) – (total sum of discomfort + insecurity sub-dimension score). This score provides an overall measure of technology readiness towards the specific technology ranging from -20 to 20. A higher overall score indicates a more positive acceptance and readiness to adopt a new technology. The lower the score, the more uncomfortable and insecure the respondent is towards technology.

As per the guidelines provided by Verma *et al*. (2007:8), a score on an abbreviated TRI scale of -10 or lower indicates high levels of technophobia and technology avoidance.

If the score lies between 2 and 7, it indicates relative technology acceptance. A score over 7 indicates high technology acceptance and adoption. This method, although not grounded on standard sample *t*-test statistical methods, proves useful as it allows for the categorisation of responses into different technology segments. This is important for identifying and grouping gender differences on a continuum of technophobia and technology adoption.

By conducting both methods of calculation, using the summing approach of Verma *et al.* (2007:8) as well as the standard statistical *t*-tests, researchers are encouraged to experiment with the differences in findings and research whether they yield the same indications.

Future research may build on the use of the abbreviated TRI in this way by further segmenting the consumers into the ‘technology types.’ This study compared gender differences in levels of technophobia, but thereafter did not allow for the categorisation of the respondents qualitatively.

The measurement technique did not allow for the segmentation of male and female respondents into the five stages of technology adoption. According to Lamb *et al*. (2001:254-255), the five consumer categories, defined by time of new product adoption, would have provided the ability to classify men and women as either 'early adaptors' or 'technophobes' and would have provided invaluable information for managers.

Researchers are urged to conduct cluster analysis in order to classify the survey participants into different segments based on their responses captured on the TRI. By classifying the respondents as early adopters, explorers, paranoids, innovators or laggards, further analysis can be conducted in to what stage of technology adoption the consumer is at. The segmentation of consumers will provide invaluable information which will assist managers with making decisions regarding technology offerings.

As this study focused on determining whether gender differences exist towards three different technologies, the next step for researchers would be to further segment these findings by conducting a cluster analysis.

The use of the TRI in this regard (segmenting the respondents into technology-psychographic clusters) has been successfully completed by researchers; however, not across multiple technologies (Victorino, Karniouchina & Verma, 2009:347-348).

Further research is also suggested in terms of the technologies used to compare gender differences. This study attempted to define 'innovative' products in order to select the technology products used. This study made use of the standard desktop computer, DSLR camera and home automation technology.

However, more research is required when selecting the product upon which the study will be based. Future researchers could add to this by providing better means of selecting the product. Research could look at revising these technology bases and update them with more advanced technologies to uncover latest gender differences in technophobia.

Given the diffusion of innovation and the temporal nature of technology adoption, future research may be useful in a longitudinal research design which could measure a product new to market over time in order to see the time frame in which technophobia changes (Sinkovics *et al*., 2002:491). Additional research may thus include longitudinal studies to determine the gender differences in the rate of technophobia change towards a technology product over time. Researchers are encouraged to pursue this in future studies.

This study attempted to provide some explanations of *why* gender differences continue to exist. Researchers may uncover patterns amongst different countries or communities by probing deeper the social belief differences and may be regarded as an important contribution to the literature on this topic. This study focused on consumers in the high LSM groups. It would be interesting to focus future studies on consumers from the emerging black middle class and also on consumers in other, less affluent LSM groups.

Future research may also include identifying ways in which women can be encouraged to overcome their fears of technology which could be based on deeply ingrained social norms. In this growing digital era, that would be first prize.

CHAPTER 9. REFERENCES

Adam, A., Howcroft, D. & Richardson, H. 2004. A decade of neglect: reflecting on gender and IS. *New Technology, Work and Employment*, 19(3):222-240. [Online] Available from: EBSCOHost: Business Source Premier: http://0-search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=14236174&site=ehost-live&scope=site [Accessed: 2007-03-21].

Anderson, O. 2007. South Africa – at the forefront of the global biometric identity management revolution. *Financial Mail: Business Lifestyle Essentials*, May: 60.

Anthony, L.M., Clarke, M.C. & Anderson, S.J. 2000. Technophobia and personality subtypes in a sample of South African university students. *Computers in Human Behaviour*, 16(1) [Online] Available from: ERIC: http://www.sciencedirect.com/science/article/B6VDC-3YGDD58-3/2/0a85adf2b26aeace852094f8ad6fedb2 [Accessed: 2007-09-10].

Backhans, M.C., Burström, B., Lindholm, L. & Månsdotter, A. 2009. Pioneers and laggards – Is the effect of gender equality on health dependent on context? *Social Science & Medicine*, 68(8):1388-1395. [Online] Available from: ScienceDirect: http://0wwsciencedirect.com.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VBFVP58461&_user=59388&_coverDate=04%2F30%2F2009&_alid=922983707&_rdoc=192&_fmt=high&_orig=search&_cdi=5925&_st=4&_docanchor=&view=c&_ct=1851&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5= 1291dbb674f096fbb0fe35cefbb0730a [Accessed: 2009-05-22].

Bain, C.D. & Rice, M.L. 2006. The influence of gender on attitudes, perceptions and uses of technology. Journal of Research on Technology in Education, 39(2):119-132. [Online] Available from: EBSCOHost: Business Source Premier: http://0search.ebscohost.com.innopac.up.ac.za:80/ogin.aspx?direct=true&db=buh&AN=23485681&site=ehost-live&scope=site [Accessed: 2007-03-21].

Bakewell, C. & Mitchell, V.W. 2004. Male consumer decision-making styles. *International Review of Retail, Distribution and Consumer Research*, 14(2):223-240. [Online] Available from: EBSCOHost: Business Source Premier: http://0-search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=12524951&site=ehost-live&scope=site [Accessed: 2007-03-21].

Baloğlu, M. & Çevik, V. 2008. Multivariate effects of gender, ownership, and the frequency of use on computer anxiety among high school students. *Computers in Human Behavior*, 24(6):2639-2648. [Online] Available from: ScienceDirect: http://0www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4SCTMXP1&_user=59388&_coverDate=09%2F17%2F2008&_alid=892705637&_rdoc=11&_fmt=high&_orig=search&_cdi=5979&_sort=d&_st=4&_docanchor=&_ct=86&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=b464f0cca45ba03b8b62767a24827941 [Accessed: 2009-03-28].

Barkatsas, A., Kasimatis, K. & Gialamas, V. 2009. Learning secondary mathematics with technology: Exploring the complex interrelationship between students' attitudes, engagement, gender and achievement. *Computers & Education*, 52(3):562-570. [Online] Available from: ScienceDirect: http://0-www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VCJ4V57XXB2&_user=59388&_coverDate=04%2F30%2F2009&_alid=921351813&_rdoc=59&_fmt=high&_orig=search&_cdi=5956&_st=1&_docanchor=&_ct=542&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=32afe4cf7f4a623207ddf418e7c13261 [Accessed: 2009-04-29].

Bawden, D., Holtham, C. & Courtney, N. 1999. Perspectives on information overload. *Aslib Proceedings*, 51(8):249-255. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/EUM0000000006984 [Accessed: 2009-03-27].

Bearden, W.O., Netemeyer, R.G. & Mobley, M.F. 1993. *Handbook of Marketing Scales: Multi item measures for marketing and consumer behavior research*. Newbury Park: Sage Publishers.

Beetles, A. & Crane, A. 2005. Mapping out the field of gender and buyer-seller relationships: developing a new perspective. *Journal of Marketing Management*, 21(1):231-250. [Online] Available from: EBSCOHost: Business Source Premier: http://0search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=16063054&site=ehost-live&scope=site [Accessed: 2007-03-19].

Blackwell, A.F., Rode, J.A. & Toye, E.F. 2009. How do we program the home? Gender, attention investment, and the psychology of programming at home. *International Journal of Human-Computer Studies*, 67(4):324-341. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6WGR4TKPVH82&_user=59388&_coverDate=04%2F30%2F2009&_alid=922983707&_rdoc=171&_fmt=high&_orig=search&_cdi=6829&_st=4&_docanchor=&view=c&_ct=1851&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=8c1fadfd853046a065abdcf72d65fd20 [Accessed: 2009-05-22].

Booij, A.S. & van Praag, B.M.S. 2009. A simultaneous approach to the estimation of risk aversion and the subjective time discount rate. *Journal of Economic Behavior & Organization*, 70(1-2):374-388. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V8F4VF56PB1&_user=59388&_coverDate=05%2F31%2F2009&_alid=924185001&_rdoc=75&_fmt=high&_orig=search&_cdi=5869&_sort=d&_st=4&_docanchor=&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=4a1ad2e317e0f3ac00d53d7da444e1a0 [Accessed: 2009-05-25].

Bovée, C., Voogt, J. & Meelissen, M. 2005. Computer attitudes of primary and secondary students in South Africa. *Computers in Human Behavior*, 23(4):1762-1776. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4HPD3P12&_user=59388&_coverDate=07%2F31%2F2007&_alid=892705637&_rdoc=35&_fmt=high&_orig=search&_cdi=5979&_sort=d&_st=4&_docanchor=&_ct=86&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=b7fdd1f9b601e84c9e2fd095c79fee57 [Accessed: 2009-03-29].

Broos, M.A. 2005. Gender and information and communication (ICT) anxiety: male self-assurance and female hesitation. *CyberPsychology & Behaviour*, 8(1):21-31. [Online] Available from: EBSCOHost: Business Source Premier: http://0search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=16278542&site=ehost-live&scope=site [Accessed: 2007-03-21].

Brosnan, M. & Lee, W. 1998. A cross-cultural comparison of gender differences in computer attitudes and anxieties: the United Kingdom and Hong Kong. *Computers in Human Behavior*, 14(4):59-577. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC3VF9DYS3&_user=59388&_coverDate=12%2F01%2F1998&_rdoc=1&_fmt=high&_orig=article&_cdi=5979&_sort=v&_docanchor=&view=c&_ct=636&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=eca1fc8d54b7812303d6d1d9ba97b1b7 [Accessed: 2009-03-29].

Brosnan, M.J. & Thorpe, S.J. 2006. An evaluation of two clinically-derived treatments for technophobia. *Computers in Human Behavior*, 22(6):1080-1095. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4JJ84B11&_user=59388&_coverDate=11%2F30%2F2006&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=7f5dcb2db0de35043b38135deebaa461 [Accessed: 2009-03-28].

Bruner, G.C. & Hensel, P.S. 1992. *Marketing Scales Handbook: A compilation of multi-item measures*. USA: American Marketing Association.

Brunner, C. 2005. A review of: 'Gender and computers: understanding the digital divide.' *The Information Society*, 21(3)221-222. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=17147999&site=ehost-live&scope=site [Accessed: 2007-03-21].

Bstieler, L. 2005. The moderating effect of environmental uncertainty on new product development and time efficiency. *Journal of Product Innovation Management*, 22(3):267-284. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=113&sid=497cf7617f224e13b01b294b747a912d%40sessionmgr104&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=16626552 [Accessed: 2009-03-26].

Burns, A.C. & Bush, R.F. 2006. *Marketing Research*. 5th Ed. Upper Saddle River: Pearson Prentice Hall.

Cant, M., Gerber-Nel, C., Nel. D. & Kotze, K. 2003. *Marketing Research*. 2nd ed. Claremont, South Africa: New Africa Books.

Carr, N. 2004. *The z curve and IT investment*. [Online] Available from: http://www.nicholasgcarr.com/digital_renderings/archives/the_z_curve_and_it.shtml [Accessed: 2007-07-16].

Castano, R., Sujan, M., Kacker, M. & Sujan, H. 2008. Managing consumer uncertainty in the adoption of new products: Temporal distance and mental simulation. *Journal of Marketing Research,* 45(3):320-336. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=31996798&site=ehost-live&scope=site [Accessed: 2009-03-27].

Catterall, M., Maclaran, P. & Stevens, L. 2005. Postmodern paralysis: the critical impasse in feminist perspectives on consumers. *Journal of Marketing Management*, 21(5):489-504. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=17338991&site=ehost-live&scope=site [Accessed: 2007-03-19].

Chiu, Y., Lin, C. & Tang, L. 2005. Gender differs: assessing a model of online purchase intentions in e-tail service. *International Journal of Service Industry Management*, 16(5):416-435. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/09564230510625741 [Accessed: 2007-03-22].

Christensen, R., Knezek, G. & Overall, T. 2005. Transition points for the gender gap in computer enjoyment. *Journal of Research on Technology in Education*, 38(1):23-37. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=18566853&site=ehost-live&scope=site [Accessed: 2007-03-21].

Christofides, E., Islam, T. & Desmarais, S. 2009. Gender stereotyping over instant messenger: The effects of gender and context. *Computers in Human Behavior*, 25(4):897-901. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4W3299B1&_user=59388&_coverDate=04%2F16%2F2009&_alid=921351813&_rdoc=52&_fmt=high&_orig=search&_cdi=5979&_st=1&_docanchor=&_ct=542&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=fbd13c88f6e04c264632c34da2b3dd65 [Accessed: 2009-04-29].

Coley, A. & Burgess, B. 2003. Gender differences in cognitive and affective impulse buying. *Journal of Fashion Marketing and Management*, 7(3):282-295. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/13612020310484834 [Accessed: 2007-01-28].

Cooper, D.R. & Schindler, P.S. 2003. *Business Research Methods*. 8th Ed. New York: McGraw-Hill.

Cullen, R. 2001. Addressing the digital divide. *Online Information Review*, 25(5):311-320. [Online] Available from: Emerald: http://0-www.emerald-library.com/ft [Accessed: 2008-09-28].

Czerniewicz, L. & Brown, C. 2009. A study of the relationship between institutional policy, organisational culture and e-learning use in four South African universities. *Computers & Education*, 53(1):121-131. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VCJ4VP5XBD1&_user=59388&_coverDate=08%2F31%2F2009&_alid=921880939&_rdoc=15&_fmt=high&_orig=search&_cdi=5956&_sort=d&_st=4&_docanchor=&_ct=4682&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=189ffaa70f1ee12776ecb5a913e536f0 [Accessed: 2009-05-19].

Dabholkar, P.A. & Sheng, X. 2008. The role of perceived control and gender in consumer reactions to download delays. *Journal of Business Research*, 62(7):756-760. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V7S4T1SFM41&_user=59388&_coverDate=07%2F31%2F2009&_rdoc=13&_fmt=high&_orig=browse&_srch=docinfo(%23toc%235850%232009%23999379992%231024342%23FLA%23display%23Volume)&_cdi=5850&_sort=d&_docanchor=&view=c&_ct=13&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=076cc415dce79b447137532258227661 [Accessed: 2009-04-28].

Datamonitor, 2006. *Consumer electronics: global industry guide*. [Online] Available from: http://www.marketresearch.com/product/display.asp?productid=1344548&SID=281150073888613023775235 29&kw=Global%09consumer%09electronics%09sales [Accessed: 2007-07-23].

Deacon, J.H., Forrester, M. & Cole, S. 2003. Challenges in product adoption. *Journal of Strategic Marketing*, 11(3):187-201. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=11093342&site=ehost-live&scope=site [Accessed: 2009-03-27].

Demaree, H.A., DeDonno, M.A., Burns, K.J., Feldman, P. & Everhart, D.E. 2009. Trait dominance predicts risk-taking. *Personality and Individual Differences*, 47(5):419-422. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V9F4W7RJST2&_user=59388&_coverDate=05%2F08%2F2009&_alid=924185001&_rdoc=59&_fmt=high&_orig=search&_cdi=5897&_sort=d&_st=4&_docanchor=&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=2d6683265b38b8eda526c39d06880195 [Accessed: 2009-05-25].

Dlodlo, N. 2009. Access to ICT education for girls and women in rural South Africa: A case study. *Technology in Society*, 31(2):168-175. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V804W7B53G1&_user=59388&_coverDate=05%2F06%2F2009&_alid=921880939&_rdoc=125&_fmt=high&_orig=search&_cdi=5856&_st=4&_docanchor=&view=c&_ct=4682&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=edadc02f68dd8e8a385f4cc7dbec625 [Accessed: 2009-05-22].

Dobscha, S. 2003. Introducing gender into the analysis of techno-consumption. *Advances in Consumer Research*, 30(1):91-93. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=11236795&site=ehost-live&scope=site [Accessed: 2007-03-21].

Dolliver, M. 2005. OK, so they can't programme a VCR: doesn't make mean they're technophobes. *Adweek*, 46(44):1 (2p). [Online] Available from: EBSCOHost: Business Source Premier: http://search.global.epnet.com/ [Accessed: 2007-03-21].

Du Plessis, P.J. & Rousseau, G.G. 2003. *Buyer Behaviour: a multi-cultural approach*. 3rd ed. South Africa: Oxford University Press.

Dwivedi, Y.K. & Lal, B. 2007. Socio-economic determinants of broadband adoption. *Industrial Management & Data Systems*, 107(5):654-671. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/02635570710750417 [Accessed: 2009-03-27].

Eggers, J.P. 2007. Falling flat: Failed technologies and investment under uncertainty. Academy of Management Proceedings, 1-7. [Online] Available from: EBSCOHost: Business Source Premier. http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=101&sid=ac1140ed1cc44a469cba4ca2477aa10e%40sessionmgr104&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=26516229 [Accessed: 2009-03-26].

Elliott, K.M. & Hall, M.C. 2005. Assessing consumers' propensity to embrace self-service technologies: are there gender differences? *Marketing Management Journal*, 15(2):98-107. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=19403284&site=ehost-live&scope=site [Accessed: 2007- 03-21].

Erasmus, A.C. & Boshoff, E. 2003. The elicitation and generation of a script for the acquisition of major household appliances within a consumer decision-making framework. *Advances in Consumer Research*, 30(1):332-339. [Online] Available from EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=11238068&site=ehost-live&scope=site [Accessed: 2007-03-21].

Fink, C. & Kenny, C.J. 2003. Whither the digital divide? *MCB UP Limited*, 5(6):15-24. [Online] Available from [Online] Available from: Emerald: http://0-www.emeraldinsight.com/1463-6697.htm [Accessed: 2008-09-25].

Galpin, V., Sanders, I., Turner, H. & Venter, B. 2003. Computer self-efficacy, gender and educational background in South Africa. *IEEE Technology and Society Magazine*, Fall: 44-48. [Online] Available from: IEEE Xplore: http://www.ieeexplore.ieee.org [Accessed: 2007-09-10].

Gilbert, D., Lee-Kelley, L. & Barton, M. 2003. Technophobia, gender influences and consumer decision-making for technology-related products. *European Journal of Innovation Management*, 6(4):253-263. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/14601060310500968 [Accessed: 2007-01-28].

Glazer, R. 2007. Meta-Technologies and innovation leadership: Why there may be nothing new under the sun. *California Management Review*, 50(1):120-143. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=27341281&site=ehost-live&scope=site [Accessed: 2009-03-27].

Hair, J., Bush, R. & Ortinau, D. 2006. *Marketing Research Within a Changing Environment*. 3rd Ed. New York: Mc-Graw Hill.

Harrant, V. & Vaillant, N.G. 2008. Are women less risk averse than men? The effect of impending death on risk-taking behaviour. *Evolution and Human Behavior*, 29(6):396-401. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6T6H4T29WP81&_user=59388&_coverDate=11%2F30%2F2008&_alid=924185001&_rdoc=347&_fmt=high&_orig=search&_cdi=5031&_st=4&_docanchor=&view=c&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=eae3764c44dc1a59d785dd5f7710c089 [Accessed: 2009-05-26].

Hatfield, D.E., Tegarden, L.F. & Echols, A.E. 2001. Facing the uncertain environment from technological discontinuities: Hedging as a technology strategy. *Journal of High Technology Management Research*, 12(1):63. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=104&sid=767a984846a44f409a5b290d4842cc8e%40sessionmgr103&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=5176703 [Accessed: 2009-03-26].

Hendry, J. 2000. Technology readiness and educational choice: Is there a relationship between technology readiness and the decision to study on-line? *ANZMAC 2000*.

Herbig, P.A. & Kramer, H. 1994. The effect of information overload on the innovation choice process: innovation overload. *Journal of Consumer Marketing*, 11(2):45-54. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/07363769410058920 [Accessed: 2009-03-27].

Hill, R., Beyon-Davies, P. & Williams, M.D. 2008. Older people and internet engagement: Acknowledging social moderators of internet adoption, access and use. *Information, Technology & People*, 21(3):244-266. [Online] Available from: Emerald: http://0-www.emeraldinsight.com/0959-3845.htm [Accessed: 2008-09-25].

Hirunyawipada, T. & Paswan, A.K. 2006. Consumer innovativeness and perceived risk: implications for high technology product adoption. *Journal of Consumer Marketing*, 23(4):182-198. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/07363760610674310 [Accessed: 2007-03-22].

Hogan, M. 2005. Technophobia amongst older adults in Ireland. *Irish Journal of Management*, Special Issue: 57-77. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=22789716&site=ehost-live&scope=siteDatabaseBusiness Source Premier [Accessed: 2007-03-21].

Hogge, B. 2006. Brave new world. *New Statesman*, 12 June: 56. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=21117393&site=ehost-live&scope=site [Accessed: 2007-03-19].

Hubregste, S. 2005. The digital divide within the European Union. *New Library World*, 106(1210):164-172. [Online] Available from Emerald: http://www.emeraldinsight.com/0307-4803.htm [Accessed: 2008-09-25].

Hynes, N. & Lo, S. 2007. Innovativeness and consumer involvement in the Chinese market. *Singapore Management Review*, 28(2):31-46. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/pdf?vid=5&hid=3&sid=0dca52e5-fb8d-4e29-a399-118678667f55%40SRCSM2 [Accessed: 2007-11-24].

Im, S., Mason, C.H. & Houston, M.B. 2007. Does innate consumer innovativeness relate to new product / service adoption behaviour? The intervening role of social learning via vicarious innovativeness. *Journal of Academic Marketing Sciences*, 35:63-75 [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=16&hid=3&sid=0dca52e5-fb8d-4e29-a399-118678667f55%40SRCSM2 [Accessed: 2007-11-24].

Imhof, M., Vollmeyera, R. & Beierleina, C. 2006. Computer use and the gender gap: The issue of access, use, motivation, and performance. *Computers in Human Behavior*, 23(6):2823-2837. [Online] Available from: ScienceDirect: http://0www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4MFCW0R1&_user=59388&_coverDate=11%2F30%2F2007&_alid=892705637&_rdoc=29&_fmt=high&_orig=search&_cdi=5979&_sort=d&_st=4&_docanchor=&_ct=86&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=f397bf9c1029d358b3a56cf0f13ea839 [Accessed: 2009-03-29].

Internetworldstats.com. 2007. *Internet World Statistics*. [Online] Available from: http://www.internetworldstats.com/stats.htm [Accessed: 2007-11-24].

Jackson, L.A., Zhao, Y., Qiu, W., Kolenic, A., Fitzgerald, H.E., Harold, R. & von Eye, A. 2008. Culture, gender and information technology use: A comparison of Chinese and US children. *Computers in Human Behavior*, 24(6):2817-2829. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4SJ9G7N1&_user=59388&_coverDate=09%2F17%2F2008&_alid=921361991&_rdoc=6&_fmt=high&_orig=search&_cdi=5979&_sort=d&_st=1&_docanchor=&_ct=91&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=7ee16c369ea0bfe44901ee0e221ca906 [Accessed: 2009-04-28].

Kay, R.H. 2009. Examining gender differences in attitudes toward interactive classroom communications systems (ICCS). *Computers & Education*, 52(4):730-740. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VCJ4VB557N2&_user=59388&_coverDate=05%2F31%2F2009&_rdoc=3&_fmt=high&_orig=browse&_srch=docinfo(%23toc%235956%232009%23999479995%23941050%23FLA%23display%23Volume)&_cdi=5956&_sort=d&_docanchor=&view=c&_ct=17&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=b678c40425b6e8e49ddfcb9b36054073 [Accessed: 2009-04-28].

Kent, R. 2007. *Marketing Research: Approaches, Methods and Applications in Europe*. London, England: Thomson Learning

Kesici, S., Sahin, I. & Akturk, A.O. 2009. Analysis of cognitive learning strategies and computer attitudes, according to college students' gender and locus of control. Computers in Human Behavior, 25(2):529-534. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC4V8N7H91&_user=59388&_coverDate=03%2F31%2F2009&_alid=921351813&_rdoc=86&_fmt=high&_orig=search&_cdi=5979&_st=1&_docanchor=&_ct=542&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=786c61bef08bf1d09f15dbcb9c687933 [Accessed: 2009-05-18].

Kirchler, E., Hoelzl, E. & Kamleitner, B. 2008. Spending and credit use in the private household. *Journal of Socio-Economics*, 37(2):519-532. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6W5H4MY6N5C1&_user=59388&_coverDate=04%2F30%2F2008&_alid=924185001&_rdoc=568&_fmt=high&_orig=search&_cdi=6571&_st=4&_docanchor=&view=c&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=206dd654ac1c2cbe2919e572b47c1815 [Accessed: 2009-05-26].

Korukonda, A.P. 2007. Differences that do matter: A dialectic analysis of individual characteristics and personality dimensions contributing to computer anxiety. *Computers in Human Behavior*, 23(4):1921-1942. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VDC_4JHMHTV_1&_user=59388&_coverDate=07%2F31%2F2007&_rdoc=1&_fmt=high&_orig=article&_cdi=5979&_sort=v&_docanchor=&view=c&_ct=636&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=01eb414788036df9f29b92d44853263d [Accessed: 2009-03-29].

Korukonda, A.P. 2005. Personality, individual characteristics, and predisposition to technophobia: some answers, questions, and points to ponder about. *Information Services*, 170:309-328. [Online] Available from: Science Direct: http://www.sciencedirect.com [Accessed: 2007-09-10].

Kulviwat, S., Bruner, G.C. & Al-Shuridah, O. 2009. The role of social influence on adoption of high tech innovations: The moderating effect of public / private consumption. *Journal of Business Research*, 62(7):706-712. [Online] Available from: Science Direct: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V7S_4TCPN491&_user=59388&_coverDate=07%2F31%2F2009&_alid=921361991&_rdoc=1&_fmt=high&_orig=search&_cdi=5850&_sort=d&_st=1&_docanchor=&_ct=91&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=bebf85946bd1fa52826b16c2e77aac37 [Accessed: 2009-05-20].

Lamb, C.W., Hair, J.F., McDaniel, C., Boshoff, C. & Terblanche, N.S. 2001. *Marketing*. Cape Town: Oxford University Press.

Laukkanen, P., Sinkkonen, S. & Laukkanen, T. 2008. Consumer resistance to Internet banking: postponers, opponents and rejectors. *International Journal of Bank Marketing*, 26(6):440-455. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/02652320810902451 [Accessed: 2009-03-26].

Laukkanen, T., Sinkonnen, S., Kivijarvi, M. & Laukkanen, P. 2007. Innovation resistance among mature consumers. *Journal of Consumer Marketing*, 24(7):419-427. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/07363760710834834 [Accessed: 2009-03-26].

Liljandera, V., Gillbergh, F., Gummerusc, J. & van Rield, A. 2005. Technology readiness and the evaluation and adoption of self-service technologies. *Journal of Retailing and Consumer Services*, 13 (3):177-191. [Online] Available from: Science Direct: http://www.sciencedirect.com/ [Accessed: 2007-11-24].

Malhotra, N.K. & Birks, D.F. 2007. Marketing *Research: An Applied Approach*. Third Edition. Edinburgh Gate, England: Pearson Prentice Hall.

Martin, L.L. 2009. Black asset ownership: Does ethnicity matter? *Social Science Research*, 38(2):312-323. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6WX8_4V34D4G2&_user=59388&_coverDate=06%2F30%2F2009&_alid=921880939&_rdoc=75&_fmt=high&_orig=search&_cdi=7152&_sort=d&_st=4&_docanchor=&_ct=4682&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=abc18e227cbd49068b80045b90cf4406 [Accessed: 2009-05-20].

Martinez, E. & Polo, Y. 1996. Adopter categories in the acceptance process for durables. *Journal of Product & Brand Management*, 5(3):34-47. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/10610429610126560 [Accessed: 2009-03-27].

Masclet, D., Colombier, N., Denant-Boemont, L. & Lohéac, Y. 2009. Group and individual risk preferences: A lottery-choice experiment with self-employed and salaried workers. *Journal of Economic Behavior & Organization*, 70(3):470-484. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V8F_4VF56PB_5&_user=59388&_coverDate=06%2F30%2F2009&_alid=924185001&_rdoc=24&_fmt=high&_orig=search&_cdi=5869&_sort=d&_st=4&_docanchor=&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=0019f75fdc887cb2810d5a9813b155f6 [Accessed: 2009-05-25].

Matthing, J., Kristensson, P., Gustafsson, A. & Parasuraman, A. 2006. Developing successful technology-based services: the issue of identifying and involving innovative users. *Journal of Services Marketing*, 20(5):288-297. [Online] Available from Emerald: http://0-www.emeraldinsight.com/0887-6045.htm [Accessed: 2008-09-25].

Meeds, R. 2004. Cognitive and attitudinal effects of technical advertising copy: the roles of gender, self-assessed and objective consumer knowledge. *International Journal of Advertising*, 23(3):309-336. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=14133342&site=ehost-live&scope=site [Accessed: 2007-03-21].

Meier-Pesti, K. & Penz, E. 2008. Sex or gender? Expanding the sex-based view by introducing masculinity and femininity as predictors of financial risk taking. *Journal of Economic Psychology*, 29(2):180-196. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V8H_4NT84JJ_1&_user=59388&_coverDate=04%2F30%2F2008&_alid=924185001&_rdoc=564&_fmt=high&_orig=search&_cdi=5871&_st=4&_docanchor=&view=c&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=7df0e350a4caa9d0ebc8afe33a4591a0 [Accessed: 2009-05-26].

Min, S., Kalwani, M.U. & Robinson, W.T. 2006. Market pioneer and early follower survival risks: a contingency analysis of really new versus incrementally new product-markets. *Journal of Marketing (USA)*, 70(1):15-33. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=105&sid=918472f7_605c_4eaf_8179_8fb550229b7e%40sessionmgr102&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=19451859 [Accessed: 2009-03-27].

Mitchell, V.W. & Boustani, P. 1993. Market development using new products and new customers: A role for perceived risk. *European Journal of Marketing*, 27(2):17-32. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/03090569310026385 [Accessed: 2009-03-27].

Monat, J.P. 2009. Why customers buy. *Marketing Research*, 21(1):20-24. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=37012066&site=ehost-live&scope=site [Accessed: 2009-03-27].

Mukherjee, A. & Hoyer, W.D. 2001. The effect of novel attributes on product evaluation. *Journal of Consumer Research*, 28(3):462-472. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=5728501&site=ehost-live&scope=site [Accessed: 2007-03-21].

Ndubisi, N.O. 2006. Effect of gender on customer loyalty: a relationship marketing approach. *Marketing Intelligence and Planning*, 24(1):48-61. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/02634500610641552 [Accessed: 2007-01-28].

Niemelä-Nyrhinen, J. 2007. Baby boom consumers and technology: shooting down stereotypes. *Journal of consumer marketing*, 24(5):305-312. [Online] Available from: Emerald: http://0-www.emeraldinsight.com/0736-3761.htm [Accessed: 2008-09-25].

Nwogugu, M. 2005. Towards multi-factor models of decision making and risk: A critique of prospect theory and related approaches, part II. *The Journal of Risk Finance*, 6(2):163-173. [Online] Available from: Emerald: http://www.emeraldinsight.com [Accessed: 2007-11-18].

Ogawa, S. & Piller, F.T. 2006. Reducing the risks of new product development. *MIT Sloane Management Review (USA)*, 47(2):65-71. [Online] Available from: Emerald: http://0-proquest.umi.com.innopac.up.ac.za/pqdlink?Ver=1&Exp=03-22-2014&FMT=7&DID=994491031&RQT=309&cfc=1 [Available from: 2009-03-27].

Omnisol. 2008. *Omnisol Home Automation*. [Online] Available from: http://www.omnisol.co.za/ [Accessed: 2008-05-03].

Ono, H. 2006. Digital inequality in East Asia: evidence from Japan, South Korea and Singapore. *Asian Economic Papers*, 28(3):116-139. [Online] EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=5728501&site=ehost-live&scope=site [Accessed: 2007-03-21].

Packaged Facts. 2006. The U.S market for women and technology products and services: trends in users demographics, attitudes and purchasing behaviours at home and work. [Online] Available from: http://www.marketresearch.com/product/display.asp?productid=1123265&SID=28115007-388861302-377523529 [Accessed: 2007-07-23].

Pallant, J. 2001. *SPSS survival manual – A step-by-step guide to data analysis using SPSS*. 1st Ed. Buckingham, UK: Open University Press.

Parasuraman, A. & Colby, C.L. 2001. Techno-ready marketing: How and why your customers adopt technology. *Sage Business Journal* [Online] Available from: Sage Journals Online: http://jsr.sagepub.com/cgi/reprint/2/4/307 [Accessed: 2007-11-24].

Parasuraman, A. 2000. Technology Readiness Index (TRI). A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4):307-320. [Online] Proquest: http://proquest.umi.com/login [Accessed: 2007-09-10].

Park, S. 2009. Concentration of internet usage and its relation to exposure to negative content: Does the gender gap differ among adults and adolescents? *Women's Studies International Forum*, 32(2):98-107. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VBD_4W4JR5S_1&_user=59388&_coverDate=04%2F30%2F2009&_alid=922983707&_rdoc=254&_fmt=high&_orig=search&_cdi=5924&_st=4&_docanchor=&view=c&_ct=1851&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=1dfd2bd24a79dc9d3b53f952686d1e9 [Accessed: 2009-05-25].

Park, N., Roman, R., Lee, S. & Chung, J.E. 2009. User acceptance of a digital library system in developing countries: An application of the Technology Acceptance Model. *International Journal of Information Management*, 29(3):196-209 Volume 29, Issue 3, June 2009, Pages 196-209. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VB4_4VYMP5K_2&_user=59388&_coverDate=06%2F30%2F2009&_alid=921885191&_rdoc=3&_fmt=high&_orig=search&_cdi=5916&_sort=d&_st=5&_docanchor=&_ct=231&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=74e8fc11482731f1fb0fe03ac71f4cfc [Accessed: 2009-05-22].

Paul, J. 2002. Narrowing the digital divide: initiatives undertaken by the Association of South-East Asian Nations (ASEAN). *Program: electronic library and information systems,* 36(1):13-22. [Online] Available from: Emerald: http://0-www.emeraldinsight.com/0033-0337.htm [Accessed: 2008-09-25].

Pereira, P. 2004. Some implications of search and switching costs for the price dynamics of electronic markets. *International Journal of the Economics of Business*, 11(3):303-327. [Online] Available from: EBSCOHost Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=114&sid=64dd15ab_b2dc_45b0_beb0_a38e18cd9dcc%40sessionmgr108&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=15544625 [Accessed: 2009-03-26].

Portnoi, L. 2009. To be or not to be an academic: South African graduate students' vocational choices. *International Journal of Educational Development*, 29(4):406-414. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VD7_4VS9KWH_1&_user=59388&_coverDate=07%2F31%2F2009&_alid=921880939&_rdoc=29&_fmt=high&_orig=search&_cdi=5975&_sort=d&_st=4&_docanchor=&_ct=4682&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=816ef76861feb56fc833bf05d48f7b31 [Accessed: 2009-05-20].

Rainer, R.K., Laosethakul, K. & Astone, M.K. 2003. Are gender perceptions of computing changing over time? *Journal of Computer Information Systems*, 43(4):108-114. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=10346368&site=ehost-live&scope=site [Accessed: 2007-03-21].

Rajamäki, H. 2008. Anticipating and managing the challenges of biotechnology marketing. *Journal of Commercial Biotechnology*, 14(3):225-231. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=115&sid=0646d3e7_e13f_4056_9ce4_0b9bbe8f6365%40sessionmgr103&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=32776742 [Accessed: 2009-03-26].

Rall, W.J. 1984. *A comparison of married and living together couples*. Unpublished master's thesis. Pretoria: University of Pretoria.

RNCOS. 2006. *Worldwide consumer electronics market*. [Online] Available from: http://www.marketresearch.com/product/display.asp?productid=1225381&SID=28115007_388861302_377523529&kw=Global%09consumer%09electronics%09sale [Accessed: 2007-07-23].

Robinson, W.T. & Min, S. 2002. Is the first to market the first to fail? Empirical evidence for industrial goods business. *Journal of Marketing Research*, 39(1):120-128. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=101&sid=69d499d0_65e1_489d_af15_22dbf8092f54%40sessionmgr107&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=6311129 [Accessed: 2009-03-26].

Rundle-Thiele, S. & Bennett, R. 2001. A brand for all seasons? A discussion of brand loyalty approaches and their applicability for different markets. *Journal of Product & Brand Management*, 10(1):25-37. [Online] Available from: Emerald: http://0-www.emeraldinsight.com.innopac.up.ac.za:80/ [Accessed: 2007-01-28].

Rust, R.T. & Kannan, P.K. 2003. E-service: a new paradigm for business in the electronic environment. *Communications of the ACM*, 46(6):36-42. [Online] Available from: http://portal.acm.org/citation.cfm?id=777313.777336 [Accessed: 2007-11-24].

Saaksjarvi, M. 2003. Consumer adoption of technological innovations. *European Journal of Innovation Management*, 6(2):90-100. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/14601060310475246 [Accessed: 2009-03-27].

Sami, L.K. & Pangannaiah, N.B. 2006. "Technostress." A literature survey on the effect of information technology on library users. *Library Review*, 55(7):429-439. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/00242530610682146 [Accessed: 2007-03-22].

Sanchez-Franco, M.J., Ramos, A.F.V. & Velicia, F.A.M. 2009. The moderating effect of gender on relationship quality and loyalty toward Internet service providers. *Information & Management*, 46(3):196-202. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VD0_4VRX66X_1&_user=59388&_coverDate=04%2F30%2F2009&_alid=924185001&_rdoc=119&_fmt=high&_orig=search&_cdi=5968&_st=4&_docanchor=&view=c&_ct=1509&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=2021ebe8c118055e30839d2bee35919a [Accessed: 2009-05-25].

Scott, J. & Nolan, J. 2007. New technology and gendered divisions of labour. Problems and prospects for equality in the public and private spheres. *Equal Opportunities International*, 26(2):89-95. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/02610150710732177 [Accessed: 2007-03-22].

Selwyn, N. 2004. Exploring the role of children in adults' adoption and use of computers. *Information, Technology & People*, 17(1):53-70. [Online] Available from: Emerald: http://0-www.emeraldinsight.com/0959-3845.htm [Accessed: 2008-09-25].

Sidin, S., Zawawi, D., Yee, W.F., Busu, R. & Hamzah, Z.L. 2004. The effects of sex role orientation on family purchase decision making in Malaysia. *Journal of Consumer Marketing*, 21(6):381-390. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/07363760410558654 [Accessed: 2007-03-22].

Sieverding, M. & Koch, S.C. 2009. (Self-)Evaluation of computer competence: How gender matters. *Computers & Education*, 52(3):696-701. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VCJ_4VB557N_1&_user=59388&_coverDate=04%2F30%2F2009&_alid=921351813&_rdoc=64&_fmt=high&_orig=search&_cdi=5956&_st=1&_docanchor=&_ct=542&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=d82b981f7414186fb152cc90fd9df23d [Accessed: 2009-05-18].

Simba. 2004. Technology advertising and branding report. *The News Biweekly of technology Marketing Strategy and Tactics*, 22(1):1-2. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/results?vid=12&hid=6&sid=a506c2a3-0164-4e9a-91ef-fa4101a1b9fa%40SRCSM1 [Accessed: 2007-03-19].

Simon, S.J. & Peppas, S.C. 2005. Attitudes towards product website design: a study of the effects of gender. *Journal of Marketing Communications*, 11(2):129-144. [Online] EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=17132328&site=ehost-live&scope=site [Accessed: 2007-03-21].

Sinkovics, R.R., Stöttinger, B., Schlegelmilch, B.B. & Ram, S. 2002. Reluctance to use technology-related products: development of a technophobia scale. *Thunderbird International Business Review (USA)*, 44(4):477-494. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za/Insight/viewContentItem.do;jsessionid=6ACACC4A3859EA799B82B27ECC5CADFA?contentType=Review&contentId=1362464 [Accessed: 2009-03-26].

Slater, S.F., Tomas, G., Hult, M. & Olson, E.M. 2007. On the importance of matching strategic behaviour and target market selection to business strategy in high-tech markets. *Journal of the Academic Marketing Sciences*, 35:5-7. [Online] EBSOCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=18&hid=3&sid=0dca52e5-fb8d-4e29-a399-118678667f55%40SRCSM2 [Accessed: 2007-11-24].

Smith, E. & Oosthuizen, H.J. Attitudes of entry-level university students towards computers: a comparative study. *Computers and Education*, 47:352-371. [Online] Available from:
Science Direct: http://www.sciencedirect.com [Accessed: 2007-09-10].

Snoj, B., Korda, A.P. & Mumel, D. 2004. The relationships among perceived quality, perceived risk and perceived product value. *Journal of Product & Brand Management*, 13(3):156-167. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/10610420410538050 [Accessed: 2009-03-26].

Song, M. & Montoya-Weiss, M.M. 2001. The effect of perceived technological uncertainty on Japanese new product development. *Academy of Journal Management*, 44(1):61-80. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/detail?vid=1&hid=104&sid=b8968bbc_08a6_4692_81ff_2d93e82a573b%40sessionmgr103&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=buh&AN=4131593 [Accessed: 2009-03-26].

Sony. 2007. *Sony HD world. What's all the fuss about?* Cape Town, South Africa: Volcano Print.

South African Advertising Research Foundation. 2008. *Living Standards Measure*. [Online] Available from: http://www.saarf.co.za [Accessed: 2008-12-03].

Southerton, D. 2007. Time pressure, technology and gender: the conditioning of temporal experiences in the UK. *Equal Opportunities International*, 26(2):113-128. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/02610150710732195 [Accessed: 2007-03-22].

Style-Vision, 2004. Global consumer trends to 2006 for the automotive, electronics and technology industries. [Online] Available from: http://www.marketresearch.com/product/display.asp?productid=1020300&SID=28115007_388861302_377523529&kw=Global%09consumer%09electronics%09sales [Accessed: 2007-07-23].

Talukdar, D., Sudhir, K. & Ainslie, A. 2002. Investigating new product diffusion across products and countries. *Marketing Science*, 21(1):97-114. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=6702495&site=ehost-live&scope=site [Accessed: 2009-03-27].

Tarter, C.J. & Hoy, W.K. 1998. Toward a contingency theory of decision making. *Journal of Educational Administration*, 36(3):212-228. [Online] Available from: Emerald: http://www.emeraldinsight.com [Accessed: 2007-11-16].

Third, H. 2007. More women needed in IT industry. [Online] Available from: http://www.microsoft.com/southafrica/press/press-864.mspx [Accessed: 2007-11-24].

Tolle, E. 2006. A New Earth. *Awakening to your life's purpose*. London: Penguin Books.

Tu, Q., Wang, K. & Shu, Q. 2005. Computer-related technostress in China. *Communications of the ACM*, 48(4):77-81. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=16746221&site=ehost-live&scope=site [Accessed: 2007-03-21].

Van de Wijngaert, L. & Bouwman, H. 2009. Would you share? Predicting the potential use of a new technology. *Telematics and Informatics*, 26(1):85-102. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6V1H_4RP0MK4_1&_user=59388&_coverDate=02%2F28%2F2009&_alid=922983707&_rdoc=290&_fmt=high&_orig=search&_cdi=5675&_st=4&_docanchor=&view=c&_ct=1851&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=44f4ea6cee9b3d55d264d3bbc6fcf1cd [Accessed: 2009-05-25].

Van der Rhee, B., Verma, R., Plaschka, G.R. & Kickul, J.R. 2007. Technology Readiness, Learning Goals and eLearning: Searching for Synergy. *Decision Sciences Journal of Innovative Education*, 5(1):127-149. [Online] Available from: Science Direct: http://www.sciencedirect.com [Accessed: 2008-08-25].

Vekiri, I. & Chronaki, A. 2008. Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers & Education*, 51(3):1392-1404. [Online] Available from: ScienceDirect: http://www.sciencedirect.com.innopac.up.ac.za/science?_ob=ArticleURL&_udi=B6VCJ_4S02D4T_2&_user=59388&_coverDate=11%2F30%2F2008&_alid=921351813&_rdoc=159&_fmt=high&_orig=search&_cdi=5956&_st=1&_docanchor=&view=c&_ct=542&_acct=C000005298&_version=1&_urlVersion=0&_userid=59388&md5=e83bd956c0d0128cd14c1e2173f0c6cf [Accessed: 2009-05-18].

Verleye, G. & De Marez, L. 2004. Diffusion of innovations: successful adoptions needs more effective soft-DSS driven targeting. *Journal of Targeting, Measurement and Analysis for Marketing*, 13(2):140-155. [Online] Available from: EBSCOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/pdf?vid=18&hid=3&sid=0dca52e5-fb8d-4e29-a399-118678667f55%40SRCSM2 [Accessed: 2007-11-24].

Verma, R., Victorino, L., Karniouchina & Feickert, J. 2007. Segmenting Hotel Consumers Based on the Technology Readiness Index. *Cornell Hospitality Report*, 7(13):4-15. [Online] Available from: Science Direct: http://www.sciencedirect.com [Accessed: 2008-09-25].

Walsh, G. & Mitchell, V.W. 2005. Demographic characteristics of consumers who find it difficult to decide. *Marketing Intelligence & Planning*, 23(3):281-295. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/02634500510597319 [Accessed: 2009-03-27].

Wang, G., Dou, W. & Zhou, N. 2008. Consumption attitudes and adoption of new consumer products: a contingency approach. *European Journal of Marketing*, 42(1):238-254. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/03090560810840998 [Accessed: 2009-03-27].

Wang, J. & Cole, C. 2008. Assessing consumer reaction to new product ideas: Does it matter where you live and how old you are? *Advances in Consumer Research: North American Conference Proceedings*, 35:983-984. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=buh&AN=35064043&site=ehost-live&scope=site [Accessed: 2009-03-27].

Wikipedia. 2007. *Technophobia*. [Online] Available from: http://en.wikipedia.org/wiki/Technophobia [Accessed: 2007-07-16].

Williams, T.G. 2002. Social class influences on purchase evaluation criteria. *Journal of Consumer Marketing*, 19(3):249-276. [Online] Available from: Emerald: http:// .www.emeraldinsight.com/ [Accessed: 2007-11-16].

Wolin, L.D. & Korgaonkar, P. 2003. Web advertising: gender differences in beliefs, attitudes and behavior. *Internet Research: Electronic Networking Applications and Policy*, 13(5):375-385. [Online] Available from: Emerald: http://www.emeraldinsight.com.innopac.up.ac.za:80/10.1108/10662240310501658 [Accessed: 2007-03-22].

Wood, S.L. & Moreau, C.P. 2006. From fear to loathing? How emotion influences the evaluation and early use of innovations. *Journal of Marketing*, 70:44-57. [Online] Available from: EBSOHost: Business Source Premier: http://web.ebscohost.com.innopac.up.ac.za/ehost/pdf?vid=17&hid=3&sid=0dca52e5-fb8d-4e29-a399-118678667f55%40SRCSM2 [Accessed: 2007-11-24].

Yadav, N., Swami, S. & Pal, P. High technology marketing: conceptualization and case study. *Vikalpa: The Journal for Decision-Makers*, 31(2):57-74. [Online] Available from: EBSCOHost: Business Source Premier: http://search.ebscohost.com.innopac.up.ac.za:80/login.aspx?direct=true&db=buh&AN=21559050&site=ehost-live&scope=site [Accessed: 2007-03-19].

Yeniyurt, S. & Townsend, J.D. 2003. Does culture explain acceptance of new products in a country?: An empirical investigation. *International Marketing Review*, 20(4):377-396. [Online] Available from: Emerald: www.emeraldinsight.com/10.1108/02651330310485153 [Accessed: 2009-03-27].

UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

ANNEXURE A

QUESTIONNAIRE

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

University of Pretoria

Consent for participation in an academic research study

Dept. of Marketing and Communication Management

A survey of gender differences in technophobia and in the adoption of high-technology consumer products

<u>Research conducted by:</u>
Mrs. Olivia Anderson (22167723)
Cell: 082 828 2632

Dear respondent

You are invited to participate in an academic research study conducted by Olivia Anderson, a Masters student from the Department of Marketing and Communication Management at the University of Pretoria.

The purpose of the study is to investigate consumers' willingness to adopt new, high-technology consumer products.

Please note the following:

- This study involves an <u>anonymous</u> survey. Your name will not appear on the questionnaire and the answers you give will be treated as strictly <u>confidential</u>. You cannot be identified in person based on the answers you give.
- Your participation in this study is very important to me. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 10 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my study leader, Mr. T.G. Kotzé, on tel. (012) 420-4844 (e-mail: theuns.kotze@up.ac.za) if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

___________________________   ___________________
Respondent's signature   Date

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Research Questionnaire

Respondent number				
For office use only V1	1	2	3	4

- Technophobia and Technology Adoption -

Dear respondent

Thank you for your willingness to complete this survey. This survey aims to determine your attitude towards technology and should not take more than 10 minutes to complete. This is an anonymous and confidential survey. You cannot be identified and the answers you provide will be used for research purposes only.

Please answer <u>all</u> the questions. There are no right or wrong answers. We are interested in understanding your feelings towards certain technologies.

Q1. Please indicate your age in years

For office use only
V2 ☐ 5

If you are not between the ages of 25-35 years, please stop and do not continue with the survey. If are between the ages of 25-35 years, please continue below.

Q2. Various products are listed below. Which of these products do you have in your household? (*Please tick <u>all</u> the products that are in your household*).

		For office use only
Hi-fi / music system	1	V3 ☐ 6
Computer / laptop	2	V4 ☐ 7
Dishwashing machine	3	V5 ☐ 8
Clothes washing machine	4	V6 ☐ 9
Electric stove	5	V7 ☐ 10

If you do not make use of at least four of these items, please stop and do not continue with the survey. If you do make use of at least four of these items, please continue with the survey below.

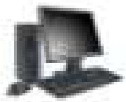
Q3. Please indicate your gender

Male	1	
Female	2	

For office use only
V8 ☐ 11

Section 1: General attitudes to four specific technology products

Q4. Consumers react to new technologies in different ways. A number of statements describing different attitudes towards certain technologies appear below and on the next page. Please indicate the extent to which you agree or disagree that the statement describes how you generally feel about the specific technology shown.



Standard Desktop Computer

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
I can usually figure out how computers work without help from others.	1	2	3	4	5	V9 ☐ 12
The computer is often too complicated to be useful.	1	2	3	4	5	V10 ☐ 13
I feel confident using the latest computer technology.	1	2	3	4	5	V11 ☐ 14
Computer technology may fail at the worst possible time.	1	2	3	4	5	V12 ☐ 15
Computer technology gives people more control over their daily lives.	1	2	3	4	5	V13 ☐ 16
Learning about computer technology can be as rewarding as the technology itself.	1	2	3	4	5	V14 ☐ 17
In general, I am among the first in my circle of friends to acquire new computer technology.	1	2	3	4	5	V15 ☐ 18
Computer technology is usually a lot safer than people are led to believe.	1	2	3	4	5	V16 ☐ 19
I prefer to use the most advanced computer technology available.	1	2	3	4	5	V17 ☐ 20
It can be risky switching to the latest computer technology too quickly.	1	2	3	4	5	V18 ☐ 21

Digital Camera with Quick Auto Focus and Face Detection features

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
I can usually figure out how this high-end camera works without help from others.	1	2	3	4	5	V19 ☐ 22
This camera is often too complicated to be useful.	1	2	3	4	5	V20 ☐ 23
I feel confident using the latest camera technology.	1	2	3	4	5	V21 ☐ 24

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
This camera technology may fail at the worst possible time.	1	2	3	4	5	V22 25
The latest camera technology gives people more control over their daily lives.	1	2	3	4	5	V23 26
Learning about this camera technology can be as rewarding as the technology itself.	1	2	3	4	5	V24 27
In general, I am among the first in my circle of friends to acquire new camera technology.	1	2	3	4	5	V25 28
Camera technology is usually a lot safer than people are led to believe.	1	2	3	4	5	V26 29
I prefer to use the most advanced camera technology available.	1	2	3	4	5	V27 30
It can be risky switching to the latest camera technology too quickly.	1	2	3	4	5	V28 31

Home automation technology uses high-end intelligent systems to 'smart home' your house. This includes the ability to control everything in your home from your coffee maker, room temperature and lighting via an electronic remote.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
I would be able to figure out how home automation technology works without help from others.	1	2	3	4	5	V29 32
Home automation technology is often too complicated to be useful.	1	2	3	4	5	V30 33
I would feel confident using the latest home automation technology.	1	2	3	4	5	V31 34
Home automation technology may fail at the worst possible time.	1	2	3	4	5	V32 35
Home automation technology gives people more control over their daily lives.	1	2	3	4	5	V33 36
Learning about home automation technology can be as rewarding as the technology itself.	1	2	3	4	5	V34 37
In general, I would be the first in my circle of friends to acquire home automation technology.	1	2	3	4	5	V35 38
Home automation technology is usually a lot safer than people are led to believe.	1	2	3	4	5	V36 39
I would prefer to use the most advanced home automation technology available.	1	2	3	4	5	V37 40
It can be risky switching to the latest home automation technology too quickly.	1	2	3	4	5	V38 41

Section 2: Optimism towards technology

Q. 5 People differ in their optimism towards new technologies. A number of statements below describe different attitudes towards innovative products. Please indicate the extent to which you agree or disagree with the statement.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
I prefer to use the most advanced technology available.	1	2	3	4	5	V39 ☐ 42
Technology gives me more freedom of mobility.	1	2	3	4	5	V40 ☐ 43
I feel confident that machines will follow through with what I instructed them to do.	1	2	3	4	5	V41 ☐ 44
Learning about technology can be as rewarding as the technology itself.	1	2	3	4	5	V42 ☐ 45
I find new technologies to be mentally stimulating.	1	2	3	4	5	V43 ☐ 46

Section 3: Willingness to take technological risks

Q 6. Consumers differ in their willingness to take risks when trying new technology products. Please indicate the extent to which you agree or disagree with the statement.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	For office use only
I like to purchase unusual technology products, even if I am not sure whether I would like it.	1	2	3	4	5	V44 ☐ 47
I am the kind of person that would try any new and unfamiliar technology once.	1	2	3	4	5	V45 ☐ 48
I am cautious in trying new or different products.	1	2	3	4	5	V46 ☐ 49
I would rather stick with a technology I usually buy than try something I am not sure of.	1	2	3	4	5	V47 ☐ 50
I never buy something I don't know about at the risk of making a mistake.	1	2	3	4	5	V48 ☐ 51
If I buy appliances, I will buy only well-established brands.	1	2	3	4	5	V49 ☐ 52
I enjoy taking chances in buying unfamiliar brands just to get some variety in my purchases.	1	2	3	4	5	V50 ☐ 53

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Section 4: Attitude towards your last technology purchase

Q 7. Some purchase decisions are important and require careful thought while others are less important. Think back to the last time you purchased or considered purchasing a technology product. <u>How important was the decision to you?</u>

	7	6	5	4	3	2	1	
Very important decision								Very unimportant decision
Decision required a lot of thought								Decision required little thought
A lot to lose if you choose wrong								Little to lose if you choose wrong

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V51		54
V52		55
V53		56

Thank you for completing the survey.
We appreciate your assistance.

ANNEXURE B

HISTOGRAMS

Figure 5: Distribution of responses to technophobia towards standard desktop computers scale

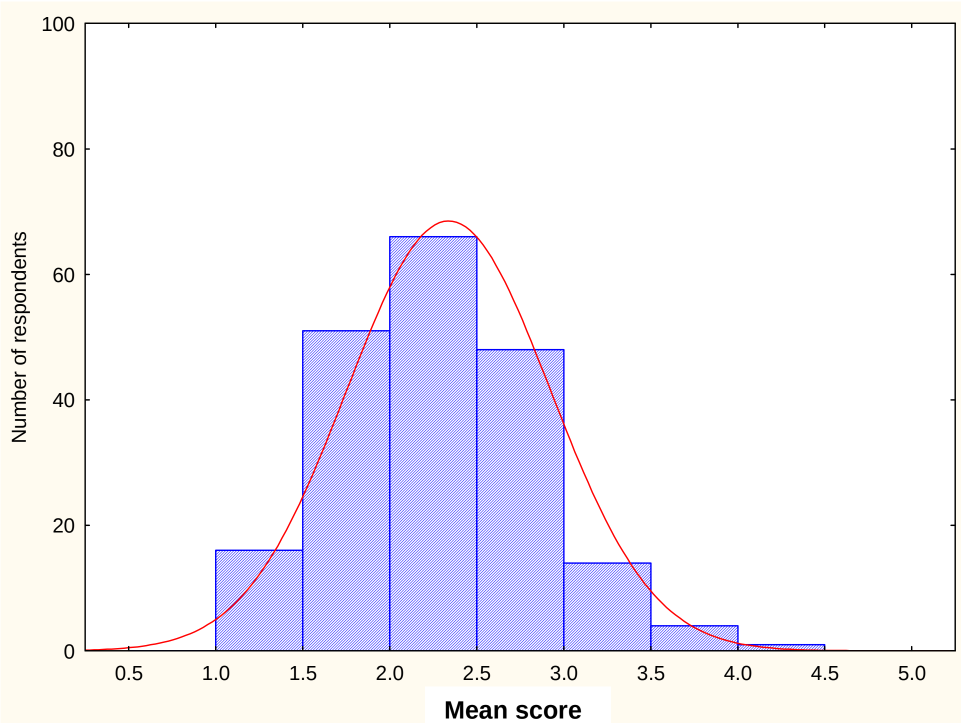

Figure 6: Distribution of responses to technophobia towards DSLR cameras scale

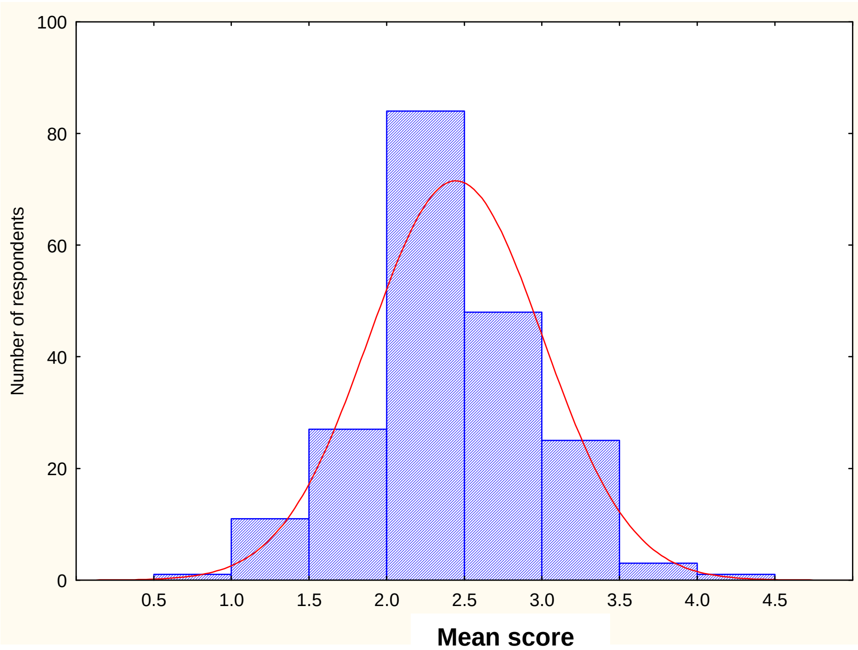

Figure 7: Distribution of responses to technophobia towards home automation technology scale

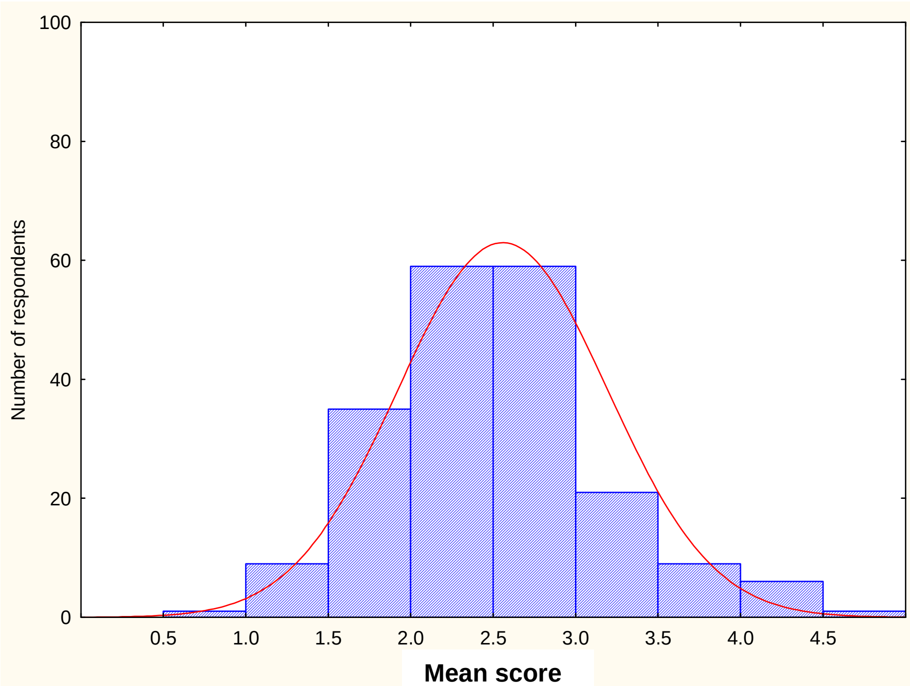

Figure 8: Distribution of responses to optimism towards technology scale

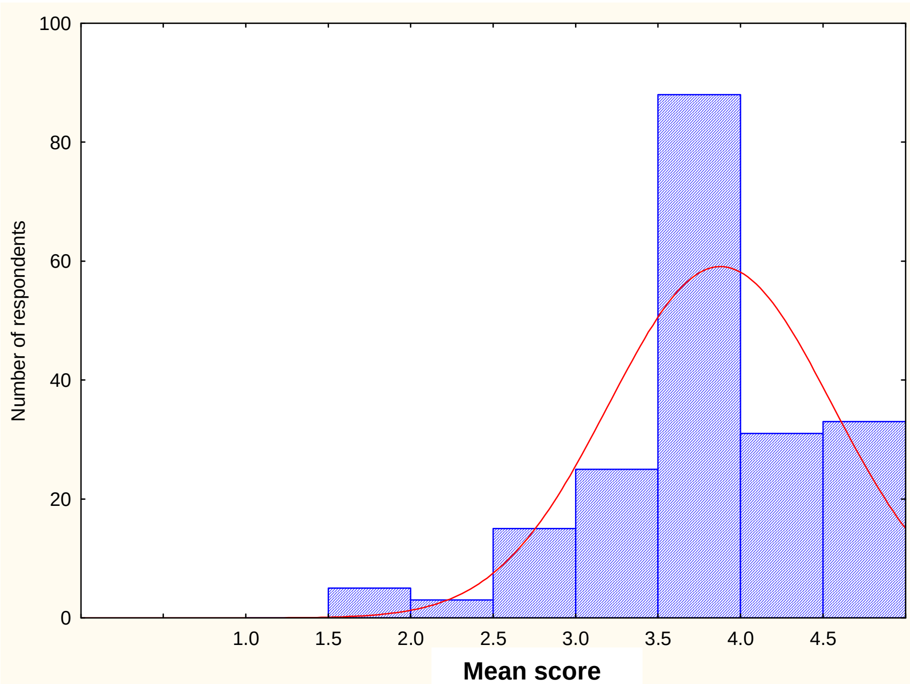

Figure 9: Distribution of responses to willingness to take technological risks scale

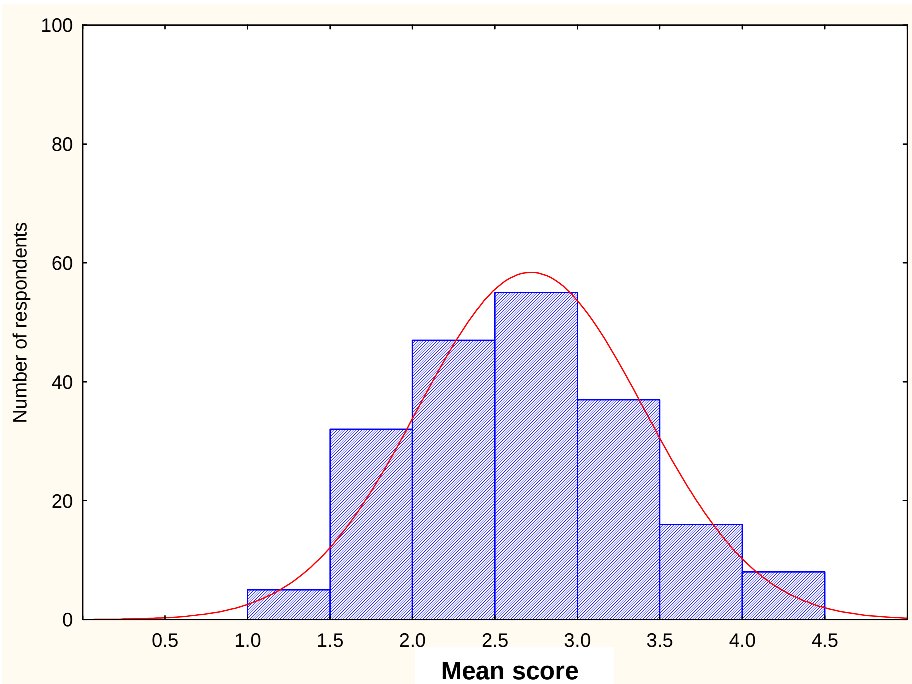

Figure 10: Distribution of responses to cognitive involvement scale