An investigation into the role of moderating variables on mobile broadband technology acceptance in Indonesia

A thesis submitted in fulfilment of the requirement for the degree of Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author along; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Priyantono Rudito
Date: 01 October 2010

ABSTRACT

This thesis involved an examination of the impact of moderator variables on the extended technology acceptance model with the aim of developing a more integrative framework for understanding mobile broadband technology acceptance in Indonesia. The absence of an integrative model that incorporates other types of variables, such as moderator factors, in the current literature indicates the importance of developing such a framework. The research design of this thesis was based in part on a comprehensive literature review, followed by a pre-test, a pilot study and the main study, which yielded 704 responses. The study identified three main variables that potentially have a moderating influence on the Technology Acceptance Model (TAM). These are individual culture value orientation, customer perceived value (CPV) and demographic factors. Furthermore, the most recently developed model in the field, the TRAM (Technology Readiness and Acceptance Model), was also examined for its potential as a baseline model for testing the moderator variables. A comparison between the TRAM and the original TAM was conducted based on structural equation modelling (SEM) fit examination procedures, the results of which revealed that only the TAM part of the TRAM was valid for implementation in the present research.

The high and low groups of CPV, individual cultural orientation and demographic data were used to develop unconstrained structural high and low data group models, a constrained model and a partially constrained model, to which chi-square difference tests were then applied. The results of these tests indicated whether the differences in the hypothesised relationships in the research model were significant across the groups. A significant result confirmed the influence of some of the moderator variables. These included the conservation and openness to change cultural orientations, which were measured based on Schwartz's Value System (SVS). Openness to change was proven to moderate two of the three relationships in TAM. It significantly moderated the relationships between perceived enjoyment (PE) and usage intention (UI) and between perceived ease of use (PEOU) and UI.

The moderating influence of openness to change on the relationship between perceived usefulness (PU) and UI was found to be insignificant. An interesting finding was obtained by testing the moderating influence of conservatism. Although significant evidence was found to support that conservatism moderated the technology acceptance model overall, no significant results were identified confirming a moderating influence of openness to change on the PE–UI, PU–UI and PEOU–UI relationships. A significant result was obtained for the relationship between PU and PE, where conservatism demonstrated a moderating influence.

In addition, ‘technology readiness’ was revealed to have a moderating role, rather than performing as a primary antecedent variable within TAM as previously suggested by TRAM research. The moderating influence test results showed that technology readiness moderated the relationships between PE and UI, PU and UI, and also between PEOU and UI.

These findings led to the development of a more integrative model for understanding mobile broadband technology acceptance in Indonesia. This model can be seen to provide researchers and practitioners alike with invaluable new knowledge needed to enhance technology investment and deployment, new product development, market education, and marketing programs.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious, the most Merciful

Undertaking the RMIT PhD program has been an unforgettable experience. It is not only about obtaining an academic degree. More meaningful than that, it has been an invaluable opportunity for me to embrace a world of knowledge and learning that I have been very thankful to experience. I feel that the rigorous learning process I have been through in this program has been essential to build my understanding about what the research is all about and how it relates to the 'real world' of industry and daily life.

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Priyantono Rudito

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

This chapter explains the importance of studying mobile broadband technology acceptance, as outlined in the sections on the research objective, the research problem and the contribution of this thesis to existing theory. The issues addressed by the objectives relate to the developments and trends occurring in the Indonesian telecommunications industry on which the research is based. An overview of this industry is presented early in the chapter to provide the readers with an understanding of the main issues backgrounding the research problems. At the end of the chapter the definitions of the technical terms related to broadband technology used in this thesis are presented.

1.2 RESEARCH BACKGROUND: TELECOMMUNICATIONS DEVELOPMENT AND THE INDONESIAN ECONOMY

The telecommunications industry continues to hold its capacity for innovation and invention. Considerable numbers of new products have been introduced into this sector, and a large number of patents have been registered in patent offices all over the world. Hundreds of trillions of dollars have been invested to create more advanced technologies that satisfy people's ever changing needs. One of the most important communication needs that is now being addressed by both telecommunications manufacturers and telecommunications operators is mobility. The mobility has been proven to be a major part of today's communications sector. This explains why mobile communication has been dominating this sector as the role played by mobility in every area of life continues to grow. People move from one place to another rapidly and need to have access to the latest information, work while travelling, spend time on their hobbies using mobile digital gadgets, and stay in touch with colleagues and business partners, relatives and friends through a range of online social networks.

Innovation in mobile communication is signified by different generations. The first generation was analog communication, which delivers voice-only communication. Digital breakthroughs carried mobile communication into a new era. The second generation is often known as GSM (Global Systems for Mobile Communication), which saw the European digital mobile communication standard become the major standard at the time. The second generation was limited in its capacity to transfer high volumes of data.

Subsequent research and development introduced newer generations onto the market, with the following technology names: 2.5G (GPRS), 3G and currently 4G. This latest generation is characterised by a higher capability to provide broadband communication to users. With the latest technology, high-speed data access that delivers multimedia information, music and video streaming, online gaming and other online activities through a mobile network has now become the norm.

As is the case in other parts of the world, the telecommunications sector in Indonesia plays an important role in boosting the Indonesian economy (Kim, S & Garrison 2009). It has also transformed the country's citizens into a productive, knowledgeable and broad-minded human resource at levels equal to that of other nations (Indonesia-Infocom-Society 2004). Former Minister for Communication and Information of the Republic of Indonesia Nuh (2008) stated that telecommunications technology development in Indonesia provides a way for the country to break the vicious circle of poverty and backwardness it has faced. An adequate telecommunications infrastructure is believed not only to promote economic growth but also to enhance living standards (Nuh 2008). It stimulates much needed investments in Indonesia by enabling local and foreign investors to set up business in the country (Sridhar & Sridhar 2007). More importantly, it also meets the need for broadband-based services which are now required by both business and residential consumers.

However, to serve the current broadband-based communication needs for individuals and businesses, the telecommunications infrastructure in Indonesia is still in need of improvement. The government has recognised this fact and the importance of upgrading its current telecommunications network to become more modern and cost effective. This upgrade is to be conducted through large-scale investment into the implementation of the next generation network (NGN) technology platform. The new platform will enable operators in Indonesia to provide the required broadband access services to their customers in a more efficient way. The network will also offer greater flexibility to customers in that they can either use wired or wireless devices. In the same vein, telecommunications operators, including the incumbent Telkom Indonesia, have been working intensively to find the best way to deploy the new mobile broadband technology into commercialised services. They must ensure that the services can be successfully adopted by consumers before committing to significant financial investment in such technology. Yet past experience has shown industry participants that this is not going to be an easy task, as evidenced by the low success rate of past adoption of new technology in Indonesia. The government and all participating operators must first gain a thorough understanding of how consumers accept the new technology. Such understanding can be

obtained through a comprehensive framework or model that explains how influential factors affect technology acceptance processes. Unfortunately, the theoretical models described in the literature have not been implemented in the Indonesian telecommunication industry. As a result, the development of new broadband technology infrastructure, which is capital intensive, must be performed with reduced confidence in achieving commercial success.

The search for a more comprehensive model of technology acceptance has been receiving increased attention in the research world, and researchers are in agreement about the importance of developing such a model. This model is known as the integrated acceptance model. Research efforts have continued to discover the most effective model, involving the inclusion of more factors into various existing models; however, still no satisfactory results have been obtained. So the search for the optimal technology acceptance model continues.

1.3 PROBLEM STATEMENTS

A visionary strategic scenario to develop a new broadband technology network in Indonesia needs to be identified and implemented. To sucessfully do so, however, certain issues first need to be addressed due to their potential for becoming obstacles to progress. A number of these issues are addressed in the problem statements of this thesis as follows:

- Low rate of new technology adoption

The first and most crucial problem is the low adoption rate of new technology products. As reported by the state-owned Telkom Indonesia (2007), the introduction and adoption of mobile broadband technology in Indonesia has not been as rapid as that of other countries. This fact is supported by the results of a market survey conducted by independent market research company Sharing Vision (2007). Projected teledensity data (Telkom Indonesia 2007) shows that the number of new broadband product users in every 100 Indonesian residents in 2010 equated to the low level of 0.65%. This means that approximately only 1 person among 100 are using mobile broadband services in Indonesia. This figure is much lower than that for the old technology of fixed telephone lines, which achieved a 38% teledensity level in the same year.

- Lack of understanding of the technology acceptance process

There is a lack of comprehensive understanding of the acceptance process for new technologies. The factors influencing customers to adopt new technology products in the

Indonesian telecommunications industry have not been systematically studied. As a consequence, Indonesian telecommunications operators tend to rely heavily on the promotional pricing approach in introducing and attracting customers to use their new technology products. This approach has caused a lot of confusion for Indonesian customers (Mahadevan & Chan 2008) because it does not really address their needs and explain how these needs are met. The approach tends to over emphasise the promotional price advantages offered to create "this time only opportunity" to acquire the new technology product.

- Less confidence in achieving national penetration rate targets

To resolve the country's economic problems, the Indonesian Government is encouraging telecommunications operators to build new voice–internet–multimedia convergence networks. It is expected that this policy will stimulate economic growth as a result of the new internet and multimedia product applications. The internet and multimedia penetration rate target of 25% (Mastel 2003) is less likely to be realised without a good understanding of the new product acceptance process.

- The need for an improved integrated model of new technology acceptance

An integrated model of new technology adoption involving moderator variables is needed to successfully introduce new broadband-based products into the market.

- Need for a theoretical framework

The issue of new technology acceptance has increasingly drawn the attention of scholars around the world. As mentioned by Lu et al. (2005) and Bhatti (2007), most m-commerce applications, beyond a very few personal applications (e.g. ring tones), have failed to meet expectations (p. 2). This has encouraged scholars to seek to identify the factors that influence the adoption of mobile applications (Bhatti 2007; Pagani 2004; Smith, Smith & Christopher 2007) and to incorporate such factors into an integrated model. Of all the influential factors, researchers believe that it is essential to focus on the role of moderator variables in developing an integrated model of technology acceptance.

1.4 RESEARCH OBJECTIVE

This thesis will focus on an investigation into the role of moderating variables on mobile broadband technology acceptance in Indonesia with the aim of developing an integrated mobile broadband service acceptance model in Indonesia. The model is developed to provide a contribution to the theory in this field by studying moderator variables more intensively. The results of this reseach might also be used to assist telecommunications

operators—both those who have already operated in the country as well as those outside Indonesia—to develop strategic, high-tech new product development and marketing programs.

More specifically, the objectives of this research are:

1. to develop, empirically test and validate an integrated model of mobile broadband technology acceptance in Indonesia

2. to explore, identify and characterise the variables that have potential moderating influences on mobile broadband technology acceptance

3. to examine and empirically test the influence of the identified moderator variables

4. to understand the implications of moderator variable role and its influence on technology acceptance formation.

1.5 RESEARCH QUESTIONS

The following research questions (RQs) were formulated to address the research objectives listed in point 1.3 above:

RQ1: What model can appropriately explain the mobile broadband technology acceptance process in Indonesia?

RQ2: What are the moderator variables that influence the causal relationships in the model of mobile broadband technology acceptance?

RQ3: In what ways do moderator variables moderate the acceptance model of mobile broadband technology?

1.6 CONTRIBUTION OF THE THESIS

Extant studies found in the literature offer inadequate explanations of technology acceptance. A more comprehensive model than those already developed which incorporates the less studied moderator variables is required. This thesis contributes important research findings to the body of knowledge enabling better understanding of the technology acceptance phenomenon in the following ways. First, the thesis provides a more integrated model, developed by integrating the individual propensity–based approach and the system perceived perspective approach, and including moderator

variables. Second, the thesis presents new findings that were obtained from testing acceptance models within non-work settings. This fills a gap in the present research findings since most studies to date have been conducted within organisations. Third, this thesis identifies factors that potentially demonstrate a moderating influence in the model of technology acceptance. The moderating factors identified were based on exploratory literature reviews conducted in the areas of individual cultural orientation, consumer perceived value, technology readiness and demographic factors. The first three factors are measured based on the reconstructed dimensional scales obtained from the exploration and confirmation of dimensionality procedures to identify contextualised findings to contribute to the theory. Finally, this thesis enhances understanding of the causal interactions occurring between acceptance and its dimensions under the moderating influence of certain significant factors.

1.7 ORGANISATION OF THE THESIS

This thesis is divided into seven chapters, reflecting the research process and stages undertaken in developing a model of mobile broadband technology acceptance in Indonesia.

Chapter 1 introduces the research background, highlighting the importance of the Indonesian telecommunications sector for the country's economic growth. Issues that could become problems or obstacles for the research objectives are outlined. This chapter also explains the research objectives, research questions and the study's contribution to the extant theory. The terminology used in this thesis that is related to the technical aspects of broadband technology is explained at the end of this chapter.

Chapter 2 presents the literature review conducted for this research. The review begins with an explanation of important developments in mobile communication technology in the Indonesian telecommunications industry. It also discusses the activities undertaken year by year aimed at improving the infrastructure to meet the demand for fixed and mobile broadband convergence networks in the country. The chapter continues by reviewing extant theories and previous research conducted to produce models of technology acceptance. Some of the most prominent models frequently adopted in research studies are elaborated here. To address the focus of this research, this chapter covers studies of acceptance models carried out specifically in the mobile broadband industry. Finally, Chapter 2 incorporates a review of the attempts of previous studies to discover an integrated technology acceptance model. This includes a notable attempt to incorporate technology readiness (TR) into the most prominent Technology Acceptance Model (TAM).

Finally, the importance of studying moderator variables in enhancing the understanding of the technology acceptance process is also explained.

Chapter 3 identifies potential moderator variables to be incorporated into the research model. It starts by referring to an important model that has successfully integrated a personal attitude–based model, called technology readiness, with a prominent cognitive system assessment–based framework known as the Technology Acceptance Model, or TAM. This integrated model is named TRAM (technology readiness and acceptance model). The need for moderator variables to be included both in TAM and TRAM to produce a more solid model is discussed. Finally, Chapter 3 presents comprehensive reviews of three potential moderator variables to be empirically tested in this thesis. These factors are customer perceived value (CPV); individual cultural orientation; and demographic factors including age and gender. The methods and metrics used to measure these variables will also be examined involving multiple-item scale CPV and Short Schwartz's Value Survey (SSVS). This chapter concludes by presenting the research model conceptually constructed based on the identified influential variables. The hypotheses required to empirically test the conceptual model are presented in this section.

Chapter 4 explains the research paradigm, methods, stages, operationalisation of variables and research instrument development. The results of the research activities conducted prior to the main study are reported in this chapter, including pretesting and pilot study phases. Finally, a statistical procedure used to test the conceptual model and to examine the moderator variable involving structural equation modelling (SEM) is summarised.

Chapter 5 reports the data analysis results. It begins with an explanation of the internal reliability measurement of the research instrument and the results of data cleaning and preparation. This first section is followed by a report of the outcome of exploration and confirmation of dimensionality stages as embedded parts of the structural equation modelling applied in this research. Finally, Chapter 5 concludes discussion of the results of moderator variable testing by presenting the factors that display significant moderating influences in the technology acceptance model.

Chapter 6 explains and discusses the results of the hypothesis tests conducted to validate the research models. There are 15 hypothesised results explained in this chapter based on theoretical and practical perspectives. The final model confirmed by this thesis is then presented which is used to demonstrate the contributions of this thesis to the body of literature. The limitations of the study are discussed, and potential directions for future

research suggested. Finally, the most important findings are crystallised in the conclusion of Chapter 6.

Chapter 7 summarises key findings obtained in this thesis based on the hypothesis test results. The findings are explained in relation to the research questions and referred to finalise the integrated model of mobile broadband technology acceptance in Indonesia. Theoretical, managerial and social implications of the findings are also discussed in this chapter. At the end of the chapter, recommendations for future research are suggested.

1.8 DEFINITION OF TECHNICAL MOBILE BROADBAND RELATED TERMS

1.8.1 Mobile Broadband Technology

The term 'broadband' commonly refers to high-speed internet access. The Federal Communications Commission (FCC), an independent United States (US) government agency, defined 'Broadband services as data transmission speeds exceeding 200 kilobits per second (kbps), or 200,000 bits per second, in at least one direction: downstream (from the Internet to the user's computer) or upstream (from the user's computer to the Internet)'.

Broadband speeds vary significantly depending on the particular type and level of service provided, and may range from as low as 200 kilobits per second (kbps), or 200,000 bits per second, to six megabits per second (Mbps), or 6,000,000 bits per second. Some recent offerings even include 50 to 100 Mbps. Broadband services for residential consumers typically provide faster downstream speeds (from the internet to the computer) than upstream speeds (from the computer to the internet).

Wireless broadband can be mobile or fixed:

- A fixed wireless broadband service is becoming increasingly widely available at airports, city parks, bookstores, and other public locations called 'hotspots'. Hotspots generally use a short-range technology that provides speeds of up to 54 Mbps. Wireless fidelity (Wi-Fi) technology is also often used in conjunction with DSL or cable modem services to connect devices within a home or business to the internet via a broadband connection. The most recent technology development is Worldwide Interoperability for Microwave Access, better known as WiMAX, which is able to reach data access speeds of up to 128 Mbps.

- Mobile wireless broadband services are also becoming more readily available from mobile telephone service providers and others. These services are generally

appropriate for highly mobile customers and require a special PC card with a built-in antenna that plugs into a user's laptop computer. Generally, they provide lower speeds, in the range of several hundred Kbps.

This thesis focuses on the use of mobile broadband services by Indonesian consumers primarily to obtain fast mobile internet access to perform online activities.

1.8.2 NGN (Next Generation Network)

The International Telecommunication Union (ITU), as stated on its official website, defines NGN as 'a packet-based network able to provide Telecommunication Services to users and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent of the underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and services of their choice. It supports generalised mobility which will allow consistent and ubiquitous provision of services to users' (ITU-T Recommendation Y.2001 [12/2004] - General overview of NGN).

Seel (2007) has described NGN as the term commonly used to explain the next telecommunications technology platform. It is the carrier vision of an all-IP multi-service fixed mobile converged network that creates many new revenue streams for dramatically decreased costs.

CHAPTER 2: LITERATURE REVIEW

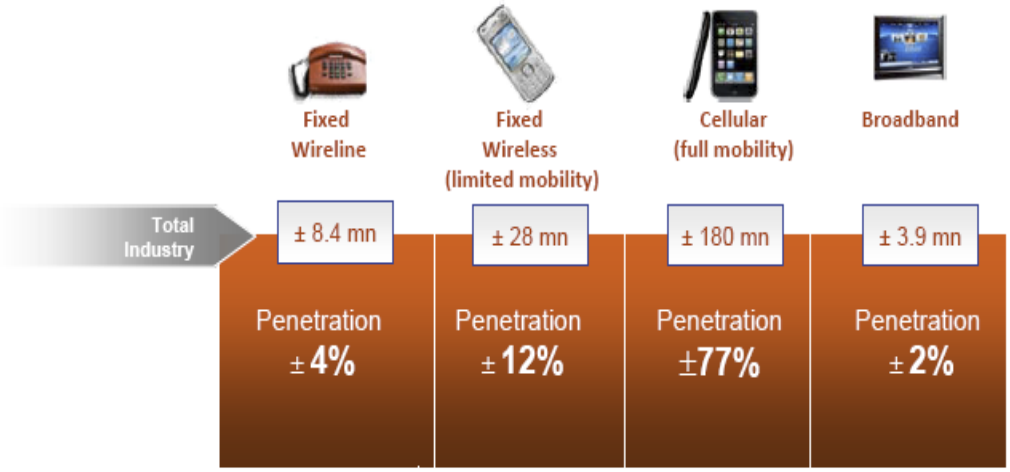
2.1 INTRODUCTION

The objective of this chapter is to identify the best fitted model to be used as a baseline for testing moderator variables. To achieve this aim, the general acceptance models existing in the literature are first reviewed. Accordingly, models that specifically explain consumers' acceptance of mobile technology are investigated, followed by identification and review of the models that incorporate moderator variables. At the end of the chapter, a synthesis of common existing approaches used by previous studies to investigate technology acceptance and develop an integrated acceptance model is presented. The literature review is then concluded by proposing potential baseline models to be further tested based on empirical data. To begin, it is important first to gain an understanding of the main issues and trends in the Indonesian telecommunications industry to provide a context for the model development approaches.

2.2 TELECOMMUNICATIONS INDUSTRY AND MOBILE COMMUNICATION DEVELOPMENT IN INDONESIA

Indonesia has experienced tremendous growth in the number of mobile service users, particularly in the full mobility celullar service segment, as shown in Figure 2.1. With a market penetration level of 77% in March 2010, this particular service is operated by eight providers that serve as many as 180 million subscribers in the country. This figure has already exceeded the initial projection which estimated a much smaller number of subscribers of only 120 million users by the end of 2010 (Evans 2005). This initial projection is presented in Figure 2.2. This hiking trend is expected to continue in the coming years, providing lucrative opportunities for significant investments to be made in this fourth most populous country in the world.

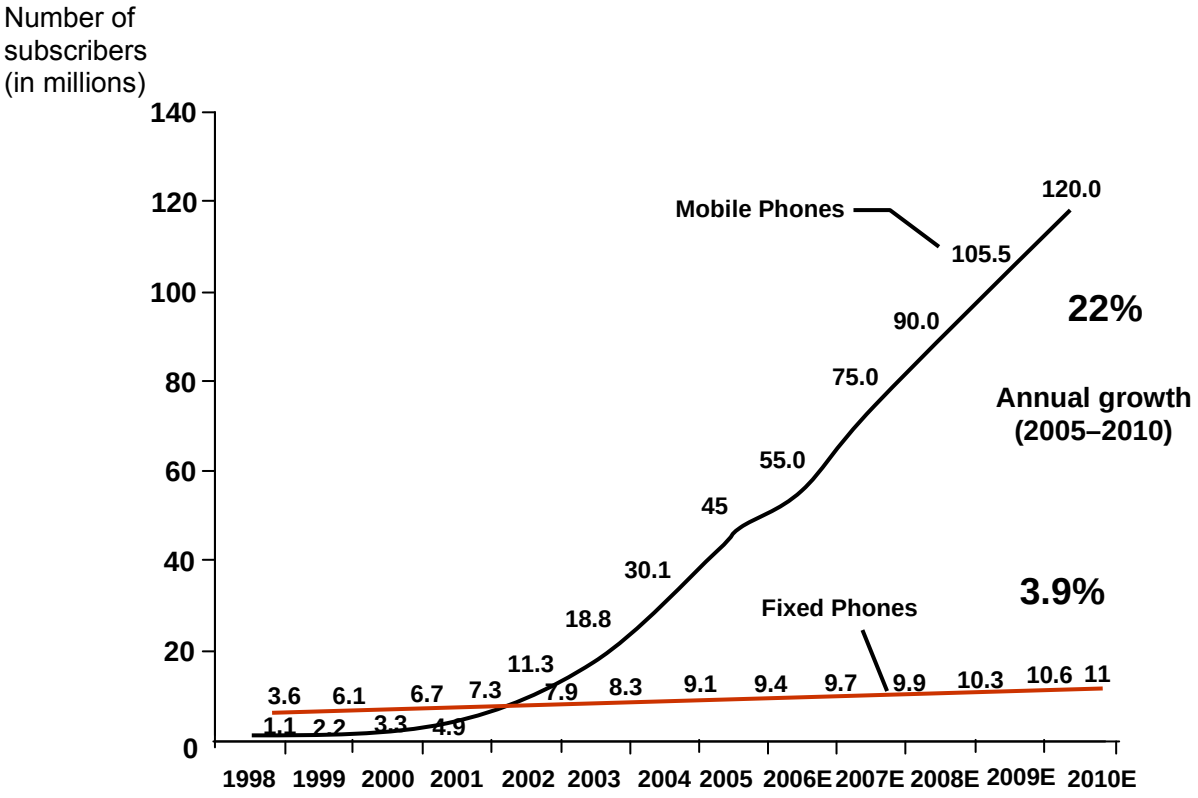
FIGURE 2.1 MARKET PENETRATION OF TELECOMMUNICATION SERVICES IN INDONESIA AS OF MARCH 2010



Source: Telkom-Indonesia (2010)

As is the case in other parts of the world, mobile communication in Indonesia has not emerged overnight. Mobile service development began in 1984, marked by the introduction of Nordic Mobile Telephone (NMT), the first generation (1G) of mobile technology. The development stages of the evolution of mobile service deployment, utilising the 1G through to the 3G technologies, are described in Table 2.1 (Evans 2005; Suwandi & Mahardika 2006).

FIGURE 2.2 PROJECTION OF NUMBER OF SUBSCRIBERS TO FIXED AND MOBILE TELEPHONES IN INDONESIA



Source: Evan (2005)

The first initiative to build a national mobile communication network was undertaken by a state-owned telecommunications company known as P.T. Telekomunikasi Indonesia, Tbk., commonly known as Telkom Indonesia. The company has full national coverage and is now operating in 33 provinces and 440 districts throughout the country. Encouraged by the Indonesian Government's policy of fostering competition, other private providers have also been intensively investing in developing mobile communication infrastructure for commercial purposes. This has resulted in more options for Indonesian consumers in choosing a mobile service operator, creating intense competition in the industry.

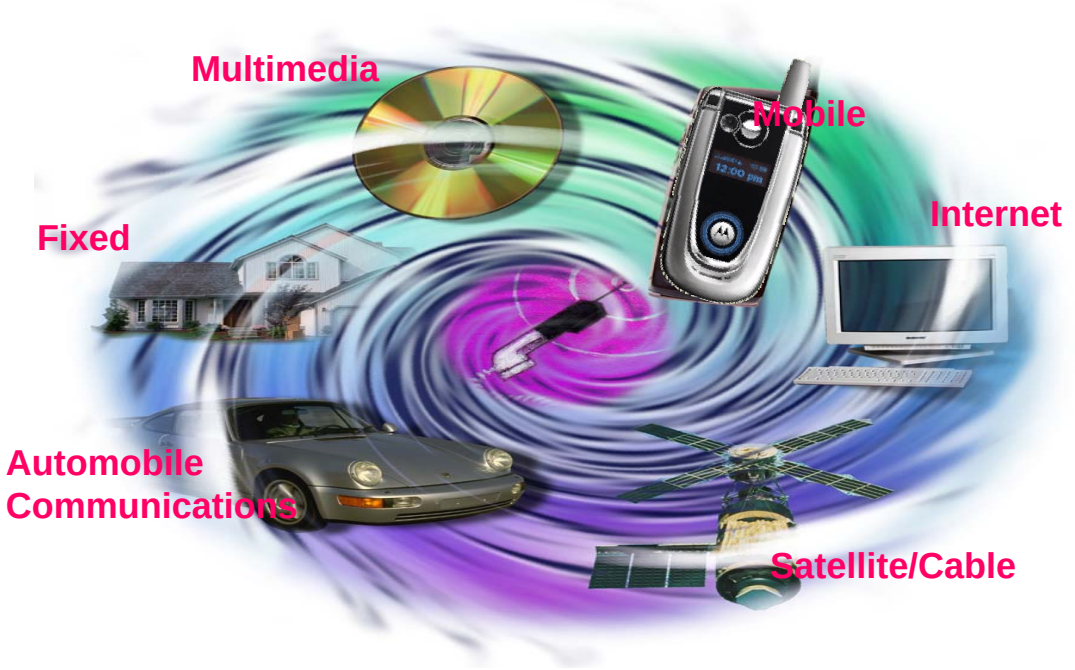
TABLE 2.1 MOBILE COMMUNICATION DEVELOPMENT IN INDONESIA

Year	Development stage
1984	Introduction of mobile communication with analog technology adopted by Nordic Mobile Telephone (NMT).
1985–1992	A newer generation of the NMT technology was introduced along with Advanced Mobile Phone Systems (AMPS), another standard created in North America.
1993	PT Telkom Indonesia kicked off a pilot project of digital mobile communication using the GSM standard in Batam Island, Bintan Island and the Islands of Riau. The pilot project ran successfully.
1994	First commercial application of GSM by Satelindo (Satelit Palapa Indonesia). The coverage included Jakarta and its nearby neighbourhoods.
1995–1997	PT Telkom Indonesia established PT Telkomsel, the current market leader in the mobile communication sector in Indonesia. Telkomsel introduced a premium brand, Kartu Halo, followed by a prepaid card, Simpati, in 1997. The two became popular and attracted significant numbers of users.
1998–1999	PT Excelcomindo joined the competition with the introduction of its prepaid card, Pro-XL. This card offered a distinctive feature that enabled users to roam nationally. By 1999, there were 2.5 million users of mobile communication in Indonesia.
2000–2002	Short Message Service (SMS) was the phenomenal application of these periods. General Packet Radio Service (GPRS) was launched in 2001, followed by MMS (Multimedia Message Service) and video streaming in 2002.
2004	Non-voice services, particularly person-to-person SMS, came to produce significant traffic, accounting for 25–30% of the total revenues of the mobile industry.
2005	The Assocation of Indonesian Cellular Operators (ATSI) revealed it would need an additional investment of US$5 billion to serve the 50 million potential subscribers in the local market. This figure was calculated based on the performance of the previous 10 years, in which the industry spent US$7 billion on investments.
2006	Telkomsel launched the first 3G services in Indonesia. Video calls, internet browsing and music and video streaming became popular among the subscribers.

Source: Evans (2005); Suwandi & Mahardika (2006)

History indicates a promising future for mobile communication in Indonesia. However, the future outlook for this industry will be marked by a fundamental change in the form of communications convergence. Voice communications, the internet, data and movie-type media are expected to become accessible, transferable and shareable on one converged network (see Figure 2.3) known as the FMC (Fixed Mobile Convergence) platform.

FIGURE 2.3 TELECOMMUNICATIONS CONVERGENCE



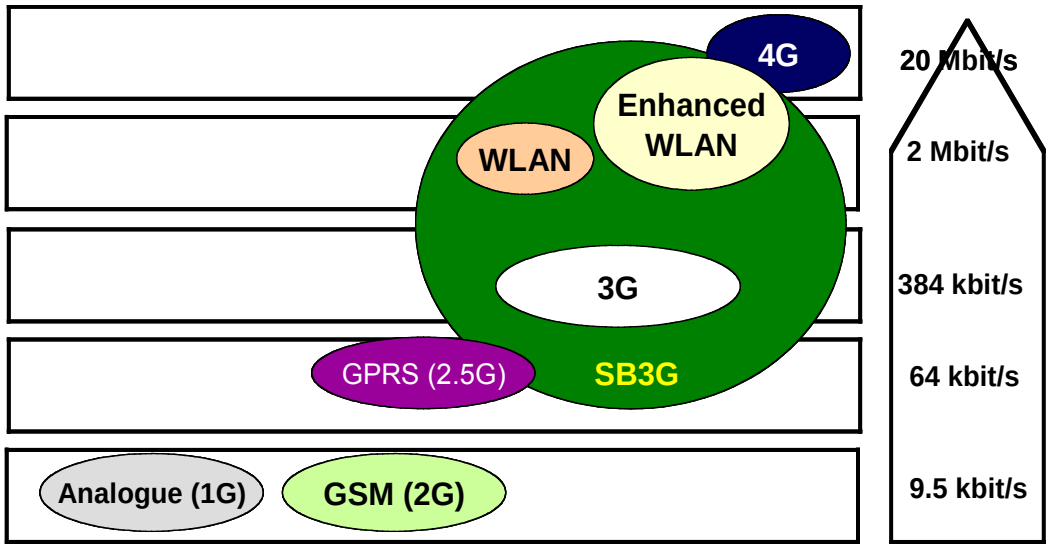
Source: Telkom Indonesia (2007)

The FMC-based network will enable multi-services to be developed and delivered to users through different kinds of communications devices at home, at work or even outside buildings. FMC will progressively remove the border between mobile and fixed phone networks, and is characterised by highly flexible accessibility. In this manner, the FMC network will be accessible for both fixed and mobile phone users. Accordingly, there will be a growing need for users to have access to an easy online connection, to access any information they want and to use a range of online activities.

2.3 MOBILE BROADBAND SERVICES IN INDONESIA

Voice and data communications, browsing, downloading and streaming are all online activities in high demand in Indonesia. Other services such as corporate wireless data applications and hosting applications have also recently been introduced into Indonesia, and are currently still in the early stages of development. These new services are estimated to expand significantly as mobile penetration increases in Indonesia. However, more bandwidth is needed to deliver these services. Therefore, the availability of broadband-capable backbone networks has now become an important issue. This need can be effectively fulfilled by upgrading the current networks through the acquisition of the most advanced and efficient technology, as shown in Figure 2.4.

FIGURE 2.4 MOBILE TECHNOLOGY GENERATION AND BIT RATE



Source: Dahlman et al. (2007)

The above situation applies to all operators. To survive in the business, they must upgrade their infrastructure so that the risk of experiencing inefficiencies caused by the old network is firmly reduced. Indonesian operators are aware of this need, and have taken an initial step to transform the current network into a broadband-based convergence infrastructure. One of the major projects currently being undertaken by the incumbent Telkom Indonesia is called INSYNC2014 (Telkom-Indonesia 2007). This huge investment project is aimed at providing a network that can deliver broadband access services. To achieve this objective, Next Generation Network (NGN) technology will be implemented. The NGN will enable a wide range of new broadband-based services to be readily available to Indonesian customers. These include True Broadband and Triple Play Services (voice–internet–multimedia) with a quality of service over 2 Mbps. The new platform is expected to be fully operatonal by 2014.

Other Indonesian mobile operators are also in a position to move forward in modernising their networks, and have decided to introduce a more advanced infrastructure into the current mobile cellular network. The new upgraded network is expected to provide more mobile broadband access including W-CDMA, 3G plus, HSDPA, HSPA, HSUPA and the latest technology platform known as Long Term Evolution (Dahlman et al. 2007). Indonesian mobile operators appear to be aggressive in building their mobile broadband networks. They are embracing the move towards greater mobility in modern society, and therefore seeking to advance new mobile communication services. However, their confidence in the value of the new technology is perhaps questionable. As noted in the previous chapter, no comprehensive study in Indonesia has explored the technology

acceptance behaviour of potential consumers. Models of technology acceptance previously studied and developed by other researchers could potentially be adopted for implementation in this country. However, a comprehensive review must first be conducted, based on specific research involving potential consumers in this country. An overview of existing technology acceptance models is the first step in building such a model. The Technology Acceptance Model proposed by Davis (1989) is the central model in this domain. It is arguably the most widely accepted reference model for investigating a situation of technology adoption as it explains a significant degree of variance. This encourages researchers to apply TAM for different purposes, even beyond the technology domain (Bagozzi, Richard P. 2007). A discussion of this model is preceded by a consideration of its foundation, as based in the Theory of Reasoned Action (Fishbein & Ajzen 1975) and the Theory of Planned Behaviour (Ajzen 1985), and then is progressed by presenting some models which are based on the Technology Acceptance Model.

2.4 MODELS OF TECHNOLOGY ACCEPTANCE: THEORIES OF BEHAVIOURAL INTENTION

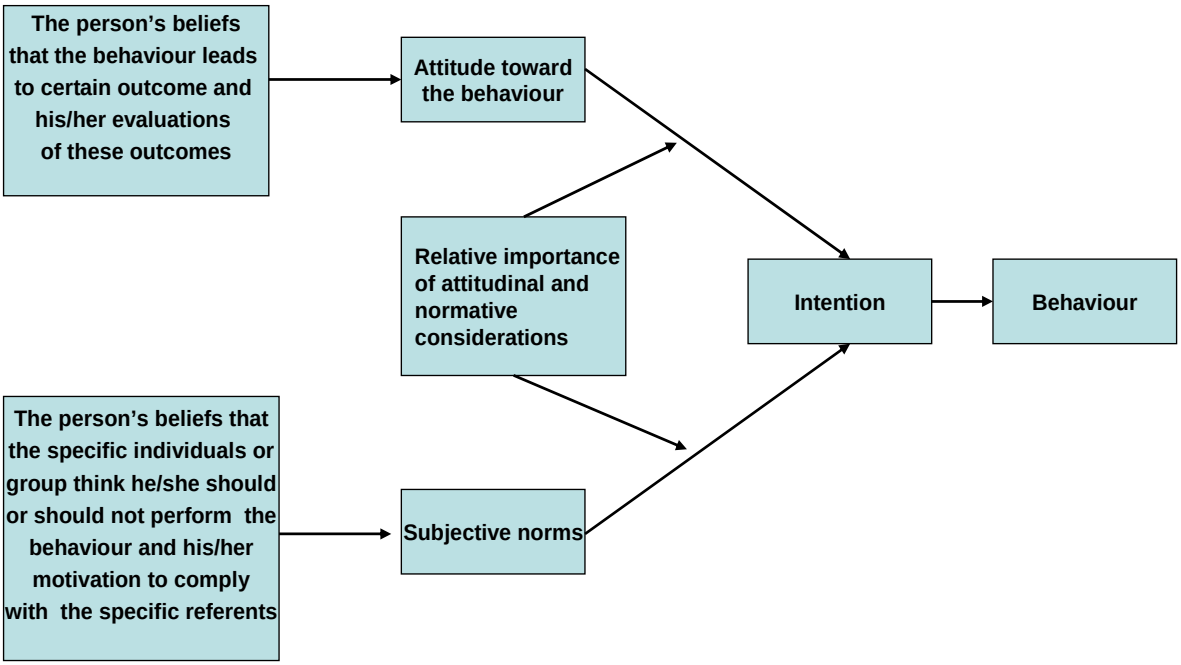
The adoption of mobile broadband services is basically driven by people's acceptance of the technology involved. Some models of technology acceptance are available in the literature which explain and predict an individual's intention to adopt a technology. The Technology Acceptance Model is considered by the majority of researchers to be the primary model in this area. The model was developed by Fred D. Davis in 1989 and has been tested by other researchers in various contexts. It is parsimonious yet powerful in predicting an individual's acceptance of technology. Some notable models that have drawn on its development are the Unified Theory of Acceptance Model (UTAUT) by Venkatesh et al. (2003) and the Technology Readiness Acceptance Model (TRAM) by Lin et al. (2007). In order to understand the Technology Acceptance Model, it is important to examine its roots, which are found in the Theory of Reasoned Action introduced by Fishbein and Ajzen (1975) and the Theory of Planned Behaviour developed by Ajzen (1985). These models have been considered as fundamental models for predicting consumer behaviour in both voluntary and non-voluntary situations.

2.4.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) was articulated by Fishbein and Ajzen (1975). TRA explains individuals' actions by identifying the causal connections between various factors: beliefs, attitudes, intentions and behaviour (see Figure 2.5). Beliefs determine an individual's likelihood of performing the target behaviour (Fishbein & Ajzen 1975).

Behavioural intention is a measure of the strength of one's intention to perform a specified behaviour. Actual behaviour is caused by an individual's feeling (evaluative affect) about performing the target behaviour (Fishbein & Ajzen 1975). The most basic paradigm of the TRA is that behaviour is determined by behavioural intention. The behavioural intention is postulated to be a function of the individual's attitude toward the act and the subjective norm. The subjective norm is a result of the individual's normative beliefs, which affect an individual's assumption about what another person wants him/her to do, and his/her motivation to comply with such expectations. Whether the attitude toward the act or the subjective norm exerts a greater influence on the behavioural intention depends on the individual and the decision object (Fishbein & Ajzen 1975).

FIGURE 2.5 THEORY OF REASONED ACTION



Source: Ajzen, Icek and Fishbein (1980)

The basic assumption of TRA is that consumers consciously decide to either perform or not perform a specific behaviour; they consider and evaluate various criteria concerning the behaviour before actually performing it. Sheppard et al. (1988) conducted a meta-analysis of 87 different studies to assess the predictive utility of TRA. Their results provide strong support for TRA's ability to predict behavioural intention. TRA usage in the mobile broadband context has been examined by Pavlou and Chai (2002). They found that the adoption of mobile data services depends primarily on consumer behavioural intentions to experience these services.

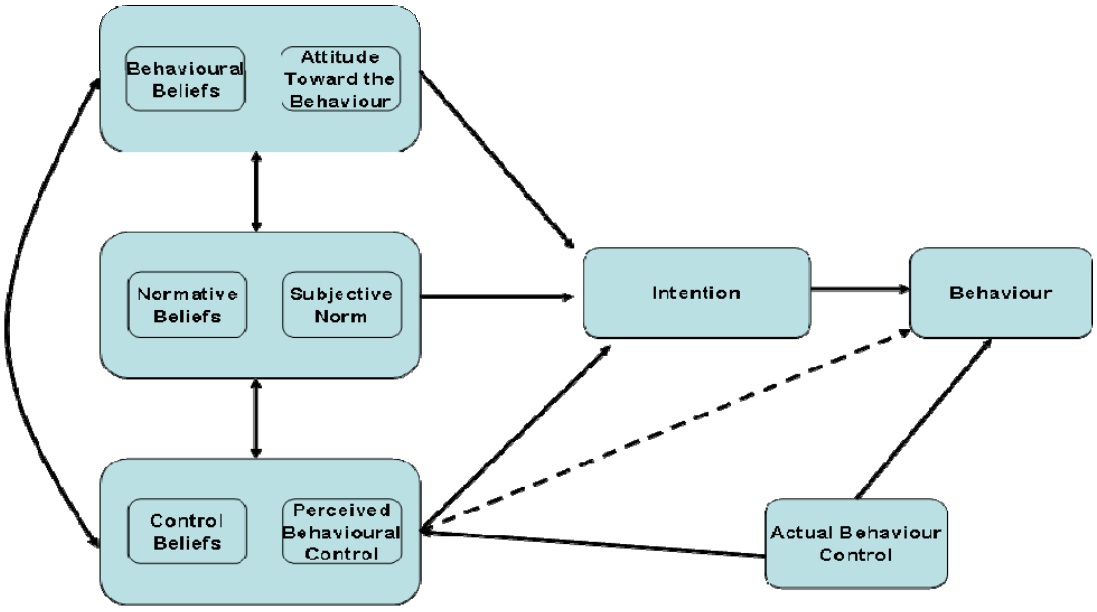
TRA has been criticised for not being able to incorporate consideration of any variation in an individual's control over their actions. It assumes that individuals can control their actions and ensure that they can achieve the objective of performing the action. In reality, the results of their actions depend to some extent also on how they are influenced by others' actions. The Theory of Planned Behaviour (TPB) extends the TRA to account for conditions where consumers do not have full control over the situation (Madden, Ellen & Ajzen 1992). Ajzen (1985) added the control belief to TRA to represent the situations in TPB which will be explained in the following section.

2.4.2 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour, or TPB (Ajzen 1985, 1991), is a well-established general theory of social psychology, which affirms that specific salient beliefs influence behavioural intentions and subsequent behaviour. In TPB, individual behaviour is driven by behavioural intentions where such intentions are a function of an individual's attitude toward the behaviour, the subjective norms surrounding the execution of the behaviour, and the individual's perception of the ease with which the behaviour can be performed (behavioural control).

Three antecedent constructs in TPB are attitude, subjective norm and perceived behavioural control. Attitude is determined through an assessment of one's beliefs regarding the consequences arising from a behaviour and an evaluation of the desirability of these consequences (Eagly & Chaiken 1993). The subjective norm can be expressed as the sum of the individual's perception intensified by the motivation assessments for all relevant referents (Eagly & Chaiken 1993). Behavioural control is one's perception of the difficulty of performing a behaviour in the model (Eagly & Chaiken 1993). Moreover, these antecedents of behavioural intention influence each other. The basic assumption of the Theory of Planned Behaviour model is that attitude and subjective norms are antecedents of intention and have reciprocal effects (see Figure 2.6).

FIGURE 2.6 THEORY OF PLANNED BEHAVIOUR

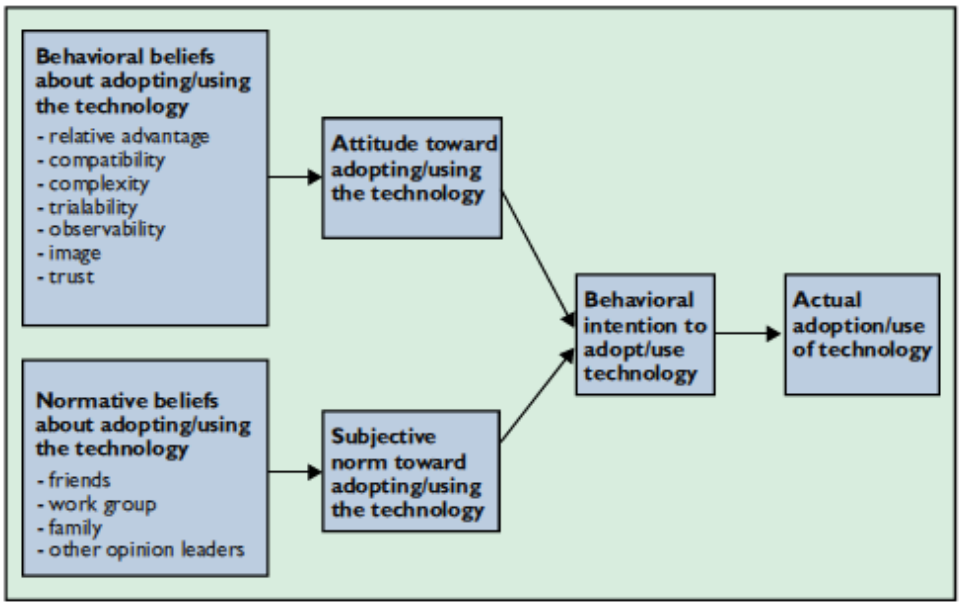


Source: Ajzen (1991)

Teo and Lee (2010) used TPB to study pre-service teachers who were enrolled at the National Institute of Education (NIE) in Singapore, specifically to examine their self-reported intention to use computers. It was found that their intention to use the technology was influenced significantly by their attitude toward computers and their subjective norms. Perceived behavioural control was not significant in this study. According to Teo and Lee, alone this variable had insufficient power to motivate pre-service teachers to use computers. This variable only had a significant effect in correlation with the other two factors of attitude and subjective norm (p. 66). The authors concluded that TPB is fairly efficient as a model to predict the behavioural intention to use technology among pre-service teachers in Singapore (p. 66).

Both TRA and TPB provide valid predictors of individual intention to perform an action. These models are, however, too general to be applicable to the technology adoption context. Many peculiarities of the technology adoption situation cannot be represented well in these models, such as individuals' perceptions about the usefulness and utilisation of technologies to help them to achieve their goals. This issue has been discussed by Barnes and Huff (2003), who identified many factors that need to be considered if one wants to use TRA to analyse technology adoption. These are illustrated in Figure 2.7 below.

FIGURE 2.7 FACTORS INFLUENCING BEHAVIOURAL AND NORMATIVE BELIEFS IN TECHNOLOGY ADOPTION



Source: Ajzen (1991)

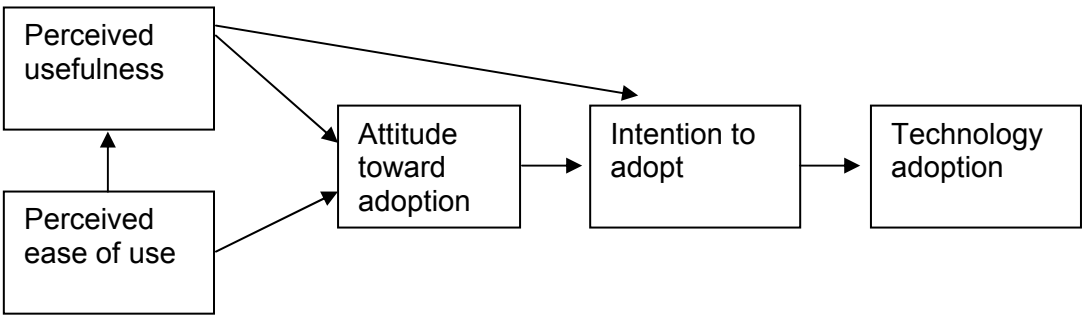
It was Davis (1989) who initiated the creation of a simple model for predicting technology adoption behaviour. He introduced the Technology Acceptance Model (TAM) to fill this gap. The model is based on TRA because the goal was to develop a parsimonious model for technology acceptance and TRA was considered to be the most effective model to meet that goal. The model is described in the following section.

2.4.3 Technology Acceptance Model (TAM)

TRA and TPB are not specifically developed as models of technology acceptance or adoption, but can explain technology acceptance to some extent, as described above with reference to some studies. Fred D. Davis sought to build a specific model for technology acceptance in (1989) as part of his doctoral dissertation in the Massachusetts Institute of Technology (MIT). Davis conducted an explorative study to find the determinant factors of users' acceptance of information technology (electronic mail and file editor in study 1 and PC-based graphic systems in study 2). He identified two factors, namely perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness is defined as the degree to which a person believes that using particular systems would enhance his/her job or task at hand, while perceived ease of use is defined as the degree to which a person believes that using a system would be free of effort (Davis (1989), p. 320). His study confirmed that both factors explained users' acceptance of information technology in the two studies.

The Technology Acceptance Model was based on Fishbein and Ajzen's Theory of Reasoned Action (TRA). However, Davis did not consider subjective norm to be a relevant factor in a workplace context in which technology use is often mandatory. He was interested in examining the varied behaviour of users in the adoption of technology per se. His research results informed him that users' behaviour is different because they possess different attitudes toward the technology. This attitude, according to Davis, is formed by users' perceptions about the usefulness of the technology and the degree of the technology's ease of use. The confirmed model, widely known as the Technology Acceptance Model (TAM), is represented in Figure 2.8.

FIGURE 2.8 TECHNOLOGY ACCEPTANCE MODEL



Source: Davis (1989)

Davis's article about TAM study has received more than 1,000 citations in articles about technology acceptance. Bagozzi (2007) even mentioned that TAM has outperformed other models (such as TRA and TPB) in terms of explained variances across studies. The model is also famous for its parsimonious yet powerful explanatory ability (Davis, Bagozzi & Warshaw 1989a); Goodhue (2007); Premkumar & Bhattacherjee (2008)). Venkatesh et al. (2007) and Venkatesh (2006) noted that this model has undergone many replications and generalisation tests in a range of countries and contexts even more diverse than the original study. The authors recorded that TAM has been applied in the field of marketing, advertising and information adoption.

Nevertheless, studies focusing on TAM have generated inconclusive results about this model. Ma and Liu (2004) and Yousafzai, Foxall and Pallister (2007) conducted a meta-analysis of TAM-related studies to consolidate their findings and generate a common understanding of the influences of each factor in different technology adoption contexts. Their research indicated that both perceived usefulness and perceived ease of use are good predictors of intention to adopt technology, but they express a caution with regard to contextual influences. Yousafzai et al. (2007) differentiated these contexts into three categories: field (real work situation), lab (both work and non-work situations) and

voluntary (non-work situation). They stated that the significance of each factor tends to vary as the context varies.

TAM has demonstrated its power to predict an individual's intention to adopt new technology. The parsimonious structure of TAM allows it to be applied in any context of technology adoption, as proven by numerous studies. It is also easy to administer and test. However, as demonstrated by Davis et al. (1989a), the model can only explain variance of up to 50%, which means that half of the variance still cannot be explained by TAM. Bagozzi (2007) stated that the major weakness of TAM comes from its strength. Its parsimonious quality renders it unable to explain variations of technology adoption in the real world, a fact that has been noted by Davis et al. (1989). They suggested expanding TAM by including other factors.

In line with Davis et al. (1989a) and Bagozzi (2007) above, Goodhue (2007) has observed two blind spots of TAM. First, TAM ignores the situation after adoption, and secondly, it overlooks other factors that might influence perceived usefulness and ease of use. The first omission creates ambiguity about the relationship between adoption and performance; yet this is a crucial factor since people adopt technology in order to improve their performance. Furthermore, understanding use behaviour after the adoption stage is important for understanding how technology is diffused and how the use of technology affects future intention to adopt similar or new versions of the technology.

Different approaches have been taken to improving TAM. These include: modifying the basic structure of TAM by adding other factors to the main model (e.g. adding the 'perceived enjoyment' variable); extending the model to include 'use behaviour' (e.g. the Technology Adoption and Use Model developed by Bagozzi 2007); extending TAM backward by linking perceived usefulness and perceived ease of use with individual or situational factors (e.g. the Technology Readiness Acceptance Model introduced by Lin et al. 2007); or introducing new predictors and moderating variables into the model (e.g. the Unified Theory of Acceptance and Use of Technology developed by Venkatesh et al. 2003). Modification, forward extension and the addition of moderators to TAM are discussed first. These approaches differ from the backward extension in that the latter substantially extends the core model of TAM. This approach incorporates the complex world of human psychology, which adds a level of complexity to TAM. The forward extension is not so substantial since it only introduces one variable, i.e. use behaviour. The above mentioned approaches used to improve TAM have also been implemented in a number of more recent studies. One that demonstrated a comprehensive modification and well-designed approach was conducted by Crabbe, Standing and Standing (2009), who investigated mobile banking adoption in Ghana. Through this research, they intended to

develop a more comprehensive model based on TAM. This study reveals how rigorous and dynamic the studies of TAM are, which are performed to enhance the power, implementability and expandibility of TAM.

2.4.4 The search for an integrative model: the Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The Technology Acceptance Model predicts individual intention to adopt a technology; however, the intention does not always lead to the use of technology. Individuals may continue to the adoption stage, postpone or decline the adoption decision. Moreover, scholars have identified different use behaviours among adopters of technology, differences which relate to frequency and type of use. For example, one person may use a technology extensively while others may only use it irregularly. This issue has been investigated by Richard Bagozzi. Bagozzi (1990) introduced the Technology Adoption and Use (TAU) model to fill the knowledge gap. His focus was on explaining how users' intentions to adopt a technology manifest in their daily use of the technology. His model was a combination of different models, namely the normative model of Hauser and Urban (1979), expectation–value–attitude theory formulated by Ajzen and Fishbein (1980), TRA and TAM. His findings showed that intention to adopt a technology is significantly related to intensive use of the technology. The model has been adapted to different contexts that show significant support for its power. This approach was followed by Karahanna and Straub (1999), who combined TAM, TRA and Innovation Diffusion Theory (IDT) developed by Rogers (1983) to explain attitude and intention after adoption.

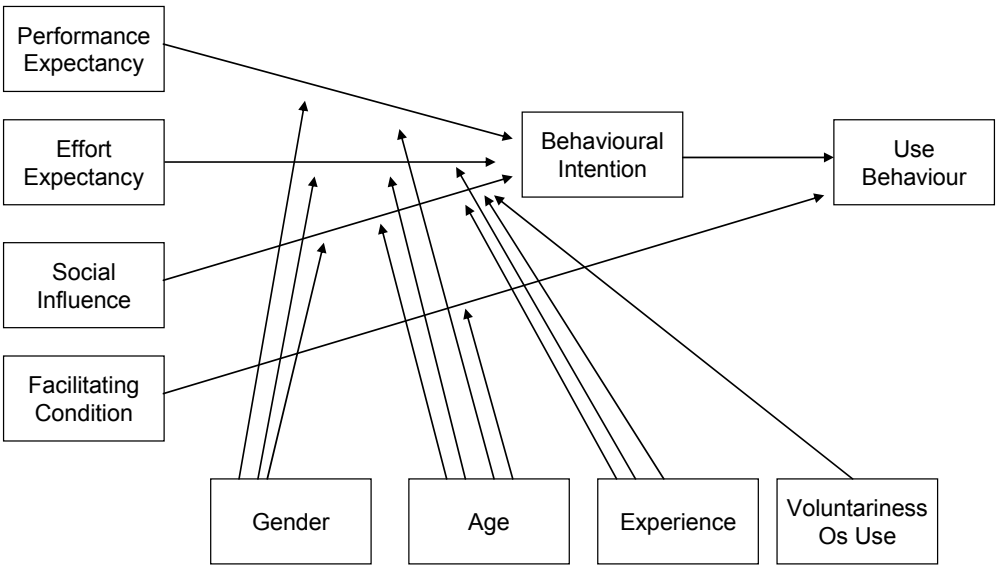
Shih and Venkatesh (2004) followed a different path from the above authors. Their study was also on the use behaviour of adopters, but they decided to use TAM as the basis since it is a widely accepted model of technology adoption. The use-diffusion stage is added to TAM to extend the existing node of adoption decision. Their findings demonstrated that use behaviours vary among technology adopters and that early adopters' experience with technology affects others' intentions to adopt the technology. Although their study did not mention how early adopters' intention to adopt future technology is affected by their experience, this paper can be seen as a significant contribution to developing TAM.

Venkatesh et al. (2003) continued these efforts. Their goal was to create an integrated model for predicting technology acceptance and use. Their research output was a model known as the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which is a combination of eight prominent models. These are the Theory of Reasoned

Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model, the Theory of Planned Behaviour (TPB), the Model of PC Utilisation, a combination of TAM and TPB, Innovation Diffusion Theory, and Social Cognitive Theory.

The author tested the eight models in longitudinal studies of voluntary and mandatory use of technologies in different industries. This research also involved the inclusion of significant moderating factors into the models as found in past research. The test results showed that one factor remained persistent in each model: for example, perceived usefulness in TAM, attitude in TRA, and extrinsic motivation in the Motivational Model. Moreover, it was found that the predictive validity of the models, other than the Motivational Model and Social Cognitive Theory, was improved with the introduction of moderating variables. This indicated a significant role of moderating variables in explaining users' intention toward and use of technologies. Venkatesh et al. (2003) built their model based on these results and determined that intention to adopt technologies is predicted by four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. The moderators are gender, age, experience and voluntariness of use, and the users' intention to use the technologies will influence their use behaviour. This model is presented in Figure 2.9.

FIGURE 2.9 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY



Source: Venkatesh et al. (2003)

This model was tested and compared to the other eight models. The results showed that UTAUT demonstrated significantly higher predictive validity than the others. The best achievement among the eight models was 53%, while UTAUT consistently achieved 70% of explained variance. Although it may seem that an effective integrated model has been found in UTAUT, debate continues in the literature about the applicability of this model. Hence, achieving a status like that of TAM will be somewhat more difficult. Moreover,

Venkatesh himself added to the uncertainty by developing TAM 3, in which he considered social factors and facilitating conditions as predictors of perceived usefulness and ease of use (Venkatesh & Bala 2008). This conflicts with his UTAUT model in which both social factors and facilitating conditions are parallel with perceived usefulness (performance expectancy) and perceived ease of use (effort expectancy).

Up to this point, we can now see that the existence of the different models of technology adoption discussed in the previous sections conveys an important message to researchers: that developing an integrated model of technology adoption is a difficult venture. Rarely are consistent and agreed results found in the research that identify firm causal relationships among the influential factors in the models. Each model posits a different theoretical argument that could cause confusion around establishing a baseline research framework. To address this issue, we believe that it may be easier to build such a model for a specific context like mobile technology. The narrower scope of mobile technology will result in a more specific, focused and clear determination of the influences of factors. In line with this thinking, the following section presents research on mobile broadband services adoption with the goal of elaborating the models commonly used in the research. Two important studies will be reviewed. The first is a study of cellular telephone adoption conducted by Kwon and Chidambaram (2000). The other study, by Bruner and Kumar (2005), involves an investigation of consumer acceptance of handheld internet devices, using TAM to develop a newer model called c-TAM (consumer technology acceptance model).

2.5 STUDIES OF MOBILE TECHNOLOGY ACCEPTANCE

Scornavacca, Barnes and Huff (2005) have identified five major focuses in mobile broadband research. First and foremost are consumer applications, consumer behaviour, and the implications of mobile technology for consumers. The least studied are the telecommunications industry and service providers (Scornavacca, Barnes & Huff 2005). These authors also suggested that model building is among the top three contributions made by research into mobile broadband technology, meaning that scholars are continuously exploring and testing different models that can predict mobile broadband adoption behaviours. Typical studies of mobile broadband service adoption fall within one of the following categories:

1. direct application of TAM
2. application of modified TAM, either by adding particular variable(s) or changing the relationship directions between factors in TAM

3. application of an alternative model. UTAUT is considered the most common alternative model found in mobile broadband service research.

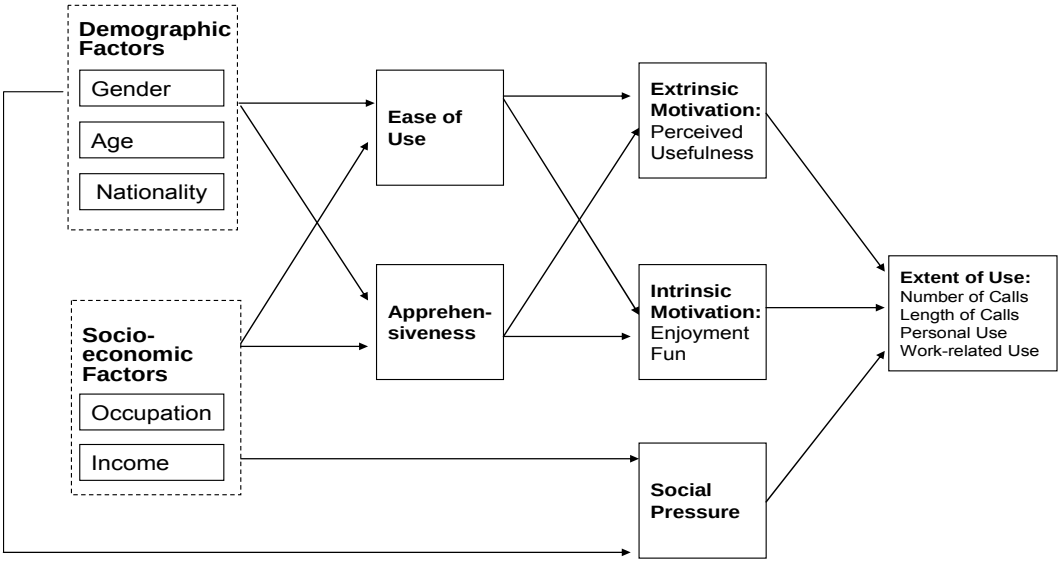
The second category was implemented in this thesis since it enabled us to identify the specific moderator factors and relationships involved in mobile broadband applications. A review of the research undertaken by Kwon and Chidambaram (2000) and Bruner and Kumar (2005) is considered essential for this purpose.

2.5.1 Model of cellular telephone acceptance

Kwon and Chidambaram (2000) adapted TAM to examine the motivations and perceptions of people using cellular phones. As the theoretical background, they drew on several previous studies somewhat related to theirs. Citing Deci's motivation theory (1975), they argued that behaviour is determined by intrinsic as well as extrinsic motivation. While extrinsic motivation precipitates actions because of external rewards such as improved job performance or advancement, intrinsic motivation leads to the performance of an activity for no other reason than the satisfaction to be derived from the activity itself. In addition to this, they also referred to the Theory of Reasoned Action (TRA) articulated by Fishbein and Ajzen (1975). Lastly, they looked at TAM, which is specifically aimed at explaining computer usage behaviour. TAM replaces the attitudinal determinants of TRA with two distinct variables: perceived ease of use (PEOU) and perceived usefulness (PU). Like TRA, TAM theorises that actual computer usage is determined by behavioural intention, but it is distinguished by its characteristic showing that the intention is jointly determined by the person's attitude toward using the system and perceived usefulness.

Kwon and Chidambaram's (2000) study presented and tested a model of cellular telephone usage in a large metropolitan area in Hawaii (see Figure 2.10). Their research model suggests that user acceptance of new technology is affected directly and/or indirectly by: (1) individual characteristics; (2) perceived ease of use; (3) perceived usefulness (i.e. extrinsic motivations); (4) enjoyment/fun (i.e. intrinsic motivations); and (5) social pressure. In addition, since apprehensiveness about technology was found to be an important factor in moderating usage in other contexts, it was included in this model as well.

FIGURE 2.10 A RESEARCH MODEL OF CELLULAR TELEPHONE ADOPTION



Source: Kwon and Chidambaram (2000)

Individual characteristics, represented by demographics, affect the level of technological adaptation. Perceived ease of use is defined as 'the degree to which a person believes that using a particular system would be free of effort' (Davis, Fred D. 1989). Apprehensiveness in the context of this study refers to anxiety about using a new medium or technology (Dordick & LaRose 1992). The concept of apprehensiveness is similar to that of 'computer avoidance' (Moore 1989), which refers to individuals avoiding the use of computers due to their innate fear of the technology. Extrinsic motivation refers to the source of behaviour being prompted by a person's need for external rewards, such as the usefulness of the technology (Igbaria 1993). According to Rogers (1976), relative advantage and compatibility are two important attributes of innovations that affect adoption. He suggested a number of sub-dimensions of relative advantage such as the degree of economic profitability, decrease in discomfort, and saving time. Social pressure includes the motivations of individuals who believe they should use cellular telephones to increase their social status.

The primary dependent variable used in the study performed by Kwon and Chidambaram's (2000) was the extent of cellular telephone usage. The two indicators of usage are the number of calls with various calling partners (including personal calls with spouse, family members and friends; and work-related calls with colleagues, customers and others related to one's business or profession). Using multiple regression and Path Analysis, the research findings suggest that users' perceptions about cellular phones are strongly related to their motivations to use them. Perceived ease of cellular telephone use

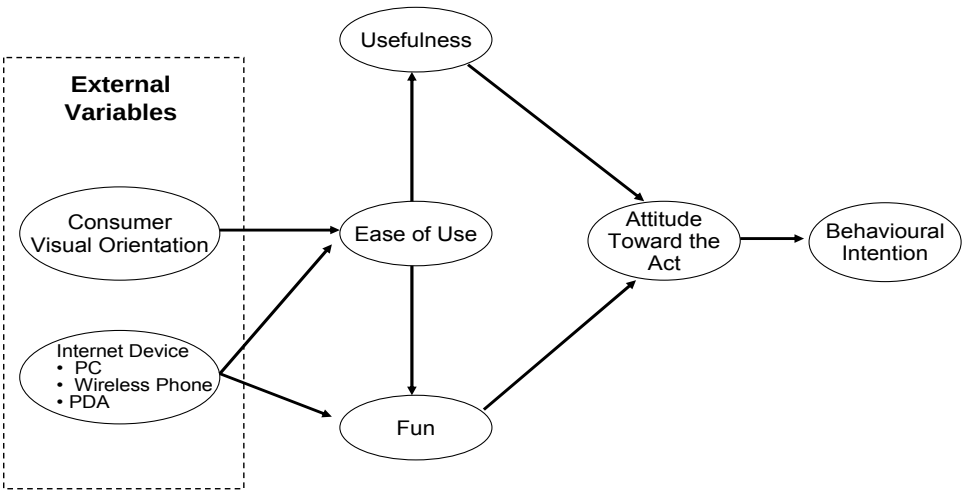
and apprehensiveness about telephones combined explains 20% of the variance in extrinsic motivations and 18% of the variance in intrinsic motivations. These values suggest the importance of the links between perceptions and motivations regarding cellular phone usage. Contrary to the expectations of the researcher, no significant relationship was identified between the respondents' motivations to use cellular telephones and their level of personal calls. The respondents' extrinsic motivation and social pressure to use cellular telephones also did not appear to have any significant association with work-related cellular phone use. However, interestingly and as expected, the respondents' intrinsic motivation to use cellular telephones had a significant and negative association with work-related cellular telephone use. This finding suggests that cellular telephone users are likely to perceive stress and feel constrained by their work-related cellular telephone usage.

2.5.2 Model of consumer acceptance of handheld internet devices

Bruner and Kumar (2005) conducted an investigation of TAM in a consumer context which was augmented with a hedonic factor. This factor was drawn from the work of Childers et al. (2001), and Dabholkar and Bagozzi (2002), resulting in c-TAM (the consumer technology acceptance model), which is represented in Figure 2.11. Further, they examined how two external variables, device used to access the internet and consumers' preferred style of processing, influence variables in TAM.

The central idea underlying TAM is that a person's behavioural intention (BI) to use a system is determined primarily by two assessments: its usefulness and its ease of use (EOU). Usefulness relates to the degree to which a person believes a certain system will help them perform a certain task. In contrast, EOU involves the extent to which a person thinks that use of a system will be relatively free of effort.

FIGURE 2.11 CONSUMER SPECIFIC TECHNOLOGY ACCEPTANCE MODEL/C-TAM



Source: Bruner and Kumar (2005)

Bruner and Kumar's (2005) research employed SEM to measure undergraduate students' responses on how they perceived three internet gadgets (PC, wireless phone and personal digital assistant) to the research constructs. An examination of the parameter estimates (coefficients) and the associated *t* values obtained from the structural model analysis revealed that all the paths shown in model 1 were statistically significant. The results indicate that the higher a subject's preference for processing information visually, the easier it was for them to use a device to access the internet. It was found that wireless phones were significantly less easy to use than desktops to access the internet, but PDAs were found to be as easy to use as the desktops. On the other hand, as expected, PDAs were perceived to be more fun to use than desktops, but contrary to the study expectations wireless phones were found to be less fun to use than desktops. This reveals that respondents perceived significant differences between devices used to access the internet in terms of their EOU and the fun associated with using them.

The results also showed strong effects of the EOU of a device on the perceptions of the usefulness of a device and the extent to which subjects felt the device was fun to use. Subjects' perceptions of the usefulness of a device had a significant direct effect on attitude toward using the device. Support was also found for significant effects of fun on subjects' attitudes, and that this effect was more than double the effect of usefulness on attitudes. Further, subjects' attitudes significantly influenced their intentions to use the devices. To rule out the possibility of direct effects from EOU on attitude, EOU on BI, usefulness on BI, and fun on BI, a modified model that included these paths was estimated. Each of the four additional paths was found to be non-significant. Thus, the model as hypothesised and all of the hypothesised paths therein were supported.

The findings of Bruner and Kumar's study suggest that the fun of using a device was a more powerful determinant of attitudes toward usage than was the perceived usefulness of the device. This is in line with Kwon and Chidambaram's findings outlined above. In addition to emphasising the importance of making devices fun to use, c-TAM provides guidance as to how devices can be made more fun to use. The results suggest that an important way to increase the fun associated with using a device is to make it easy to use. Another important result of their study was that consumers who were more visually oriented found it easier to use devices to access the internet than those with low levels of visual orientation. Consumer preference for visual processing is an individual-level characteristic, and our results can help firms identify and target groups of consumers who might be more inclined to adopt new devices. For those with low levels of visual orientation, the implications are less clear and further research is necessary to determine

whether certain design features could be used to compensate for their disinclination to accept the technology.

The two studies of mobile technology acceptance discussed above indicate the importance of involving personal psychological characteristics. For this reason, scholars have moved forward by investigating the psychology of adopters. The investigation is directed at finding significant personal factors that drive an individual's evaluation of technology. Researchers have looked for such factors that do not change easily and have studied the correlation between those factors and the evaluation and adoption of technology. The persistent factor identified in more recent studies is a trait known as personal innovativeness (PI). In the context of technology adoption, this factor was later termed technology readiness (TR). The following sections will elaborate both personal innovativeness and technology readiness.

2.6 PERSONAL INNOVATIVENESS AND TECHNOLOGY READINESS

Scholars have explored various traits and persistently found that personal innovativeness, later renamed technology readiness (TR), shows strong correlation with technology acceptance at the individual level. The subsequent sections discusses research into personal innovativeness and technology readiness, and explains how these constructs have been incorporated into the Technology Acceptance Model (TAM).

2.6.1 Personal innovativeness towards new technology

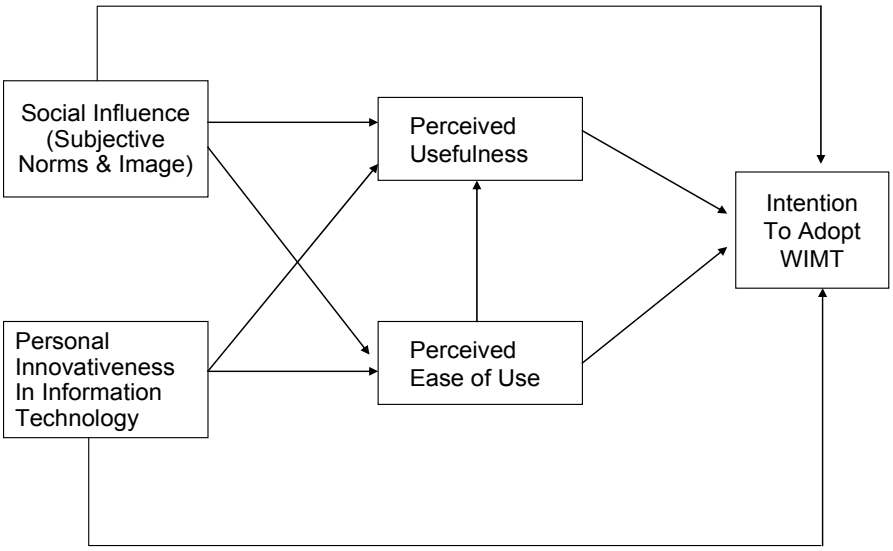
Research on mobile services has been extended to cover personal psychological attitudes toward technology. This refers to personal innovativeness or readiness, later termed technology readiness, to adopt technology. The concept of personal innovativeness was introduced by Rogers and Shoemakers (1971). They defined it as the extent to which someone adopts an innovation earlier than do other members of a social system. Rogers and Shoemaker argued that consumers who possess high levels of innovativeness tend to adopt a new product earlier than do others. Innovativeness is seen as an indicator or measure of the tendency or willingness to embrace change and try new things (Hirunyawipada & Audhesh 2006). Mudd (1990) has argued that individual innovativeness is influential in any technology adoption situation. It is commonly proposed that consumers with high innovativeness levels can be expected to demand new products.

Scholars were aware of the influence of innovativeness on technology adoption, yet studies in this area that included innovativeness remained rare at that time. A systematic effort to represent and measure personal innovativeness in relation to information

technology (IT) was undertaken by Agarwal and Prasad (1998). These authors argued that personal factors have the most proximate influence on an individual's cognitive interpretation of IT. Among personal factors, innovativeness is considered to be highly relevant in the context of IT adoption. This factor, which is formally referred to as personal innovativeness in information technology (PIIT), is defined as the willingness of an individual to try out any new information technology. Agarwal and Prasad added this factor as a new construct to Davis's original TAM model, and hypothesised that PIIT is positively related to perceptions of the new technology and that people with higher PIIT tend to have more positive intentions toward the use of a new IT. The factor was tested and confirmed by several researchers, including Agarwal and Karahanna (2000) and Lewis, Agarwal and Sambamurthy (2003). Further examples of personal innovativeness studies are discussed below.

Lu, Yao and Yua (2005) tested the influence of personal innovativeness in a mobile technology adoption situation, specifically wireless internet service adoption by mobile phone users. Their model is shown in Figure 2.12.

FIGURE 2.12 INFLUENCE OF PERSONAL INNOVATIVENESS IN A MOBILE SERVICE ADOPTION



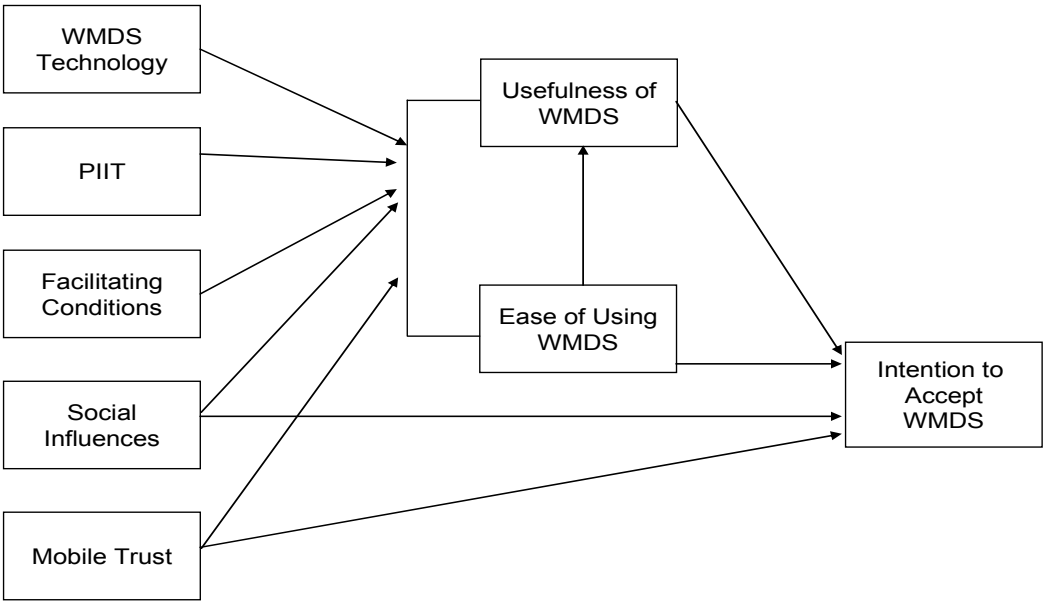
Source: Lu, Yao and Yua (2005)

As shown in the model, PIIT was considered to impact on perceived usefulness and ease of use. It was also hypothesised to have a direct effect on intention to accept the wireless internet service, alongside the social factor which involves subjective norms and image.

The path analysis of the survey results, however, did not support this direct relationship. Hence, it is argued that innate personal innovativeness manifests in attitude before influencing the formation of intention to use a mobile service.

The finding was contradicted by the results of a study by Lu et al. (2008), in which a direct relationship between personal innovativeness and intention to adopt a mobile service was found. Their model was developed to study wireless mobile data service acceptance in China. The model is an extension of TAM and the position of PIIT in the model is shown in Figure 2.13.

FIGURE 2.13 PERSONAL INNOVATIVENESS AS AN ANTECEDENT IN THE TECHNOLOGY ACCEPTANCE MODEL

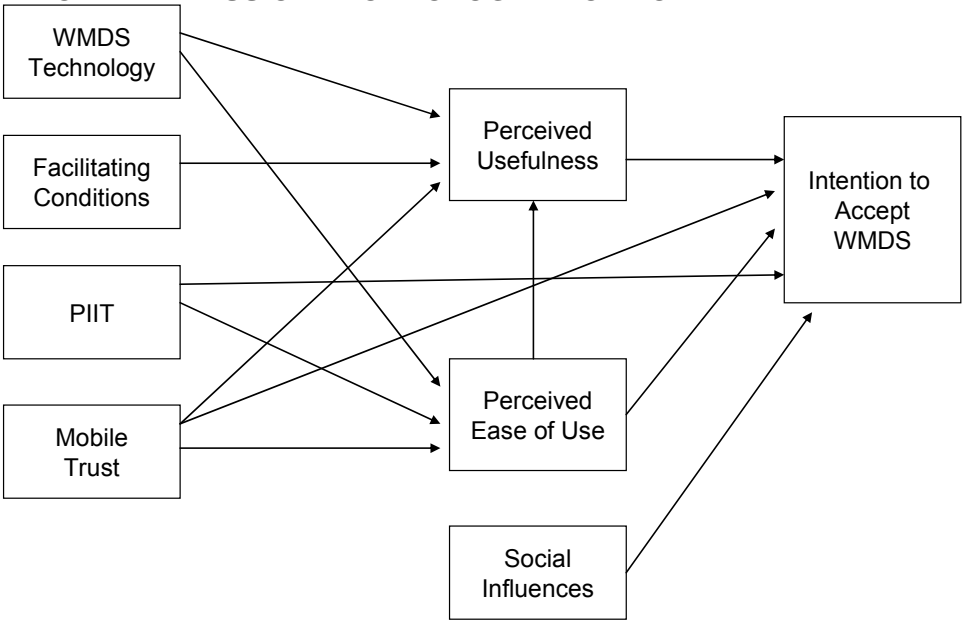


Source: Lu et al. (2008)

In line with Agarwal and Prasad (1998), Lu et al. (2008) defined PIIT as the willingness of an individual to try out any new IT. The researchers argued that highly innovative persons are willing to take risks, and have been shown to be active seekers and testers of new ideas and products. Such individuals are able to deal with a high degree of uncertainty and develop more positive intentions to accept new innovation. Furthermore, Lu et al. (2008) postulated that highly innovative individuals tend to develop more positive perceptions about the advantage and ease of use of mobile services, and have stronger intentions towards its use. Consequently, innovativeness was hypothesised to influence perceptions of usefulness and ease of use in the adoption of mobile services.

SEM procedures were used to test the research model. The empirical data strongly supported the initial research model. The authors tested an alternate model in which PIIT was hypothesised to have a direct effect on intention to adopt mobile services and perceived ease of use of those services. The alternate model, shown in Figure 2.14, demonstrated a better fit with the data (Lu et al. 2008). It provided a detailed account of the key forces underlying respondents' intentions to adopt wireless mobile data services (Lu et al. 2008).

FIGURE 2.14 THE ALTERNATE MODEL OF THE INFLUENCE OF PERSONAL INNOVATIVENESS ON TECHNOLOGY ADOPTION



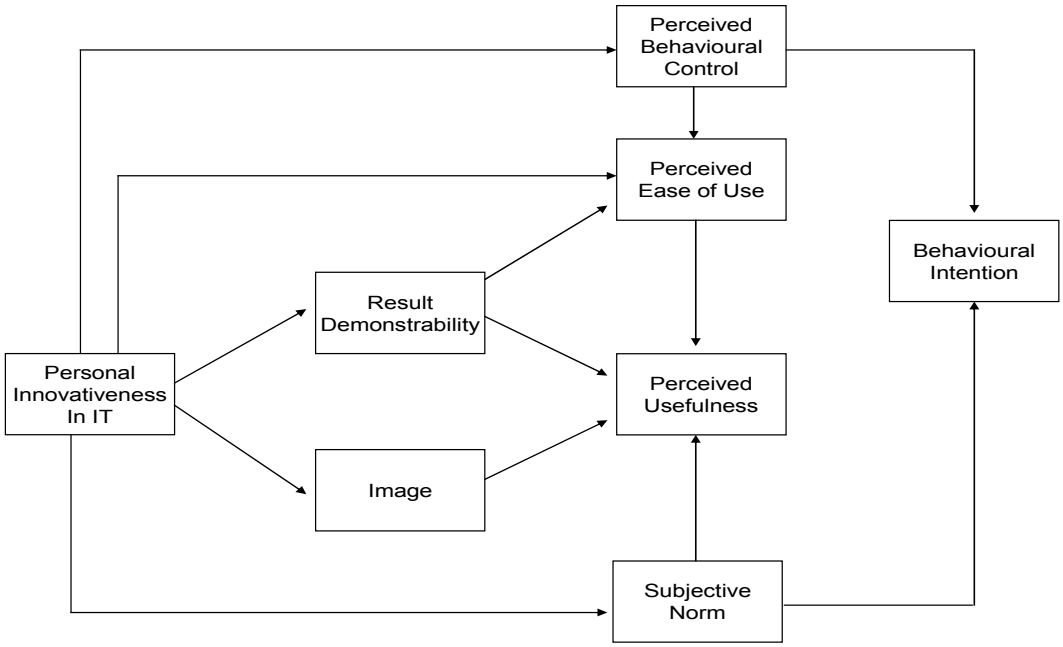
Source: Lu et al. (2008)

In another study, Yi et al. (2006) tested the significance of PIIT in a mobile technology adoption situation by applying a more complicated model. Their model was a combination of three technology adoption models, namely TAM, TPB and IDT. The authors considered TAM as the basic model and enriched this model by adding particular variables from TPB (perceived behavioural control and subjective norm) and IDT (result demonstrability). The resulting model is reproduced in Figure 2.15.

Yi et al. (2006) stated that people react differently due to their differences in innovativeness, or a predisposed tendency toward adopting an innovation. Based on this, the theory separates adopters into one of five categories: innovators, early adopters, early majority, late majority, and laggards. These categories represent different behaviours based on differences in PIIT, which describes the extent to which an individual has an innate propensity toward adopting a new IT. The authors hypothesised that PIIT will have a positive effect on subjective norms, perceived behavioural control, perceived ease of use, result demonstrability and image. The SEM test they conducted revealed that PIIT

significantly influenced perceived behavioural control, perceived ease of use, result demonstrability and subjective norms.

FIGURE 2.15 A TEST OF PIIT SIGNIFICANCE IN A MOBILE TECHNOLOGY ADOPTION SITUATION



Source: Yi et al. (2006)

The non-significant effect of PIIT on image suggests that more innovative people do not necessarily value more highly the image they derive from the use of a new technology. This finding is understandable if we consider the subjects of the study, physicians. Physicians are already esteemed by others by virtue of their profession; hence earlier adopters might not highly value the positive image associated with the use of a technology as might otherwise be expected. This study puts forward an important finding in that PIIT is a distal determinant of professional user acceptance of technology, achieving its influence indirectly through mediators such as result demonstrability, perceived ease of use, subjective norms, and perceived behavioural control (Yi et al. 2006).

To further understand the implications of the findings about PIIT as elaborated above, it is beneficial to review the notable theoretical contribution made by Parasuraman (2000) and Parasuraman and Cloby (2001). These reseachers have found that an individual has both drivers and inhibitors within her/himself that together create an overall tendency in technology evaluation. Their exploratory research suggested that these factors also reflect individual innovativeness in embracing a new technology. They used a new term, 'technology readiness', to describe this aggregated technology-specific innovativeness. These researchers' findings are discussed in the following section.

2.6.2 Technology readiness (TR)

Parasuraman (2000) and Parasuraman and Colby (2001) identified positive and negative beliefs among users towards technology from their exploratory research. They proposed that these beliefs work in different directions. The combination of these beliefs determines users' overall tendency and evaluation of technology. These researchers suggested the technology readiness (TR) concept, which consists of four components: two contributors and two inhibitors. These four components of readiness are used to measure the level of users' propensity to embrace and utilise technologies to accomplish goals at home and at work. Optimism and innovativeness refer to 'contributor' factors that strengthen a user's technology readiness. The other two, discomfort and insecurity, are 'inhibitors that suppress technology readiness. Innovativeness is a measure of an individual's tendency to be a pioneer in any aspect of their life and optimism is a belief that technology offers them an easier life, increases their control and flexibility in their work and improves efficiency. Discomfort leads to a perception of technology that it will control one's life and turn people into servants of technology. Insecurity is a negative feeling about technology, which causes people to worry about whether technology can fulfil its functions as expected. These conflicting factors interact to create an overall psychological state and generate a particular attitude toward new technology. A scale called the Technology Readiness Index (TRI) was formulated to measure this psychological state (Parasuraman 2000). Consumers with a high TRI are believed to embrace, utilise and be able to drive technology at an early stage. Five categories of people have been proposed according to their attitude toward new technology, which are shown in Table 2.2.

TABLE 2.2 FIVE CATEGORIES OF PEOPLE IN RELATION TO THEIR READINESS TO ADOPT NEW TECHNOLOGY

Type	Drivers		Inhibitors	
	Optimism	Innovativeness	Discomfort	Insecurity
Explorers	High	High	Low	Low
Pioneers	High	High	High	High
Sceptics	Low	Low	Low	Low
Paranoids	High	Low	High	High
Laggards	Low	Low	High	High

Source: Parasuraman (2000)

Parasuraman and Colby (2000) used TRI to develop a marketing concept known as Techno-Ready Marketing (TRM). They defined TRM as 'the process of creating and developing markets by deploying innovative technologies'. TRM is implemented through

the identification of potential target groups of consumers classified based on their technology readiness levels. Each group is distinguished by its response to programs aimed at encouraging and attracting them to adopt a new technology product. To satisfy potential consumers in each group, specific marketing programs are developed to cater for the levels of techno-readiness that the groups' members possess. The approach offered by TRM which classifies consumers into groups is comparable with the behavioural segmentation proposed by Kotler and Amstrong (2001) and McDonald and Dunbar (2004), who refer to such groups as a market segment. Furthermore, TRM is operationalised based on four principles. First, technology product adoption is seen as a process that is uniquely different from other product adoption and driven by varying levels of optimism about technology, tendency to innovate, discomfort with technology, and inherent insecurity among users. Second, the marketing strategies used to encourage consumers to adopt technology products are different from that used for other products due to the different product adoption process entailed. Third, satisfying customers with a technology-based product is considered more difficult because of the product complexity. Finally, the last principle asserts that technology markets are dictated by a law of critical mass.

With the support of the above explained concepts and principles, TRI has contributed a more effective analytical framework for understanding the psychological dynamics underlying the user adoption process in information and communication technology area. However, very limited empirical findings or explanations were found in relation to the impact on actual adoption of technology applications created by the system. We were only able to find four empirical studies of the TRI effect in technology adoption.

The first is research carried out by Walczuch, Lemmink and Streukens (2007). Their study combined the Technology Readiness Index (TRI) and TAM into one model, with which they measured the relation between TRI's personality trait dimension (optimism, innovativeness, discomfort and insecurity) and the cognitive dimensions of TAM. Elaborating on previous studies of TAM and TRI, their study applied TRI in four independent separate dimension of trait, as follows:

- Optimism: a positive view of technology. Belief in obtaining increased control, flexibility and efficiency in daily life as a result of technology usage.
- Innovativeness: a tendency to be the first to use a new technology.
- Discomfort: possessing a need to be in control and a sense of being overwhelmed.
- Insecurity: distrusting technology for security and privacy reasons.

The four factors above (TRIs) are believed to be the predictors of TAM. The stronger a

trait within an individual, the better they will fit into one of the groups and the more significantly they will be influenced by that trait in their use of high-technology products and services. Walczuch et al. (2007) hypothesised that optimism, innovativeness, insecurity and discomfort traits would have an effect on the perception of technology, represented by the TAM construct. Their research was conducted in cooperation with a Belgian multisite financial service provider. The subjects were the employees of this company, who completed questionnaires administered to all branches of the company. The questionnaires were sent to all employees in the relevant language by internal mail, 2,764 at 937 branches, resulting in 810 valid respondents.

Analysis revealed that the traits under study had the expected impact on user perceptions. The researchers were able to show that personality made a difference in the adoption process of IT. This may help to explain how its adoption might be influenced by the personality of the user as well as the characteristics of the technology, through demonstrating that personality characteristics as measured in the TRI had a significant effect on technology adoption. Yet surprisingly, innovativeness was found to be negatively related to usefulness, as it was usually associated with TAM constructs.

The second study is from Lam, Chiang and Parasuraman (2008). The authors re-examined the roles of the innovativeness trait, generalised beliefs, and the effects of these variables on technology acceptance. Particular attention was given to the two technology acceptance behaviours of technology adoption and usage, since there has been hardly any research that compares the determinants of adoption with those of usage. The authors conducted their study in the US and chose the adoption and usage of web-based interactive marketing as their focus.

As Lam, Chiang and Parasuraman (2008) point out, innovativeness is commonly defined as a person's tendency to try out new things (p. 22). The authors argue that the psychological process that accounts for the innovativeness effect does not involve evaluation of the target product (p. 23). They propose that the evaluative process, which involves generalised beliefs and affects, takes place in parallel to that psychological process when customers are exposed to a technology-based product. The authors state that similar to the innovativeness disposition, we postulate that these generalised beliefs and affects would be associated with the generic concept representing technology-based products (p. 23),

The generalised beliefs and affects could guide a customer's evaluation of a product, including selective usage, interpretation and integration of product information to form their judgement (p. 23). These beliefs and affects are represented by customers'

technology readiness (TR), which consists of the four dimensions innovativeness, optimism, discomfort and insecurity. The first dimension was included under the innovativeness trait, hence leaving only three dimensions to form the generalised beliefs. The authors were interested in testing the robustness of individual dimensions in technology readiness as a predictor of user behaviour in the adoption and use of technology. They formulated nine hypotheses about the relationship between each dimension and the adoption behaviour, represented by adoption time and variety of personal use. The internet was chosen as the technology under examination, and the study confirmed the influence of innovativeness, optimism and insecurity. The influence of discomfort on adoption time and variety of use was rejected because many websites utilise familiar design features, hence a user's evaluation of the site's ease of use would likely be based largely on their perceptions about the user-friendly features than on any discomfort (p. 34).

2.7 TECHNOLOGY READINESS AND ACCEPTANCE MODEL (TRAM)

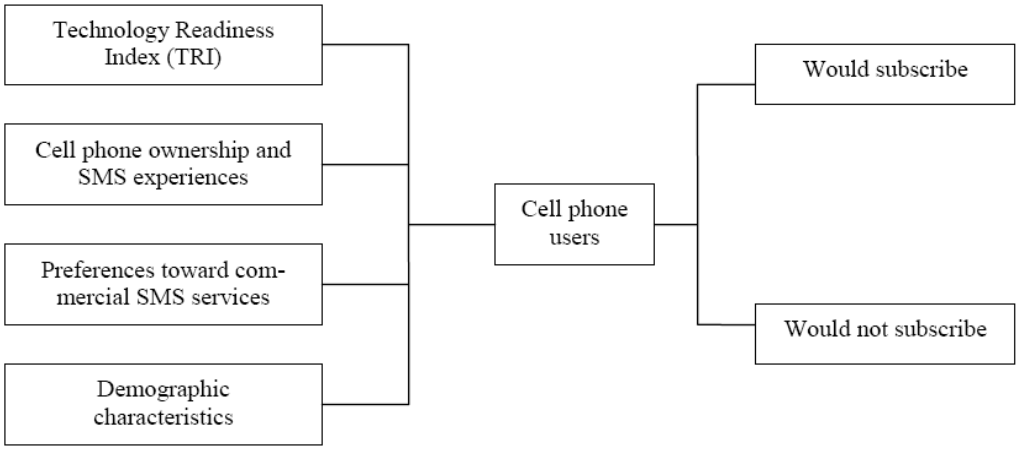
As the influence of individual TR dimensions on technology evaluation and adoption behaviour came to be supported, scholars moved forward by investigating the aggregate effect of the individual dimensions on the form of technology readiness itself. Three such studies are described below.

Sophonthummaparn and Tesar (2007) conducted research aimed at examining the effect of technology readiness on cellular telephone users in association with their willingness to subscribe to commercial Short Message Service (SMS) services. They proposed that there are two possible channels for sending commercial SMSs to customers. Using the first channel, a company can send an SMS directly to customers using its own customer database, while the second channel is one in which a company buys services from a commercial SMS service agent. This agent would be a company that buys customer databases from various telecommunications operators which provide basic demographic information on cellular telephone subscribers. This agent will then categorise customers according to their demographic characteristics, and offer a service to a company wishing to send a commercial SMS to a specific group of customers drawn from the demographic database. It is believed that the second channel could be used for advertising and promotional purposes to attract new customers. It has been argued that the intention to use the second channel is influenced by the Technology Readiness Index of cell phone users, as illustrated in Figure 2.16.

Sophonthummaparn and Tesar (2007) were unable to find support for any aggregate TR

influence on technology adoption behaviour. Their results showed that there is no statistical difference in technology readiness scores between people who would subscribe and those who would not subscribe to commercial SMS services in this study's sample. Consequently, it can be said that technology readiness plays a minor role in explaining cellular telephone users' propensity towards subscribing to commercial SMS services. With regard to this result, the authors explained that these days most people have owned or do own a cellular telephone (98.5%) and thus know how to send and receive SMS messages. The cellular telephone has become such a common communication device that now anyone can easily obtain one. Indeed, it could be argued that the cellular telephone and its common functions are no longer considered new technology. In this situation, TRI may play a minor role in explaining such adoption.

FIGURE 2.16 A MODEL OF THE EFFECT OF TECHNOLOGY READINESS INDEX ON CELL PHONE USERS' INTENTIONS TO SUBSCRIBE TO COMMERCIAL SMS



Source: Sophonthummaparn and Tesar (2007)

These researchers examined TR's influence on the adoption of some relatively recent Self-Service Technologies (SSTs), including e-banking, online ticketing and electronic retailing. Their research endeavour was inspired by the proposal by other researchers positing that traits affect the adoption of SST and technology readiness is the dominant trait positively correlating with technology use.

The authors proposed that TR is positively associated with people's attitude toward using SST. It is also correlated positively with their intention to adopt SST. Technology readiness is also positively associated with their responses to SSTs, in terms of perceived

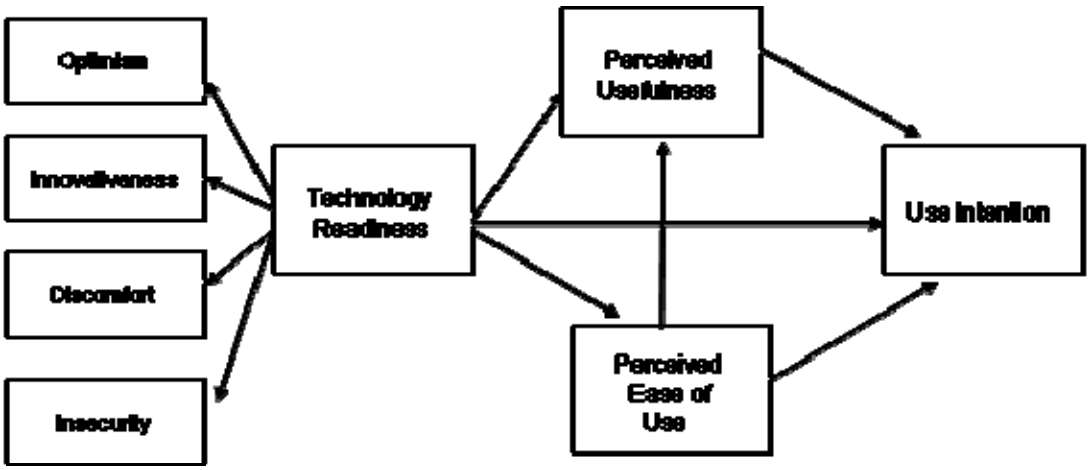
quality, satisfaction and loyalty. In this context, optimism and innovativeness as contributors to technology readiness are positively related to all responses to technology (technology evaluation, attitude and intention to adopt), whereas discomfort and insecurity as inhibitors are negatively related to those responses.

The relationships expected between the variables were indeed found in this study, showing that TR is positively related with customer attitudes to using SST. Their analyses also confirmed that overall TR is positively associated with customers' willingness to use SST. Liljander et al. also performed a t-test to compare the TR of adopters and non-adopters. The results revealed that adopters possess higher TR than do non-adopters. However, TR explained only a small proportion of the variance in the dependent variables.

The role of TR in the adoption of new technology has also been confirmed by Lin et al. (2007), who integrated technology readiness into TAM in the context of consumer adoption of e-service systems. By so doing, the researchers expected to improve the explanatory power of TR in the mobile technology adoption context, which had not been supported in previous research. Their model is called TRAM (Technology Readiness and Acceptance Model). The initiative to integrate TR and TAM emerged from an intuitive idea that the two models are interrelated. TAM is intended to analyse the adoption process from a particular system aspect, while TR is based on an individual's predisposition to adopt new technologies. Lin et al.'s web-based survey results confirmed that TRAM can be used to integrate individual factors with system characteristics as the basis for analysing technology adoption as part of a more comprehensive approach. The psychological process verified by TRAM to follow a 'TR→PEOU→PU→UI' mechanism bridges the contradiction between the two main opposing theories.

The research of Liljander et al. (2006) and Lin et al. (2007) has given us strong empirical findings about the role of TR in the adoption of new technology. Their studies have encouraged others to investigate the aggregate effect of TR in new technology adoption as a more realistic approach. Separating the individual dimensions' effects on technology adoption not only adds unnecessary complexity but is also unrealistic. It was originally stated that individual dimensions will interact with each other to form overall technology readiness. Thus, it is the technology readiness that affects an individual's evaluation of technology, rather than its individual dimensions. This understanding has led to what is known as the Technology Readiness and Adoption Model, or TRAM (Lin et al. 2007), presented below in Figure 2.17.

FIGURE 2.17 TRAM MODEL



Source: Lin et al. (2007)

Although the validity of TRAM still requires further investigation, there is a need to perform a detailed review of this model. With the inclusion of technology readiness as an individual trait factor in the model, TRAM is believed to have the potential to better predict technology acceptance. The review should include an analytical comparison with TAM since this model is a major constituent of TRAM. The results obtained can be used to establish the baseline framework for further developing a more integrative model that includes moderator variables.

2.8 FUTURE RESEARCH ON MOBILE BROADBAND APPLICATION

Scornavacca, Barnes and Huff (2005) have argued that the area of research into mobile broadband adoption is maturing, and have identified three promising areas requiring further research. One of these is theory development. Existing studies are predominantly based on TAM, which may limit our knowledge of mobile broadband acceptance. As the review of technology adoption model suggests, research into mobile broadband adoption may generate significant findings if it incorporates individual traits. This has been demonstrated by Liljander et al. (2007) and Lin et al. (2007). Future studies might benefit from extending their model (TRAM) into an integrated model for mobile broadband adoption. An integrated model has been successful in the past in increasing the explained variance, as demonstrated by the use of UTAUT by Venkatesh (2003). His model significantly improves explained variance from about 50% (by TAM) to 70%. Venkatesh (2003) achieved this by adding moderating variables to the model.

Previous studies on technology acceptance point to the urgency and importance of studying the impact of moderator variable. The presence of the influence of moderator variables in extant models of user technology acceptance has been identified by Chin et

al. (2003). Their findings support those of Agarwal and Prasad (1998), who escalated the necessity of investigating moderator variable effects after finding an absence of moderating influences on TAM. An empirical test of eight technology adoption models pioneered by Venkatesh et al. (2003) revealed that six of them performed with enhanced predictive power after involving moderator variables. In line with Venkatesh, Sung et al. (2004) found that moderating factors may enhance the limited explanatory power of technology acceptance models when specifically examining the role of moderating factors in user information technology acceptance.

Understanding of how moderator variables influence the mobile broadband technology acceptance process in a marketing setting is the main focus of this thesis. Not only is this knowledge scarce in the academic literature, but it is also urgently needed by the industry. Indonesian operators, including the state-owned incumbent company, are seeking to enhance their understanding in this respect to overcome the problem of low rates of mobile broadband product adoption. This vital market knowledge can contribute towards more effective development of technology investment and deployment, new product creation, market education, and marketing and promotional strategic programs. The identification of potential moderator variables for inclusion in the conceptual model is based on a thorough literature review as well as email correspondence with certain researchers who are recognised as experts in technology acceptance model development.

2.9 SYNTHESIS AND SUMMARY

A review of existing models of technology acceptance reveals an ongoing debate in this area. This debate surrounds the question of whether technology drives consumers to adopt new tech-based products or whether it is the customers who initiate their use of technology and hence consumption. This thesis unveils that this debate is underpinned by two main theoretical approaches.

The first theoretical approach has a system perspective orientation. It asserts that as long as the technology meets user requirements, it will result in consumer technology adoption. Theories that are grouped into this category include the Technology Acceptance Model/TAM (Davis 1989), originally derived from the Theory of Reason Action/TRA (1980) and Theory of Planned Behaviour/TPB (1985), and the Unified Theory of Technology Acceptance/UTAUT (Venkatesh et al. 2003). With his Technology Acceptance Model (TAM), Davis (1989) proposed that technology is accepted if perceived as having an appropriate function for its users (perceived usefulness), as easy to use and fitting the subjective user. This model has been extended by the inclusion of performance

expectancy, effort expectancy, social influence, and facilitating conditions, and become known as the Unified Theory of Technology Acceptance (UTAUT). The common characteristics underpinning these theoretical models focus on technology characteristics, labelled as relative advantage, complexity, compatibility, trialability and observability or perceived usefulness and perceived ease of use by Davis (1989).

The second theoretical approach involves theories that view technology adoption more from the user perspective. The most prominent theories in this group are based on the notions of consumer innovativeness, also known as personal innovativeness (Rogers & Shoemaker, 1971) and the Technology Readiness Index/TRI (Parasuraman 2000). Rogers and Shoemaker (1971) argued that consumers who have high innovativeness levels adopt a new product earlier than do others. Innovativeness is seen as an indicator or measure of the tendency and willingness to embrace change and try new things (Hirunyawipada & Paswan 2006). Consumers who are highly innovative are expected to demand new products. Technology readiness, in the same vein, specifies the concept of consumer innovativeness in the context of high-tech technology adoption. It indicates consumers' propensity to embrace and utilise technologies to carry out activities at home and work.

The literature review also aimed specifically to identify previous efforts at developing models of mobile technology acceptance, revealing that researchers have applied various theoretical models. Among these models, the Technology Acceptance Model has been the mostly widely applied to studies of mobile technology/product/service adoption. TAM is clearly the most accepted reference framework for investigating the formation of the technology adoption process as it can successfuly capture the two most robust adoption dimensions, perceived usefulness (PU) and perceived ease of use (PEOU). These dimesions are derived from technology characteristics, suggesting that a person will be likely to adopt a technology if it is useful and easy to use. However, understanding technology acceptance solely on the basis of these two variables is considered inadequate since it is also important to identify what factors influence a person's attitude to the technology.

The addition of technology readiness to TAM to form a new model called TRAM (Lin et al. 2007) has created an opportunity to better understand how an individual's traits and general beliefs affect attitude toward technology. Past research, such as that of Chiu and Tseng (2010), Lam, Chiang and Parasuraman (2008), Sophonthummapharn and Tesar (2007), Yi et al. (2006), and Lin and Hsieh (2007), has proven this factor's influence in technology acceptance. This, again, suggests that TAM is considered too simple to

adequately explain consumer adoption of technology. TAM is also questioned for its ability to explain technology acceptance in a non-work situation, such as mobile broadband service adoption. The adoption of this kind of service assumes consumer independence, such that their adoption is not compulsory as in the adoption of technology in the workplace (Kwon, HS & Chidambaram, L 2000; Park, Yang & Lehto 2007). Perceived enjoyment (PE) is also considered to be an important factor for inclusion in TAM. This has been suggested by many researchers such as Ha, Yoon and Choi (2007), Shin (2007) and Bruner and Kumar (2005). All of these researchers suggest that TAM exploration has not lost its value, and recommend the pursuit of an integrated model of technology acceptace by adding certain factors to enhance understanding of the interaction between those factors and the main predictors or dimensions of acceptance.

Significant effort has been invested by both researchers and marketers in identifying such an integrated model. Within the context of mobile broadband service acceptance, exploration can start from TAM and TRAM as they have solid support within the field. They also represent the two theoretical approaches discussed above. Moreover, these two models can potentially act as the baseline model for further development towards a more integrated framework. However, the intuitive idea used by Li et al. (2007) to integrate TR into TAM in developing TRAM still requires further empirical validation. The integration of the individual trait approach and the system perspective approach raises a critical issue about the validity of TRAM. The psychological 'TR→PEOU→PU→UI' process of technology acceptance proposed by TRAM implies that the evaluation of new technology systems can only occur if prior knowledge and experience with technology is present and is first retrieved by the consumer to be able to perceive the ease of use and usefulness of the system. However, this notion is questionable since consumers can potentially still observe new technology regardless of their level of technology readiness. To resolve this issue, a closer examination of TRAM is needed which can be conducted by a comparative analysis between TRAM and TAM. In so doing, it is important to remember that TAM in the TRAM should first be modified by adding perceived enjoyment to the model, as in the work of Shin (2007) and Bruner and Kumar (2005). The next step toward the construction of an integrated model is to select other important factors for inclusion in the model. The focus here is on finding moderating variables instead of mediating ones because many previous studies have incorporated mediating variables without significant improvement in the model's ability to predict consumer acceptance of mobile broadband services. The identification of potential moderator variables for inclusion in the baseline model is the aim of the following chapter.

CHAPTER 3: IDENTIFICATION OF MODERATOR VARIABLES IN THE MODEL OF TECHNOLOGY ACCEPTANCE

3.1 INTRODUCTION

The objective of this chapter is to examine the identification of moderator variables undertaken in previous studies, through a comprehensive exploratory literature review. Research performed by Sun and Zhang (2006) has been seen as a starting point for exploring the moderators relevant for inclusion in the Technology Acceptance Model (TAM) and Technology Readiness and Acceptance Model (TRAM). The identification of potential moderator variables conducted through exploratory literature review is presented in three sections. The exploration result shows that there are three potential moderator variables identified, which are to be further examined in this reseach. These moderators include the marketing factor, individual cultural orientation and demographic factors reflected by age and gender. This chapter concludes by incorporating the three identified moderators into the baseline model to be empirically tested based on a number of hypotheses developed in this thesis. To begin, a review of previous studies that have explored the presence of moderator variable influence in TRAM and TAM is presented in the following section.

3.2 IDENTIFICATION OF POTENTIAL MODERATOR VARIABLES IN TRAM

Numerous studies have identified a significant influence of moderator variables in the technology acceptance process, such as those of Meng, Elliott and Hall (2010), Westjohn et al. (2009), Demirci and Ersoy (2008), Kim (2008), Ha et al. (2007) and Venkatesh et al. (2003). These studies reported improved predictability of TAM after the introduction of moderating factors in the model. A summary of the moderator variables tested in these studies is presented in Table 3.1 below.

TABLE 3.1 SUMMARY OF MODERATOR VARIABLES EXAMINED IN PREVIOUS RESEARCH

Moderator variable	Researchers	Year	Situation Setting
National culture	Juan (Gloria) Meng Kevin M. Elliot Mark C. Hall	2010	Non-work situation
National culture	Ahmet Emre Demirci Nezihe Figen Ersoy	2008	Work situation
Job relevance and experience	Sang Hyun Kim	2008	Non-work situation
Gender, age and prior experience	Imsook Ha Youngseog Yoon Munkee Choi	2007	Non-work situation
Gender, age and voluntariness of use	Viswanath Venkatesh Michael G. Morris Gordon B. Davis	2003	Work situation

As can be seen in Figure 3.1, Meng et al. (2010), Westjohn et al. (2009) and Demirci and Ersoy (2008) have all reported the moderating role of culture over technology readiness in technology adoption. Kim's, Ha et al.'s and Venkatesh et al.'s studies suggested that certain demographic and price factors have a significant influence on technology adoption. A seminal paper from Venkatesh et al. has become an essential reference in research into the moderating effect of demographic factors in technology adoption. However, these studies have significant limitations in that they do not take into account factors created externally such as the influence of mobile broadband providers' or marketers' actions on consumer perceptions of the value of new technology offerings. Therefore, there is a need to propose moderator variables that are relevant to the research context of this thesis. A study by Sun and Zhang (2006) is useful as a starting point in identifying such moderator variables.

Sun and Zhang (2006) found three groups of factors that have a moderating influence on technology acceptance within a work or formal organisational context. These three moderator groups include technology, individual and organisational factors. For a technology acceptance study in a non-work situation involving individual users, the use of such factors must be adapted accordingly. Marketing-related factors are taken into consideration as the first moderator identified in this chapter, since marketing is known to have an influence on user attitude (Teng & Laroche 2007), trial probability (Steenkamp & Gielens 2003) and purchase intention (Laroche 2002; Laroche, Kim & Zhou 1996). More specifically, a marketing effectiveness metric known as consumer perceived value (CPV) was adopted to examine the moderating influence of marketing factors. A more detailed

explanation of this factor can be found in section 3.2.1. The second moderator variable that potentially demonstrates a signficant influence on the acceptance model is the factor of culture. This factor was taken into consideration instead of the organisational factor proposed by Sun and Zhang (2006). In a situation in which users are not institutionally obligated to adopt technology, the organisational factor is deemed less relevant for use in the model. Besides, the influence of culture has been explored in both work and non-work situations (Han & Shavitt 1994; Srite & Karahanna 2006a; Veiga, Floyd & Dechant 2001; Zhang & Gelb 1996). The concept and definition of culture, the relation between culture and individual values, the different framework of the value system and the determination of the value system to be used in this thesis are explained in greater detail in section 3.2.2. This section also presents arguments for adopting the Schwartz Value System to measure individual cultural orientation performing as a moderator. Finally, in section 3.2.3, individual factors including age and gender are identified as potential moderator variables, as found also by Sun and Zhang (2006).

3.2.1 Identification of Moderator Variable 1: Consumer Perceived Value (CPV)

3.2.1.1 Consumer perceived value as a marketing metric

The strategic role played by marketing includes setting the strategic direction for a firm and guiding investments to develop marketing assets that can be leveraged within business processes to provide sustainable competitive advantage (Rust et al. 2004). Marketing's quest to justify its role in attaining such objectives has reached a crescendo over the last few years (Keh, Chu & Xu 2006; Keh & Sun 2008; Llonch, Eusebio & Ambler 2002; Mitchell 2008) Llonch et al. (2002) mentioned that a variety of marketing metrics have been developed in recent years to measure the effectiveness of marketing. Llonch et al. (2002) have observed that Clark (1999) identified around 20 measures, Ambler and Riley (2000) examined 38 measures, Davidson (1999) posits 10 important measures of marketing effectiveness, and Meyer (1998) notes hundreds of marketing metrics.

Kokkinaki and Ambler (1999) deduced that marketing activity measures can be reduced to six categories: financial measures (such as turnover, contribution margin, and profits); measures of competitive market (such as market share, advertising share, and promotional share); measures of consumer behaviour (such as customer penetration, customer loyalty, and new customers gained); measures of consumer intermediate (such as brand recognition, satisfaction, and purchase intention); measures of direct customer (such as distribution level, the profitability of intermediaries, and quality of service); and

measures of innovativeness (such as new products launched and revenue gained from these products as a percentage of total turnover).

The key to improving the accountability of marketing is, however, to link those measures to the source of cash flow (Stewart 2009). Stewart (2009) has hinted that the important source of such cash flow is the customer rather than the products or services produced by companies. Traditionally, a firm's primary focus has been to allow a product to 'find' its customer (Kumar, Venkatesan & Reinartz 2008; Ramani & Kumar 2008). This product-centric approach has encouraged firms to focus on the most profitable products rather than the most profitable customers. Kumar et al. (2006) stress that this strategy has proven to be not so profitable. Kumar et al. (2008), Stewart (2009) and other researchers have argued that taking a customer-centric approach is more straightforward for measuring marketing effectiveness.

From the buyer's perspective, a better purchasing decision is actually more valuable than a better product or service per se because, given healthy, competitive markets, a better decision will lead the buyer to a better product as a matter of course (Mitchell 2008). The consumer is an active, autonomous agent exercising choice between competing products and services and choosing those products and services that best fit his/her needs and values. The core metrics of this model revolve around delivering superior value as perceived by the consumer.

The real marketing challenge then is to understand what a good go-to-market decision-making process looks like from the buyer's point of view (Mitchell 2008). In this regard, it is important to remember that a 'better decision' is not necessarily the same as a 'rational' decision as defined by economics text books. A better decision may help the buyer access the cheapest product, or the highest-quality product, or the one conferring the highest status, or the one deemed most fashionable, or the one deemed least risky. 'Better' might also relate as much to the decision-making and purchase process as to the product itself: for example, it might entail the quickest and easiest choice or the least time-consuming means of purchase. In other words, 'better' is determined by the buyer's goals and priorities and is driven and measured by the buyer's key performance indicators (KPIs), whatever these might be—such as money, time, attention, work, or emotional costs/returns. Under this measurement framework, it is therefore vital for marketers to understand the different consumer segments' go-to-market KPIs. In the literature, this new metric of marketing effectiveness is called consumer perceived value (CPV) (Graf & Maas 2008; Rust et al. 2004; Sweeney, Jillian C. & Soutar, Geoffrey N. 2001). CPV has gained worldwide acceptance as a marketing effectiveness metric. Graf and Maas (2008) note

that, during the last few years, the value concept has always been the fundamental basis for all marketing activity. Many theories and studies explore the mechanisms by which marketing actions affect consumers' value perceptions (Bolton & Drew 1991; Dodds, Monroe & Grewal 1991; Teas & Agarwal 2000; Zeithaml 1988). Yet the mechanism is not the focus here. Rather, the aim in this thesis is to develop a theory of the role of CPV in technology acceptance. In this regard, we elaborate the CPV concept in the next section.

3.2.1.2 The concept of consumer perceived value

Duman et al. (2005) identified four types or definitions of value raised in the literature. The first is value as that which is of true worth to people in the broad context of the wellbeing and survival of individuals or society as a whole. Second, value refers to what a society collectively views as important, regardless of whether or not such highly valued objects of consumption really contribute towards individual wellbeing. The third type of value refers to what an individual holds to be worthwhile to possess, or to strive or exchange for. Lastly, value refers to the amount of utility that consumers see as inherent to a particular object which they aim to maximise out of a particular act of buying or consuming. While economists and some marketing scholars have emphasised the last definition of value, researchers have pointed out the necessity of including the first three definitions in the measurement of consumers' perceptions of value of the products they buy (Duman, T. 2002).

Identifying and creating consumer perceived value (CPV) is regarded as an essential prerequisite for long-term company survival and success (Graf & Maas 2008; Pihlström & Brush 2008). Understanding how consumers judge and value a service or product is crucial to achieving competitive advantage. Scientists and practitioners have recognised the power of the CPV concept in identifying value for consumers and managing consumer behaviour (Graf & Maas 2008; Kothari & Lackner 2006; Setijono & Dahlgaard 2007; Woodruff 1997b, 1997a).

Terminology such as utility, quality, advantage and preference is used to define CPV even though these terms themselves are not clearly defined (Graf & Maas 2008). Graf and Maas (2008) compiled a summary of the various CPV definitions found in the literature, which is represented in Table 3.2. They noted that the definitions have in common that CPV is considered a theoretical construct related to a consumer perspective of provider products or services. In addition, CPV is a subjective concept, as the value of a product or service is the result of the consumer's subjective judgement. Graf and Maas also identified some commonalities among the definitions in that CPV is regarded as a dynamic construct and a theoretical and 'higher-order' construct with multiple dimensions and several levels of abstraction. Last, Graf and Maas highlighted that researchers share

an understanding that CPV is conceptualised as a trade-off between benefits and sacrifices or between what is got and what is given (Zeithaml 1988), with a focus on the concrete performance characteristics of the products/services. The multiple dimensions of CPV that determine product performance are elaborated in the next section.

TABLE 3.2 DEFINITIONS OF CONSUMER PERCEIVED VALUE

Source	Definition
Zeithaml (1988)	Perceived value is a consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given.
Gale (1994)	Consumer value is market perceived quality adjusted for the relative price of your product. [It is] your consumer's opinion of your products (or services) as compared to those of your competitors.
Holbrook (1994)	Consumer value is 'a reativistic (comparative, personal, situational) preference characterizing a subject's (consumer's) experience of interacting with some object... i.e. any good, service, person, place, thing, event, or idea.'
Woodruff (1997)	Consumer value is a 'consumer's perceived preference for and evaluation of those product attributes, attribute performance, and consequences arising from use that facilitate (or block) achieving the consumer's goals and purposes in use situations'.

Source: Graf and Maas (2008)

3.2.1.3 Antecedents of consumer perceived value

As can be seen from Table 3.2, CPV is defined by (Zeithaml 1988) as the overall assessment of the utility of a product based on a consumer's perceptions of what is received and what is given, which is also referred to as comparison between a product's or service's give and get components. Some researchers, including Durvasula et al. (2004), J. Joseph Cronin, Brady and Hult (2000) and Monroe (1990), note that price and quality constitute the give and get components, respectively.

Under this conception, quality refers to how well a product or service serves its intended purpose or performs its proper function (Holbrook & Hirschman 1982), whereas price is the amount of money paid (Sweeney, Jillian C. & Soutar, Geoffrey N. 2001). The consumer evaluates quality before making a purchase and chooses the product or service that provides better quality. This understanding posits that the process is influenced by the cognitive functions of a consumer alone, and ignores the consumer's experiences when using the product. Consumer research has evolved from this limited focus to include affective factors as well. The main driver to this thinking is consumer experience. Consumers may have different opinions after having some experience with a product and that opinion will determine their future behaviour. It is important to mention that the

experience may be obtained even before the consumer pays for the product. This makes the affective component more important in value construction. Therefore, the view of consumer value based on price and cognitive-based judgements of quality is overly simplicistic. Although it is argued that the concept of product quality can be broadened to include many things such as features, warranty, after sales services and packaging, Sweeney and Soutar (2001) argue that decomposing CPV into multiple dimensions will be more useful. They add that a more sophisticated measure is needed to understand how consumers value products and services.

Sweeney and Soutar (2001) endeavoured to develop a more comprehensive understanding of the dimensions that construct CPV. Referring to their study, we present a summary of CPV dimensions as seen in Table 3.3. Sheth et al.'s work became the foundation of the multiple dimensions of CPV developed by Sweeney and Soutar (2001). The authors applied Churchill's (1979) approach to developing a marketing measure. Sweeney and Soutar (2001) carried out two scale purification stages and came to the conclusion that the epistemic and conditional values should be disregarded, leaving them with only four dimensions: quality, price, and emotional and social values. The following reasons were cited for rejecting the conditional and epistemtic values. First, the objective is to develop a general measure, so conditional value is seen as less critical. Second, based on an exploratory study, the authors found that epistemic value is not relevant for all goods. It is more relevant for experiential services such as holidays or shopping trips. The authors continued by conducting several processes. An exploratory factor analysis with the remaining items revealed a stable structure of four dimensions, which is described in Table 3.3.

First, functional value can be defined as the practical or technical benefits that users can obtain by using a product or a service (Sweeney, Jillian C. & Soutar, Geoffrey N. 2001). The functional features of wireless broadband services can lead consumers to adopt and utilise such services.

Second, emotional value refers to meeting the mental or psychological needs of product or service users (Sweeney, Jillian C. & Soutar, Geoffrey N. 2001). Emotional value is the most important predictor of purchase intention and word-of-mouth behaviour. Although a consumer may not seek emotional benefits intentionally from a consumption experience, positive feelings aroused unintentionally from the experience play an important role in further decision-making at a subliminal level (Sweeney, Jillian C. & Soutar, Geoffrey N. 2001).

Third, social value is obtained when consumers feel they are connected to others by using a product or a service (Yang, K 2006). Social value can be derived by communicating with and belonging to a specific group or socialising actively through wireless broadband services such as mobile audio and visual communication.

TABLE 3.3 SUMMARY OF CPV DIMENSIONS

Authors	CPV Dimensions	Definition
Zeithaml (1988); Monroe (1990); Cravens et al. (1988); Dodds et al. (1991)	Price	The amount of money paid by consumers
	Quality	The measurement of how well a product performs its intended functions
Porter (1990)	Product quality	Similar to quality definition above
	Special features	Other product features that do not influence a product's basic function but enhance its overall value
	After-sale service	Service provided by seller after a consumer buys a product
Holbrook and Hirschman (1982); Babin et al. (1994); Richins (1994)	Product quality	Similar to quality definition above
	Symbolic value	A specific symbol or status that the consumer gets by purchasing a product
	Hedonic value	A feeling that arises when using a product (usually linked to enjoyment)
	Esthetic value	Product design that enhances its outer appearance
Sheth et al. (1991)	Social	Ability of a product to enhance someone's social status, self-concept and presence by invoking a specific social image
	Emotional	Likeliness of a product to increase the chance of positive emotional response
	Functional	Reliability, durability and price of a product
	Epistemic	Product's capacity to arouse curiosity, offer novelty or satisfy a desire for knowledge, which may be important for consumers who are considering new experiences
	Conditional	Temporary functional or social value, which arises when situational factors moderate the perceived value-outcome process
Sweeney and Soutar (2001)	Functional value (performance/quality)	The utility derived from the perceived quality and expected performance of the product
	Emotional value	The utility derived from the feelings or affective states that a product generates
	Social value (enhancement of social self-concept)	The utility derived from the product's ability to enhance the consumer's social self-concept
	Functional value (price/value for money)	The utility derived from the product due to the reduction of its perceived short-term and longer-term costs

Source: Sweneey and Soutar (2001)

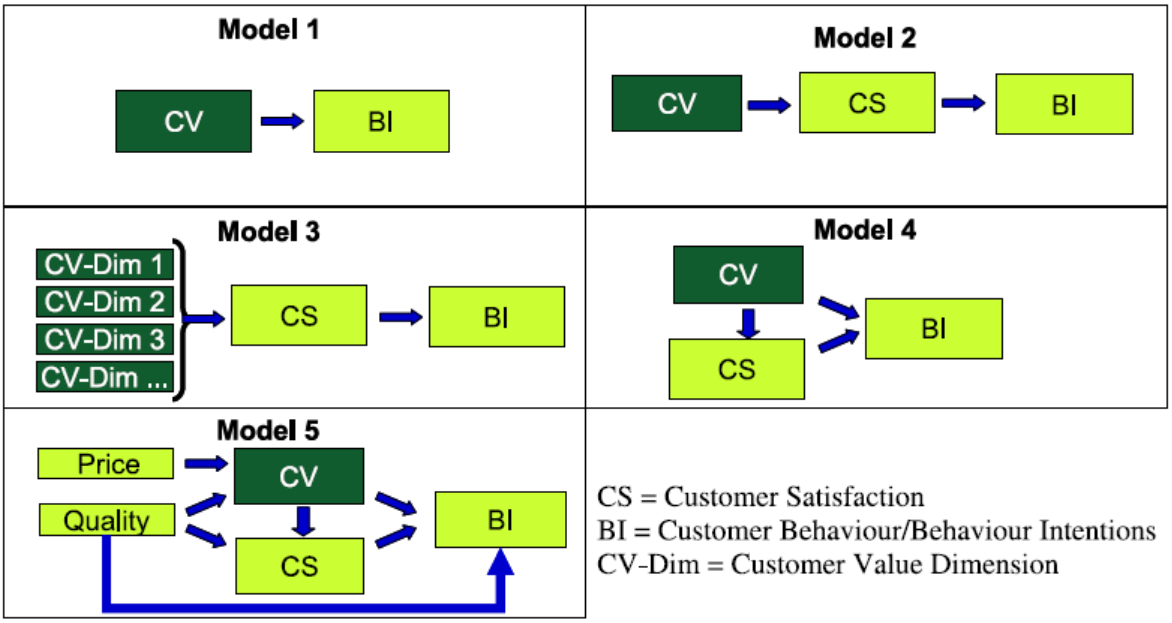
Finally, monetary value is defined as how much a product or a service is satisfactory in relation to cost, time or effort spent in using that product or service (Bolton & Drew 1991; Cravens et al. 1988; Monroe 1990; Sweeney, Jillian C. & Soutar, Geoffrey N. 2001). Monetary value cannot be neglected in this framework because wireless broadband service users generally pay relatively high usage fees for the services.

These four value dimensions are relevant antecedents to examine when studying consumers' behavioural intentions toward the use of wireless services in general (Yang, K 2006). A specific indication for CPV to perform as a moderator variable in the acceptance model was found in the literature. The findings are reported in the following chapter.

3.2.1.4 Moderating role of CPV in TAM and TRAM

Numerous studies (Chen & Dubinsky 2003; Cronin et al. 1997; Grewal et al. 1998; Kashyap & Bojanic 2000; Sweeney, Jillian C. & Soutar, Geoffrey N. 2001; Zeithaml 1988) have proposed that there is a relationship between CPV and behavioural intentions. Graf and Maas (2008) presented five models of this relationship, which are represented in Figure 3.1.

FIGURE 3.1 CPV AND CONSUMER BEHAVIOUR



Source: Graf and Maas (2008)

The authors identified different arguments regarding the relationship between CPV and behaviour. CPV can be connected directly to behavioural intention (Models 1, 4 and 5) or indirectly through the customer satisfaction construct (Models 2 and 3). The indirect CPV–

UI relationship indicated an involvement of a 'third variable' which can be a mediator or moderator variable (Wu & Zumbo 2007). In the case of the mobile broadband technology usage intention investigated in this thesis, in which the respondents are non-users, it is irrelevant to relate this third variable to customer satisfaction. This is because the technology has never previously been experienced by the respondents, yet customer satisfaction needs to be preceded by experience (Pihlström & Brush 2008). This situation suggests that the third variable that was more relevant for inclusion in the model is a moderator. The study conducted by Wang et al. (2006) supported this proposition. They found that the fundamental constructs used in the existing Technology Acceptance Model (TAM) as well as in the Technology Readiness and Acceptance Model (TRAM) do not fully reflect the specific influences of technological and usage-contextual factors that may alter user acceptance of a technology. Referring to Venkatesh et al. (2003), we argue that an important contextual factor that moderates consumer acceptance of new technology, especially in technology-importing countries like Indonesia, is CPV of available mobile services. The role of CPV is therefore deemed to be a factor that demonstrates the nature of a moderator variable.

The insertion of CPV as a moderator into the acceptance models (TAM and TRAM) was considered to have strong potential to enhance the power of these models. This is because both TAM and TRAM have no construct which represents attitude towards the adoption object (Kim, H-W, Chan & Gupta 2007). It has been revealed in the literature that attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour (Kim, H-W, Chan & Gupta 2007). In the context of the present research, the adoption object or the particular entity mentioned above refers to the commercialised mobile broadband service (MBS) developed by the Indonesian mobile broadband operators who gave this service a specific commercial brand name such as Telkomsel Flash by PT. Telkomsel Tbk., Indosat 3.5G Broadband and Indosat Mega Media (Indosat M2) by PT. Indosat Tbk., and XL 3G HSDPA by PT. Exelcomindo Pratama Tbk. We still need to incorporate CPV into the model even though TAM and TRAM have been expanded through the insertion of another emotional variable of perceived enjoyment (PE) because CPV and PE perform different roles in the model. CPV is adopted to measure consumer value of the mobile broadband services provided and commercialised by Indonesian MBS operators, whereas PE as a dimension of TAM is used to investigate the perceived capability of the imported 3.5G technology in handling enjoyment/entertainment-related applications and its generated traffic from which the commercialised services are deployed.

The available technology, or the technology offered in the market, in a specific locale may not be identical to its original platform produced elsewhere. This is evident in technology-importing countries like Indonesia. Indonesian operators adopt mobile services technology and adapt the technology to fit their local situational factors. As a result, Indonesian consumers are likely to receive a somewhat different technology from that offered in the technology-exporting countries. For this reason, there will be a comparison between the actual offering and the characteristics of the technology in its original platform. Such comparison will be made based on consumers' perception of the value of the actual offering or deployed technology in comparison to its original characteristics. Theoretically, this value is referred to as CPV, which was believed to have a different influence on the relationships among the constructs in both TAM and TRAM for different levels of its intensity. Based on this thinking, we posit that CPV of actual mobile service offerings in Indonesia (or in technology-importing countries in general) will hypothetically act as a moderator to consumer's acceptance of the technology in the TAM.

From a theoretical perspective, we can also find a solid rationale for incorporating CPV as a moderator by reviewing its implementation in a number of notable studies of mobile service adoption. The multiple-item scale for measuring CPV proposed by Sweeney and Soutar (2001) has been extended to a number of mobile service studies, such as that of Anderson and Srinivasan (2003), Yang (2006), and Turel, Serenko and Bontis (2007). Yang (2006) attempted to determine whether the effect of consumer perceived value might explain differences in consumer mobile data services acceptance behaviour between American and Korean consumers. He revealed that the effect of consumer perceived value explained the differences in mobile data services usage between the two countries. Moreover, the results indicated that emotional value in using mobile data services might be emphasised by developing and positioning mobile data services in each country.

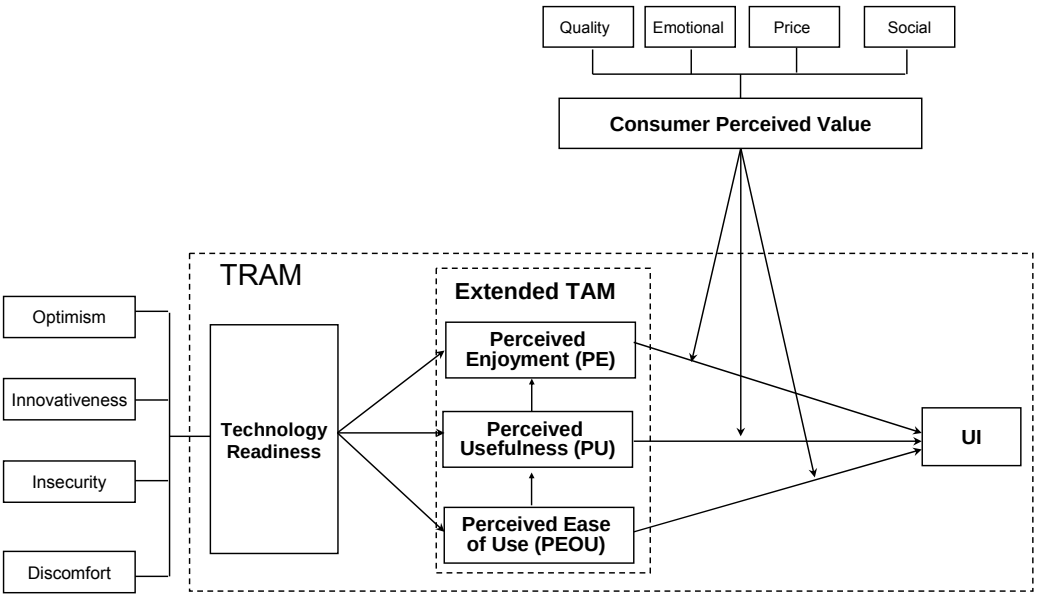
Turel et al. (2007) discussed a broadened conceptualisation of technology acceptance in which value trade-offs (i.e. price, social or emotional value, and quality) are critical drivers in the adoption decision for Short Messaging Services (SMS). They suggested that intentions to use IT were influenced to some extent by CPV. Perceived value of SMS was an important predictor of people's behavioural intentions. Perceptions of positive emotional values were also the key factors influencing usage intentions towards SMS. Indeed, many people may utilise SMS for purely intrinsic reasons without feeling that there are effectiveness or efficiency outcomes (Turel et al., 2007). The price (price for quality value) is a significant predictor of the employment of an SMS technology on a pay-per-use basis: many SMS users are price sensitive (Turel et al., 2007). The degree of perceived

quality of SMS was found to have a moderate effect on usage intentions; however, the extent of perceived social value was found to have no impact on users' overall perceived value and future usage of SMS.

Another proof of the influence of CPV in broadband technology adoption can also be found in Anderson and Srinivasan's (2003) work. The authors studied CPV influences on customer loyalty towards an electronic business. They argued that CPV can enhance loyalty by reducing an individual's need to seek alternative service providers (Anderson & Srinivasan 2003). Indeed, their research shows that the perceived value of a website moderates the impact of e-satisfaction on e-loyalty (p. 132).

To incorporate CPV into TRAM and TAM, Sweeney and Soutar's (2001) multi-scale CPV measurement model was adopted. There are two reasons for taking this approach. First, Sweeney and Soutar's model provided a comprehensive framework for investigating and measuring CPV beyond the traditional quality and price perspective. Second, their model provided a valid measurement of CPV and demonstrated much better explanatory power. Referring to the comparison made between the outcomes of the four dimensions against those of a single dimension in measuring CPV (Sweeney & Soutar 2001), it was noted that the explained variance was much greater when using multiple dimensions, at around 48–68%. The single dimension could only explain around half of that (Sweeney & Soutar 2001, p. 214). Finally, Sweeney and Soutar's (2001) model provided a valid measurement of CPV for durable goods that has also been adapted and extended to cover mobile phone services. These findings were used to position the multidimensional CPV as a moderator in the research model displayed in Figure 3.2.

FIGURE 3.2 HYPOTHETICAL MODERATING ROLE OF CPV IN TAM AND TRAM



The moderating role of CPV in the acceptance model shown in Figure 3.2 indicates that consumer perceived value moderates the relationships between perceived enjoyment and usage intention, perceived ease of use and usage intention, and perceived usefulness and usage intention. We now move to the next stage of our study, which is to ascertain the potential for the cultural factor to be the second moderator in the model.

3.2.2 Identification of Moderator Variable 2: Individual Cultural Orientation

In this chapter the potential moderating role of individual cultural orientation is reviewed. Because understanding of culture requires a high level of abstraction, the review process begins with an overview of the concept of culture, the components of culture and the research efforts to date aimed at developing a consensus understanding of culture. It will be explained that the core component or dimension of culture is linked to the concept of value. To understand, measure and examine culture, a value system framework is needed. Therefore, the review is followed by an account of the concept and definition of values, and an examination of the existing theories developed to measure values as a system. There are seven theories considered to have a strong relevance for the research purposes of this thesis. A critical and comprehensive review is applied to these theories with the aim of identifying an appropriate value theory to be applied in this thesis. In this regard, it is reported later in this chapter that the most relevant theory which demonstrates a solid conceptual background and good applicability to the present study is the value system proposed by Schwartz (1992). Consequently, the investigation of the moderating role of culture within the acceptance model is conducted based on a model incorporating Schwartz's value system, which is presented at the end of this section on culture.

3.2.2.1 Definitions of culture

Various definitions of culture have been proposed by scholars who have focused their research on this subject, ranging from short and simple to complex, sharpening and broadening or even challenging previous definitions (Jameson 2007; Straub et al. 2002). Kroeber and Kluckhohn's review of culture alone identified around 160 definitions of culture (Kroeber, A & Kluckholm 1952). In this section, we present some definitions of culture that extend those found by Kroeber and Kluckhohn (1952). Despite the term originating from a verb,[1] the majority of scholarly ideas about culture refer to it as a noun. Scholars have focused on analysing the construction of culture because understanding of it has been limited. Tylor (1871; 1874) defined culture as a complex whole which includes

[1] The word 'culture' came into English usage (as distinct from cultivation and refinement) from nurture, from agriculture and pearl culture, and from test tube culture in 1871 (see Straub et al. 2002, p. 14).

knowledge, beliefs, art, morals, law, customs, and any other capabilities and habits acquired by the individual as a member of society. Two keywords from his definition are relevant to highlight here. First, culture is complex, and second, it is acquired by the individual as a member of society. The complexity of culture is also captured in the definition of culture put forward by Mowen and Minor (1998), that culture is an interactive aggregate of common characteristics. Other broad definitions of culture are offered by Hofstede (1997), Hall (1976, 1989) and Kroeber and Kluckhohn (1952). Hofstede (1997) defined culture as collective programming of the mind. Hall (1976) mentioned that culture is a series of situational models for behaviours and thoughts. In (1989), Hall sharpened his idea that culture embodies the trace effects or inferred underlying patterns of belief about past and future behaviour that has no meaning outside of that pattern. Kroebe and Kluckhohn (1952) defined culture as patterned ways of thinking, feeling and reacting. All of these definitions contain abstract dimensions, namely collective programming, pattern of belief, and pattern of ways of thinking, feeling and reacting. Because of this abstract conceptualisation, culture is broadly spoken of as a way of life (Mowen & Minor 1998), as humanity's medium (Hall, ET 1976) which consists of a system of information with unique meaning that ensures survival, enables the pursuit of wellbeing, and is transmitted from one generation to the next (Matsumoto, D. 2007).

To return to Tylor's definition, we may infer from his second keyword that the institution of culture is society. Culture exists and is maintained in society and members of the society need to acquire and learn it in order to live in harmony with each other. This is inline with the definition proposed by Schein (1999). Schein defined culture as the sum total of all shared, taken-for-granted assumptions that a group has learned through its history. The notion 'taken for granted' implies that culture is established in a society and that members take it for granted as their way of conduct in that society. As a result, culture becomes an identity. It distinguishes the members of one group or category of people from another (Hofstede, G 1997). Mowen and Minor (1998) wrote a definition of culture that extended understanding of how culture is acquired. Their definition states that culture is a set of socially acquired behaviour patterns (Mowen & Minor 1998). The term 'socially acquired' indicates an interaction between people as the members of a society. Thus, culture is not an independent or static thing. It is embodied in people, the members of the society, and the interaction between them causes the transfer of culture from one person to another, and hence its very construction.

Sheldon (1951) offered a definition that still revolves around the form of culture, yet which still aligns with the points made above. According to the author, culture is a theoretical model, and that the abstractions and principles of which it is comprised are spontaneous

creations of the mind (Sheldon 1951). Although his definition remains somewhat vague, Sheldon recognised that culture is constructed by people, which is in line with the idea of culture explained in the previous paragraph. The idea that culture is constructed by humanity has also been acknowledged by Triandis (1972), who understands culture as an individual's characteristic way of perceiving the human-made part of one's environment (Triandis, H.C. 1972). This notion of culture as human-made suggests that society and everything within it, including culture, is constructed by people. This idea is supported by the work of Sackmann and Phillips (2004). These authors note that the conception of culture has changed from something consisting of given, static, single and immutable individual characteristics to something which is socially and collectively constructed (see Table 3.4 for a summary of this change in understanding of culture as compiled by Sackmann and Phillips). Hence, culture is not an individual trait (Hall, ET 1976).

TABLE 3.4 CHANGES IN THE CONCEPTION OF CULTURE

Perspective / Key Issues	Cross-national comparison	Intercultural interaction	Multiple Cultures
Context driving emergence	Political forces ▪ post World War II Economic forces ▪ rise of MNC focus on how to conduct business in other countries ▪ management recognised as means for economic development ▪ US practices=model for other nations Academic research forces ▪ rise of comparative management ▪ no universal definition of culture ▪ data collection difficult ▪ Management research a western (largely US) enterprise	Economic forces ▪ changing balance of global economic power ▪ dramatic increase in FDI (e.g. joint ventures, subsidiaries, MNCs)	Political forces ▪ melting of national boundaries ▪ separation movements ▪ regional independence Economic forces ▪ increasing globalisation ▪ growing importance of regional economic zones ▪ increasing strategic alliances within/across borders Technological forces ▪ enhanced communication technology Social forces ▪ growing global movement of people ▪ increasing workforce diversity ▪ attention to differences in identity
Theories/ assumption/ frameworks	▪ nation-state='culture' ▪ cultural identity is a given, single immutable individual characteristic ▪ convergence thesis ▪ search for universally applicable dimensions	▪ culture is socially constructed ▪ national culture/identity of critical importance ▪ generalised national work culture ▪ organisational culture may be salient *	▪ culture is collective, socially constructed phenomenon ▪ organisation=multiplicity of cultures ▪ individuals may identify with and/or hold membership in many cultures ▪ salience of any cultural group/identity is empirical question ▪ frameworks are: a priori, empirically derived, emergent
Research focus	▪ How do managerial attitudes and behaviours differ across nation? ▪ How do national cultural differences affect individual, group and firm performance? ▪ How can the effect of cultural differences be controlled?	▪ What is the nature of bicultural interaction and its perceived impact on organisational life? ▪ What are the characteristics and processes of culture formation/evolution/emergence from binational interaction?	▪ Many cultures are present within organisations? ▪ How do the various cultures interact? ▪ How do individuals deal with multiple identities? ▪ What are implications for managerial practice?
Research methods	▪ positivistic ▪ universal categories of culture ▪ dimensions operationalised as scales ▪ large-scale quantitative studies	▪ interpretive ▪ anthropological ethnography-'thick description ▪ long-term case study ▪ primarily qualitative analysis	▪ interpretive, inductive methodologies ▪ seek insiders' view ▪ hybrid, multiple methods ▪ field-based data collection
Key contributors	▪ comparative management: - Farmer and Richman, 1965 - Haire et al., 1966 - GLOBE Project, 1993 - House et al., 1999/2004 ▪ dimensions and constructs - Triandis, 1972 - Hofstede, 1980 (dominant) - Schwartz, 1992 - Smith et al., 2002 - Trompenaars, 1993 ▪ Country clusters	Kleinberg, 1989+ Sunihara, 1992 Brannen, 1994+	▪ Sociologists focusing on reality groups and sub-cultures (e.g. [illegible]) ▪ Industrial anthropologists focusing on subcultures (e.g. [illegible]) ▪ Organisational researchers with focus on issues of: - culture and subcultures in organisational settings (e.g. Martin and Siehl, [illegible]; contributors to Sackmann, 1997) - organisational identity (e.g. contributors to Whetten and Godfrey, [illegible]) - professional identity (e.g. [illegible]) - social psychologists studying social identity (e.g. Tajfel, [illegible])
Contribution to knowledge	▪ culture is trackable - generalisations across national units - cultural clustering ▪ cross-national testing of organisational theories, processes and practices ▪ motivated development of cultural dimensions and categories ▪ finite set of culture dimensions allows other disciplines to use culture variables ▪ increasing knowledge of management practices beyond G-7	▪ importance of contextual analysis ▪ process-orientation ▪ emergent 'negotiated' culture ▪ attention to intercultural communication in the workplace ▪ 'thick description' of cultural context Bridge to multiple cultures perspective	▪ reveals culture as socially constructed ▪ focuses on both sensemaking process/content, as well as practical applications ▪ reveals nature of shared understandings ▪ appreciation of cultural differences/similarities ▪ acknowledge complexity of personal identity & organisational life ▪ recognises paradoxes in organisational settings ▪ recognises conflicts in organisational and individual identities ▪ possibility of achieving synergies by building on similar cultural identities ▪ identifies skills needed for work in a multicultural environment ▪ methodological variety

***** Note: Emergent/negotiated culture derived from: organisation culture research, interpretative paradigm, anthropological theories, intercultural communication model

Source: Sackmann and Phillips (2004)

Individuals build consensus with one another in order to establish commonly accepted ways of doing things, under the name of the group's culture, which fosters harmony among them, and within society. In Hofstede's words, it is a set of shared assumptions that results in a common frame of reference for members of a society (Hofstede, G. 1980;

1997). This coherent, learned and shared view of life determines what is important to be considered, people's attitudes about what is seen as appropriate and individuals' behaviour (Varner & Beamer 2005).

The idea of culture as a product of human civilisation is also reflected in the work of Kroeber (1952). Based on his definition, culture is a historically differentiated and variable mass of customary ways of functioning of human societies (Kroeber, AL 1952). The notions of 'historically' and 'customary' highlight that a society's culture is constructed through the playing out of that society's history, which leads to the formation of customary practices in that society. This is supported by House et al. (2004), who stated that culture results from the common experiences of societal members which are transmitted across generations (House et al. 2004).

As can be observed from the various definitions outlined above, culture can be seen as a mental model of behaviour. As Varner and Beamer (2005) assert, culture dictates behaviour. Culture manifests itself in the form of activity and behaviour that act as models and enable people to live harmoniously in a society (Porter, RE & Samovar 1985). Accordingly, it is also conceived as a conditioning element of future action (Veiga, Floyd & Dechant 2001). It will be reflected in the meaning people attach to their behaviour (Straub et al. 2002, p. 7).

Based on the above review of definitions of culture, we can now highlight the common ideas on culture. First, culture is rooted in individual characteristics, but it is not personal traits. Second, individuals form a consensus on shared beliefs, practices and values, which as a group they respect and follow as a way of life. Third, culture is manifested and reflected in behaviour; and finally, individual behaviour may not represent the common consensus or group culture, as each individual must to some degree sacrifice or compromise their own cultural orientation in order to live harmoniously within society

With regard to the last point, we propose that such a consensus will not bring total satisfaction to every individual. All who partake in the consensus must necessarily sacrifice their ego in exchange for a harmonious relationship with the rest. Accordingly, society's consensus, which is so-called culture, may not reflect the ways of doing things or perceiving the world at the individual level.

3.2.2.2 Components of culture

In the previous section, we presented the idea that culture is different from, but reflected in, behaviour. We elaborate what is commonly perceived as the main components of

culture in this section. The components of culture we found in the literature are listed in Table 3.5.

Observation of the components listed in Table 3.5 leads us to consider culture in two parts: explicit and implicit, or manifest and latent. The explicit part is more noticeable, and includes language, behaviour and material artifacts; the implicit part is that which lies beneath the surface, and includes beliefs, values and norms.

TABLE 3.5 COMPONENTS OF CULTURE IDENTIFIED IN THE LITERATURE

Author(s)	Component(s) of culture
Tylor (1871)	Culture includes knowledge, beliefs, art, morals, laws, customs, and any other capabilities and habits acquired by people as members of society.
Kroeber (1952)	Culture embodies values, which may be formed (overtly, as mores) or felt (implicitly, through customs/traditions') by the society carrying the culture.
Kroeber and Kluckhohn (1952)	Culture consists of traditional (historically derived and selected) ideas and their attached values and is also represented by the artifacts that embody these ideas and values.
Triandis (1972)	Culture consists of rules, norms, roles and values.
Triandis (1995)	Culture consists of tools, words, shared beliefs, attitudes, norms, roles and values.
Schein (1985)	Culture consists of basic assumptions, values and artifacts.
Hall (1989)	Culture consists of two main components: manifest components and latent components. Our conventional understanding of culture as comprising behaviour, language, social organisation and the arts is not complete. Culture has another aspect, which is the hidden, nonverbal and unstated realm of values.[2]
Hofstede (1980)	Culture consists of dimensions that collectively program the mind to create a pattern of behaviour.
Matsumoto et al. (1999)	The cultural characteristics of individuals comprise a constellation of psychological traits and attributes.
Matsumoto (2007)	Culture consists of a system of information that has unique meaning.
Trompenaars and Wooliams (2003)	Culture consists of a set of values.
Craig and Douglas (2006)	Values and belief systems, language and communication systems, and material culture and artifacts are all parts of culture.
Foscht (2008)	Culture is made up of many different components, such as language, religion, values and standards.

A similar conceptualisation of culture is found in the work of Schein (1985), cited in Leidner and Kayworth (2006), who describes culture as having two main parts: artifacts and espoused values. Artifacts are the visible products, processes and behaviours of a culture. They mainly reflect the 'as is' and thus the cultural practices. Espoused values are

[2] This is what we inferred from Hall's book.

the individuals' or society's sense of what ought to be, as distinct from what is. They primarily reflect the 'should be' and thus reflect the culture's values. However, Schein (1985) stated that culture has another layer, which consists of basic assumptions. This layer resides in the inner-most part of culture. It shapes people's values, and in turn people's behaviour (Schein, E. H. 1985). This layer is also noted as the basic structure of culture by Porter and Samovar (1985).

Schein (1985) argued that values are more easily studied than are basic assumptions, which are invisible and preconscious and therefore not easily identifiable, as well as cultural artifacts (technology, art, visible and audible behaviours) that, while being most visible, are not easily decipherable (as observed by Leidner and Kayworth, 2006). The two-layered understanding of culture (values and behaviour) is becoming the predominant idea in the literature. For example, Varner (2001) describes two levels of culture metaphorically, as a stage production. What one sees on the surface is the front-stage culture (such as behaviours, material goods and institutions); in contrast, all that lies behind and shapes the observable is backstage culture (for example, the values, beliefs and history of a nation).

Values has been mentioned in the literature as the measureable determinant for the outer-most part of culture, i.e. behaviour, language and material artifacts. It is relatively stable (Schein, E. H. 1985) and represents the distinguishing characteristics of a culture (Straub et al. 2002). This is supported by Terlutter and Mueller (2006) in their study of global culture. In this research the authors stated that values are considered to be the core of culture that influences behaviour. In a similar vein, Craig and Douglas (2006) assert that values are the key elements of culture that determine the patterning of daily life and behaviour of consumers.

As a summary of the review of culture and its components, we posit that values constitute the core dimension or layer of culture. The construction of culture can be more readily observed based on how values drive behaviour. Therefore, this is the key to understanding the influence of culture on the behavioural aspects of technology acceptance which is reflected by usage intention in many existing models like TAM and TRAM. We interchange the term culture with that of values in the remainder of this thesis, unless otherwise stated. The following section will elaborate more deeply on the theoretical conception of values in order to understand how they are defined, classified and evaluated through a number of relevant value theories or systems found in the literature. Later in this chapter, the elaboration of value systems will be used to determine

the most appropriate system for measuring values and incorporating them into the technology acceptance model.

3.2.2.3 The concept of values

As outlined above, values are considered to form the main part of culture that drives the behaviour of individuals or society. Why do people behave according to their values? One possible reason is a need for consistency between one's beliefs (values) and one's actions (Rokeach 1973). Another is that value-consistent action is rewarding; it helps people get what they want. Values are acquired through lifestyle-altering experiences such as childhood and education (Karahanna, Evaristo & Srite 2005; Straub et al. 2002). Once it is learned, it becomes integrated into an organised system of values or a value set, wherein each value is assigned a relative priority. The value set ultimately determines behaviour, hence does not merely consist of the values dictated by a specific level of culture. Rather, it is an amalgamation or function of all the various levels of culture to which an individual belongs (Karahanna, Evaristo & Srite 2005). A value is relatively stable in nature but can change over time in response to changes within a culture (Feather 1995; Karahanna, Evaristo & Srite 2005; Straub et al. 2002). Therefore, individuals not only differ in their value systems but also in terms of the relative stability of these value systems. Erez and Earley (1993) proposed that values consist of two components: peripheral and core. The peripheral values change throughout life, but core values are difficult to change (Erez & Earley 1993). The principle of peripheral and core values as stated by the author explains how people adopt new cultures, but at the same time are able to maintain certain principle values and behaviours in their life. These are the basic ideas about values that have evolved in the literature. They are inspired by and lead to different definitions of values, as seen in Table 3.6 .

Kluckhohn, Rokeach and Schwartz notably provided comprehensive definitions of values. Based on their definitions, values pertain to enduring beliefs that transcend specific actions and situations, which can be stated explicitly or implicitly, about desirable and important end states or goals that consistently generate motivation and action to achieve these states/goals. Thus, it is important that values are associated with desirable end states, not only desired ones (Mueller & Wornhof 1990). The definitions posited by these three researchers have become the foundations of some prominent value theories in the literature, such as those of Kluckhohn, Hofstede, Schwartz, Trompenaars and the GLOBE project. We present and discuss their ideas below. Part of this discussion is credited to the work of Nardon and Steers (2006), who summarised and compared the concepts of culture proposed by Kluckhohn, Schwartz, Hofstede, Trompenaars and GLOBE.

TABLE 3.6 VARIOUS DEFINITIONS OF VALUES

Author(s)	Definition
Kluckhohn (1951)[3]	Values are conceptions, whether explicit or implicit, of the desirable which influences the general nature of the mode, means and ends of action.
Rokeach (1973)	Values are enduring beliefs that a specific mode of conduct or end state of existence is personally or socially preferable to an opposite or converse mode of conduct or end state of existence.
Brown (1976)	A value refers to a single prescriptive or proscriptive belief that transcends objects and situations to which attitudes are tied.
Hofstede (1980) and Hofstede et al. (1993)	Values are an individual's personal preference in work- and life-related issues.
Feather (1995)	Values can be conceived as abstract structures that involve the beliefs that people hold about desirable ways of behaving or about desirable end states.
Karahanna et al. (2005) and Straub et al. (2002)	Values are fundamental assumptions about things.
Triandis (1972) and Karahanna et al. (2005)	Values are important antecedents of cognitive beliefs, attitudes and social norms and thus behaviour.
Craig and Douglas (2006)	Values are the intangible elements of culture that characterise a society or culture and guide the patterning of behaviour in that society.
Schwartz and Bilsky (1987)	Values are beliefs that refer to desirable goals, transcend specific actions or situations, serve as standards to guide the selection and evaluation of behaviour, people and events, and are ordered by importance relative to one another.
Schwartz (1992)	Values convey what is important to us in our lives. They are desirable goals that serve as guiding principles in people's lives.
Schwartz (1999)	Values are conceptions of the desirable that guide the way social actors (e.g. organisational leaders, policy-makers, individual persons) select actions, evaluate people and events, and explain their actions and evaluations. Values are trans-situational criteria or goals (e.g. security, hedonism), ordered by importance as guiding principles in life.
Schwartz and Bardi (2001)	Values are desirable, trans-situational goals, varying in importance, that serve as guiding principles in people's lives.
Bardi and Schwartz (2003)	Values are motivational constructs that represent broad goals that apply across contexts and time.
Trompenaars and Wolliams (2003)	Values are a group's preferences and point of view that are continuously created by interactions between the group members.
GLOBE Project	Refer to Hofstede.

The various definitions of values as presented in Table 3.6 above reveal that there is no one universal definition of values. Despite no universal definition of value, it is evident that all of the major definitions of values share a similar idea that value pertains to desirable situations, end states or goals. It is not only something desired or preferred, but also

[3] As found in Connor and Becker (2003).

should be something desirable and important, that motivates people to achieve that goal or end state. The acceptance of a desired situation indicates people's inability to overcome many external factors that hinder them from attaining the desirables. The idea of the desirable situation appearing within all of the definitions of value leads to an important conception of what is termed 'value orientation'. This notion of orientation is essential in order to operationalise values in the conceptual model.

3.2.2.4 Value orientation

Culture is not a genetic part of human existence (Mowen & Minor 1998; Kroeber 1952; Karahanna et al. 2005). It is contextual and built on relationships among people (Jameson 2007). As noted by Hofstede (1980), culture is only understandable by the people who practise it. Consequently, people need to learn different values and practices as they shift to different contexts (Jameson 2007). Today, an individual may be exposed to several different types of people, societies and thus cultures while growing up and moving through the processes of socialisation and self-discovery. Moreover, this process of socialisation and self-discovery continues throughout one's life (Jacob 2005). This view is shared by Straub et al. (2002), who state that each individual is influenced by a plethora of cultures and subcultures, some ethnic, some national and some organisational.

Being exposed to many factors within their environment, people are compelled to learn different values since they want to be rewarded or avoid problems when interacting in different social settings. The objective of learning may not be to adopt the values, but to understand them because it is desired by the situational setting in the society. By understanding different values, individuals are able to behave according to a desired situation based on social norms and rules and in a manner that is rewarded by the members of the group in which they are interacting (Terlutter & Mueller 2006). This allows a person to adapt to his or her natural and social settings (Hall, E 1989). In terms of the broader picture, the whole set of values reflects the existence of a more permanent desirable situation, which in turn forms value orientations.

Bates and Chen (2004) argue that value orientations are important for understanding individual behaviour because they are a part of everyone's psychological character, tend to be global in scope, transcend specific situations and are hierarchically organised to become part of a relatively enduring system. These qualities enable value orientations to influence behaviour. They also suggest that the hierarchical structure of value orientations provides individuals with an ordered framework for making decisions about behaviour and resolving means/ends conflicts. It is through their influence on decision-making that variations in value orientations motivate individual behaviour and affect specific actions.

This helps to explain why sometimes people are satisfied with desired goals rather than struggling for the desired one. These orientations have been shown to influence not only a variety of important work-related cognitive and affective factors such as work motivation, job satisfaction and organisational commitment, but also behaviour in technology acceptance. This suggests that investigating the structure and content of individuals' value orientation may be useful in understanding how selective cognitions, feelings and behaviours may be ordered in a given situation (e.g. mobile service aceptance).

To further understand how value orientation can affect an individual when dealing with a given situation, it is essential first to acknowledge that structured values of a particular situational orientation can be crystallised to form a categorisation, then transformed to become a social identity. We refer to two well-known theories to explain this phenomenon. The first is Social Identity Theory (SIT) and the second is called Self-Categorisation Theory (SCT). SIT proposes that social identity results from categorisation in the social group. Categorisation of stimuli (whether social or not) involves the psychological accentuation of differences between categories and the attenuation of differences between elements within categories, known as the metacontrast principle (Amiot et al. 2007). Amiot et al. (2007) proposed that once categorised in a social group, group members are motivated to maintain or acquire a distinct and positive social identity for their 'in group'. What happens within the in group can be explained by SCT principles.

SCT emphasises the cognitive processes involved in self-categorisation. Although SCT recognises that each of us belongs to a variety of social groups, the theory is focused on providing an explanation of why individuals identify with a specific social category in one specific situation and which situational factors explain this fluctuating pattern of identification. In this regard, SCT proposes that for a specific social identity to become salient, not only do the intergroup differences need to be greater than the intragroup differences (as dictated by the metacontrast principle), but the objective differences between groups must also match the expected stereotypical features of these groups, known as the normative fit principle (Amiot et al. 2007). A more technical explanation is provided by Roccas and Brewer (2002), as reviewed by Amiot et al. (2007), through their social identity complexity model. This model specifies further how social identities are organised structurally and how they are represented cognitively within the self (Amiot et al. 2007). The model is based on cross-categorisation principles, according to which groups vary in the amount of overlap or embeddedness they share, with some groups being completely nested within others, some being mutually exclusive, and some partially overlapping. According to crossed-categorisation principles, the greater the overlap or

points of similarity between the groups, the more positive will be the evaluation of these groups.

At this point, we can now conclude that value orientation is a system assembled by a set of structured values. It is a system that develops its own mechanism of internal interactivity within a social or cultural group. It is also a system that signifies a normative direction for individuals in the group to interact with other groups outside their boundary of desired or shared values. Therefore, to move our investigation of the influence of culture forward, we first have to determine the appropriate or relevant framework for measuring structured values as a system at the individual level that corresponds to those at the group culture level. This framework is to be selected from the existing value theories previously proposed in the literature. The identification and review of existing value theories is presented in the folllowing section, followed by the selection of the appropriate system for use in this research.

3.2.2.5 Review of existing value system theories

The approach taken in reviewing existing value theories is based on the objective of discovering a value system for implementation at the individual level that accurately reflects the corresponding group values. It was found that the extant value theories can be categorised into two groups. One group deals with value at the social or group level, and the other deals with value at the individual level. Referring to Table 3.4, which is reproduced from Sackman and Phillips's article (2004), we can see that all of the value theories, except the latest work from Triandis (1995) and Rokeach Value Systems, fall into the first category.[4] Accordingly, the focus of this review is directed to those theories that explore the individual level. However, it is also considered important to revisit other theories classified at the group level in accordance to Sackman and Phillips's classification since there is a possibility for these theories to be also applied at the individual level. Following this thinking, this chapter presents seven value theories drawn from both groups. They include the theories proposed by Kluckhohn (1961), Rokeach Value System (1973), Hofstede (1980), Hall (1989), GLOBE (2004), Triandis (1972, 1985) and Schwartz (1987, 1990, 1992).

The issue of validity is critical here as researchers commonly conflate collective individual values with group values. As has been recognised by many researchers, such as Strite and Karahana (2006), the common method used to arrive at the higher level measurement of value is by the aggregation of individual values—for example, conducting

[4] Kluckhohn and Strodtbeck's theory is considered to be in the first category since it formed the basis of other value theories in that category.

individual value measurements then taking the aggregate value of this measurement to represent the group values. This widely used approach can mean that variations at the individual level are ignored. Thus, any study that uses this dimension to investigate individual level behaviour may encounter serious validity issues. In the literature, this is known as ecological fallacy (Straub et al. 2002). Specific attention is given to this issue in performing this review of existing value theories. In this regard, an approach proposed by Strite and Kahana (2006) is adopted here. They suggested that to avoid the risks of the ecological fallacy in investigating the influence of culture on individual behaviour, culture should be treated as an individual diffirence variable. The argument is that such an approach is consistent with studies in psychological anthropology that concentrate on the interaction between culture and personality and measure culture traits by personality tests at the individual level of analysis (Hofstede, Geert & Bond 1984). Besides, it is also in line with approaches in cultural psychology that examine the impact of culture on the self (p. 681).

3.2.2.5.1 Kluckhohn's value system

Clyde Kluckhohn (1961) is a respected scholar in value and culture research. He was an American anthropologist and social theorist, best known for his long-term ethnographic work among the Navajo and his contributions to the development of the theory of culture within American anthropology. A key methodological approach that he developed together with his wife Florence Rockwood Kluckhohn and colleagues Evon Z. Vogt and Ethel M. Albert, among others, was the Values Orientation Theory. They believed that cross-cultural understanding and communication could be facilitated by analysing a given culture's orientation to five key aspects of human life: Human Nature (whether people are seen as intrinsically good, evil or mixed); Human–Nature Relationship (the view that humans should be subordinate to nature, dominant over nature, or live in harmony with nature); Time (whether primary value is placed on past/tradition, present/enjoyment, or future/posterity/delayed gratification); Activity (being, becoming/inner development, or doing/striving/industriousness); and Social Relations (hierarchical, collateral/collective-egalitarian, or individualistic).[5]

This idea was developed further in Kluckhohn[6] and Strodtbeck (1961). Both researchers are cultural anthropologists and suggested one of the earliest models of culture that has served as a principal foundation for several later models. They proposed a theory of culture based on value orientations, arguing that there are a limited number of problems that are common to all human groups and for which there are a limited number of solutions. They further suggested that values in any given society are distributed in a way

[5] Source: www.wikipedia.com, accessed on 5 December 2008.
[6] This is Clyde Kluckhohn's wife, Florence Kluckhohn.

that creates a dominant value system. They used anthropological theories to identify five value orientations, four of which were later tested in five subcultures of the American Southwest: two Native American tribes, a Hispanic village, a Mormon village, and a farming village of Anglo-American homesteaders. The five dimensions are presented in Table 3.7. Each dimension is represented on a three-point continuum.

TABLE 3.7 KLUCKHOHN AND STRODTBECK's VALUE SYSTEM

Cultural Dimensions	Scale Anchors		
Relationship with Nature: Beliefs about the need or responsibility to control nature.	Mastery: Belief that people have a need or responsibility to control nature.	Harmony: Belief that people should work with nature to maintain harmony or balance.	Subjugation: Belief that individuals must submit to nature.
Relationship with People: Beliefs about social structure.	Individualistic: Belief that social structure should be arranged based on individuals.	Collateral: Belief that social structure should be based on groups of individuals with relatively equal status.	Lineal: Belief that social structure should be based on groups with clear and rigid hierarchical relationships.
Human Activities: Beliefs about appropriate goals.	Being: Belief that people should concentrate on living for the moment.	Becoming: Belief that people should strive to develop oneself into an integrate whole.	Doing: Belief in striving for goals and accomplishments.
Relationship with Time: Extent to which past, present, and future influence decisions.	Past: In making decisions, people are principally influenced by past events or traditions.	Present: In making decisions, people are principally influenced by present circumstances	Future: In making decisions, people are principally influenced by future prospects.
Human Nature: Beliefs about good, neutral or evil human nature. (This dimensions was not tested empirically)	Good: Belief that people are inherently good.	Neutral: Belief that people are inherently neutral.	Evil: Belief that people are inherently evil

3.2.2.5.2 Rokeach's value system

Rokeach (1973) realised that values have different meanings to different people. Some consider values to be something that resides in people and which drive the motivation to perform an action, while others think of a value as something that resides in an object for which people search. Therefore, Rokeach endeavoured to differentiate between value as a deep-seated motivational or guiding behaviour held by a person and a utility or function of an object. Rokeach (1973) then approached value from the first point of view. He proposed the idea that human values are based on five assumptions, as follows:

(1) each person possesses a relatively small number of values
(2) all people possess the same number of values, but to different degrees
(3) values are organised into value systems
(4) values are derived from culture, society and its institutions
(5) human values are part of all phenomena and are worth investigating and understanding.

With regard to the third point, Rokeach proposed that human values are organised into two groups of values: instrumental and terminal values. One who behaves in all of the ways prescribed by one's instrumental values (mode of conduct) will be rewarded with all the end states of existence specified by one's terminal values (Brown 1976). These values exist in everybody (as mentioned in Rokeach's first assumption). People's experience and learning processes entailed in interaction with society and its institutions (as stated in point 4 above) generate an understanding about this relationship, and create a preference for and institutionalisation of specific values in one's self. Accordingly, Rokeach suggested that values are enduring beliefs that generate 'preferable modes of conduct or end-states of existence along a continuum of relative importance' specific to everybody (in line with his second assumption above). Each position along the continuum for each value will collectively form the person's value orientation.

Rokeach compiled a list of terminal values from a review of the literature, his own values, those of 30 graduate students in psychology, and of 100 adults in metropolitan Lansing, Michigan, and other sources (Brown 1976). This resulted in a long list of values which then reduced to 18 terminal values, which are shown in Table 3.8. Individuals' values are measured by requesting them to rank the values in each list according to their importance and then analysing the rank order correlation (Beatty et al. 1985).

TABLE 3.8 TERMINAL AND INSTRUMENTAL VALUES IN THE ROKEACH VALUE SYSTEM

Terminal values	Instrumental values
A comfortable life (a prosperous life)	Ambitious (hard-working, aspiring)
An exciting life (a stimulating, active life)	Broad-minded (open-minded)
A sense of accomplishment (lasting contribution)	Capable (competent, effective)
A world at peace (free of war and conflict)	Cheerful (lighthearted, joyful)
A world of beauty (beauty of nature and the arts)	Clean (neat, tidy)
Equality (brotherhood, equal opportunity for all)	Courageous (standing up for your beliefs)
Family security (taking care of loved ones)	Forgiving (willing to pardon others)
Freedom (independence, free choice)	Helpful (working for the welfare of others)
Happiness (contentedness)	Honest (sincere, truthful)
Inner harmony (freedom from inner conflict)	Imaginative (daring, creative)
Mature love (sexual and spiritual intimacy)	Independent (self-reliant, self-sufficient)
National security (protection from attack)	Intellectual (intelligent, reflective)
Pleasure (an enjoyable, leisurely life)	Logical (consistent, rational)
Salvation (saved, eternal life)	Loving (affectionate, tender)
Self-respect (self-esteem)	Obedient (dutiful, respectful)
Social recognition (respect, admiration)	Polite (courteous, well-mannered)
True friendship (close companionship)	Responsible (dependable, reliable)
Wisdom (a mature understanding of life)	Self-controlled (restrained, self-disciplined)

3.2.2.5.3 Hofstede's value system

Dutch management researcher Geert Hofstede advanced the most widely used model of cultural differences in the management literature. He conducted an important study of values associated with work among employees of a multinational company (IBM) with branches in more than 40 countries. His model was based on the assumption that different cultures can be distinguished based on differences in what they value. According to his research, value orientation in relation to the following four factors is sufficient to distinguish between cultures (Gouveia & Ros 2000):

1. Power Distance: this is the degree to which members of a society accept as legitimate that power held by institutions and organisations is unequally distributed.
2. Uncertainty Avoidance: this refers to the degree to which members of a society are uncomfortable with uncertainty and ambiguity. This leads them to support beliefs that promise certainty and to maintain institutions that protect conformity.
3. Masculinity–Femininity: this refers to the degree to which a society has a preference for accomplishment, heroism, severity and material success as opposed to a preference for relationships, modesty, attention to the weak and quality of life.
4. Individualism–Collectivism: this refers to the degree to which a society has a preference for closed social surroundings in which it is understood that individuals must care for themselves and only their closest relations as opposed to a dependence on groups of which individuals form a part.

Thus, Hofstede explored how some cultures place a high value on equality among individuals, while others place a high value on hierarchies and power distances between people. Likewise, some cultures value certainty in everyday life and have difficulty coping with unanticipated events, while others have a greater tolerance for ambiguity and perhaps even embrace change. Taken together, Hofstede argues that it is possible to gain considerable insight into organised behaviour based on these value dimensions. Initially, Hofstede (as in Hofstede 1980) asserted that cultures could be distinguished along four dimensions, but later he added a fifth dimension, which is Time Orientation (long- vs. short-term orientation). The final five dimensions are illustrated in Table 3.9.

TABLE 3.9 HOFSTEDE VALUE SYSTEM

Cultural Dimensions	Scale Anchors	
Power Distance: Beliefs about the appropriate distribution of power in society.	Low power distance: Belief that effective leaders do not need to have substantial amounts of power compared to their subordinates. Examples: Austria, Israel, Denmark, Ireland, Norway, Sweden	High power distance: Belief that people in positions of authority should have considerable power compared to their subordinates. Examples: Malaysia, Mexico, Saudi Arabia
Uncertainty Avoidance: Degree of uncertainty that can be tolerated and its impact on rule making.	Low uncertainty avoidance: Tolerance for ambiguity; little need for rules to constrain uncertainty. Examples: Singapore, Jamaica, Denmark, Sweden, U.K.	High uncertainty avoidance: Intolerance for ambiguity; need for many rules to constrain uncertainty. Examples: Greece, Portugal, Uruguay, Japan, France, Spain
Individualism-Collectivism: Relative importance of individual vs. group interests.	Collectivism: Group interests generally take precedence over individual interests. Examples: Japan, Korea, Indonesia, Pakistan, Latin America	Individualism: Individual interests generally take precedence over group interests. Examples: U.S.A., Australia, U.K., Netherlands, Italy, Scandinavia
Masculinity-Femininity: Assertiveness vs. passivity; material possessions vs. quality of life.	Masculinity: Values material possessions, money, and the pursuit of personal goals. Examples: Japan, Austria, Italy, Switzerland, Mexico	Femininity: Values strong social relevance, quality of life, and the welfare of others. Examples: Sweden, Norway, Netherlands, Costa Rica
Long-term vs. Short-term Orientation: Outlook on work, life, and relationships.	Short-term orientation: Past and present orientation. Values traditions and social obligations. Examples: Pakistan, Nigeria, Philippines, Russia	Long-term orientation: Future orientation. Values dedication, hard work, and thrift. Examples: China, Korea, Japan, Brazil

3.2.2.5.4 Hall's value system

Edward T. Hall, a noted American cultural anthropologist, has proposed a model of culture based on his ethnographic research in several societies, notably Germany, France, the US and Japan. His research focused primarily on how cultures vary in terms of interpersonal communication, but also includes work on personal space and time. These three cultural dimensions are summarised in Table 3.10. Many of the terms used today in the field of cross-cultural management (e.g. monochronic or polychronic) are derived from this work.

TABLE 3.10 HALL'S VALUE SYSTEMS

Cultural Dimensions	Scale Anchors	
Context: Extent to which the context of a message is as important as the message itself	Low context: Direct and Frank communication; message itself conveys its meaning. Examples: Germany, US, Scandinavia	High context: Much of the meaning in communication is conveyed indirectly through the context surrounding a message. Examples: Japan, China
Space: Extent to which people are comfortable sharing physical space with others	Centre of power: Territorial; need for clearly delineated personal space between themselves and others. Examples: US, Japan	Centre of community: Communal; comfortable sharing personal space with others. Examples: Latin America, Arab States
Time: Extent to which people approach one task at a time or multiple task simultaneously	Monochronic: Sequential attention to individual goals; separation of work and personal life; precise concept of time. Examples: Germany, US, Scandinavia	Polychronic: Simultaneous attention to multiple goals; integration of work and personal life; relative concept of time. Examples: France, Spain, Mexico, Brazil, Arab States

An important contribution by Hall is his theory of contexting in culture. This is based on his observations of human behaviour in everyday life (mainly comparisons between Western and non-Western countries). Western people, according to Hall (1976), like to do many things on schedule and plan. This differs from non-Western practices that reward communality and informal approaches that tend to ignore adherence to rigid plans or schedules. The contexting theory was elegantly presented in Hall (1989). In explaining this model, he defined high-context and low-context messages as follows:

> A high-context (HC) communication or message is one in which most of the information is either in the physical context or internalized in the person, while very little is in the coded, explicit, transmitted part of the message. A low-context (LC) communication is just the opposite; i.e., the mass of the information is vested in the explicit code. (p. 79)

3.2.2.5.5 GLOBE's value system

The GLOBE (Global Leadership and Organisational Behaviour Effectiveness) project was initially designed to analyse the relationship between societal values and practices, and leadership effectiveness (Terlutter et al. 2006). In their research, the GLOBE researchers identified nine cultural dimensions, which are summarised in Table 3.11. GLOBE project involved analysis of data obtained from 62 cultures, based on a survey of 17,300 middle managers in 951 organisations. Managers were drawn from three industries: financial services, food processing and telecommunications.

GLOBE outlined the following nine cultural dimensions (see Table 3.11): (1) assertiveness—the degree to which individuals in societies are assertive, confrontational, aggressive and straightforward; (2) uncertainty avoidance—the extent to which members

of a society strive to avoid uncertainty by relying on established social norms and practices; (3) power distance—the degree to which members of a society expect and accept that power is distributed unequally; (4) collectivism I (institutional collectivism)—the degree to which societal institutional practices encourage and reward collective distribution of resources and collective action, as opposed to individual distribution and individual action; (5) collectivism II (in-group collectivism)—the extent to which members of a society express pride, loyalty and cohesiveness in their groups, organisations or families; (6) gender egalitarianism—the degree to which a society minimises gender role differences and inequality; (7) future orientation—the degree to which members of a society engage in future-oriented behaviours such as planning, investing and delaying gratification; (8) performance orientation—the degree to which a society encourages and rewards group members for performance improvement and excellence; and (9) humane orientation—the extent to which a society encourages and rewards its members for being fair, altruistic, friendly, caring and kind to others.

While several of these dimensions have been identified previously (e.g., individualism–collectivism, power distance and uncertainty avoidance), others are new (e.g., gender egalitarianism and performance orientation). In addition, factor analyses conducted by GLOBE researchers revealed that the dimension of collectivism could effectively be divided into two sub-dimensions: institutional collectivism and in-group collectivism. Whereas in-group collectivism, reflecting the degree to which individuals have pride and loyalty in their families, is similar to the dimension of collectivism as typically understood in the literature (for instance, by Hofstede (1980) and Triandis (1995)), institutional collectivism, which reflects the degree to which laws, social programs or institutional practices are designed to encourage collectivistic behaviour, is a form of collectivism that has received limited research attention to date.

One of the principal contributions of the GLOBE project has been to systematically study not only cultural dimensions but also how variations in such dimensions affect leadership behaviour and effectiveness.

TABLE 3.11 GLOBE VALUE SYSTEMS

Cultural Dimensions	Scale Anchors	
Power Distance: Degree to which people expect power to be distributed equally.	High: Society divided into classes; power bases are stable and scarce; power is seen as providing social order; limited upward mobility.	Low: Society has large middle class; power bases are transient and sharable; power often seen as a source of corruption, coercion, and dominance; high upward mobility.
Uncertainty Avoidance: Extent to which people rely on norms, rules, and procedures to reduce the unpredictability of future events.	High: Tendency to formalize social interactions; document agreements in legal contracts; be orderly and maintain meticulous records; rely on rules and formal policies.	Low: Tendency to be more informal in social interactions; reliance on word of people they trust; less concerned with orderliness and record-keeping; rely on informal norms of behavior.
Humane Orientation: Extent to which people reward fairness, altruism, and generosity.	High: Interests of others important; values altruism, benevolence, kindness, and generosity; high need for belonging and affiliation; fewer psychological and pathological problems.	Low: Self-interest important; values pleasure, comfort, and self-enjoyment; high need for power and possessions; more psychological and pathological problems.
Institutional Collectivism: Extent to which society encourages collective distribution of resources and collective action.	High: Individuals integrated into strong cohesive groups; self viewed as interdependent with groups; societal goals often take precedence over individual goals.	Low: Individuals largely responsible for themselves; self viewed as autonomous; individual goals often take precedence over societal or group goals.
In-Group Collectivism: Extent to which individuals express pride, loyalty, and cohesiveness in their organizations and families.	High: Members assume they are highly interdependent and seek to make important personal contributions to group or organization; long-term employer-employee relationships; organizations assume major responsibility of employee welfare; important decisions made in groups.	Low: Members assume they are independent of the organization and seek to stand out by making individual contributions; short-term employer-employee relationships; organizations primarily interested in the work performed by employees over their personal welfare.
Assertiveness: Degree to which people are assertive, confrontational, and aggressive in relationships with others.	High: Value assertiveness, dominance, and tough behavior for all members of society; sympathy for the strong; value competition; belief in success through hard work; values direct and unambiguous communication.	Low: Prefers modesty and tenderness to assertiveness; sympathy for the weak; values cooperation; often associates competition with defeat and punishment; values face-saving in communication and action.
Gender Egalitarianism: Degree to which gender differences are minimized.	High: High participation of women in the workforce; more women in positions of authority; women accorded equal status in society.	Low: Low participation of women in the workforce; fewer women in positions of authority; women not accorded equal status in society.
Future Orientation: Extent to which people engage in future-oriented behaviors such as planning, investing, and delayed gratification.	High: Greater emphasis on economic success; propensity to save for the future; values intrinsic motivation; organizations tend to be flexible and adaptive.	Low: Less emphasis on economic success; propensity for instant gratification; values extrinsic motivation; organizations tend to be bureaucratic and inflexible.
Performance Orientation: Degree to which high performance is encouraged and rewarded.	High: Belief that individuals are in control of their destiny; values assertiveness, competitiveness, and materialism; emphasizes performance over people.	Low: Values harmony with environment over control; emphasizes seniority, loyalty, social relationships, and belongingness; values who people are more than what they do.

3.2.2.5.6 Triandis's value system

Triandis et al. (1985) stated that within a country there are idiocentrics, those whose values and behaviour are similar to the values and behaviour of people in individualist cultures, and allocentrics, those whose values and behaviour are similar to the values and behaviour of people in collectivist cultures.

In general, collectivists value personalised relationships, family security, harmonious social relationships, group cohesion, social order and respect for tradition. In contrast, individualists emphasise autonomy, independence, freedom, self-direction, self-reliance, self-improvement, hedonism, competition, and the desire to be distinguished and to have emotional distance from others. Individualists desire to be curious, broad-minded, creative, and to pursue an exciting and varied life (Triandis, H.C. 1995).

Differences in value systems imply different attitudes toward behavioural norms. Prioritising conformity, collectivists encourage restraint of actions, as well as inclinations or impulses that could upset or harm others and violate social expectations or norms. They are more likely to behave according to social norms and show little tolerance for even slight deviations from the norm. In addition, they tend to agree on what constitutes appropriate or inappropriate actions (Triandis, H.C. 1995). Collectivists respect such traditional values as being humble, devout, obedient and self-controlled. Unlike individualists who focus on one's internal needs, personal feelings and attitudes, collectivists pay close attention to how one is perceived by others.

Individualistic cultures, in contrast, often have multiple, sometimes conflicting, behaviour norms. People are encouraged to be unique and different, and are rewarded for being independent and creative. Those who deviate from norms are not necessarily punished. Individualistic cultures are generally looser than collectivist cultures: deviance may be tolerated; norms are expressed in many ways; and group solidarity is not particularly fostered. In individualistic cultures, it is one's internal needs and attitude rather than concern for group harmony or social norms that drives a person's behaviour. Consequently, in an individualistic culture, cognitive consistency leads to a stronger attitude–behaviour link than is the case in collectivistic cultures, whose emphasis is on appropriate behaviour (Li & Wu 2005).

Furthermore, behaviour depends not only on the cultural orientation but also on the situation. For instance, cooperation is maximal when allocentrics are in cooperative situations; idiocentrics do not cooperate much even in cooperative situations; and

allocentrics do not cooperate in non-cooperative situations (Robert, Lee & Chan 2006). Triandis (1995) extended the individualism–collectivism constructs. According to him, individualism and collectivism are multidimensional or polythetic constructs. He recommended that the conceptualisation of both individualism and collectivism be modified based on the additional attribute of the horizontal or vertical nature of a population, and suggested that individualism and collectivism tend to occur either in forms that stress equality (i.e. horizontal) or in forms that stress hierarchy or status differences (i.e. vertical). This extension resulted in the classification of four cultural patterns: horizontal individualism (HI), which de-emphasises hierarchical differentiation and reflects being unique, self-reliance and independence from others; vertical individualism (VI), which emphasises being independent as well as competitive, wanting to be the best to climb the hierarchy; horizontal collectivism (HC), which emphasises being closely related to a group, empathy, sociability and cooperation; and vertical collectivism (VC), which emphasises sacrifice for the sake of the group, in-group cohesion, respect for in-group norms, and the directives of authorities.

3.2.2.5.7 Schwartz's value system

Schwartz's ideas on value structure can be traced back to his earliest publication with W. Bilsky in the *Journal of Personality and Social Psychology* in 1987. In that article, the authors generated a conceptual definition of values that incorporated five formal features that recurred in the literature. According to them, values: (1) are concepts or beliefs; (2) pertain to desirable end states or behaviours; (3) transcend specific situations; (4) guide selection or evaluation of behaviour and events; and (5) are ordered by relative importance.

They continued by developing hypothetical descriptions of four facets of value theory: (1) the goal type, (2) interests served, (3) the content of motivation domain, and (4) the structure of the domain. The first one deals with a common idea proposed by Rokeach that value may dictate desirable mode of conduct or an end state of existence, i.e. values need to be distinguished as either instrumental or terminal. The second one deals with the question of whose interests are served and placed as the terminal values. This needs to be clarified in terms of people having two roles: as an individual and a member of a group. This role duality will influence the meaning people attach to values. The third and fourth are the main elements of Schwartz's value theory, which represent the typology of values and their structure. Schwartz in Schwartz and Bilsky (1987) began with seven distinct motivational domains (later relabelled motivational type in Schwartz (1992)). These domains are generated from three universal human requirements: the needs of individuals

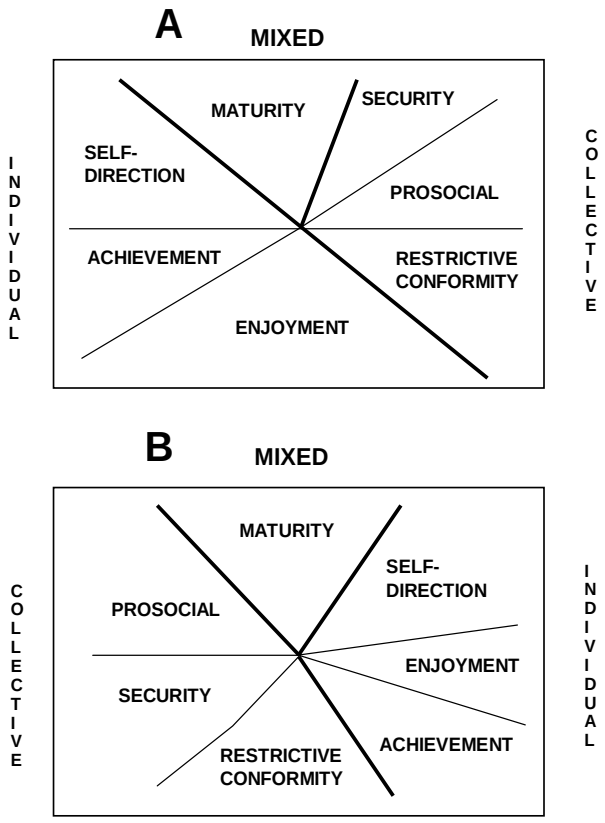
as biological organisms; the requisites of coordinated social interaction; and the survival and welfare needs of groups. These values are as follows:

(1) *Prosocial*: active protection or enhancement of the welfare of others
(2) *Restrictive conformity*: restraint of actions and impulses likely to harm others and to violate sanctioned norms
(3) *Enjoyment*: pleasure, sensuous and emotional gratification
(4) *Achievement*: personal success through demonstrated competence
(5) *Maturity*: appreciation, understanding and acceptance of oneself, others and the surrounding world
(6) *Self-direction*: independent thought and action—choosing, creating, exploring
(7) *Security*: safety, harmony and stability of society, of groups with whom one identifies, of relationships, and of self

Schwartz and Bilsky (1987) theorised that the psychological, practical and social consequences of pursuing or expressing values from the different domains organise people's value preferences. For example, actions intended to foster equality (a prosocial value) are likely to conflict with actions intended to pursue a comfortable life (enjoyment). On the other hand, actions that express wisdom (maturity) are compatible with actions that express independence (self-direction).

The simultaneous pursuit of values from the following sets of domains is compatible: (a) prosocial, restrictive conformity and security—because all support smooth social relations; (b) achievement and enjoyment—because both are concerned with self-enhancement; and (c) maturity and self-direction—because both express comfort with or reliance on one's unique experience and capacities. As a consequence of this, Schwartz and Bilsky hypothesised that the domains in each of these sets are contiguous in the empirical mapping of motivational domains. They added that the simultaneous pursuit of values in the following sets of domains is contradictory: (a) self-direction versus restrictive conformity—emphasising one’s own independent thought and action contradicts with conforming and self-restraint; (b) prosocial versus achievement—emphasising a concern for others interferes with the pursuit of personal success; (c) enjoyment versus prosocial—emphasising one’s own pleasure and comfort contradicts with devoting oneself to others' welfare; and (d) achievement versus security—emphasising the pursuit of success is likely to upset harmonious social relations (pp. 880–881). These statements found support from empirical findings drawn from Israel and Germany, as presented in Figure 3.3.

FIGURE 3.3 EMPIRICAL FINDINGS SUPPORTING SCHWARTZ'S VALUE TYPOLOGY AND STRUCTURE IN ISRAEL AND GERMANY



Structural relations among motivational domains of values
From smallest space analysis: (A) observed for an Israeli sample and hypothesised as a general model: (B) observed for a German sample.

Further investigation was conducted in seven countries (Germany, Israel, the US, Spain, Australia, Hong Kong, and Finland) to test the consistency of the four facets of value theory outlined above. As reported in Schwartz and Bilsky (1990), the results are compatible with the first hypothesis, that values are projected into either instrumental or terminal values. However, an alternative explanation exists when questions about both types of values are paraphrased, i.e. instrumental values are presented as nouns and terminal values as verbs. The results also supported the second hypothesis, which suggests that the discrimination between values as serving the individual's own interests or those of the collectivity is universally meaningful. Lastly, the results present strong evidence for the seven value typologies and their structure. However, Schwartz's research was inspired by the Rokeach Value Systems, which do not recognise some values as applied in other cultures (as found by Schwartz after reviewing the literature, e.g. Ng et al. (1982)). He identified four other types of values that guide human behaviour. These were: power, self-determination, equity and social justice. While the last one can be included within the prosocial domain, the other three form distinct domains (Schwartz, Shalom H. &

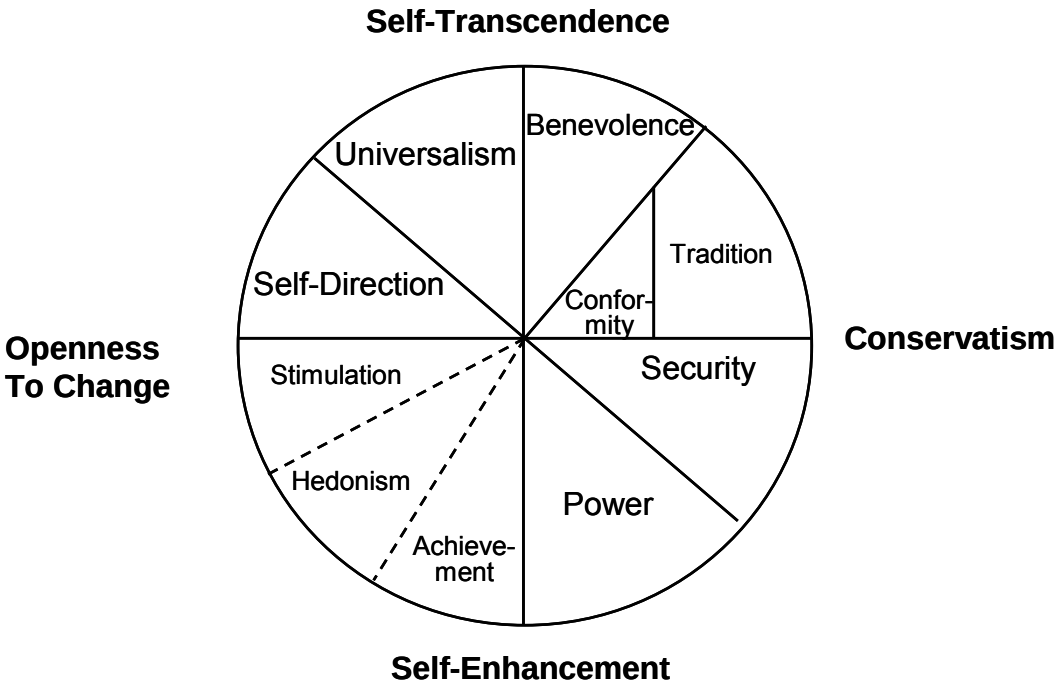
Bilsky, Wolfgang 1990). Schwartz refined his theory in Schwartz (1992) by adding and renaming the motivational types to form 10 value types, as seen in Table 3.11. Formerly, there was another value, spirituality. Schwartz eliminated this value considering that:

> Firstly, the pursuit of meaning and coherence as described by theologians and philosophers may entail a level of sophisticated, effortful thought that is beyond that in which most people typically engage. Instead, most people may satisfy their need for coherence through pursuing tradition, security, and conformity values. Thus, spirituality values may not serve as guiding principles for all people. Secondly, it is most likely that spirituality is represented by different values for different groups. (Schwartz 1992, p. 10)

Schwartz (1990) reported that the data confirmed that people in a large number of cultures implicitly distinguish 10 types of values when assessing the importance of specific values as guiding principles in their lives. Schwartz (1992, p. 42) also reported support for the compatible or conflicting nature of value types, as supporting either individualistic or collectivistic interests, or being somewhere in between.

Apparently, Schwartz (1992) relabelled the value structures from three (individualist, collectivist and mixed) into the following four value groups: openness to change, conservatism (also called conservation), self-transcendence and self-enhancement (see Figure 3.4). Openness to change is characterised by stimulation and self-direction values, both of which involve intrinsic motivation for mastery. Conservatism is characterised by conformity, security and tradition. All promote the protection of order and harmony in relations.

FIGURE 3.4 SCHWARTZ'S UNIVERSAL VALUE SYSTEMS



As presented in Table 3.12, universalism and benevolence characterise self-transcendence, which conveys a spirit of enhancement of other people and transcendence of selfish interests for the sake of a more universal priority. Self-enhancement, on the other hand, is driven by power and achievement, both of which emphasise social superiority and self-esteem. One value content, hedonism, is related to both openness to change and self-enhancement as hedonism usually involves the pursuit of new things in order to enhance one's status or existence. The four polars of the two dimensions (openness to change, conservatism, self-transcendence and self-enhancement) are considered as higher-order value types. These groups, however, have resulted from the projections of the individualism–collectivism polarisation (Schwartz 1992). Hence, it is safe to assume that the newer structure still resembles the basic human requirement to serve personal (individual) needs and/or social needs or, in other words, to be individualists or collectivists.

TABLE 3.12 SCHWARTZ'S VALUE SYSTEM

Power	Social status and prestige, control or dominance over people and resources (social power, authority, wealth, preserving my public image)
Achievement	Personal success through demonstrating competence according to social standards (successful, capable, ambitious, influential)
Hedonism	Pleasure and sensuous gratification for oneself (pleasure, enjoying life)
Stimulation	Excitement, novelty, and challenge in life (daring, a varied life, an exciting life)
Self-direction	Independent thought and action, choosing, creating, exploring (creativity, freedom, independent, curious, choosing own goals)
Universalism	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature (broad-minded, wisdom, social justice, equality, a world at peace, a world of beauty, unity with nature, protecting the environment)
Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact (helpful, honest, forgiving, loyal, responsible)
Tradition	Respect, commitment, and acceptance of the customs and ideas that traditional cultures or religions provide the self (humble, accepting my lot in life, devout, respect for tradition, moderate)
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms (politeness, obedient, self-discipline, honouring parents and elders)
Security	Safety, harmony, and stability of society, of relationships, and of self (family security, national security, social order, clean, reciprocation of favours)

Source: Schwartz and Bardi (2001)

3.2.2.5.8 Summary of value theory review

To summarise the value theories discussed above, an observation conducted by Nardon and Steers (2006) is a useful reference here. These researchers observed the content of different values theories (notably from Kluckhohn and Strodtbeck, Hofstede, Hall, Trompenaars, Schwartz, and GLOBE). They identified five common value dimensions, namely Relationship with Environment, Social Organisation, Power Distribution, Rule Orientation and Time Orientation. These findings can be extended to include the other value theories cited in this thesis, which are those of Rokeach and Triandis. The Rokeach value system arguably is more representative of the five common dimensions than is the Triandis value system. The terminal values of 'world at peace' and 'equality' and instrumental values of 'helpful' and 'self-disciplined', for example, represent the dimensions of Relationship with Environment, Power Distribution, Social Organisation and Time Orientation, respectively. Rokeach's system, however, fails to represent Rule Orientation. Meanwhile, Triandis's value system is more focused on Social Organisation, Power Distribution and Rule Orientation. His individualist–collectivist differentiation, the different rules within the two groups, and the horizontal or vertical nature of those dimensions represent Social Organisation, Rule Orientation and Power Distribution,

respectively. Furthermore, Nardon and Steers (2006) provided the definitions and continuums of the common dimensions that seem acceptable in these value theories. They are listed in Table 3.13. The characteristics of each continuum indicated a cultural value orientation that can be interpreted at both the organisational and individual levels. Taken together, it can be argued that the individualism–collectivism dimension (Social Organisation) becomes a persistent dimension in any theory of cultural values. This important point becomes a fundamental reference when selecting the appropiate value system, which will be conducted in the following section.

TABLE 3.13 DEFINITIONS OF COMMON DIMENSIONS IN VALUE THEORIES

Cultural Dimensions	Focus of Dimensions	Scale Anchors
Relationship with the Environment	*Relationship with the natural and social environment*: Extent to which people seek to change and control or live in harmony with their natural and social surroundings	Mastery vs. Harmony
Social Organisation	*Role of individuals and groups*: Extent to which social relationships emphasise individual rights and responsibilities or group goals and collective action.	Individualism vs. Collectivism
Power Distribution	*Power distribution in society*: Extent to which power in a society is distributed hierarchically or in a more egalitarian or participative fashion.	Hierarchical vs. Egalitarian
Rule Orientation	*Relative importance of rules*: Extent to which behaviour is regulated by rules, laws, and formal procedures or by other factors such as unique circumstances and relationships.	Rule-based vs. Relationship-based
Time Orientation	*Time perception and tasks*: Extent to which people organise their time based on sequential attention to single tasks or simultaneously attention to multiple tasks.	Monochronic vs. Polychronic

Source: Nardon and Steers (2006)

3.2.2.6 Selecting the appropriate value system

In selecting the appropriate value system we must first consider the objectives of our research. One of the objectives of the existing research on mobile services acceptance in Indonesia is to investigate the influence of culture on mobile technology acceptance in this country. The study will be conducted at the individual level and aggregated to obtain a general conclusion at the country level. It is thus important that we have a value system that provides a comprehensive and valid list of values at the individual level. Moreover, it is also essential to ensure that the value system enables us to analyse interactions between an individual and his/her culture group based on a particular value orientation. In light of this, we can identify two candidates only: the Rokeach value system and the Schwartz value system. Triandis's value system, although described at the individual level, is not comprehensive and too rigid in that it does not acknowledge the intersection between individualism and collectivism. Schwartz (1990) stated that the dichotomy is insufficient because:

> Certain values are overlooked if one focuses exclusively on the conflict between personal and in-group goals, because these values inherently serve both types of interests. (p. 141)

Furthermore, Rokeach (1973) noted that it is very rare that any situation encountered in life will activate a single value. Most situations will involve a conflict among several values to be resolved in accordance with the individual's value priorities, or value system.

The two candidate theories are similar in that each recognises the individualism–collectivism divide that can be referred to address individual value orientation. One may see this clearly in Schwartz's systems, but what about Rokeach's value system?

Rokeach generated his value system from an individual-level study and did not advance this research to generate group-level or cross-national meanings for the values. Clare and Sanford (1979) have argued that Rokeach's model represents values that belong to individuals. Accordingly, it can be argued that Rokeach's value system is also to be categorised within the second group of value theories, i.e. at the individual level. In a further test conducted by Johnston (1995), it was revealed that Rokeach's system contains an underlying structure of values that consists of two dimensions very similar to the individualism–collectivism continuum proposed by Triandis and Schwartz. However, there is a serious caveat about Rokeach's value system. Brown (1976) asserts that:

> One possible problem with [Rokeach's value systems] results from its ordinal nature. Since both lists of values [terminal and instrumental] are presented to the respondent in alphabetical order, there is a possibility of ranking those higher in the alphabetical order as more important than those lower.

He further added that:

> limitation may center around the ipsative nature of results from any rank-order procedure. Ipsative holds where value scores for an individual are dependent on his or her own scores or other values; they are not strictly comparable with the scores of other individuals.

Dewey (1957) confessed that, conceptually, the distinction between ends and means is not clear-cut; an end can readily become a means and vice versa. Schwartz and Bilsky (1990), in their critique of Rokeach's value system, mentioned that terminal values (e.g.,

pleasure) sometimes serve as instrumental for promoting other terminal values (e.g., happiness), and instrumental values (helpful) can become ends to be promoted by other instrumental values (self-controlled). It was found that people cannot distinguish clearly between these types of values when they are given a task of sorting a set of values into terminal and instrumental (Heath & Fogel 1978).

Schwartz and Bilsky (1990) identified two factors that may affect the findings of Rokeach-based value research. The first is the influence of the location of the values statement on the questionnaire. Item locations can influence responses so as to produce distinguishable regions in multidimensional space (Schwartz & Bilsky 1990). The second is that a formal, grammatical feature of the values may influence the discrimination. Phrasing terminal values as nouns and instrumental values as adjectives will completely confound the conceptual and grammatical distinctions (Schwartz & Bilsky 1990). This problem was not found in Schwartz's value system. The emergence of distinct regions for the motivational domains and for the interests cannot be attributed to the sequence of item presentation. Each region included values from locations spread throughout the questionnaire. A later test by Schwartz demonstrated that different item orders also yielded the same motivational types.

With respect to Schwartz's value theory, Johnston (1995) stated that a key aspect of this theory is the postulated structure of relations among the values held by individuals. This proposed structure enables a structured view of the influence of values on individuals' behaviour. Spini (2003) mentioned that Schwartz's value theory has the advantage of being universal and integrative. In this regard, we are in disagreement with Sackmann and Phillips (2004) who placed Schwartz in the first group of value theory. As has been explained earlier, the value systems are developed from an understanding of three universal human requirements: the needs of individuals as biological organisms; the requisites of coordinated social interaction; and the survival and welfare needs of groups (Schwartz & Bilsky 1987, 1990). Moreover, Schwartz and Bilsky (1990) have tested this set of values at the individual level in many countries. It is true that they generated an aggregate measure of those values in each country, but this should be understood as their effort to compare values in different countries at a specific point in time rather than identifying common value dimensions at the country level as undertaken by Hofstede and Trompenaars. One can replicate the measurement and obtain different results as the people in those countries have likely changed since the study was conducted. However, the typologies of values will remain the same as the universal human requirements do not change significantly (Spini 2003). Thus, we argue that Schwartz's value system can be applied at the individual level as well without engendering the ecological fallacy.

In addition, numerous researchers have reported the valid application of the Schwartz value theory in different situations in relation to marketing and consumer behaviour (2006). This is an advantage for the present researchers as we are dealing with the marketing aspects of mobile broadband service acceptance and consumer behaviour with regard to those services. Finally, Schwartz's value system is now widely acknowledged as the seminal instrument in the field (McGuire et al. 2006). In conclusion, the above analysis provides us with the confidence to implement Schwartz's value survey in measuring individual cultural orientations, and also to investigate their influence on technology acceptance. The specific role of the factor of culture as a moderator can now be readily examined based on the SVS perspective, which will be presented in the following section.

3.2.2.7 Moderating role of cultural values orientation in TAM and TRAM

Crabbe, Standing and Standing (2009) have highlighted the critical need to further investigate the influence of social and cultural factors on the adoption of technology. They responded to this need by conducting a study involving TAM as a baseline framework to which four new constructs were added. Specifically, these factors were incorporated to the original perceived usefulness and perceived ease of use within TAM. The first three factors include perceived elitisation (Moore & Benbasat 1991; Venkatesh & Davis 2000), perceived credibility (Luarn & Lin 2005) and facilitating conditions (Taylor & Todd 1995). The fourth factor inserted into TAM in their study was sustained usefulness and sustained usage (Chau 1996). The results confirmed that social and cultural factors had a significant influence on behavioural intention. They influence behavioural intention in different ways in user- and non-user-based adoption models. In the model for the adoption of mobile banking by users in Ghana, perceived elitisation was found to have a direct impact on behavioural intention. Age, education and banking experience influenced usage through attitude, whereas gender, income and occupation demonstated a significant impact on sustained usage. In addition, the influence of social and cultural factors in the model for the adoption of mobile banking by non-users showed a different pattern. Here, perceived etilisation and age had a direct influence on attitude, whereas gender and education demonstrated an impact on both attitude and behavioural intention to use. As a result, the findings reported in this study not only confirmed the significant roles of social and cultural factors in the technology adoption formation, but they also indicate a potential moderating influence of this factor, which invites future researchers to conduct further investigations into this area.

The factor of culture has been examined for its role as a moderator variable in the acceptance model. Culture is posted to moderate an individual's attitude and his/her

behavioural intention (Patterson, Cowley & Prasongsukarn 2006; Putit & Arnott 2007; Vermeir & Verbeke 2008). Previous studies have also specifically reported the moderating role of culture in individual decision-making about technology selection and acceptance. Nasution (2005) studied the influence of cultural values on the selection of technology for collaboration between manufacturer and retailer. According to him, individual decision-makers in each company will be influenced by their cultural values when selecting collaborative technology. He mentioned the specific influence of individualism and collectivism, and that the former is considered to influence companies when considering factors other than the inherent characteristics of technology (Nasution 2005). Decision-makers from individualist cultures tend to focus on their own requirements, while collectivist decision-makers tend to take other factors into account when selecting a collaborative technology (Nasution 2005). In another study, desire to use and anxiety toward technology have been demonstrated to be moderated by culture (Meng, Elliott & Hall 2010). Meng et al. (2010) argue that the cultural values an individual possesses will influence his/her technology acceptance. They compared the cultural value influences on technology readiness between American and Chinese students. Their results revealed significant differences in the TRI profile of American and Chinese students. The authors added that American consumers were more ready and willing than were Chinese consumers to adopt new technologies to accomplish their goals in both the home and work contexts (p. 28).

The literature review conducted in this thesis also found that a moderating influence of cultural values has been identified by previous research employing Schwartz's value structure system. Keh and Sun (2008) investigated this role of culture in a study of perceived risk of a market offering. The authors mentioned that culture measured by Schwartz's value survey model affects how people perceive, evaluate and respond to risk. Perceived risk is inherent in technology adoption. When someone decides to adopt a technology he/she will be exposed to the risk of using that technology. For example, someone who buys a mobile phone may not know exactly how this gadget will affect his/her health; therefore, s/he will bear some risk when using the technology. Culture will infuence her/his tendency to embrace this risk, as addressed by the openness to change-conservatism dimension in the Schwartz value model or Uncertainty Avoidance in Hofstede's value model. Keh and Sun (2008) further asserted that:

> high resultant self-transcendence (the importance attached to self-transcendence less the importance attached to self-enhancement) leads to lower innovativeness, which involves less risk taking and greater risk perception.

Another study of the influence of cultural value orientation was conducted by Vermeir and Verbeke (2008). They confirmed a significant moderating impact of Schwartz's value types on the relationship between attitude and behavioural intention. Different types of cultural orientation resulted in different attitudes, which in turn influenced the intention to purchase the products under study. Their results demonstrated that a person who embraces high value orientation towards conformity within his/her society would be more likely to have a less self-determined attitude when choosing a new technology product for his/her life activities than would those who more strongly ascribe to a self-direction value.

The above literature findings provided us with the confidence to theorise that individual cultural orientations influence both attitude and behaviour. Accordingly, the aim of this thesis is to further examine the moderating influence on the relationship between technology acceptance dimensions and usage intention. For this purpose, Schwartz's value model was adopted, suggesting that the orientation of culture can be measured based on two dimensions or value structures. The first dimension is the 'openness to change vs. conservatism' dimension and the second is labelled 'self-enhancement vs. self-transcendence'. These two dimensions are hypothesised to potentially demonstrate a moderating influence on the acceptance model, as displayed in Figure 3.5.

FIGURE 3.5 HYPOTHETICAL MODERATING ROLE OF INDIVIDUAL CULTURAL ORIENTATION IN TAM AND TRAM

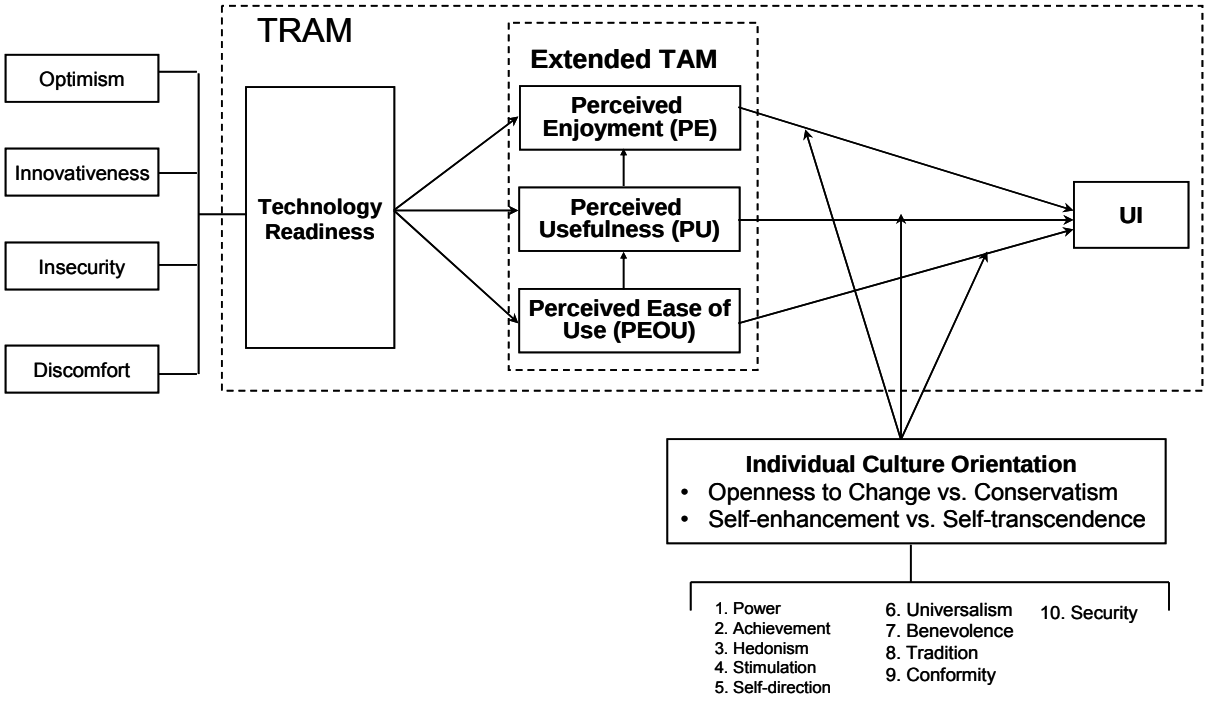


Figure 3.7 above represents how individual cultural orientations moderate the relationships between perceived enjoyment and usage intention, perceived ease of use and usage intention, and perceived usefulness and usage intention. We are now progressing to the next stage of our thesis which is to examine the possible moderating role of demographic factors.

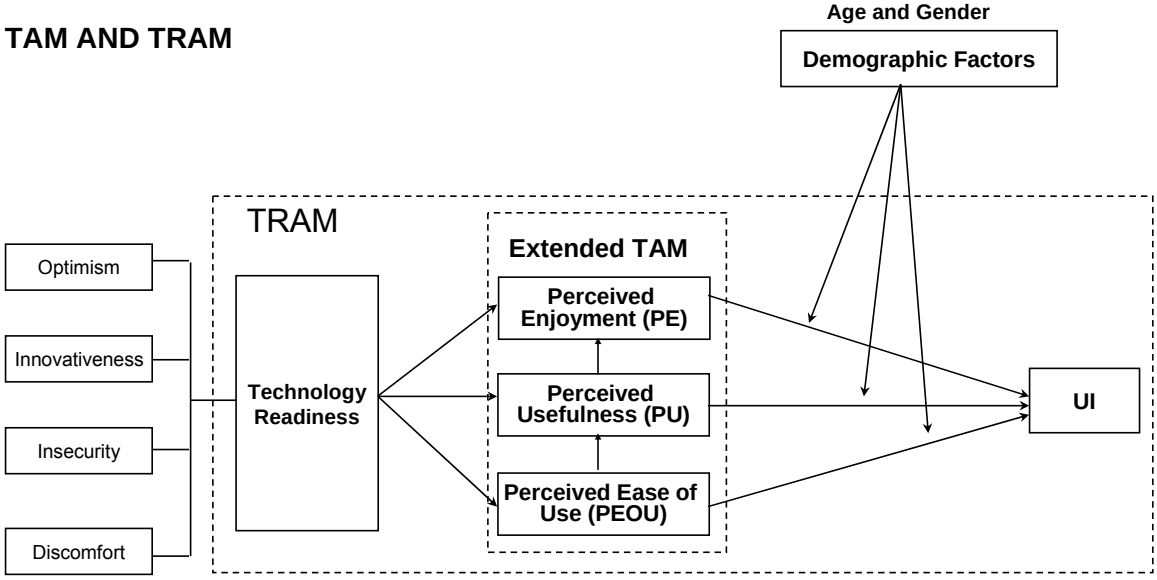
3.2.3 Identification of Moderator Variable 3: Demographic Factors

A familiar model that suggests the influence of demographic factors in technology adoption is that developed by Venkatesh et al. (2003). These authors have reported a significant moderating influence of gender and age on the adoption of technology. The role of demographic variables as moderating factors is also reported by Porter and Donthu (2006), who tested the influence of age, education and income on perceived usefulness and ease of use of internet technology. They argued that older people tend to have less capacity to learn new things and thus may avoid adopting new technology to avoid any risk associated with it. With regard to socioeconomic status, which commonly also reflects education background, the authors stated that people with higher socioeconomic status usually have more access to technology. They are more familiar with technology compared to people of a lower socioeconomic status. Accordingly, they may have developed knowledge about the usefulness and ease of use of the technology which will increase their adoption rate.

Gender has become the most researched demographic variable in the studies involving antecedents of intention to adopt a new technology (Gefen & Straub 1997; Morris & Venkatesh 2000; Nysveen, Pedersen & Thorbjornsen 2005; Shin 2009). Most of the past research has placed gender as a moderator factor to be examined for its influence on adoption or acceptance models. Different responses by men and women towards new technologies were believed to be the reason why many researchers were interested in conducting those studies. In their research into the moderating effects of gender on intention to use a mobile chat service, Nysveen et al. (2005), for example, found that perceived enjoyment is a more dominant aspect of the service for female users. This study also yielded an important finding in regards to male users—that perceived usefulness was a more significant antecedent of intention for them. Based on these findings, the role of gender as a moderator in acceptance models is significant, and therefore should be included in any model adopted for further investigation purposes.

The empirical findings about the influence of demographic factors in acceptance models have supported and reinforced their role as moderators in the adoption of technology, as depicted in Figure 3.6.

FIGURE 3.6 HYPOTHETICAL MODERATING ROLE OF DEMOGRAPHIC FACTORS IN TAM AND TRAM



As shown in Figure 3.6, age and gender as demographic factors moderate the relationships between perceived enjoyment and usage intention, perceived ease of use and usage intention, and perceived usefulness and usage intention. Resuming the moderator identification stage, we are now ready to include all potential moderator variables identified above into an integrated conceptual model. The model will be displayed in the following section and referred to when developing the hypotheses.

3.3 CONCEPTUAL MODEL CONSTRUCTION AND HYPOTHESIS DEVELOPMENT

Taking into consideration the combined models of TR and TAM, the specific relationships among the TAM dimensions and the identified moderator variables, the conceptual model for this thesis was constructed (see Figure 3.7). It can be seen from the model that PU, PEOU and PE are influenced by technology readiness positioned as TAM antecedents. Perceived enjoyment was given the same importance as PU and PEOU since it was considered an important factor to enhance the model and to contextualise the study by highlighting the hedonic experiences relevant to the reseached industry. As already explained in the introduction of this chapter, the insertion of PE into the TAM dimension configuration is supported by many studies, such as those of Ha et al. (2007), Shin (2007), Bruner and Kumar (2005) and Pagani (2004). It is essential to first investigate the interdependencies between PU and PE, PU and PEOU and PE and PEOU, particularly

because little evidence has been provided by previous TAM studies confirming consistent relationship patterns among these variables. The investigation was performed by testing the following hypotheses H1a and H1b:

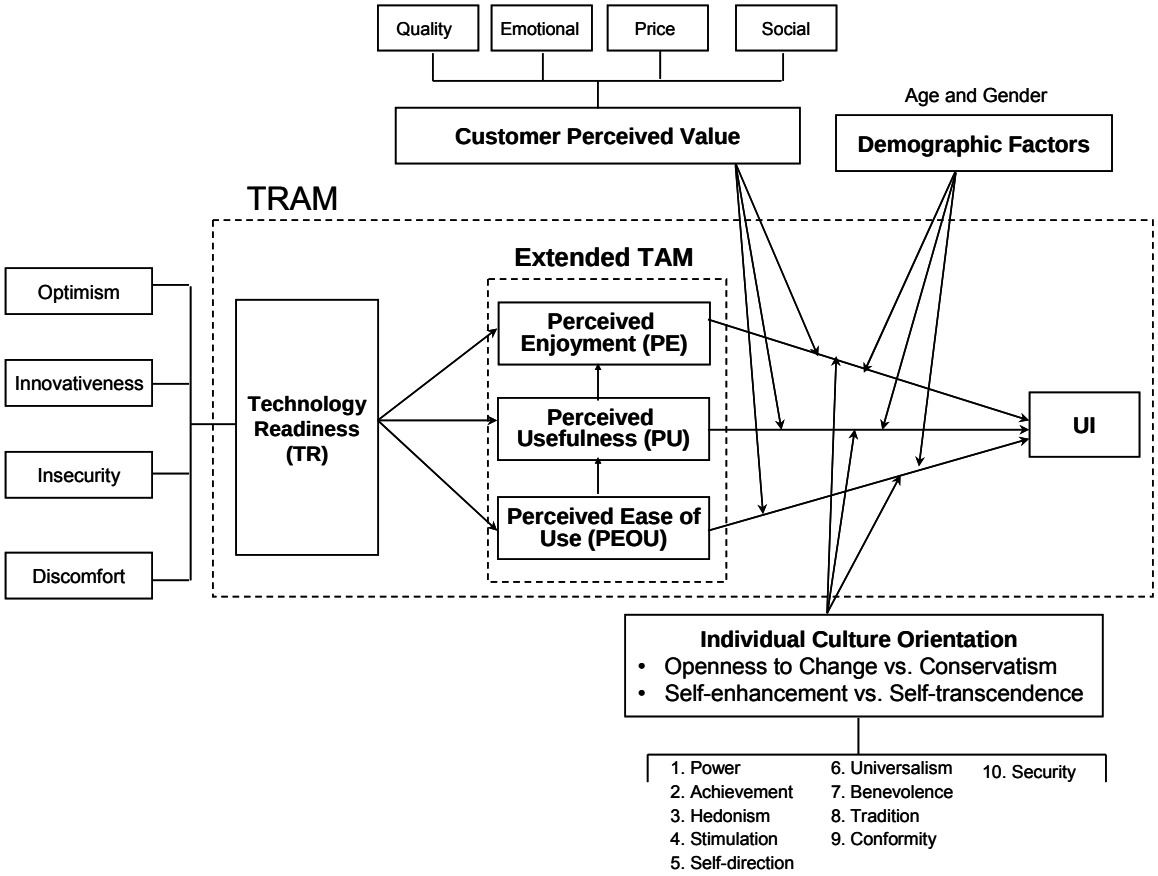
H1a: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PE → PU causal directions in extended TAM

H1b: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PEOU → PE causal directions in extended TAM

The direct relationships between the TR and TAM dimensions are fundamental to unifying the individual trait construct with the cognitive system appraisal variables. The identification of these relationships will determine the validity of TRAM as originally proposed by Lin, Shih and Sher (2007), which can also be used to comparatively analyse TRAM against the robust TAM. The analytical comparative results of these two models will generate empirical evidence to determine which should be adopted as the baseline framework into which moderator variables are to be incorporated. To this end, both models will be tested through the Hypothesis H2:

H2: TAM provides a more parsimonious fit than TRAM in explaining mobile broadband technology acceptance.

FIGURE 3.7 RESEARCH MODEL



With regards to moderator factors, three variables were identified previously in this chapter. These include consumer perceived value (CPV), individual cultural orientation and demographic factors. All moderators are hypothesised to have a significant influence on the relationships between PU and UI, PEOU and UI and PE and UI. An empirical test was performed on these relationships, but not on those between Technology Readiness and PEOU, PU and PE, because we seek to understand the direct relationships between TAM dimensions and usage intention under the influence of the moderators.

Eight hypotheses were prepared to test the moderating influence of moderator variables. Hypotheses H3, H4 and H5 were developed to test the moderating effect of CPV. The moderating influence of individual culture value orientation was tested based on H6. Finally, H7, H8 and H9 were designed to examine the moderating effect of demographic factors.

Hypotheses concerning moderating effect of consumer perceived value (CPV)

H3: The positive effect of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by consumer perceived value.

H4: The positive effect of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by consumer perceived value.

H5: The positive effect of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by consumer perceived value.

Hypotheses concerning moderating influence of individual cultural orientation dimension

It was explained earlier that individual cultural orientation is to be measured in accordance with Schwartz's value survey. This system includes four polars of the two dimensions in its framework: openness to change, conservatism, self-transcendence and self-enhancement. At this stage, upon which dimension the Indonesian cultural orientation is formed remains unknown. Therefore, to examine the moderating influence of individual cultural orientation, Hypothesis 6 developed here is not yet specified by Schwartz's dimensions. The investigation to identify Schwartz's dimensions to be applied in decomposing the hypothesis will be conducted based on the data analysis results presented in Chapter 5.

H6: The dimension of culture moderates the relationships between PEOU and UI, PU and UI, and PE and UI.

Hypotheses concerning moderating impact of demographic factors

H7: The positive effect of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by demographic factors.

H8: The positive effect of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by demographic factors.

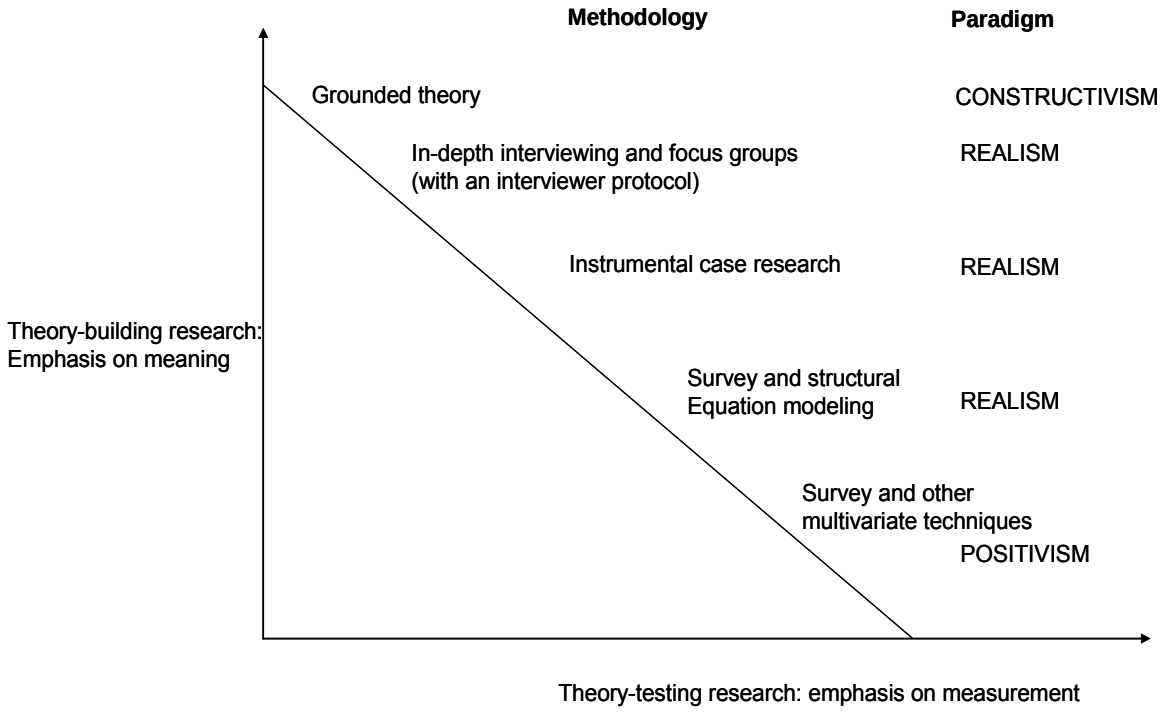
H9: The positive effect of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by demographic factors.

CHAPTER 4: METHODOLOGY AND RESEARCH INSTRUMENT

4.1 INTRODUCTION: RESEARCH PARADIGM

The methodology adopted in this thesis was designed to perform research activities involving a model validation as well as exploration and verification of potential factors that influence acceptance of new technology. Specific methods implemented to meet this need were determined based on certain research paradigms and theoretical perspectives (Kuhn 1970, 1996; McMurray 2008). To determine research paradigm and approaches used in this thesis, prior relevant scientific theories were examined and taken into consideration. The framework shown in Figure 4.1, displaying linkages between methods and their related paradigms as proposed by Healy and Perry (2000), was used in constructing the methodology.

FIGURE 4.1 A REPRESENTATIVE RANGE OF METHODOLOGIES AND THEIR RELATED PARADIGMS



Source: Healy and Perry (2000)

An exploratory literature review, personal interviews, surveys, multivariate analysis and structural equation modelling techniques are the methods used by studies employed under the positivist paradigm. The use of quantitative methods to perform theory and extant model testing authenticated the positivism existence. Besides, the examination of relationships among the constructs in technology acceptance through hypotheses tests

indicated the use of positivism paradigm. Specifically, it was demonstrated by the measurement method of the technology acceptance constructs that follow an assumption requiring the measurement result to be a single apprehensible reality (Healy & Perry 2000). The summary of the paradigm elements proposed by Sobh and Perry (2005) shown in Figure 4.2 supports this proposition. However, reflecting methods adopted in this thesis only to the elements of a paradigm was considered insufficient for philosophically confirm the scientific position taken in this research, and further offered to the technology acceptance theory development. In respond to this, it is important to examine the research activities involved in this thesis by applying postulates recognised in a post-positivist perspective. An initiative to undertake a post-positivist review of the Technology Acceptance Model conducted by Silva (2007) was referred for establishing essential philosophy foundations to meet this purpose.

FIGURE 4.2 FOUR SCIENTIFIC PARADIGMS

	Paradigm			
Element	Positivism	Constructivism	Critical theory	Realism
Ontology	Reality is real and apprehensible	Multiple local and specific "constructed" realities	"Virtual" reality shaped by social, economic, ethnic, political, cultural, and gender values, crystallised over time	Reality is "real" but only imperfectly and probabilistically apprehensible and so triangulation from many sources is required to try to know it
Epistemology	Findings true – researcher is objective by viewing reality through a "one-way mirror"	Created findings – researcher is a "passionate participant" within the world being investigated	Value mediated findings – researcher is a "transformative intellectual" who changes the social world within which participants live	Findings probably true – researcher is value-aware and needs to triangulate any perceptions he or she is collecting
Common methodologies	Mostly concerns with a testing of theory. Thus mainly quantitative methods such as: survey, experiments, and verification of hypotheses	In-depth unstructured interviews, participant observation, action research, and grounded theory research	Action research and participant observation	Mainly qualitative methods such as case studies and convergent interviews

Note: Essentially, ontology is "reality", epistemology is the relationship between that reality and the researcher and methodology is the technique used by the researcher to discover that reality
Source: Based on Perry *et al.* (1999), which itself was based on Guba and Lincoln (1994) from which the quotations come

Source: Sobh and Perry (2005)

Three prominent philosophical views assembled by Silva (2007) are highlighted in this chapter. They include Popper's principle of demarcation (1972, 2005), Kuhn's normal science paradigm (Kuhn 1970, 1996), also known as the disciplinary matrix, and the Lakatosian 'core and protective belt' progressive scientific framework (Lakatos 1978).

First, this thesis was viewed from Popper's perspective (1972, 1995). According to Popper, to be accepted as scientific work, studies in technology acceptance like TRAM or TAM research must be examined to determine whether they can meet the principle of demarcation. This principle separates scientific theory from pseudo-science based on the requirement that a theory has to be falsifiable. To scientifically claim that research findings constitute new knowledge, the methods used to produce them must be designed to maximally falsify the existing theories. Consequently, research studies must not rely solely on the implementation of confirmatory procedures or tecnniques. This avoids the trap of directly drawing conclusions based only on the results of confirmatory testing of the data to fit the existing models.

To address Popper's standpoint, his demarcation principle was implemented in this thesis. It was applied by questioning and validating the configuration of TRAM in light of construct interrelationships to perform an act of theory falsification. More specifically, the role of technology readiness (TR) as the main antecedent of TAM, as well as the interdependent relationships among variables, was revisited and retested. The possibility of TR performing a different role in the acceptance model was allowed. It was expected that the results of this thesis would not only confirm the existing TRAM or TAM model, but would also challenge the unproven existing or previous theoretical beliefs while simultaneously revitalising and relating them to the more acceptable and improved theories. This proposition was specifically reflected in two main stages of this research, which are the determination of the situation setting for data collection and the model rectification method. The data collected for validating the proposed model were obtained in an 'uncontrolled normal situation', where technology adoption was not normatively or formally directed by an institution, as in a work situation. The data were obtained from ordinary potential consumers who possessed the freedom to choose an adoption option. In taking this approach, Popper's argument was addressed with confidence because the use of intention as the construct indicating adoption was ensured to be scientifically acceptable. In a normal situation, like that of the respondents in this study, the logical connection between intention and actual usage action follows a contingent causal relationship, not an analytical relationship. Thus, the requirement for scientifically claiming the findings can be supported by the logical connection argument (as referred to in Silva 2007; Anscombe 1957; Melden 1961; Wittgenstein 1953; Wright 1971; and Silva 2007). This argument requires that a consistent approach be applied to the relationship between factors involved in a causal relationship, whether it is a contingent or a necessary (analytic) connection. The former requires the presence of natural processes, while the latter does not. The choice of a normal situation for this research signified the existence of natural processes, made visible by the hypotheses concerning the influence of the moderator

variables. Theory falsification was also confirmed by the rectification procedure conducted to achieve the model fit. In performing this procedure the reseacher adopted a mental attitude to remain open to any possible new configurations of the model based on the primary data obtained from the field.

Second, Kuhn's philosophical perspective (Kuhn 1970; 1996) provided sound support for this thesis in confirming its scientific nature. In opposition to other post-positivists who view the progress of science in terms of abstract theory integration, Kuhn suggests an accumulation of concepts instead. His standpoint was known as the normal science conception, promoting the view that scientific knowledge is socially constructed, negotiated and evolving. The concept was operationalised by the use of the paradigm known as the disciplinary matrix. This paradigm enables research within a particular disciplinary field to be conducted using different methods. A paradigm was employed to perform 'a puzzle-solving activity', and:

> [i]t defines and characterizes the subject matter of a discipline through the institutionalisation of a fundamental model of the domain and associated knowledge-producing practices. (Silva 2007, p. 8)

On this account, a paradigm is constructed using two major constituents. The first is a set of exemplars for problem-solving and achievements, while the second refers to the existence of exemplary theory development. These components are reflected in scientific activity through instruments, techniques, approaches, and specific methods adopted to solve an observed research problem.

The Technology Acceptance Model (Davis, Bagozzi & Warshaw 1989b) and Technology Readiness (Parasuraman, A. 2000), acting as the major components of the conceptual model developed in this thesis, have consistently displayed a good fit and appropriate characteristics to become a solid paradigm. An identification of the information system research paradigm termed 'TAM' can be gained from the exceptional analysis of the model performed by Silva (2007). According to his review, three main points characterise TAM as a paradigm. First, TAM has received a tremendous number of citations and has been continously and thoroughly investigated in many ongoing studies. Second, TAM has been adopted as a baseline model in many research studies for further modification and development. Third, as a consequence, TAM has become an enabler for various instruments, methods, techniques and procedures to be applied in many research studies. These findings on TAM strongly support its role as a paradigm in the present research. Similar findings were found with regard to technology readiness (TR). This model has

been a focus of many studies, following a similar pattern to the application of TAM. It can therefore be concluded that this thesis involved the use of a paradigm in aiming to meet the research objectives. The fact that this was achieved through implementation of exploratory and confirmatory statistical techniques, structural equation modelling (SEM), as well as other methods, further evidenced that a paradigm was put into operation. SEM, in particular, is the most common method employed to test a theory. As pointed out by Tabachnick and Fidell (2007), researchers are required to acquire prior knowledge and develop hypotheses about potential relationships among research variables to solve an essential issue or problem. In other words, the aim of this thesis is to undertake puzzle-solving activity that confirms the effort to make significant scientific progress, thereby filling the gap in technology acceptance research regarding the absence of moderator variables in previous models.

Third, the prominent concept about the methodology of scientific research programs introduced by Lakatos (1978) is an essential perspective referred to in this research to endorse the positivist paradigm. According to Lakatos, a research program must demonstrate a set of theoretical assumptions committed and defended by their proponents. In Lakatosian terminology, the committed assumptions are ‘core’ (Lakatos 1978; zenker 2006). Proponents thus endorse and defend the credibility of assumptions behind the core, and hence assumptions are maintained as unquestionable. Technically, the core is protected by auxiliary hypotheses developed in research-based programs. Lakatos referred to the hypotheses as a ‘protective belt’ (Lakatos 1978; zenker 2006). As a result, a theory is preserved and developed based on a stable and credible core in a particular research domain. In practice, the Lakatosian concept was operationalised by a heuristic method, which can follow positive or negative approaches. A positive heuristic approach is employed when the research design keeps the core permanently unquestioned. A negative heuristic involves the modification of hypotheses to protect the core. The mechanism of employing these two forms of heuristics is the essence of scientific progress, demarcating research programs into two categories: as either a progressive or a degenerative research endeavour. This thesis was intended to produce progressive-type research findings by employing a positive heuristic. The existence of TAM and TR constructs in the research model were defended and maintained as the core, demonstrating that theories were presented to establish robust scientific findings. The progressive nature of this research was assured through the auxiliary hypotheses investigating the role of moderator variables in technology acceptance formation and those questioning the construct configuration previously proposed by the existing TRAM model. The puzzle-solving mechanism demanded by Lakatosian methodology was made visible by performing an exploratory literature review to identify possible moderator

variables. It was also supported by the exploration of dimensionality analysis in which exploratory factor analysis was adopted.

4.2 RESEARCH DESIGN AND PROCEDURE

The procedures used for implementing the above-mentioned methods followed the mixed-method research process framework as summarised by Johnson and Onwuegbuzie (2004). Both qualitative and quantitative methods were utilised in accordance with the sequential process flow indicated by the fourth quadrant displayed in Figure 4.3 (QUAL→ quan → and qual → QUAL process). As seen from this quadrant, the qualitative methods, including the explorative literature review and personal interviews with experts, were first conducted. These were followed by quantifying the qualitative findings obtained from the interviews into a quantitative measure showing the relevance level of the research instrument items. In the later stages of the process, qualitative dispositions stated in the hypotheses were quantitatively examined based on the information gained from the surveys. The examination was performed through the multivariate and structural equation modelling techniques involving quantitative index and estimate level fit appraisal.

FIGURE 4.3 MIXED-METHOD DESIGN MATRIX WITH MIXED-METHOD RESEARCH DESIGNS SHOWN IN THE FOUR CELLS

Paradigm Emphasis Decision	Time Order Decision: Concurrent	Time Order Decision: Sequential
Equal Status	QUAL + QUAN	QUAL → QUAN QUAN → QUAL
Dominant Status	QUAL + quan QUAN + qual	QUAL → quan qual → QUAN QUAN → qual quan → QUAL

Note. "qual" stands for qualitative, "quan" stands for quantitative, "+" stands for concurrent, "→" stands for sequential, capital letters denote high priority or weight, and lower case letters denote lower priority or weight.[11]

Source: Johnson and Onwuegbuzie (2004

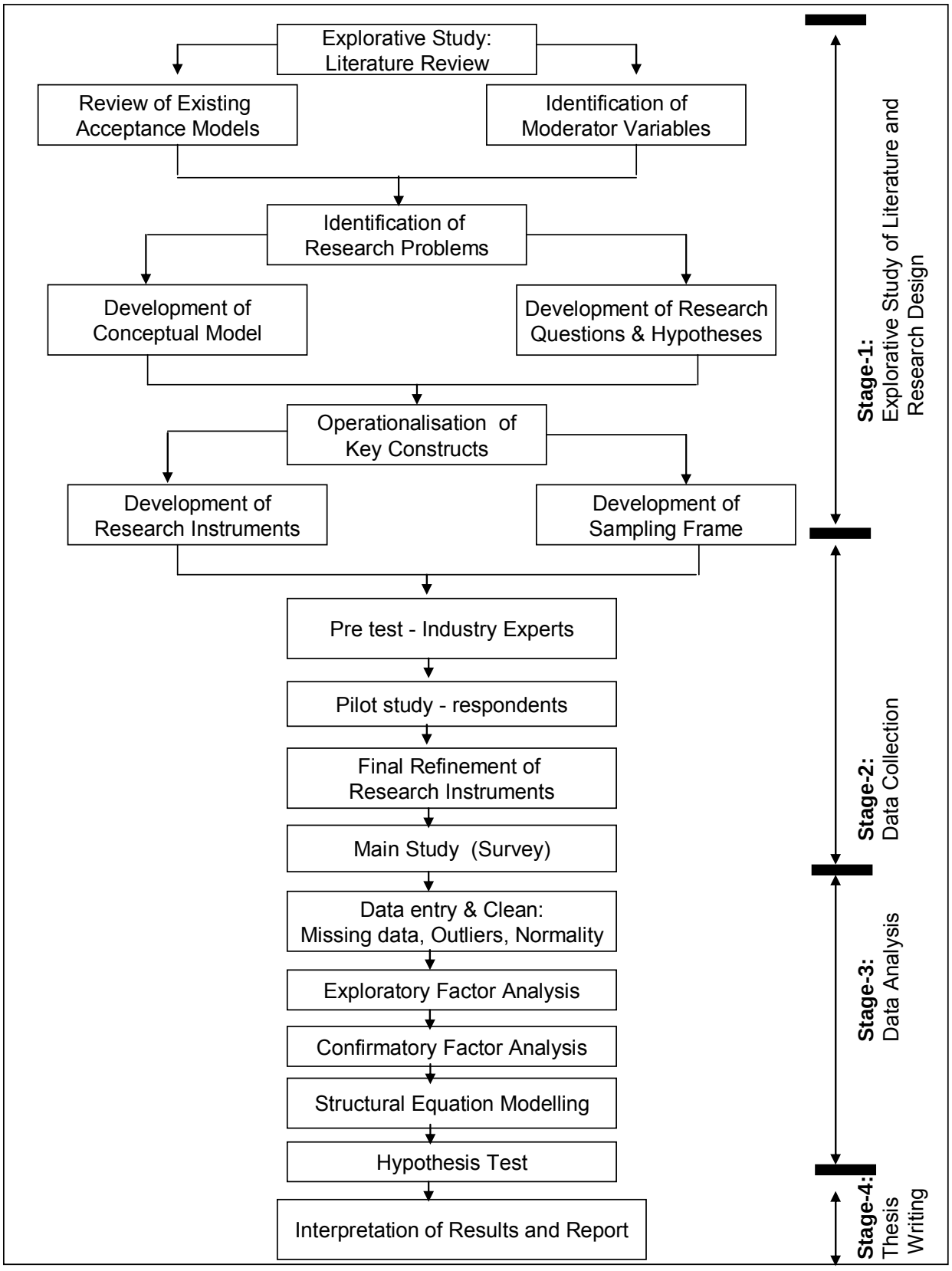
Figure 4.4 depicts the four stages conducted in the study. The first stage entailed an exploratory study, with a literature review as the chosen method. Exploration was directed

towards reviewing all relevant existing models and collecting information about the moderating factors in technology acceptance models. More specifically, the investigation of moderator factors was focused on the role of marketing effectiveness, individual cultural orientation, demographic characteristics and other factors that potentially have a moderating effect. The results obtained from the literature review were utilised to develop a conceptual model, and to formulate the research question and hypotheses. Constructs included in the model were accordingly operationalised and referred to in developing the research instruments. The first stage was finalised by preparing the sampling frames for data collection activities.

Stage 2 involved data collection and three sequential activities: pre-test, pilot study and survey (main study). This was in compliance with the systematic sequence of steps required to develop reliable instruments for marketing research prescribed by Churchill (1979). Therefore, pre-test and pilot studies were accomplished before the main study was carried out to ensure optimal research measures. The results yielded from these two activities were used to refine measurement items used in the questionnaire in terms of their content validity and reliability. The main study involved the distribution of survey questionnaires to the respondents. The research protocol was similar to that used in the pilot study, the only difference being the number of respondents. The number of required samples was derived from the requirement for performing structural equation modelling and was based on the sampling method used.

In Stage 3, the collected data were processed and analysed using statistical methods including exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and structural equation modelling. The analysis was aimed at investigating the relationships between variables, to verify and validate the proposed integrated model and to meet the research objectives through hypothesis testing. All stages were concluded and completed in the thesis writing conducted based on RMIT's standards of writing style and thesis presentation.

FIGURE 4.4 RESEARCH DESIGN AND STAGES



Source: Adopted from Maholtra (2004), Hair et al. (2006), and Tabachnick and Fidell (2007)

4.3 UNIT OF ANALYSIS

This thesis is focused on analysis at the individual level, implemented through the involvement of potential personal consumers of mobile broadband technology in Indonesia. This approach is intended to substantiate the applicability of the research model in an unconditioned non-work situation. The rationale for taking this approach relates to the fact that the TR and TAM models, as the main components of the research model, were developed for a workplace context where technology adoption is involuntary. Hence, a study of technology acceptance process in the context of daily life situations is also required. Besides, to explain the technology acceptance in a more comprehensive way for non-work situations at the individual level, the analysis needs to involve an individual trait technology-specific construct that potentially becomes an influential factor in acceptance dimensions. Technology readiness is the construct implemented for this purpose, based on its theoretical definition that it reflects an individual's trait, and it can potentially play a role as a less studied antecedence of TAM dimensions.

4.4 RESEARCH INSTRUMENT DEVELOPMENT

4.4.1 Operationalisation of Constructs

The information required to empirically validate the conceptual model was obtained through the operationalisation of technology acceptance constructs. More specifically, the main construct indicating acceptance was investigated through the measurement of consumers' usage intention (UI) antecendents and moderator variables. A set of questions containing items to measure each variable was prepared for this purpose. Items capturing information about UI antencedents were associated with perceived usefulness (PU), perceived ease of use (PEOU), perceived enjoyment (PE) and technology readiness (TR). The other items were intended to gather findings about moderator variables including individual cultural orientation, consumer perceived value (CPV), as well as age and gender as demographic characteristics. This brought the total number of items in the questionnaire to 101 which were validated by the pre-test and pilot studies.

4.4.2 Scaling and measurement

With the exception of demographic characteristices, all variables were measured on a 7-point Likert-type scale. The point '1' on the scale indicated 'strongly disagree', while '7' represented 'strongly agree' in response to the statements put forward. The use of a Likert-type scale is recommended for research involving attitude measurement (Likert

1932; Malhotra 2004; Reid 2006; Roberts, Laughlin & Wedell 1999) and the implementation of structural Equation Modelling as a data calculation method (Hair et al. 2006; Tabachnick & Fidell 2007).

4.4.3 Item development

Items appearing in the questionnaire were adapted from previous studies mostly cited by other researchers who have conducted research into similar subjects. To contextualise the items in relation to mobile broadband technology acceptance, a modification was made. This involved replacing the technology type mentioned in each question with specific attributes associated with mobile broadband technology. All items were further tested and assessed for their content validity and relevance by experts who became the participants in the pre-test study. Eleven experts were asked to give their opinions about the items. NVIVO was used to analyse the suggestions provided by those who demonstrated the biggest contribution in each construct reflected by the highest coverage score.

4.4.3.1 Pre-Test

A pre-test was conducted to strengthen the content validity of the instruments by examining the degree of relevance of each variable item, and obtaining feedback from experts confirming their acceptance of the proposed conceptual model, particularly from a practical perspective. The 7-point Likert-scale was employed to measure the degree of variable item relevance at this stage. The pre-test took place in Jakarta and Bandung, two major cities in Indonesia where all operators were headquartered and operationalised. Eleven experts, comprised of research and development heads, vice presidents, assistant vice presidents, general managers, executive regional general managers and managers at the incumbent Telkom Indonesia and other mobile broadband service operators involved in mobile broadband technology development in Indonesia participated in the pre-test phase. Six of the eleven participants were Telkom Indonesia managers who worked in the area of wireless broadband product management. Telkom was chosen for its competence and experience in managing wireless broadband products since it pioneered the availability of the product in Indonesia.

Based on the relevance scores provided by the participants on each questionnaire item, Mean Relevance Score (MRS) was calculated to ensure the item relevance was maintained in the instrument. Feedback and suggestions offered by the experts were analysed using the NVIVO application, and used to strengthen the questionnaire items for each construct, as explained in the following sections.

4.4.3.2 Usage Intention (UI) Measure

Usage intention was measured by the UI1 to UI4 items shown in Table 4.1. UI1 was originally adapted from the item developed by Davis, Bagozzi and Warshaw (1992), whereas UI2 to UI4 were based on the work of Venkatesh and Bala (2008).

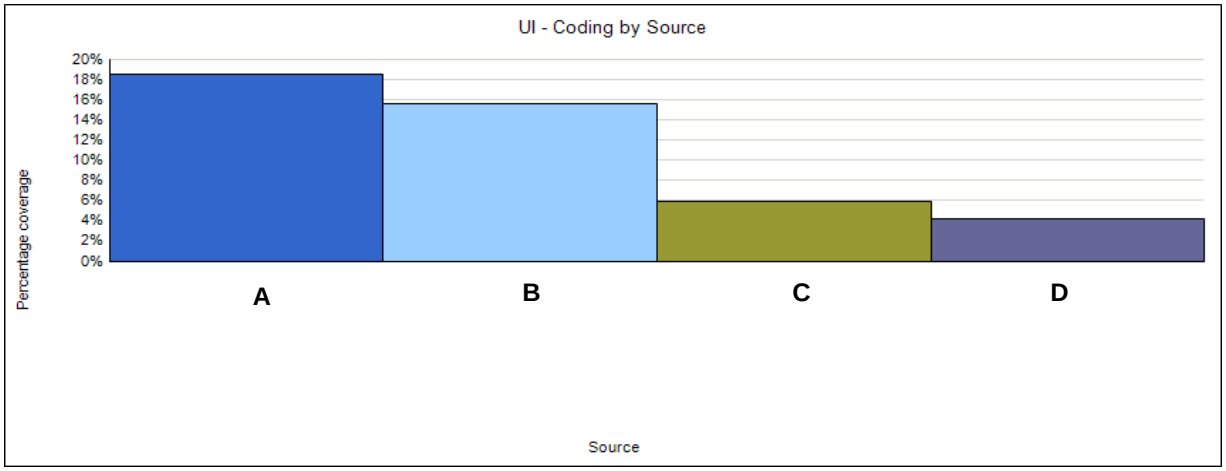
TABLE 4.1 INITIAL MEASURE FOR USAGE INTENTION (UI)

ITEM	INITIAL MEASURE
UI1	I presently intend to use mobile broadband technology to get on line.
UI2	I intend to use mobile broadband technology next month.
UI3	I predict I will use mobile broadband technology next month.
UI4	I plan to use mobile broadband technology next month.

The UI items above were assessed in the pre-test study for their relevance to the research context, and also whether they had a valid content for the industry and technology being measured.

Based on the NVIVO results presented in Figure 4.5, it can be seen that of the 11 experts interviewed, 4 provided opinions about the items for measuring the UI construct. The opinion with the largest score was that given by Expert-A, who suggested a more detailed explanation of the mobile broadband technology be given to respondents prior to completing the questionnaire. This expert also offered some examples of the main points to be included in the explanation, as reflected in the following questions: 'What does the broadband technology imply?', and 'What specific technologies are referred to by the term mobile broadband. It could be referring to the existing 3G and 3.5G technologies, or future technologies such as WIMAX or LTE.

FIGURE 4.5 PERCENTAGE COVERAGE OF EXPERT OPINION ON USAGE INTENTION (UI) – NVIVO RESULT



The expert's suggestions were addressed by providing a verbal explanation and brief overview of the mobile broadband technology (including 3G and 3.5G) in the introduction, to ensure the respondents understood what the technology was. In summary, the pre-test results confirmed agreement among the experts that the content validity of UI items shown in Table 4.1 was relevant to the industry and appropriate for this study.

4.4.3.3 Perceived Usefulness (PU) Measure

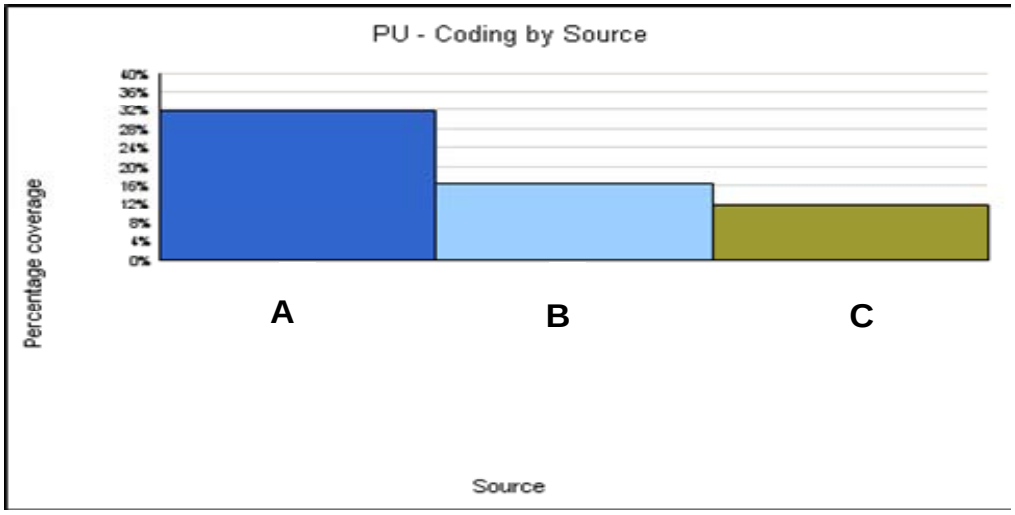
The questionnaire items for perceived usefulness were adapted from Davis (1989) and revised to match the technology context. They are presented in Table 4.2.

TABLE 4.2 INITIAL MEASURE FOR PERCEIVED USEFULNESS (PU)

ITEM	INITIAL MEASURE
PU1	Mobile broadband technology is useful to me.
PU2	Mobile broadband technology increases my productivity.
PU3	Mobile broadband technology helps me to carry out my online activities more effectively.
PU4	Mobile broadband technology enables me to have/get a high-speed online connection more easily.
PU5	Mobile broadband technology gives me a more reliable online connection with a much higher speed.
PU6	Mobile broadband technology gives me greater control over my online connection.
PU7	Mobile broadband technology enables me to make the best use of my time.
PU8	Mobile broadband technology provides me with important things that I need to get an online connection.

As shown in Figure 4.6 the pre-test results produced by NVIVO identified three experts who contributed their opinions about the UI items. Expert-A gained the biggest score for opinion coverage, recommending an improvement be made to items PU3 and PU4 by including mention of the mobility aspect of mobile broadband technology to the questions as part of product usefulness.

FIGURE 4.6 PERCENTAGE COVERAGE OF EXPERT OPINION FOR PERCEIVED USEFULNESS (PU) - NVIVO RESULT



This suggestion was adapted and implemented to PU4, and the result is shown in Table 4.3. The PU4 item was revised by the inclusion of an additional statement (which was printed in italics) about the mobility of the technology and used in the final questionnaire. Meanwhile, the PU-3 item remained unchanged since an additional explanation was considered unnecessary.

TABLE 4.3 INITIAL AND REVISED MEASURE FOR PERCEIVED USEFULNESS (PU)

ITEM	INITIAL MEASURE	REVISED/FINAL MEASURE
PU3	Mobile broadband technology enables me to have/get a high-speed online connection more easily.	Mobile broadband technology enables me to have/get a high-speed online connection more easily *wherever I am located.*

4.4.3.4 Perceived Ease of Use (PEOU) Measure

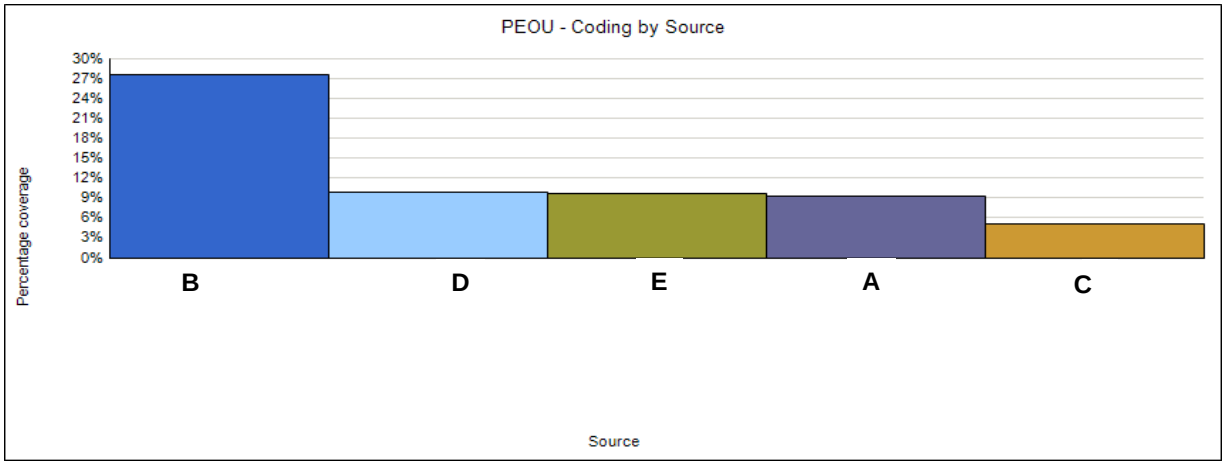
The questionnaire items for perceived ease of use were adapted from Davis (1989), and are presented in Table 4.4.

TABLE 4.4 INITIAL MEASURE FOR PERCEIVED EASE OF USE (PEOU)

ITEM	INITIAL MEASURE
PEOU1	Mobile broadband technology is easy for me.
PEOU2	It is easy to get mobile broadband technology to do what I want it to do.
PEOU3	Learning to operate mobile broadband technology is easy for me.
PEOU4	Mobile broadband technology is rigid and inflexible to interact with (reverse score).
PEOU5	It is complicated to set up mobile broadband technology (reverse score).
PEOU6	It takes a lot of effort to become skilful at using mobile broadband technology.
PEOU7	Operating mobile broadband technology requires a lot of mental effort.

The results of the pre-test produced by NVIVO, as shown in Figure 4.7, indicated that five experts expressed their opinions in the pre-test on the PEOU measurement items. Expert-B's opinion received the largest score of percentage coverage. The comments made by Expert-B addressed the importance of clarifying for the respondents the ease of use of mobile broadband technology in terms of its connectivity. Furthermore, it was suggested that we avoid using negative (reversed) statements as this could cause inaccurate interpretations.

FIGURE 4.7 PERCENTAGE COVERAGE OF EXPERT OPINION ON PERCEIVED EASE OF USE (PEOU) - NVIVO RESULT



The PEOU items addressed by the experts were improved by transforming the negative sentences into positive statements, which was applied to PEOU4 and PEOU5, as shown in Table 4.5. The other suggestion regarding the connectivity of the technology was also taken into account by providing an additional verbal explanation of this aspect to respondents during the introductory session of the survey.

TABLE 4.5 INITIAL AND REVISED MEASURE FOR PERCEIVED EASE OF USE (PEOU)

ITEM	INITIAL MEASURE	REVISED/FINAL MEASURE
PEOU4	Mobile broadband technology is rigid and inflexible to interact with.	Mobile broadband technology is *flexible* to interact with.
PEOU5	It is complicated to set up mobile broadband technology.	Setting up mobile broadband technology *is not* complicated.

4.4.3.5 Perceived Enjoyment (PE) Measure

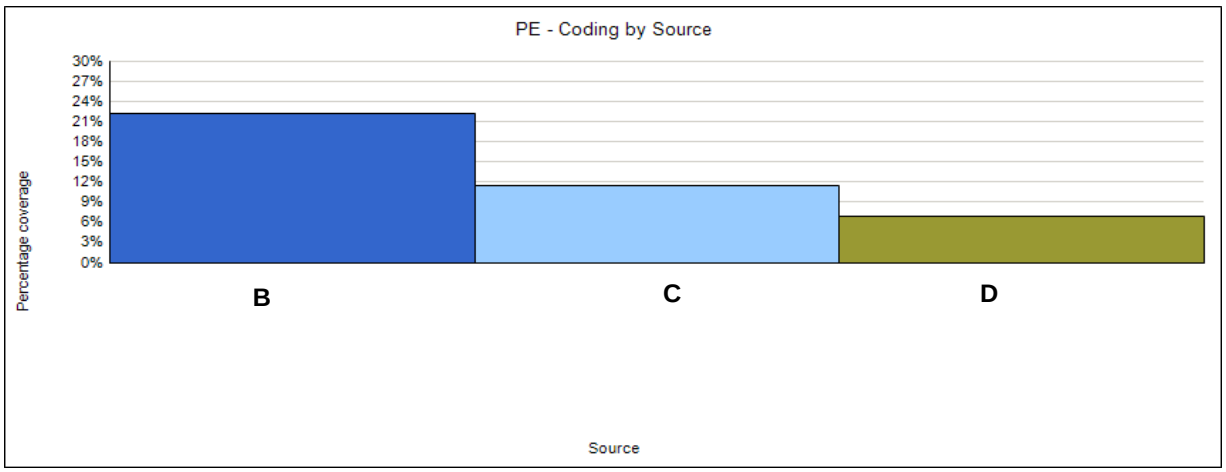
The six items displayed in Table 4.6 were developed to measure perceived enjoyment (PE). PE1, PE2 and PE3 were adapted from original statements produced by Davis, Bagozzi and Warshaw (1992). PE4 was derived from the item used to measure the enjoyment of internet usage as proposed by Teo, Lim and Lai (1999). PE5 was constructed based on Agarwal and Karahanna's research (2000), whereas PE6 was a new item created for this thesis.

TABLE 4.6 INITIAL MEASURE FOR PERCEIVED ENJOYMENT (PE)

ITEM	INITIAL MEASURE
PE1	Having mobile broadband technology is enjoyable.
PE2	The operating process of using mobile broadband technology is pleasant.
PE3	It is fun to use mobile broadband technology.
PE4	Using mobile broadband technology is exciting.
PE5	Using mobile broadband technology gives me enjoyment.
PE6	Mobile broadband technology keeps me happy.

It can be seen from the NVIVO output displayed in Figure 4.8 that three experts in the pre-test study commented on the PE items. Expert-B provided the opinions with the largest percentage score, that enjoyment resulted not only from gadget and broadband connection capability, but also from the interactivity and quality of the content or application.

FIGURE 4.8 PERCENTAGE COVERAGE OF EXPERT OPINION ON PERCEIVED ENJOYMENT (PE) - NVIVO RESULT



The feedback provided by Expert-B was addressed by providing an explanation to the respondents prior to the interview that perceived enjoyment not only addresses the capability of gadget or device such as modem and computer, but also the stability of the broadband connection in supporting them to enjoy their on-line actitivities

4.4.3.6 Technology Readiness (TR) Measure

The four dimensions of TR were operationalised with a 35-item scale proposed by Parasuraman (2000). The first two dimensions were termed optimism (10 items) and innovativeness (6 items), referring to the 'contributors' factors that strengthen a user's technology readiness. The other two, discomfort (10 items) and insecurity (9 items) are 'inhibitors' that suppress technology readiness. The items for each dimension are shown in Table 4.7.

Parasuraman (2000) originally developed seven items for measuring the innovativeness dimension of TR. This research applied only six of them. The original INN6 item was not adopted because it is focused more on the customer premises equipment (CPE) aspect of technology such as high-tech fixtures and gadgets. This does not apply to the mobile broadband technology based service studied in this research, because the core benefit of the service offered to the customer is not the physical gadget, but rather the high-speed internet connection.

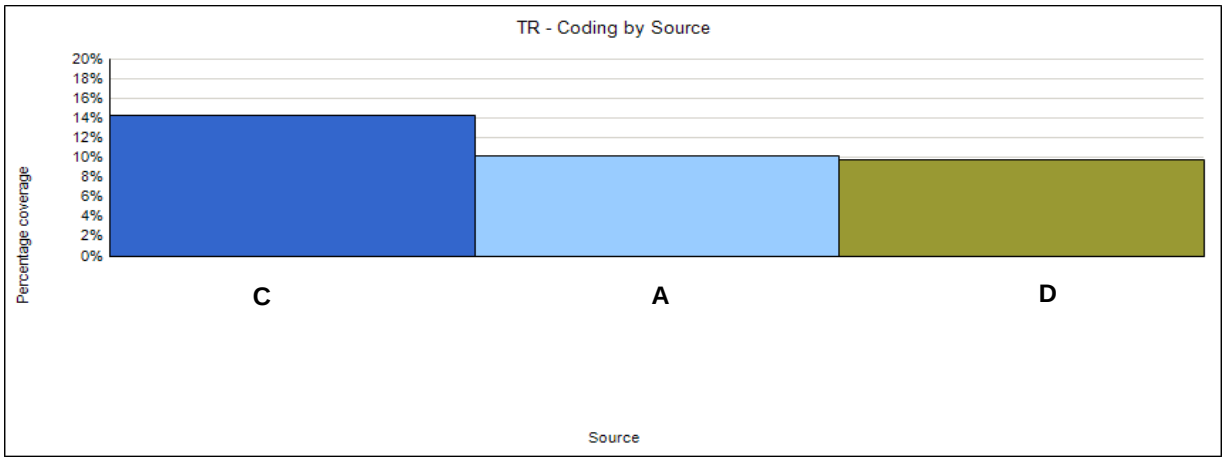
TABLE 4.7 INITIAL MEASURE FOR TECHNOLOGY READINESS (TR)

ITEM	INITIAL MEASURE
OPTIMISM	
OPT1	Technology gives people more control over their daily lives.
OPT2	Products and services that use the newest technologies are much more convenient to use.
OPT3	I like the idea of connecting to mobile broadband access because it gives me the flexibility to get online.
OPT4	I prefer to use the most advanced technology available.
OPT5	I like technologies that allow me to tailor things to fit my own needs.
OPT6	Technology makes me more efficient in my occupation.
OPT7	I find new technologies to be mentally stimulating.
OPT8	Technology gives me more freedom of mobility.
OPT9	Learning about technologies can be as rewarding as the technology itself.
OPT10	I feel confident that machines will follow through with what I instruct them to do.
INNOVATIVENESS	
INN1	Other people come to me for advice on new technologies.
INN2	It seems my friends are learning more about the newest technologies than I am.
INN3	In general, I am among the first in my circle of friends to acquire new technology when it appears.
INN4	I can usually figure out new high-tech products and services without help from others.
INN5	I keep up with the latest technological developments in my areas of interest.
INN6	I find I have fewer problems than other people in making technology work for me.
DISCOMFORT	
DIS1	Technical support lines are not helpful because they do not explain things in terms I understand.
DIS2	Sometimes, I think that technology systems are not designed for use by ordinary people.
DIS3	There is no such thing as a manual for a high-tech product or service that is written in plain language.
DIS4	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do.
DIS5	If I buy a high-tech product or service, I prefer to have the basic model over one with a lot of extra features
DIS6	It is embarrassing when I have trouble with a high-tech gadget while people are watching.
DIS7	There should be caution in replacing important people tasks with technology because new technology can break down or get disconnected.
DIS8	Many new technologies have health or safety risks that are not discovered until after people have used them.
DIS9	New technology makes it too easy for governments and companies to spy on people.
DIS10	Technology always seems to fail at the worst possible time.
INSECURITY	
INS1	I do not consider it safe to give out a credit card number over a computer.
INS2	I do not consider it safe to do any kind of financial business online.
INS3	I worry that information I send over the internet will be seen by other people.
INS4	I do not feel confident doing business with a place that can only be reached online.
INS5	Any business transaction I do electronically should be confirmed later with something in writing.
INS6	Whenever something gets automated, I need to check carefully that the machine or computer is not making mistakes.
INS7	The human touch is very important when doing business with a company.
INS8	When I call a business, I prefer to talk to a person rather than a machine.
INS9	If I provide information to a machine or over the internet, I can never be sure it really gets to the right place.

The pre-test results presented in Figure 4.9 revealed that there were three experts who provided comments about the technology readiness (TR) items. The opinions given by Expert-C have the largest percentage coverage, and confirmed the relevance and content validity of the TR items and highlighted the need to explain the definition of technology

readiness to the respondents. Based on this feedback, all initial TR items were retained and used in the survey.

FIGURE 4.9 PERCENTAGE COVERAGE OF EXPERT OPINION ON TECHNOLOGY READINESS - NVIVO RESULT



4.4.3.7 Consumer Perceived Value (CPV) Measure

The consumer perceived value scale was based on the 19-item four-dimensional model first developed by Sweeney and Soutar (2001) who mentioned that the multiple-item scale has been proven to be a better measure for CPV than the single-item scale in terms of explained variance. Although some items, particularly those that relate to emosion dimension, may be seen as similar to those of PE items used in evaluating TR, they were used to measure different research objects. CPV measurement items were implemented to measure the aggregated value of a mobile broadband service that had been introduced into the market and deployed from its technology platform by the operators; while PE items were used to measure consumer perceptions about the enjoyment aspect of the technology, including HSPA, HSDPA, 3.5G and WCDMA.

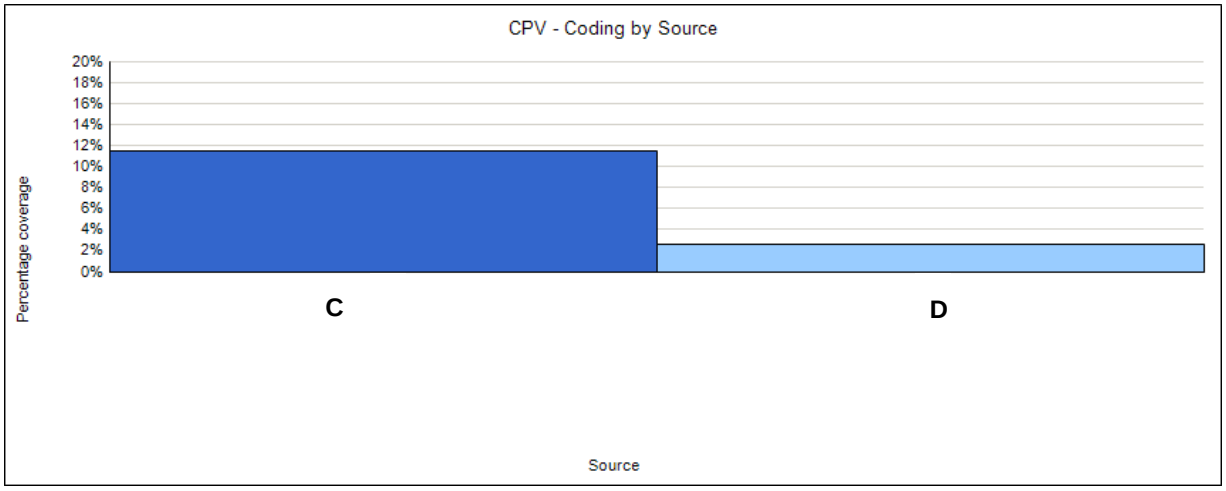
This model has been used in a variety of contexts and demonstrates strong validity and reliability, and can be extended to mobile services as found in Yang (2006) and Turel et al. (2007). The four dimensions reflecting the CPV scale were termed quality (6 items), emotion (5 items), price (4 items) and social (4 items), and are shown in Table 4.8.

TABLE 4.8 INITIAL MEASURE FOR CONSUMER PERCEIVED VALUE (CPV)

ITEM	INITIAL MEASURE
QUALITY	
QUA1	High-speed mobile broadband internet service has a stable connection and low drop-out rates.
QUA2	High-speed mobile broadband internet service is well designed.
QUA3	High-speed mobile broadband internet service has an acceptable standard of quality.
QUA4	High-speed mobile broadband internet service is not well developed (reverse score).
QUA5	High-speed mobile broadband internet service would not have a reliable connection (reverse score).
QUA6	High-speed mobile broadband internet service would perform consistently.
EMOTION	
EMO1	High-speed mobile broadband internet service is one that I would enjoy.
EMO2	High-speed mobile broadband service makes me want to use it.
EMO3	High-speed mobile broadband service is one that I would feel relaxed about using.
EMO4	High-speed mobile broadband service would make me feel good.
EMO5	High-speed mobile broadband service would give me pleasure.
PRICE	
PRC1	High-speed mobile broadband service is reasonably priced.
PRC2	High-speed mobile broadband service offers value for money.
PRC3	High-speed mobile broadband service is a good product for the price.
PRC4	High-speed mobile broadband service would be economical.
SOCIAL	
SOC1	High-speed mobile broadband service would help me to feel socially acceptable.
SOC2	High-speed mobile broadband service would improve the way I am perceived.
SOC3	High-speed mobile broadband service would make a good impression on other people.
SOC4	High-speed mobile broadband service would ensure its owner receives social approval.

Two experts contributed their opinions about the CPV items in the pre-test, as shown in Figure 4.10. The opinion with the largest percentage coverage score was obtained from Expert-C, who suggested a more specific and clearer statement be made to emphasise the mobility of mobile broadband technology, in relation to the quality dimension of value. He also recommended that the use of negative or reverse statements be avoided considering the risks of creating misleading or false interpretation.

FIGURE 4.10 PERCENTAGE COVERAGE OF EXPERT OPINION ON CONSUMER PERCEIVED VALUE (CPV) - NVIVO RESULT



To strengthen the content validity of the CPV items, particularly in light of the quality dimension as suggested by the pre-test results, the initial statement used in QUA1 item was modified. An additional phrase describing the mobility of the technology was inserted into QUA1. The additional statement highlighted the possibility for users to set up a reliable broadband connection at any location. Furthermore, to avoid false interpretation caused by negative statements used in the items, QUA4 and QUA5 were transformed into items with positive statements. This improvement finalised the CPV items development resulting in the final measures for CPV to be implemented in the survey stages. These are shown in Table 4.9. The corrected and additional statements were printed in italic style.

TABLE 4.9 INITIAL AND REVISED MEASURE FOR CONSUMER PERCEIVED VALUE (CPV)

ITEM	INITIAL MEASURE	REVISED/FINAL MEASURE
QUA1	High-speed mobile broadband internet service has a stable connection and low drop-out rates.	High-speed mobile broadband internet service has a stable connection and low drop-out rates, *wherever I am located*.
QUA4	High-speed mobile broadband internet service is not well developed (reverse score).	High-speed mobile broadband internet service *is well developed*.
QUA5	High-speed mobile broadband internet service would not have a reliable connection.	High-speed mobile broadband internet service *would have* a reliable connection.

4.4.3.8 Schwartz's Individual Cultural Orientation Measure

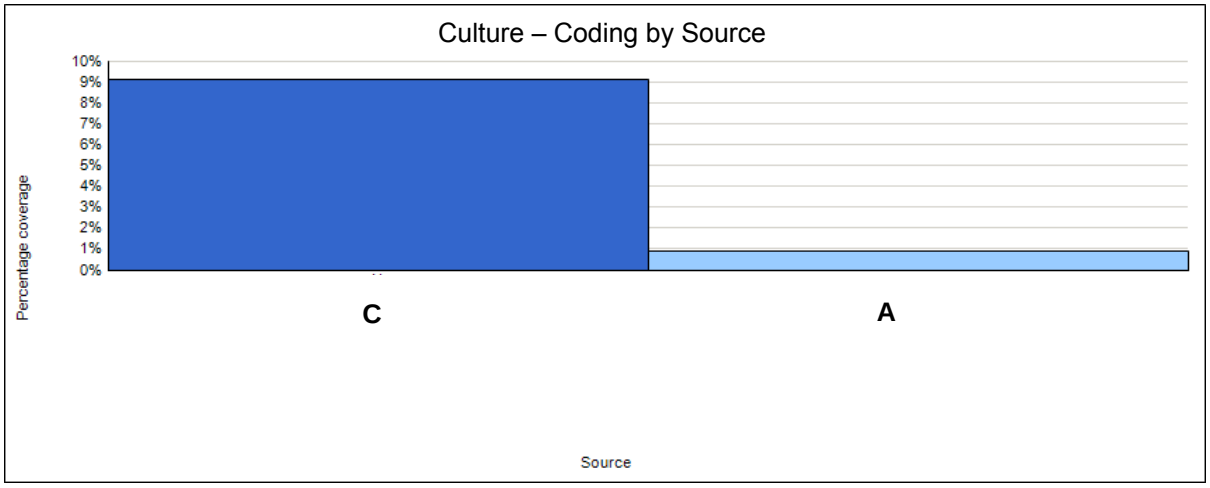
Ten human motivational distinct values developed by Schwartz (1992) were operationalised through the implementation of the Short Schwartz Value Survey (SVSS) proposed by Lindeman and Verkasalo (2005). The SSVS empirically tested by a specific study confirming its reliability and validity provided the advantage of reducing the time required for the questionnaires to be completed. The 10 original Schwartz values of power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity and security were also measured by 10 items. Furthermore, each value of SSVS was specified by a number of value items, which are presented in Table 4.10.

TABLE 4.10 INITIAL MEASURE FOR INDIVIDUAL CULTURAL ORIENTATION (SHORT SCHWARTZ VALUE SURVEY ITEMS)

CULTURE VALUE	VALUE ITEMS
POWER	social power, authority, wealth
ACHIEVEMENT	success, capability, ambition, influence on people and events
HEDONISM	gratification of desires, enjoyment in life, self-indulgence
STIMULATION	daring, a varied and challenging life, an exciting life
SELF-DIRECTION	creativity, freedom, curiosity, independence, choosing one's own goals
UNIVERSALISM	broad-mindedness, beauty of nature and arts, justice, a world at peace, equality, wisdom, unity with nature, environmental protection
BENEVOLENCE	helpfulness, honesty, forgiveness, loyalty, responsibility
TRADITION	respect for tradition, humbleness, accepting one's portion in life, devotion, modesty
CONFORMITY	obedience, honouring parents and elders, self-discipline, politeness
SECURITY	national security, family security, social order, cleanliness, reciprocation of favours

Two experts in the pre-test expressed their opinons on individual cultural orientation items as produced by NVIVO and shown in Figure 4.11. The opinion with the largest percentage score was obtained from Expert-C, who emphasised the importance of explaining the terms of Schwartz's value items to the respondents to assure they provided answers that accurately reflected their cultural orientation. Moreover, according to Expert-C's opinion, the use of a single word or short sentences to represent value items for each culture dimension could potentially confuse the respondents. In response to this comment, and in order to avoid misinterpretation, a brief explanation of how to understand the statements made in the Schwartz item sections was given to the respondents. The respondents were also reminded to read the example provided in that section before answering the questions. All items were retained and kept unchanged to follow the original format developed in SSVS (2005).

FIGURE 4.11 PERCENTAGE COVERAGE OF EXPERT OPINION ON INDIVIDUAL CULTURAL ORIENTATION - NVIVO RESULT



In summary, the pre-test results confirmed agreement among the experts that the content validity of the item variables was relevant and appropriate to the industry under study.

4.4.4 Questionnaire Translation

To ensure the questionnaire would gather the required information from Indonesian consumers, translation of the English version of the scales was conducted. Triandis's (1983) method was adopted to translate the scales into Bahasa Indonesia. The initial English version was first translated into Bahasa Indonesia, then into English, and then back into Bahasa before being pilot-tested on a representative sample of telecommunications consumers in Indonesia.

4.5 PILOT STUDY

The pilot study was designed to test the applicability of the questionnaire items in the field at the individual level in order to establish their reliability and construct validity. This stage is aimed at determining construct validity and inter-item consistency reliability. The Cronbach's alpha method was implemented for this purpose. In conducting this testing, specific attention was paid to the comprehensiveness, user friendliness, and understandability of the items in the questionnaire. Comprehensiveness is a measure of the completeness of the items, and understandability is reflected by the respondents' interpretation of the items. Both should be in line with our aims. The time needed to thoroughly answer all of the questions was also observed.

The pilot study was comprised of 100 respondents who were intercepted at shopping malls and mobile phone shops in Jakarta and Bandung. Data were collected via a face-to-face survey conducted at 13 locations in Greater Jakarta, Indonesia. Cronbach's alpha was used as a measure of reliability and construct validity. Analysis of the pilot study data showed coefficient alpha values of PU = 0.862, PEOU = 0.756, PE = 0.909, UI = 0.882, OPT = 8.74, INN = 0.753, DIS = 0.838, INS = 0.792, QUA = 0.810, EMO = 0.888, PRC = 0.716, SOC = 0.906, and Schwartz = 0.805, thus confirming an acceptable internal consistency reliability and evidence of content and construct validity. Exceeding a minimum α value of 0.70 for variables indicates that the variables are internally consistent and are good measures of the concept under study (Nunnally (1978); Hair et al. (2006)).

4.6 MAIN STUDY

4.6.1 Objectives

This stage of the study involved the main research activity designed to obtain the data needed to empirically validate the proposed model, and to answer the research questions and achieve the research objectives. The study involved the distribution of self-administered questionnaires to anonymous respondents who comprised the sample population. The sample asked to participate as research respondents was derived from this population through the use of a sampling frame, which is explained in the following section.

4.6.2 Populations and sample structure

Indonesian mobile and fixed phone consumers over 18 years of age were determined to be the target population for this research because wireless broadband services are utilised by consumers who use mobile and fixed telephones. The criteria for inclusion in the study were as follows:

- The respondents had to be Indonesian citizens.
- The respondents had to come from the AB SES (Social Economic Status) category of those with a minimum monthly household spending of 200 dollars and who were located in Greater Jakarta or Bandung.
- The respondents had to be aged between 18 and 55 years (based on Indonesian law, a consumer has to be aged 18 years or over to have accessibility to mobile services information and their availability).

- The respondents were required to not be users of mobile broadband technology and services but had been exposed to information about this technology.
- The respondents had to own cellular devices that support mobile service applications.
- The respondents needed to consent to participate in the survey.

4.6.3 Location and Procedure of Survey

To obtain an adequate response rate through the questionnaires, all possible data collection methods were first identified. They were reviewed to identify the most applicable and effective methods for the Indonesian context. A low response rate is a common problem faced by researchers when conducting data collection in Indonesia. Indonesian consumers are not easily persuaded to participate in surveys. Most believe that surveys are designed by companies for commercial purposes as a marketing tool aimed at convincing them to buy the company's products. Indonesian consumers are also reluctant to return mailed questionnaires because they do not want their personal information to be disclosed and commercially used by other parties at a later time. Therefore, of all the options, including a postal survey, online surveys and email, personal interviews were deemed to be the most effective method, particularly in terms of avoiding a low response rate, the complexity of the topic and participant concerns around anonymity. With personal interviews, it can be explained to participants that the surveys are purely for academic purposes, and responses can be directly obtained. Thus, questionnaires were distributed to anonymous respondents in the Greater Jakarta and Bandung cities. Jakarta was chosen as the most suitable city in which to conduct the survey because it is an area where the greatest number of potential consumers of wireless broadband services may be randomly found in Indonesia. Bandung was also selected because of its proximity to Jakarta, thus providing a good comparison to Jakarta. In addition, a considerable number of mobile phone users live in both cities. The survey was conducted in major internet wireless equipped malls, electronic and mobile phone shops located in Bandung, and eight suburbs of Jakarta including Tangerang, Central Jakarta, East Jakarta, South Jakarta, West Jakarta, Bogor, Bekasi and North Jakarta.

An area sampling with proportional sample technique was employed to determine the sampling frame. This is a non-probabilistic sampling technique in which samples are taken from pre-determined areas and the sample size is generated proportionally based on the demand profile in those areas (see Table 4.12). For this purpose, data on potential mobile broadband service demand produced by the Indonesian national Telkom-Indonesia (2009) were used. This technique was further implemented by adopting the shopping mall

intercept method in which a systematic random sampling technique was applied to determine potential participants for our study. Potential respondents who had just visited an electronics shop and had the available mobile broadband service explained to them or been offered a free trial of 'hot spot' facility at the mall, but had not decided to subscribe to a service provider, were approached and asked to participate in the study. If they consented they then completed the questionnaire.

TABLE 4.11 AREA SAMPLING AND PROPORTIONAL SAMPLE METHOD

No	Region	Sub-Region	Demand for Broadband Services	No of Respon-dents
1	Jakarta	Tangerang	177,476	57
2	Jakarta	Central Jakarta	93,492	28
3	Jakarta	East Jakarta	301,376	107
4	Jakarta	South Jakarta	225,390	97
5	Jakarta	West Jakarta	182,948	86
6	Jakarta	Bogor	131,217	45
7	Jakarta	Bekasi	403,199	99
8	Jakarta	North Jakarta	136,085	43
9	Bandung	West Bandung	N/A	22
10	Bandung	East Bandung	N/A	26
11	Bandung	North Bandung	N/A	22
12	Bandung	Central Bandung	N/A	30
13	Bandung	South Bandung	N/A	42
Total Demand :			1,959,803	
Total Respondents :				704

Source: Telkom-Indonesia (2009)

The survey was conducted between July and October 2009, which resulted in 704 respondents yielding a response rate of 55%. The breakdown of the locations and respondents is shown in Table 4.12 below. The non-response bias was not deemed to be an issue that could influence the results in this study because the respondents were randomly selected for the interview. The tests and comparisons with non-respondents were not conducted because the characteristics and information about non-respondents were not collected, as they did not belong to the scope of this thesis. By addressing the fact that data used in this thesis was obtained through the same questionnaires in that period of time, one could ask a question about how this thesis tackled the issue of common method variance (CMV). To provide information on such a question we visited the CMV definition proposed by Podsakoff, MacKenzie, Lee and Podsakoff (2003) as referred to by Chang, Witteloostuijn and Eden (2010). Podsakoff et al. (2003) defined

CMV as “variance that is attributable to the measurement method rather than to the construct the measures represent which could create a false internal consistency, that is, an apparent correlation among variables generated by their common source”. The presence of a substantial amount of common method variance can be detected by implementing Harman’s single factor test for common method variance (Malhotra et al. 2004). Based on this test, exploratory factor analysis was applied to research variables and the results were used to identify the presence of common method variance. When a substantial amount of CMV is in evidence, either a single factor will emerge from the factor analysis or one general factor will account for the majority of the covariance among the variables (Podsakoff & Organ, 1986). Practically, we can detect whether CMV is substantially responsible for the relationships among variables by confirming that the one-factor CFA model fits the data satisfactorily. The results of factor analysis conducted in this study revealed multiple distinct factors, rather than a single factor, accounted for the majority of the variance. As a result, the possibility of CMV was not indicated, suggesting that CMV was not an issue potentially influencing the outcome of data analysis.

TABLE 4.12 LOCATIONS AND NUMBER OF RESPONDENTS

No	Location	Number of respondents
1	Tangerang	57
2	Central Jakarta	28
3	East Jakarta	107
4	South Jakarta	97
5	West Jakarta	86
6	Bogor	45
7	Bekasi	99
8	North Jakarta	43
9	West Bandung	22
10	East Bandung	26
11	North Bandung	22
12	Central Bandung	30
13	South Bandung	42
	T o t a l	704

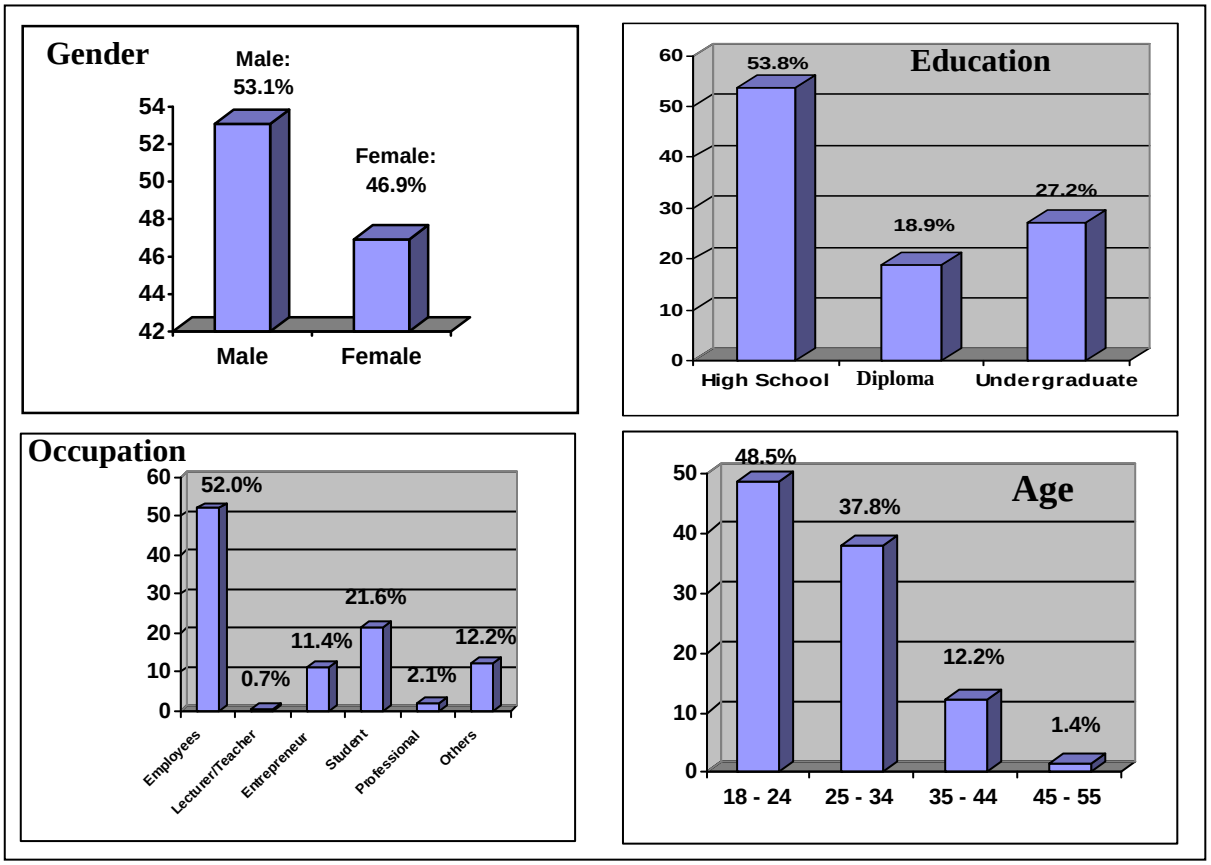
In total, 13 locations were surveyed yielding the 704 usable responses with the highest number of respondents drawn from East Jakarta (107), followed by Bekasi (99) and South Jakarta (97).

4.6.4 Demographic profile of respondents

The demographic profiles of the 704 respondents who participated in the survey are presented in Figure 4.12.

It can be seen from Figure 4.12 that 53.1% of the respondents were male and 46% female. Those aged 18–24 years formed the largest age group of respondents (48.5%), followed by the age group 25–34 years (37.8%), 35–44 years (12.2%) and 45–55 years (1.4%). The majority of respondents (53.8%) had completed secondary education, many more than those who had a diploma (18.9%) or an undergraduate university education (27.2%). The types of occupation held by the respondents varied widely. Most (52%) worked for a company or an organisation at the time the survey was conducted. The second-largest occupation group of the respondents were students (21.6%), followed by entrepreneurs (11.4%), professionals (2.1%) and lecturers or teachers (0.7%). All respondents who had other occupations were grouped into the ‘other’ category, which accounted for 12.2% of the total sample population.

FIGURE 4.12 DEMOGRAPHIC PROFILE OF SURVEY RESPONDENTS



4.7 DATA ANALYSIS STAGE

The data analysis procedures of the Structural Equation Modelling method (Hair et al. 2006; Tabachnick & Fidell 2007) were implemented in this stage. The existence of variables with different roles and multiple dependence relationships in the conceptual model justified the decision to use SEM in this research. SEM consists of a family of statistical models that seek to explain the relationships among multiple variables. It examines the structure of interrelationships expressed by a series of equations, similar to a series of multiple regression equations. These equations depict all of the relationships among constructs (both the dependent and independent variables) involved in the analysis. Constructs are unobservable or latent factors represented by multiple variables (much like variables represent a factor in factor analysis) (Hair et al. 2006).

Specifically, SEM was chosen because of its distinguishing strengths and advantages listed below:

- Estimation of multiple and interrelated dependence relationships.

- Representation of unobserved concepts in these relationships and ability to correct for measurement errors in the estimation process.
- Definition and redefinition of a model to explain the entire set of relationships.
- Performance of a moderating effect test of variables for all relevant relationship paths of the model.

These characteristics fit the context of this thesis since correlation is the type of relationship under investigation, latent constructs with multiple manifest variables are involved, and the objective and focus is to develop the best model of the interrelationships among all variables, not only the partial relationships between variables.

The following are the procedures required to conduct SEM:

- Defining the constructs (i.e. dependent or outcome variables, latent endogen variables, and latent exogen variables) based on the conceptual model.
- Defining the variables in each construct.
- Assessing measurement model validity (measurement model validity depends on goodness-of-fit for the measurement model and specific evidence of construct validity. The goodness-of-fit statistics are summarised in Table 4.13).

TABLE 4.13 GOODNESS-OF-FIT (GOF) STATISTICS

No	Statistic	Fit criteria	Definition
1	χ^2	P > 0.05	*The fundamental measure used in SEM to quantify the differences between the observed and estimated covariance matrices.*
2	GFI	≤ 0.08	*An early attempt to produce a fit statistic that was less sensitive to sample size that indicates how well the specified model reproduces the covariance matrix among the indicator items (i.e. the similarity between the observed and estimated covariance matrices).*
3	RMSR	< 0.05	*The square root of the mean of these squared residuals: an average of the residuals between individual observed and estimated covariance and variance terms.*
4	SRMR	< 0.05	*A standardised value Root Mean Square Residual that is more useful for comparing fit across models.*
5	RMSEA	≤ 0.08	*A measure that attempts to correct for the tendency of the X^2 test statistic to reject models with large samples or a large number of observed variables.*
6	NFI	> 0.9	*A ratio of the differences in the X^2 value for the fitted model and a null model divided by the X^2 value for the null model.*
7	CFI	> 0.9	*An incremental fit index that is an improved version of the normed fit index (NFI)*

Source: Adopted from Hair and Black (2006)

- Specifying the structural model

It was determined to assign indicator variables to the constructs that had to be represented. This step is critical when developing an SEM model, because it specifies the structural model by assigning relationships from one construct to another based on the proposed conceptual model. Structural model specification is focused on using the relationship type from the research model to represent the structural hypotheses of the research model. This means that each hypothesis represents a specific relationship that must be specified.

- Assessing structural model validity

This final stage involves efforts to test the validity of the structural model and its corresponding hypothesised theoretical relationships. Two key differences arise when testing the fit of a structural model relative to a measurement model.

First, although an acceptable overall model fit must be established, alternative or competing models can be compared if a competing models approach is taken.

Second, particular emphasis is placed on the estimated parameters for the structural relationships because this provides direct empirical evidence relating to the hypothesised relationships depicted in the structural model.

4.8 ETHICS AND CONFIDENTIALITY

The confidentiality of the information provided by respondents based on the questionnaire items was assured through ethics approval procedures. Approval was granted by the RMIT Human Research Ethics Committee (HREC) prior to commencement of the research stage involving respondents.

CHAPTER 5: DATA ANALYSIS

5.1 INTRODUCTION

The aim of this chapter is to present the results of the data analysis based on the following four main steps: data cleaning and preparation; exploration of dimensionality; confirmation of dimensionality; and final confirmation of the structural model. At the end of the chapter, the results of moderator variable influence test are also reported. This test was conducted in conjunction with the hypotheses previously prepared to answer the research objectives.

5.2 DATA CLEANING AND PREPARATION

Prior to analysis the data were screened for outliers, missing values, normality, linearity and multicollinearity. The objective was to avoid failure of the model estimation and crashing of fitting programs (Kline 2005).

5.2.1 Missing values

The problem of missing values commonly occurs in research studies involving questionnaire-based surveys where there are many items to be answered by the respondents. The appropriate treatment needed to resolve this problem depends on the patterns of the missing values (Tabachnick & Fidell 2001). Removing the missing values that are randomly distributed is considered acceptable and can improve the whole data structure. On the other hand, fixing the missing values with a systematic pattern could generate biased results. The survey activity conducted in 13 locations in Jakarta and Bandung resulted in 704 completed questionnaires providing the needed information with no missing data for the variables measured by the Likert scale. The questions requiring the respondents to provide information about their individual personal income were not completely answered by the respondents.

5.2.2 Outliers

Identifying the presence of outliers in the data was essential since they could cause error(s) in fitting the model estimation, parameter estimation, and standard error estimation (Gallagher, Ting & Palmer 2008). To observe the outliers, a Mahalanobis distance method was applied. As a result, 14 responses were removed from the data file due to the presence of outliers, resulting in 671 responses used in the data analysis. A further calculation of Mahalanobis distance applied to the 671 respondents data confirmed that the data were free from further outliers. A high incidence of outliers was found among some PEOU items.

5.2.3 Normality

The examination of data normality was needed to comply with the SEM procedure. Infraction of normality affects the interpretation of analysis results (Hair et al. 2006). Normality can be examined at univariate and multivariate levels. At the first level, normality is examined based on distribution of individual variables; at the latter, it is tested based on a combination of two or more variables. As suggested by Hair et al. (2006), a normal data distribution can be examined based on skewness and kurtosis values. These values indicate how the data diverge or deviate from the centroid. The condition of data normality is assumed when the values of skewness and kurtosis are less than one standard deviation within a 95% confidence level for p ranged between ± 1.96. In other words, skewness values that fall outside the range of -1 to +1 indicate largely essentially skewed distribution (Hair et al. 2006). Schumaker and Lomax (1996) added that a normal distribution had also to be indicated by values of kurtosis that fall within the range of ±1.0 and ±2.0. The examination of normality for each variable is presented in Appendix C, showing normality indicators including the mean, standard deviation, skewness and kurtosis. The results indicated that all skewness values fall within an acceptable range and almost all items performed kurtosis values close to zero, with one exception occurring to UI1. The kurtosis value of this item was slightly hinger than 2, which is outside of the acceptable range of ± 2.0. However, this value was not deemed to threaten the integrity of the findings; particularly so in this research, as the data was distributed as a normal curve and the items were to be combined to form composite variables.

5.2.4 Linearity

Linearity is an essential requirement for performing factor analysis procedures. It was examined for each group of independent variables separately. The results confirmed linear relationships between the dependent and independent variables in each level of the model.

5.2.5 Multicollinearity

Hair et al. (2007) define multicollinearity as the extent to which any variable's influence can be explained by other variables in the analysis. The ability to specify and further define any variable's effect will become more difficult as multicollinearity increases. Multicollinearity was identified through any squared multiple correlations that are close or equal to 1. The assessment of multicollinearity was more strictly applied at the construct

level. At the item level under the same construct, it was allowed to occur for the purposes of exploration of dimensionality, explained in the following section.

5.3 EXPLORATION OF DIMENSIONALITY

Exploration of dimensionality was conducted using exploratory factor analysis (EFA). Traditionally, factor analysis is a technique used to observe hidden patterns or relationships among variables through the extraction or reduction of a number of observed variables to fewer factors (Costello & Osborne 2005; Hair et al. 2006; Tabachnick & Fidell 2007; Treiblmaier & Filzmoser 2010). In this thesis, factor analysis was implemented through two sequential stages of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). This approach was adopted to develop a measurement model needed to appropriately examine multidimensional variables operationalised in the research model. The measurement of these variables needs to address the issue of computing a composite score of single constructs or factor underlying a set of measures, as suggested by Gerbing and Anderson (1988). These researchers posited that to be able to interpretate the composite scores, the computation of these scores had to be acceptably unidimensional. CFA had become a common method adopted by researchers to meet this requirement, particularly for the evaluation of unidimensionality. Gerbing and Anderson (1988) added further that CFA was believed to be a better procedure for testing unidimensionality. This could be the reason why many researchers tended to apply CFA in testing multistructured items of a single studied construct under the unidimensionality paradigm. The problem is, as they also pointed out in their summary section of their article, that most researchers do not just intend to develop unidimensionality and reliable measurement scales, but also to test and generate theory by exploring the possibility of items to load across dimensions forming a particular factor. The fact that in the CFA procedure each item is allowed to load on one, and only one, factor (Marsh, Muthen, Asparouhov, Ludtke, Robitzsch, Morin & Trautwein, 2009) has challenged the sufficiency and adequacy of a stand-alone CFA implementation. Loading on only one factor in a factor analysis procedure limits the opportunity for researchers to not only establish a better structure of a multi-item measurement model, but also to explore and understand the real pattern of relations among indicators in a researched construct.

In response the above issue, recent studies (March et al, 2009) have acknowledged the need for also applying a procedure that allows each item in a multi-item construct to cross-load on other factors. The reason for doing this is to facilitate higher levels of abstraction of measurement items under the same multidimensional factor or construct. In this thesis the measurement of researched phenomenon involved a high level of abstraction in which a number of constructs were reflected by multidimensional and multi-

item factors, including technology readiness and CPV. The structure of these multidimensional factors needs to be firmly established by examining the possibility of the items under a single factor to load on all reflective dimensions. . One can find this type of procedure demonstrated in exploratory factor analysis (EFA). EFA requires that the extraction should be executed while seeking to ensure that the loss of important information in the data structure is kept at a minimum. In this thesis, EFA was specifically implemented to understand latent constructs based on the formed factors. These factors were expected to reveal the dimensionality of the less structured data obtained in this research for further interpretation and analysis at the next analysis stage. As suggested by Gerbing and Anderson (1988), EFA can be useful in its implementation at an early stage of the scale development process to maximise the exploration of dimensionality. However, since it does not explicitly indicate the unidimensionality, the use of EFA needs a further subsequent refinement. For this purpose, CFA is recommended to be implemented in order to further robustly establishe the measurement model and test its construct validity. It has been agreed that the combination of EFA and CFA is effective in developing and testing a better scale (Gerbing and Anderson, 1988 and Marsh et al, 2009). This method was adopted in this thesis. In other words, one can observe that the objective of implementing the EFA procedure was to develop a hypothesised model that was then tested with new data using CFA. The implementation of EFA and CFA based on this approach followed what had been theoretically proposed by Conway and Huffcutt (2003) as the scheme for EFA use (Conway, J. M. 2000).

In implementing EFA, it is essential that the number of factors extracted is not predetermined (Bollen 1989), but rather investigated and determined based on specific methods chosen by the researcher. The specific methods used in this thesis for that purpose are explained in the following sections.

5.3.1 Exploratory Factor Analysis (EFA) Procedure

The EFA procedure applied in this thesis involved two major steps. The first step included data preparation and examination, determination of the number of factors to be extracted, factor extraction and factor rotation (Russell 2002; Tinsley & Tinsley 1987; Treiblmaier & Filzmoser 2010). The second step was the interpretation of factors formed in the first step (Hair et al. 2006).

The number of factors to be extracted was determined by two kinds of test. The first test was based on the eigenvalue or latent root indicator. This method has been cited as the most effective method for determining the best number of factors to retain (Zoski & Jurs 1990, 1991, 1996). It recommends that factors with an eigenvalue of 1 or greater be extracted and further analysed. Factors with eigenvalues of less than 1 are considered

unimportant and can be disregarded. However, deciding on the number of factors to extract solely based on the eigenvalue indicator is considered inadequate, since it could cause either overfactoring or underfactoring (Costello & Osborne 2005; Zoski & Jurs 1996). To best confirm how many extracted factors to obtain, a second criterion is needed. This second criterion is termed the Scree test technique (Cattell 1966; Zoski & Jurs 1996), which has been seen as the best choice for researchers for implementing EFA procedures (Treiblmaier & Filzmoser 2010; Zoski & Jurs 1996). Based on this technique, eigenvalues were plotted on a graph to identify the optimal number of factors to retain. The point on the graph where the vertical curve changed direction into a horizontal shape was used to identify the factors to be retained for further analysis. The number of points that appear on the vertical curve before the direction changes indicates how many factors to extract (Zoski & Jurs 1996). As stated by Hair et al. (2006), these factors contribute the most to the explanation of the variance in the data set.

Maximum likelihood with direct oblimin rotation is a default extraction method used in this thesis. An exception was applied to the technology readiness data, which were extracted by principal component analysis (PCA) and the Varimax rotation method. Maximum likelihood was adopted as the correlations between the components were expected. Items that double-loaded or contributed less than 0.4 to the factor were removed. The remaining items were then summed and averaged to form composite variables that were entered into the path analysis using AMOS17. The use of maximum likelihood was based on normally distributed data. Costello and Osborne (2005) have stated that it is the best choice for relatively normally distributed data. They argue that this method 'allowed for the computation of a wide range of indexes of the goodness of fit of the model and permitted statistical significance testing of factor loadings and correlation among factors and the computation of confidence intervals'. The use of the direct oblimin method also suited the purposes of this thesis. As stated by Conway and Hufcutt (2003), if a researcher's purpose is to understand the latent structure of a set of variables then the use of a common factor model such as maximum likelihood factoring represents a sensible decision. In addition, direct oblimin was adopted as the rotation method because we assumed that the factors were correlated.

PCA applied in performing the TR item extraction. As stated by Parasuraman (2000), TR can be measured based on two contradictory factors. The first factor is referred to as the 'contributors', consisting of the optimism and innovativeness dimensions, while the second factor is known as the 'inhibitors', and is comprised of the discomfort and insecurity dimensions. Contributors strengthen users' technology readiness, while inhibitors suppress the degree of readiness. To measure the overall readiness of technology both factors had to be aggregated into a single construct. To implement this concept in

exploratory factor analysis, the two factors were not expected to correlate. This is in line with the main characteristic of the PCA method, that is to create linear combinations of variables that retain as much of the original measures' variance as possible.

5.3.2 Exploratory Factor Analysis (EFA) Results

5.3.2.1 Perceived Usefulness (PU)

The results of the eigenvalue calculation for perceived usefulness items showed that there was one factor yielding a value greater than 1.

TABLE 5.1 EIGENVALUES FOR PERCEIVED USEFULNESS (PU)

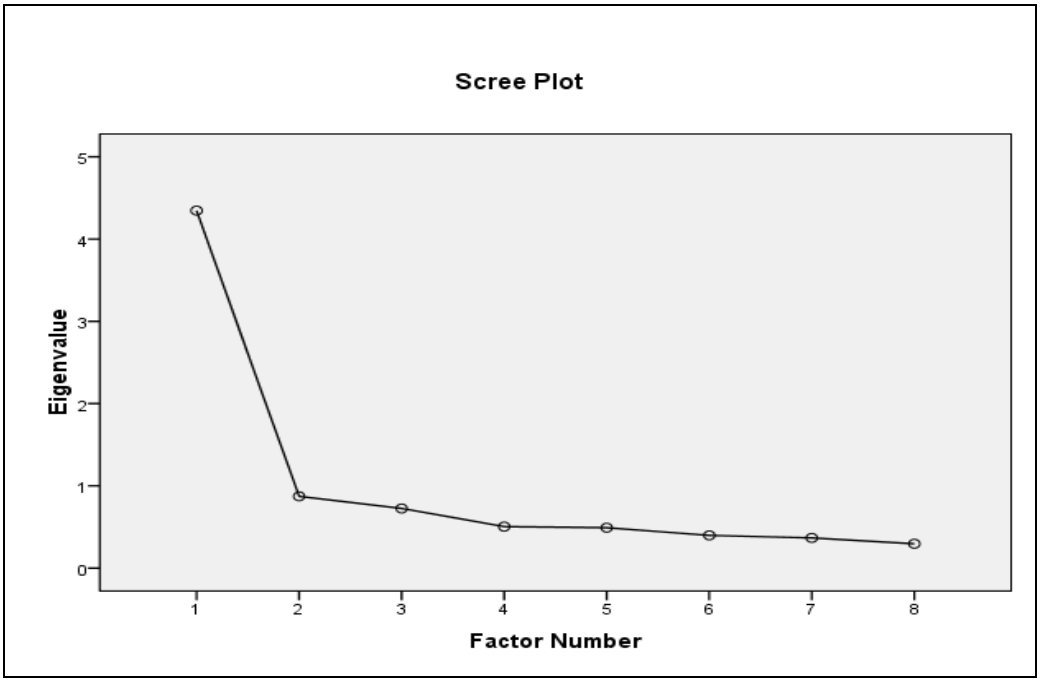
Total variance explained

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	4.346	54.324	54.324
2	.873	10.911	65.234
3	.725	9.063	74.298
4	.504	6.305	80.603
5	.491	6.138	86.740
6	.398	4.973	91.713
7	.367	4.587	96.301
8	.296	3.699	100.000

Extraction Method：Maximum Likelihood.

As presented in Table 5.1, the eigenvalue analysis suggests one factor to be extracted, explaining 54.32% of the variance.

FIGURE 5.1 SCREE PLOT - PERCEIVED USEFULNESS (PU)



The formation of the PU construct based on one factor was confirmed by the scree test. As shown in Figure 5.1, only factor 1 appears in the vertical curve area. This factor has

the highest eigenvalue compared to the other factors plotted in the straight-line part of the curve. This indicated that one extracted factor in the EFA conducted contributed the most to the explanation of the variance in the data set. Extracting factors beyond these two would produce too large a proportion of unique variance, and thus would not be acceptable.

As revealed in Table 5.13, all CPV items extracted into four factors. Items that contributed less than .3 to the factor were removed. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

The results of EFA for perceived usefulness (PU) are presented in Table 5.2, showing that one factor was extracted. All eight items grouped in forming a solid PU factor displayed loadings above 0.4. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

TABLE 5.2 EFA RESULTS FOR PERCEIVED USEFULNESS (PU)

Item retained	Factor loading	Factor formed	Cronbach's alpha		KMO and Bartlett's test	
			Initial	After dropping	KMO	Sig. Bartlett's
PU1	0.640	PU	0.876	0.876	0.886	0.000
PU2	0.752					
PU3	0.749					
PU4	0.622					
PU5	0.756					
PU6	0.723					
PU7	0.575					
PU8	0.703					

5.3.2.2 Perceived Ease Of Use (PEOU)

Perceived ease of use (PEOU) consists of seven indicator items (PEOU1–PEOU7). In the data cleaning stage, severe normality, missing data and outlier problems were found in the PEOU5, PEOU6 and PEOU7 data. These items were therefore excluded from the EFA procedure, resulting in the eigenvalues reported in Table 5.3.

TABLE 5.3 EIGENVALUES OF PERCEIVED EASE OF USE (PEOU)

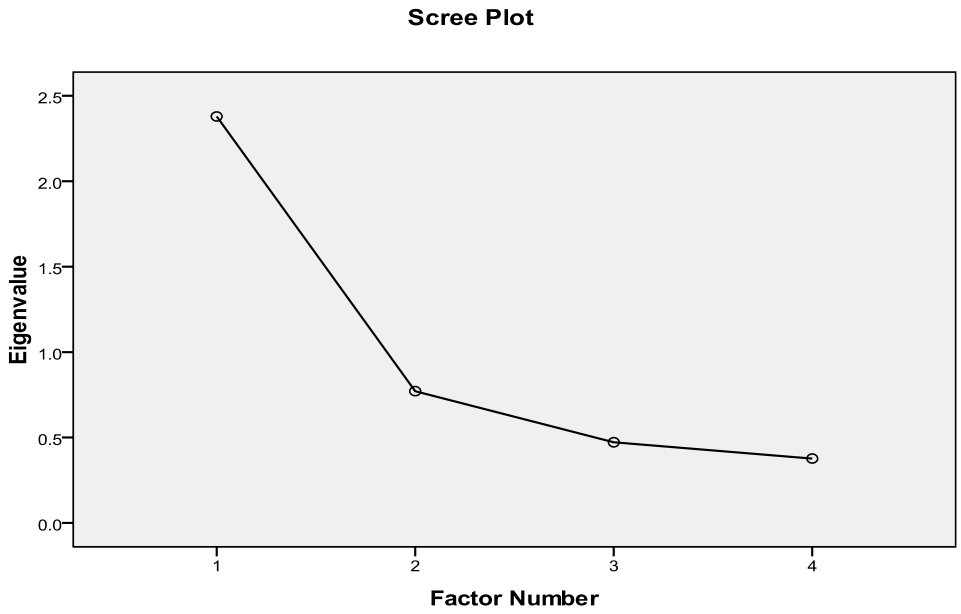
Total variance explained

Factor	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.379	59.479	59.479	1.915	47.869	47.869
2	.772	19.288	78.767			
3	.472	11.806	90.573			
4	.377	9.427	100.000			

Extraction method: Maximum likelihood

As shown in Table 5.3, the eigenvalue analysis shows one factor to have a value of over 1, suggesting that the extraction for PEOU items should be performed with one factor explaining 59.479% of the variance. This result was assessed and reconfirmed by the scree test (see Figure 5.2). As stated by Zoski and Jurs (1990), a scree test provides a more sensitive examination of the nature of data, enabling researchers to visually differentiate important factors from non-important or trivial factors. The 'scree vs cliff' guidelines for implementing a scree test summarised by Zoski and Jurs (1990) were adopted to examine the results of the eigenvalue analysis for the PEOU items. To identify the number of PEOU factors to be extracted, the 'scree' of the trivial factors was first identified by localising the eigenvalue curve with a non-vertical slope. More precisely, the slope of the curve displaying an angle of 40° or less from the horizontal was identified and used to determine the scree.

FIGURE 5.2 SCREE PLOT - PERCEIVED EASE OF USE (PEOU)



As shown in Figure 5.2, the scree starts to form at the point representing factor 2 and continues to move to the right of the curve as far as the factor 4 point. A sharp break in the vertical level of the curve occurs between factor 1 and factor 2. Therefore, it is clear that factor 2 lies at the left most point of the scree, and hence can be excluded from the non-trivial or important category. As a result, it was concluded that PEOU items were to be extracted with one factor. Extracting the PEOU items with one factor would contribute the most to the explanation of the variance in the data set.

The results of the EFA for perceived ease of use are presented in Table 5.4, showing the extraction of the items. Four PEOU items extracted into one factor displayed loadings of above 0.4. This result was well supported by the KMOMSA's value of 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

TABLE 5.4 EFA RESULT FOR PERCEIVED EASE OF USE (PEOU)

Item retained	Factor loading	Factor formed	Cronbach's alpha		KMO & Bartlett's test	
			Initial	After dropping	KMO	Sig. Bartlett's
PEOU1	0.78	PEOU	0.736	0.754	0.8	0.000
PEOU2	0.71					
PEOU3	0.81					
PEOU4	0.53					

5.3.2.3 Perceived Enjoyment (PE)

The results of the eigenvalue calculations for perceived enjoyment (PE) items showed one factor having a value of greater than 1. As presented in Table 5.5, the results indicated that the six PE items were to be extracted in one factor, explaining 67.18% of the variance.

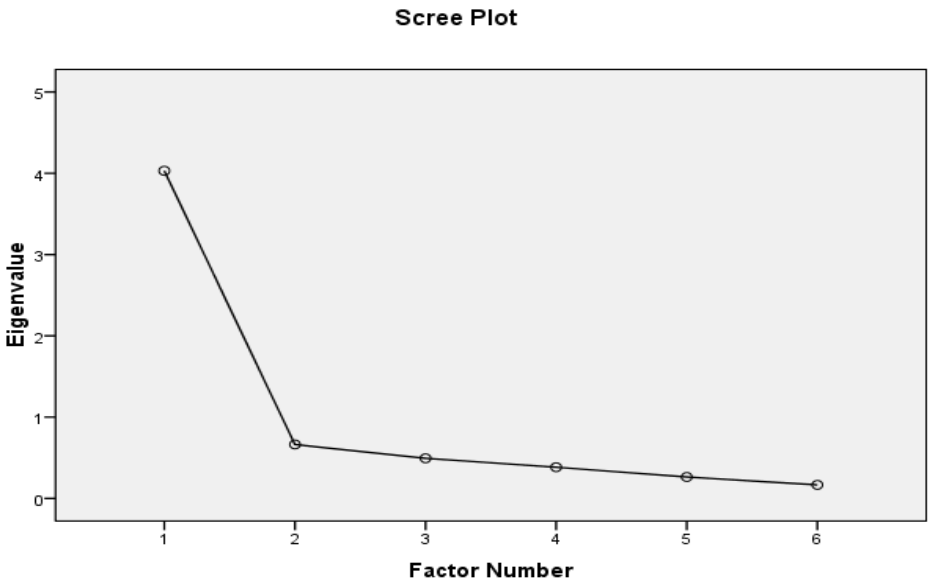
TABLE 5.5 EIGENVALUES OF PERCEIVED ENJOYMENT (PE)

Factor	Initial eigenvalues		
	Total	% of Variance	Cumulative %
1	4.031	67.179	67.179
2	.663	11.053	78.232
3	.493	8.222	86.454
4	.384	6.392	92.846
5	.263	4.381	97.228
6	.166	2.772	100.000

Extraction method: Maximum likelihood

The formation of the PE construct based on one factor was confirmed by the scree test displayed in Figure 5.3.

FIGURE 5.3 SCREE PLOT - PERCEIVED ENJOYMENT (PE)



As shown in Figure 5.3, only factor 1 plotted in the vertical curve area. This factor has the highest eigenvalue compared to the other factors sitting on the straight-line part of the curve. This indicated that one extracted factor in the EFA conducted contributed the most to the explanation of the variance in the data set.

The results of the EFA for PE are presented in Table 5.6, showing that one factor was extracted.

TABLE 5.6 EFA RESULT - PERCEIVED ENJOYMENT (PE)

Item retained	Factor loading	Factor formed	Cronbach's alpha		KMO & Bartlett's test	
			Initial	After dropping	KMO	Sig. Bartlett's
PE1	0.717	PE	0.894	0.894	0.895	0.000
PE2	0.610					
PE3	0.885					
PE4	0.917					
PE5	0.852					
PE6	0.671					

As reported in Table 5.6, all seven items grouped to form a solid PE factor displayed loadings of above 0.4. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

5.3.2.4 Usage Intention (UI)

Usage intention was measured by four indicator items, as shown in Table 5.7. It is evident from this table that the eigenvalues for UI items showed one factor to have a value over 1.

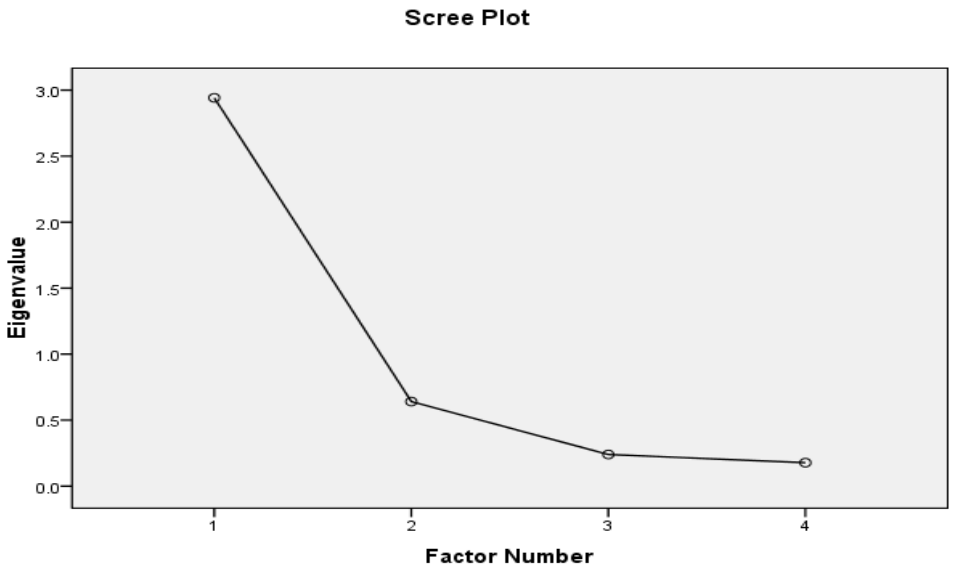
TABLE 5.7 EIGENVALUES OF USAGE INTENTION (UI)

Factor	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of	Cumulative %	Total	% of	Cumulative %
1	2.942	73.554	73.554	2.663	66.577	66.577
2	.641	16.015	89.569			
3	.240	5.992	95.561			
4	.178	4.439	100.000			

Extraction method: Maximum likelihood.

The eigenvalue analysis results shown in Table 5.7 above indicated that the items were to be extracted and grouped into one factor, explaining 73.554% of the variance. This result was reconfirmed by a scree test, which is displayed in Figure 5.4.

FIGURE 5.4 SCREE PLOT - USAGE INTENTION



It can be seen from Figure 5.4 above that the scree test confirmed the formation of the UI construct obtained through the extraction of its items with one factor. As revealed by the figure, only factor 1 appeared in the vertical curve area. This factor has the highest eigenvalue compared to the other factors plotted on the straight-line part of the curve. This indicated that one extracted UI factor contributed the most to the explanation of the variance in the data set.

The results of the EFA for UI are presented in Table 5.8, showing that one factor was extracted.

TABLE 5.8 EFA RESULTS FOR USAGE INTENTION (UI)

Item retained	Factor loading	Factor formed	Cronbach's alpha		KMO & Bartlett's test	
			Initial	After dropping	KMO	Sig. Bartlett's
UI1	0.592	UI	0.878	0.878	0.774	0.000
UI2	0.858					
UI3	0.923					
UI4	0.851					

Based on the EFA results shown in Table 5.8 above, we can see that all four items grouped to form a single UI factor displayed loadings of above 0.4. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

5.3.2.5 Technology Readiness (TR)

Technology readiness (TR) was manifested by its four dimensions. Optimism (OPT) and innovativeness (INN) were the first two dimensions, each to be measured by 10 items. The two other dimensions of discomfort (DIS) and insecurity (INS) were indicated by 10 and 9 items, respectively. All TR dimension items made up 35 indicators in total. EFA was applied to explore the dimensionality of TR based on both the industry and the country context. Therefore, the factor extraction was applied to all 35 items in one EFA procedure in order to discover the grouped items representing the contextualised TR factors for this research. Based on the eigenvalue analysis results shown in Table 5.9, four factors

having an eigenvalue over 1 were obtained. These results indicated that the TR items were to be extracted and grouped into 4 factors explaining 51.659% of the variance.

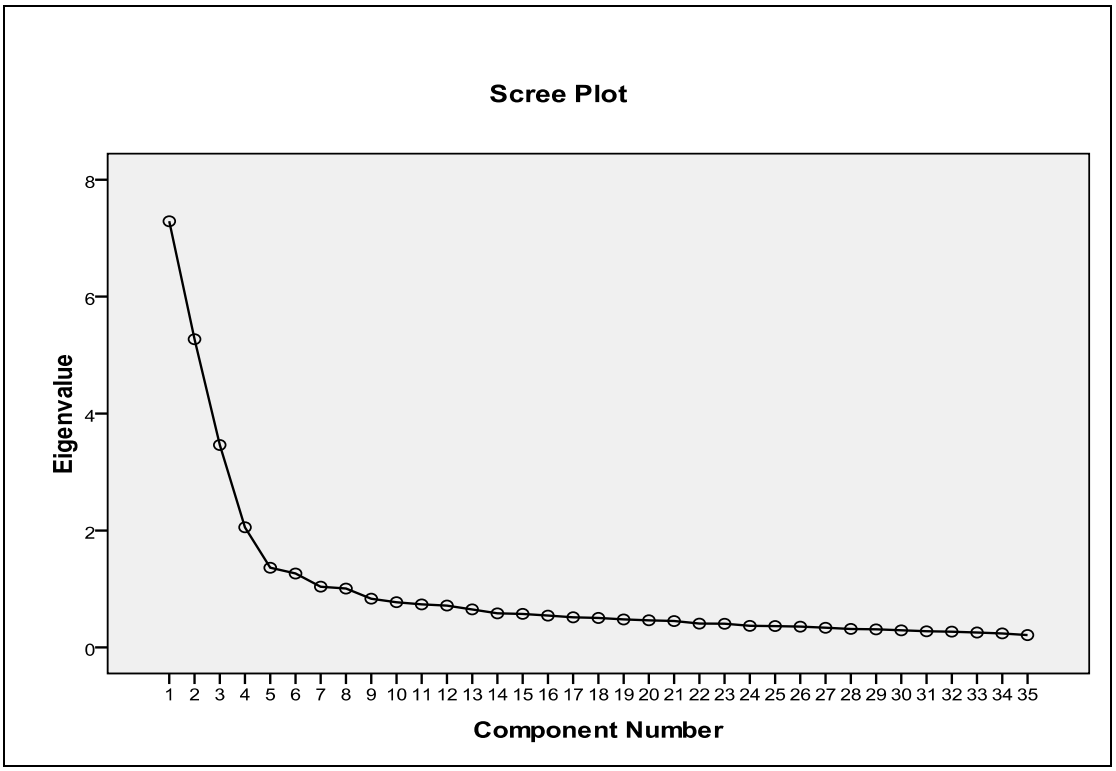
TABLE 5.9 EIGENVALUES OF TECHNOLOGY READINESS (TR)

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cum. %
1	7.289	20.827	20.827	7.289	20.827	20.827	5.802	16.576	16.576
2	5.273	15.065	35.892	5.273	15.065	35.892	4.672	13.349	29.924
3	3.464	9.896	45.788	3.464	9.896	45.788	4.163	11.895	41.819
4	2.055	5.871	51.659	2.055	5.871	51.659	3.444	9.840	51.659
5	1.363	3.895	55.553						
6	1.265	3.615	59.168						
7	1.039	2.969	62.137						
8	1.007	2.878	65.015						
9	.833	2.381	67.396						
10	.774	2.211	69.608						
11	.737	2.105	71.713						
12	.716	2.046	73.758						
13	.650	1.857	75.616						
14	.584	1.667	77.283						
15	.574	1.640	78.923						
16	.545	1.558	80.482						
17	.516	1.473	81.955						
18	.505	1.442	83.397						
19	.479	1.368	84.765						
20	.465	1.328	86.094						
21	.452	1.293	87.386						
22	.408	1.166	88.552						
23	.405	1.157	89.710						
24	.369	1.055	90.765						
25	.365	1.044	91.809						
26	.356	1.017	92.825						
27	.337	.964	93.789						
28	.317	.906	94.695						
29	.309	.884	95.578						
30	.294	.839	96.417						
31	.277	.792	97.209						
32	.270	.772	97.981						
33	.256	.730	98.711						
34	.239	.684	99.395						
35	.212	.605	100.000						

Extraction method: Principal component analysis

The indication for extracting TR items with four factors shown in Table 5.9 was confirmed by the scree test (see Figure 5.5).

FIGURE 5.5 SCREE PLOT - TECHNOLOGY READINESS (TR)



As shown in Figure 5.5, factor 1 displays the highest eigenvalue followed by factors 2, 3 and 4. These four factors clearly appear in the vertical curve area, thus signifying eigenvalues of greater than 1. This indicated that four extracted TR factors conducted with EFA would contribute the most to the explanation of the variance in the data set. Extracting factors beyond the four would produce too large a proportion of unique variance, and thus would not be acceptable.

The results of the EFA for TR are presented in Table 5.10, showing the extraction of the items.

TABLE 5.10 STRUCTURE MATRIX OF TECHNOLOGY READINESS (TR)

	Component			
	1	2	3	4
OPT8	.742			
OPT4	.735			
OPT3	.713			
OPT2	.712			
OPT6	.707			
OPT5	.706			
INN5	.677			
OPT7	.670			
OPT1	.619			
OPT9	.577			
OPT10	.470			
INS9		.755		
DIS4		.733		
DIS1		.717		
INN3		.681		
INS4		.673		
INS3		.668		
INN4		.666		
INN6		.535		
INN1		.516		
DIS3			.729	
DIS7			.632	
DIS5			.619	
DIS2			.607	
DIS9			.598	
DIS6			.594	
DIS10			.582	
INS1			.542	
DIS8			.449	
INN2			.373	
INS7				.765
INS8				.733
INS5				.688
INS6				.632
INS2				.404

Extraction method: Principal component analysis
Rotation method: Varimax with Kaiser normalisation

As revealed in Table 5.10, all 35 items extracted into four factors. Items that contributed less than .3 to the factor were removed. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

The reliability of the four TR factors was confirmed to be acceptable by the Cronbach's alpha values with scores of over 0.7. Table 5.11 presents the coefficient alpha values for factor 1 = 0.881; factor 2 = 0.862; factor 3 = 0.825 and factor 4 = 0.727, indicating acceptable levels.

TABLE 5.11 RELIABILITY OF TECHNOLOGY READINESS FACTORS

Factor	Item	Item/Factor	Issue	Name	Item	Corrected item total	Cronbach's alpha
1	OPT1 s/d OPT10	11	OPT		OPT1	0.554	
	INN5				OPT2	0.671	
					OPT3	0.648	
					OPT4	0.684	
					OPT5	0.632	
					OPT6	0.638	0.881
					OPT7	0.629	
					OPT8	0.662	
					OPT9	0.500	
					OPT10	0.419	
					INN5	0.550	
2	INS3, INS4,INS9	9			INS3	0.565	
					INS4	0.605	
	INN1,INN3,INN4				INS9	0.662	
	INN6,DIS1,DIS4				INN1	0.437	
					INN3	0.592	0.862
					INN4	0.561	
					INN6	0.482	
					DIS1	0.676	
					DIS4	0.716	
					INS4	0.60	
3	DIS2,DIS4,DIS5	10			INS1	0.472	
	DIS6 s/d DIS10				INN2	0.374	
	INS1, INN2				DIS2	0.461	
					DIS3	0.588	
					DIS5	0.559	0.825
					DIS6	0.424	
					DIS7	0.556	
					DIS8	0.541	
					DIS9	0.564	
					DIS10	0.592	
4	INS2, INS5, INS6	5	INS	INS	INS2	0.287	
	INS7, INS8				INS5	0.537	
					INS6	0.476	0.727
					INS7	0.639	
					INS8	0.611	

Based on the EFA results reported in Table 5.11, TR was to be measured by factor 1 (OPT8, OPT4, OPT3, OPT6, OPT5, INN5, OPT7, OPT1, OPT9 and OPT10), factor 2 (INS9, DIS4, DIS1, INN3, INS4, INS3, INN4, INN6 and INN1), factor 3 (DIS3, DIS7, DIS5, DIS2, DIS9, DIS6, DIS10, INS1, DIS8 and INN2) and factor 4 (INS7, INS8, INS5, INS6 and INS2). Cross-loading issues occurred with the EFA results, which will be discussed later in sections 5.5 and 5.6 on the item parcelling approach.

5.3.2.6 Consumer Perceived Value (CPV)

Consumer perceived value (CPV) was reflected by the four dimensions of quality (QUA), emotion (EMO), price (PRC) and social (SOC). These four dimensions were to be measured with 6, 5, 4 and 4 items, respectively, making up a total of 19 items. EFA was applied to explore the dimensionality of CPV based on both the industry and country context. Therefore, the factor extraction was applied to all 19 items in one EFA procedure in order to discover the grouped items representing the contextualised CPV factors for this thesis. Based on the eigenvalue analysis results shown in Table 5.12, four factors with an eigenvalue of over 1 were obtained. These results suggested that the CPV items were to be extracted and grouped into four factors explaining 67.198% of the variance.

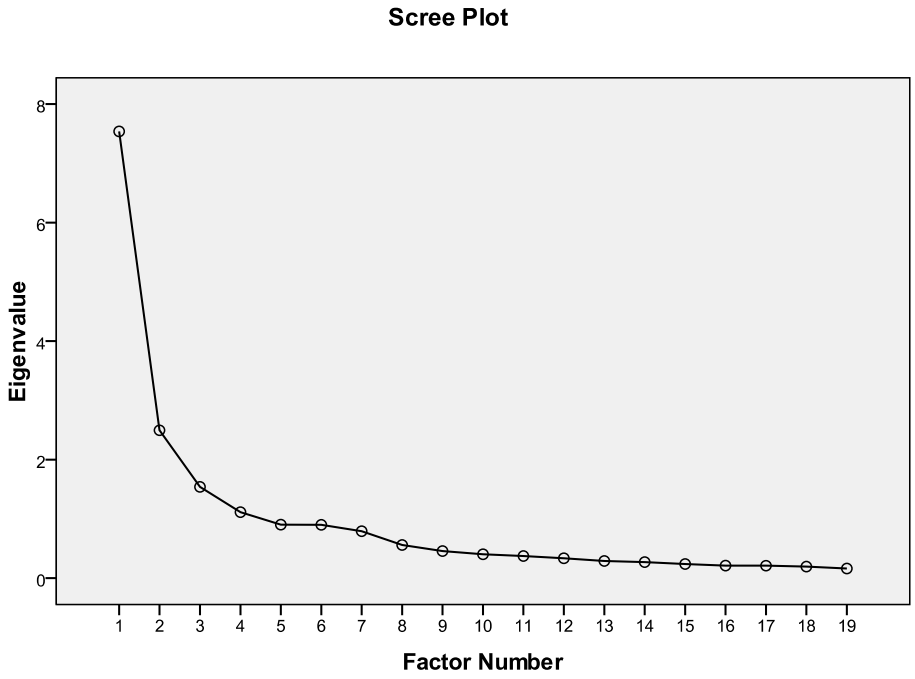
TABLE 5.12 EIGENVALUES OF CONSUMER PERCEIVED VALUE (CPV)

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of	Cumulative	Total	% of	Cumulative	Total
1	7.934	41.759	41.759	4.941	26.006	26.006	4.575
2	2.298	12.095	53.854	2.973	15.645	41.651	4.454
3	1.513	7.964	61.818	2.341	12.320	53.972	6.454
4	1.022	5.380	67.198	1.155	6.078	60.050	2.206
5	.996	5.245	72.443				
6	.805	4.239	76.681				
7	.742	3.905	80.586				
8	.610	3.209	83.795				
9	.490	2.580	86.375				
10	.456	2.402	88.777				
11	.391	2.059	90.836				
12	.338	1.781	92.617				
13	.287	1.508	94.125				
14	.251	1.323	95.448				
15	.235	1.239	96.686				
16	.184	.967	97.653				
17	.173	.910	98.563				
18	.145	.765	99.328				
19	.128	.672	100.000				

Extraction method: Maximum likelihood

The indication to extract CPV items with four factors reported in Table 5.12 was confirmed by the scree test (see Figure 5.6).

FIGURE 5.6 SCREE PLOT - CONSUMER PERCEIVED VALUE



As shown in Figure 5.6 above, factor 1 displays the highest eigenvalue followed by factors 2, 3 and 4. These four factors clearly appear in the vertical curve area, signifying eigenvalues of greater than 1. This indicated that four extracted CPV factors conducted with EFA would contribute the most to the explanation of the variance in the data set. Extracting factors beyond the four would produce too large a proportion of unique variance, and thus would not be acceptable. The results of the EFA with four factors for CPV are presented in Table 5.13, which demonstrates the extraction of the items.

TABLE 5.13 STRUCTURE MATRIX FOR CUSTOMER PERCEIVED VALUE (CPV)

	Factor			
	1	2	3	4
PRC2	.981			
PRC3	.564			
PRC1	.549			
SOC3		.947		
SOC4		.849		
SOC1		.693		
SOC2		.681		
QUA2			.784	
QUA3			.759	
EMO2			.663	
EMO4			.637	
EMO1			.630	
EMO3			.613	
EMO5			.612	
QUA1			.527	
PRC4			.407	
QUA5				.789
QUA4				.702
QUA6				.329

Extraction method: Maximum likelihood

Rotation method: Oblimin with Kaiser normalisation

Rotation converged in eight iterations

As revealed in Table 5.13, all CPV items extracted into four factors. Items that contributed less than .3 to the factor were removed. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

The reliability of the four CPV parcelled factors was confirmed to be acceptable by the Cronbach's alpha values with scores of over 0.7. Table 5.14 presents the coefficient alpha values for factor 1 = 0.874; factor 2 = 0.906; factor 3 = 0.856 and factor 4 = 0.726, indicating acceptable levels.

TABLE 5.14 VALIDITY AND RELIABILITY OF CPV FACTORS

Factor	Item	Item/Factor	Issue	Name	Item	Corrected item total	Cronbach's alpha
1	PRC1 s/d PRC3	3	PRC	PRC	PRC1	0.714	
					PRC2	0.812	0.874
					PRC3	0.757	
2	SOC1 s/d SOC4	4	SOC	SOC	SOC1	0.793	
					SOC2	0.728	0.906
					SOC3	0.859	
					SOC4	0.788	
3	QUA1 s/d QUA3	9			QUA1	0.447	
	EMO1 s/d EMO5				QUA2	0.675	
	PRC4				QUA3	0.663	
					EMO1	0.645	
					EMO2	0.697	0.856
					EMO3	0.670	
					EMO4	0.696	
					EMO5	0.664	
					PRC4	0.315	
4	QUA4 s/d QUA6	3	QUA	QUA	QUA4	0.535	
					QUA5	0.724	0.726
					QUA6	0.422	

Based on the EFA results shown in Table 5.14 above, CPV was to be measured by parcelled factor 1 (PRC 1, PRC2 and PRC3), factor 2 (SOC1, SOC2, SOC3 and SOC4), factor 3 (QUA1, QUA2, QUA3, EMO1, EMO2, EMO3, EMO4, EMO5 and PRC4) and factor 4 (QUA4, QUA5 and QUA6). Cross-loading issues occurred with the EFA results, which will be discussed later in sections 5.5 and 5.6 on the item parcelling approach.

5.3.2.7 Individual Cultural Orientation (Schwartz)

The 10 original Schwartz value items—power (POW), achievement (ACV), hedonism (HED), self-direction (SDR), universalism (UNI), benevolence (BNV), tradition (TRA), conformity (CON) and security (SEC)—were to be measured by the 10 SVSS items. The EFA procedure (see Table 5.15) was applied to all SSVS items to identify significant dimensions for measuring individual cultural orientations in the Indonesian context.

TABLE 5.15 EIGENVALUES OF SCHWARTZ'S CULTURAL ORIENTATION

Total variance explained

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.632	46.323	46.323	4.143	41.428	41.428	3.730
2	1.465	14.654	60.978	1.012	10.116	51.544	3.378
3	1.054	10.545	71.522				
4	.710	7.105	78.627				
5	.540	5.396	84.023				
6	.396	3.956	87.978				
7	.368	3.679	91.657				
8	.340	3.401	95.058				
9	.258	2.576	97.634				
10	.237	2.366	100.000				

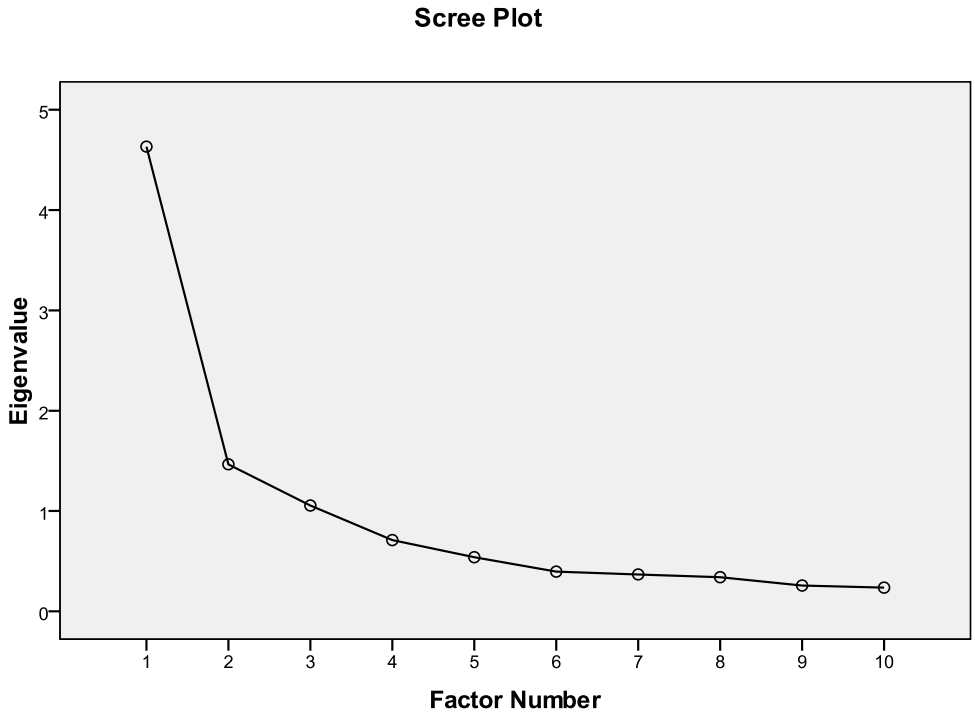
Extraction method: Maximum likelihood

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Based on the eigenvalue analysis results shown in Table 5.15 above, three factors having an eigenvalue of over 1 were obtained. These results suggested that the Schwartz value items should be extracted and grouped into three factors explaining 71.522% of the variance.

The results of the eigenvalue analysis were assessed and reconfirmed by the scree test (see Figure 5.7). The 'scree vs cliff' guidelines for implementing a scree test summarised by Zoski and Jurs (1990) were adopted to examine the findings of the eigenvalue analysis for Schwartz's items. To identify the number of Schwartz factors for extraction, the 'scree' of trivial factors was first identified by localising the eigenvalue curve with a non-vertical slope. More precisely, the slope of the curve displaying an angle of 40° or less from the horizontal was identified and used to determine the scree.

FIGURE 5.7 SCREE PLOT - SCHWARTZ'S INDIVIDUAL CULTURE VALUE ITEMS



As revealed in Figure 5.7 above, the scree starts to form at the point representing factor 3 and continues to move to the right of the curve as far as the factor 10 point. A sharp break in the direction of the curve occurs between factor 2 and factor 3. Therefore, it is clear that factor 3 is positioned at the left most point of the scree, and hence is to be excluded from the non-trivial or important category. It was therefore concluded that Schwartz's items were to be extracted with two factors, rather than three. Extracting Schwartz's items with two factors would contribute the most to the explanation of the variance in the data set. The results of the EFA for Schwartz's individual cultural orientation construct are presented in Table 5.16, showing the extraction of the items.

TABLE 5.16 STRUCTURE MATRIX OF SCHWARTZ'S INDIVIDUAL CULTURE VALUE ITEMS

	Factor	
	1	2
BNV	.861	
SEC	.845	
CON	.826	
TRA	.806	
STI		.748
SDR		.738
UNI		.681
ACV		.588
HED		.570
POW		.338

Extraction method: Maximum likelihood

Rotation method: Oblimin with Kaiser normalisation

As revealed in Table 5.13, all Schwartz's items extracted into two factors. Items that contributed less than .3 to the factor were removed. This result was well supported by the KMOMSA's value of being higher than 0.8 indicating that the data is meritorious (Hair et al. 2006), and also by the significance value of Bartlett's test of sphericity being lower than 0.05 confirming that the observed variables in the survey data are both dependant and intercorrelated. These results firmly support that EFA can be used to analyse the data.

The reliability of the two Schwartz factors were confirmed to be acceptable by the Cronbach's alpha values with scores of over 0.7. Table 5.17 presents the coefficient alpha values for factor 1 = 0.902 and factor 2 = 0.757, indicating acceptable levels.

TABLE 5.17 RELIABILITY OF SCHWARTZ'S CULTURE VALUE FACTORS

Factor	Item	Item/Factor	Issue	Name	Item	Corrected item total	Cronbach's alpha
1	BNV, SEC, CON TRA	4			BNV	0.803	0.902
					TRA	0.756	
					CON	0.772	
					SEC	0.787	
2	SDR, UNI, STI ACV, HED, POW	6			SDR	0.542	0.757
					UNI	0.491	
					STI	0.603	
					POW	0.346	
					ACV	0.610	
					HED	0.528	

Based on the EFA results reported in Table 5.17 above, Schwartz's individual cultural orientation was to be measured by factor 1 (BNV, SEC, CON and TRA) and factor 2 (SDR, UNI, STI, ACV, and HED), explaining 60.978% of the variance. The exclusion of the Power item and the cross-loading issues that occurred with the EFA results will be discussed later in sections 5.5 and 5.6 on the parcelling approach.

5.4 ITEM PARCELLING

Item parcelling was implemented in this research as a recommended technique to aggregate single-factor grouped items generated by exploratory factor analysis (Hall, RJ, Snell & Foust 1999; Yang, C, Nay & Hoyle 2010). The objective of implementing item parcelling in this case was twofold. First the aim was to keep the ratio of manifest indicators to latent constructs manageable and coherent in line with the original theoretical frameworks. The second aim was to increase the chances of adequate model fit. As stated by Hall et al. (1999), the total set of item parcels indicated a single primary factor dimension, or latent construct. Therefore, the aggregate item parcels were used as indicators of a higher-order construct in implementing CFA for the measurement model assessment and the full structural equation modelling. General guidelines or rules for creating item parcels developed by Bagozzi and Edwards (1998) were referred to in determining the item parcels. The first is the rule that requires sets of items to be unidimensional. Another is that items combined into one parcel should be at the same level of specificity and constitute independent observation from items in another parcel. These rules were applied to the latent constructs measured by multifaceted or multidimensional scales wherein cross-loading occurred; these included technology readiness, consumer perceived value and Schwartz's cultural orientation. Although these items were cross-loaded, they remained in operation as indicators of the same dimension of a construct developed based on a solid theoretical abstraction. Consequently, those items were grouped into the same factor that represented dimensions originally developed in the theory. As a result, based on the EFA results, there were four item parcels representing the TR dimensions, four other distinct parcelled factors corresponding to the CPV dimensions, and two parcels symbolising the two dimensions of Schwartz's cultural orientation. The definition of the parcels for TR, CPV and Schwartz's dimensions is presented below.

5.5 DEFINING THE ITEM PARCELS

5.5.1 Technology Readiness Item Parcels

Technology readiness consists of four factors based on the EFA results. The structure is different from the original one as identified by Parasuraman (2000). Some factors had cross-loadings especially in the innovativeness dimension. Accordingly, there is a need to redefine the dimension to fit the new items within it. In doing so, the original name was retained as part of the new name in order to maintain a connection with the old factor.

First, the optimism factor was able to maintain all of the existing items, with one addition of INN5. Therefore, the optimism dimension was renamed 'rational optimism', because a person's optimism can be justified by his/her knowledge about the latest developments in technology. Second, innovativeness was renamed 'constrained innovativeness' because a person's innovative potential is constrained by his/her feelings of discomfort and insecurity. Third, the discomfort dimension experienced some changes. The new discomfort dimension received two new items, one each from the insecurity and innovativeness dimensions (INS1 and INN2). The two items tell us that discomfort is created not only by interaction between a person and technology, but also in connection with personal matters, like personal identity and dignity, which may generate feelings of discomfort also. In order to emphasise personal matters in this dimension, the discomfort dimension was relabelled 'personal discomfort'. Finally, the insecurity dimension retained its original name because no new items were added. Even though the number of items was reduced, this did not alter the meaning of this dimension.

5.5.2 Consumer Perceived Value Item Parcels

EFA confirmed four factors in CPV. The quality dimension was reduced to contain only three items, where originally it had six. The rest revealed their place in the emotion dimension. The social dimension retained its original items. In contrast, the emotion dimension came to include some quality and price items. Based on these results, the original quality dimension was renamed 'technical quality' since it contains more technical criteria to define quality, such as technological development, reliable connection and consistent performance. The emotion dimension was relabelled 'personal standard of quality'. The price dimension received the new name of 'value for money', which is taken from PRC2: 'High-speed mobile broadband service offers value for money'. Finally, the social dimension retained its original name since its unchanged structure reflects its original items.

5.5.3 Schwartz's Item Parcels

The interpretation of the two parcels in Schwartz's Value Survey is straightforward. Referring to Figure 3.5 in Chapter 3, we can name parcel one (Sch1) 'conservatism' and parcel two (Sch2) 'openness to change'. The conservatism value consists of four dimensions: benevolence, security, conformity and tradition. The openness to change value consists of stimulus, self-direction, universalism, achievement and hedonism. The EFA results once again evidenced the robustness of Schwartz's value structure.

The interpretation of the new dimensions for CPV, TR and culture orientation will be presented in Chapter 6.

5.6 CONFIRMATION OF DIMENSIONALITY

5.6.1 Construct Validity and Confirmatory Factor Analysis (CFA)

The factors obtained based on the EFA results were adopted to develop components of the integrative structural model to gain understanding of the hypothesised relationships among constructs, indicators and items in influencing usage intention formation, but only if they performed construct validity. The importance of ensuring the validity of the constructs has been emphasised by a number of authors to address the issues of weak validation experienced by many previous research studies (Churchill 1979; DiStefano & Hess 2005; Gallagher, Ting & Palmer 2008; Hair et al. 2006; Malhotra 2004). In terms of a broad conception, validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. More specifically, as quoted from Gallagher et al. (2008), construct validity concerns 'whether or not operationalisation of a measure accurately reflects its construct (p.266). In other words, it reflects the degree to which a measure relates to other variables as expected within a system of theoretical relationships. Hair et al. (2006) posit the following four important components of construct validity: face or consenses validity, convergent validity, discriminant validity and nomological validity.

To examine construct validity through the implementation of CFA, a preliminary qualitative analysis to establish the framework of measurement model was firstly conducted. This analysis was needed to determine whether the measurement model was to be constructed based on a reflective or formative model, particularly for the constructs with multidimensional and multi-item structures, including TR and CPV. The implementation of each model would give different results and therefore interpretation at this stage was crucially important. In the reflective model, the latent variable influences the indicators, thus the direction of causality is from the construct to the indicators or measures; while in the formative model, the direction is from the measures to the construct (Jarvis et al,

2003). A guideline proposed by Jarvis, Mackenzie and Podsakoff (2003) was used to establish the model. There were four criteria proposed by these researchers to determine whether the measurement model was reflective or formative. The first criteria relates to the direction of causality between the construct and its indicators. For reflective measurement models, the direction of causality flows from the measures to the construct. The direction goes to the opposite way in the formative models. The second criteria addresses the issue of the interchangeability of the indicators. The indicators need to be interchangable for reflective models; but they do not have be like that in the formative models. The third criteria relates to the issue of whether the indicators should covary with each other. In the reflective models, covaration among the indicators is necessary; while in the formative models the covariation is not necessary. The fourth criteria is referred to a question examining whether all of the measures are needed to have the same antecedents and consequences. Indicators in the reflective model should all have the same antecendents and consequences, because they reflect the same underlying construct and are believed to be interchangeable. On the other hand, the measures in the formative models do not have to be interchangeable because they are not expected to have the same antecedents and consequences.

Applying the above criteria to the structure of TR and CPV, we found that the measurement of these two constructs should be based on reflective models. We first revisited the concept of TR to explain why it needed to be constructed with a reflective model. It has been shown in chapter 2 that TR conceptually proposed as a predisposition or attitude towards a new technology is formed from the total feeling of a person, reflected by two opposite views about technology simultaneously occurring in that individual (Parasuraman, 2000). In other words, TR is an individual's holistic attitudinal position about technology; therefore it is an aggregated construct which should be measured by using all of its indicators. TR can not be appropriately measured by using only one or some of all of its indicators because TR is the combination of all relevant beliefs reflected in four components, consisting of two contributors and two inhibitors. At this point we can see that TR requires all of its dimensions and indicators to have the same consequences and covary with each other. Having this situation in this measurement model structure, we further understand that the direction of causality is from the overall attitude TR construct to its indicators, reflecting how the construct is operationalised in explaining someone's predisposition towards embracing a new technology. This approach gained strong support from many previous studies in which the use of the reflective model in measuring attitude has been widely accepted. As reported by Jarvis et al (2003) in their article, on page 200, the measurement of attitude using the reflective model has been agreed to be an appropriate method in producing an expected outcome. As a result, we concluded that the

construction of a measurement model for TR needs to apply the reflective model structure.

The same decision was also made in determining the reflective model to be used in constructing the CPV measurement model. As has been explained in chapter 3, this thesis supported the conception of value proposed by Sweeney et al (2001) who posited that the multiple value dimensions explained consumer purchase intention better than a single value dimension. The argument previously provided by Sheth, Newman and Gross (1991) endorsed this conception, stating that consumer choice is a function of multiple consumption value dimensions. They further explained that these value dimensions may not be independent but interelated and correlated. As a result, value is conceptualised as multidimensional constructs; namely, the CPV multiple scale item adopted in this thesis. Taking into account the characteristics of this scale in which the dimensions may be interelated and correlated, it was decided that the measurement model for CPV was developed by using the reflective model. The implementation of the reflective model provided an opportunity to better understand how each dimension interacts with each other in reflecting the value construct, because all measurement items under this construct were allowed to covary with each other. Besides, allowing the items to covary with each other and interact as CPV dimension antecendents at the same construct level gave us a better insight into the possibility of discovering other significant value dimensions. This possibility was indicated by a number of researchers, as quoted by Sweney et al. who suspect that other unidentified value dimensions could be significantly present in the CPV multidimensional value construct.

Face or content validity represents an indicator of whether or not each construct's item is understandable and a reasonable measure if viewed from a theoretical perspective (Gallagher, Ting & Palmer 2008; Hair et al. 2006). Content validity is usually assured in the early stages of a research process. In this thesis it was observed at the pre-test stage, as has been explained in Chapter 4.

Convergent validity is the degree to which measurement items of the same construct demonstrate a converged relationship as indicated by the high proportion of variance shared among them. This type of validity was observed in this thesis based on the measurement model assessment conducted in accordance with the confirmatory factor analysis procedure. The implementation of CFA to confirm convergent validity and evaluate a latent structure has received substantial justification in the literature (Byrne 1998; Churchill 1979; DiStefano & Hess 2005; Hoyle & Panter 1993; Thompson & Daniel 1996). As outlined in the CFA procedure, this thesis applied three assessment schemes to ensure convergent validity. First, the convergence of a common point was assessed based on standardised factor loadings which should be over 0.50 with statistical

significance (Hair et al. 2006). Second, convergent validity was verified through the assessment of Average Variance Extracted (AVE), which had to reach 0.50 or higher in order to achieve an adequate level (Fornell & Larcker 1981; Hair et al. 2006; Vazquez-Carrasco & Foxall 2006). Finally, although not strictly required, the convergence was also reflected by measure reliability as indicated by the Cronbach's alpha value of 0.7 or above. This was applied in particular to the constructs that were measured by parcelled dimensions.

The observation of discriminant validity in this thesis was conducted by comparing the AVE of each construct indicator with the variance shared between each indicator and the other indicators of the model (Fornell & Larcker 1981; Vazquez-Carrasco & Foxall 2006). A condition where the AVE for each of the factors was greater than its shared variance with any of the other factors substantiated the discriminant validity (Carrascoa & Foxallb 2006; Fornell & Larcker 1981; Schumacker & Lomax 1996).

The above explained validity assurance must also be supported by an adequate fit of each measurement model. To achieve this, an examination of model fit was performed. The fit indices summarised in Table 5.18 were used for this purpose. A fulfilment of the acceptable cut-off level of at least one commonly used index determined the model fit.

TABLE 5.18 CUT-OFF CRITERIA FOR SELECTED FIT INDICES

No	Measure	Fit criteria	Definition
1	Chi-square (χ^2)	Non-significant (χ^2) at least p-value >0.05	*The fundamental measure used in SEM to quantify the differences between the observed and estimated covariance matrices.*
2	Normed Fit Chi-Square (χ^2 /df, or degree of freedom)	Ratio 2 to 1 or 3 to 1	*A measure of absolute fit and parsimony.*
3	GFI (Goodness-of-Fit Index)	Value > 0.95 indicates a good fit, and 0.90–0.95 an adequate fit	*A fit statistic that is less sensitive to sample size and indicates how well the specified model reproduces the covariance matrix among the indicator items (i.e. the similarity of the observed and estimated covariance matrices).*
4	AGFI (Adjusted Goodness-of-Fit Index)	Value > 0.95 indicates good fit, and 0.90–0.95 an adequate fit	*An index representing goodness-of-fit for the degree of freedom.*
5	RMSEA (Root Mean Square Error of Approximation)	Values < 0.05 indicate adequate fit	*A measure that attempts to correct for the tendency of the X^2 test statistic to reject models with large samples or a large number of observed variables.*
6	NFI (Normed Fit Index)	Values > 0.95 indicate good fit, and 0.90–0.95 an adequate fit	*A ratio of the differences in the X^2 value for the fitted model and a null model divided by the X^2 value for the null model.*
7	CFI (Comparative Fit Index)	Values > 0.95 indicate good fit, and 0.90–0.95 an adequate fit	*An incremental fit index that is an improved version of the normed fit index (NFI)*
8	TLI (Tucker-Lewis Index)	Values > 0.95 indicate good fit, and 0.90–0.95 an adequate fit	*A comparative index between proposed and null models adjusted based on degrees of freedom*
9	IFI (Incremental Fit Index)	Values > 0.95 indicate good fit, and 0.90–0.95 adequate fit	*An index interpreted similarly to TLI and CFI*
10	AIC (Akaike Information Criterion)	Values closer to 0 show better fit	*A parsimonious measure used as a comparative index between alternative models*

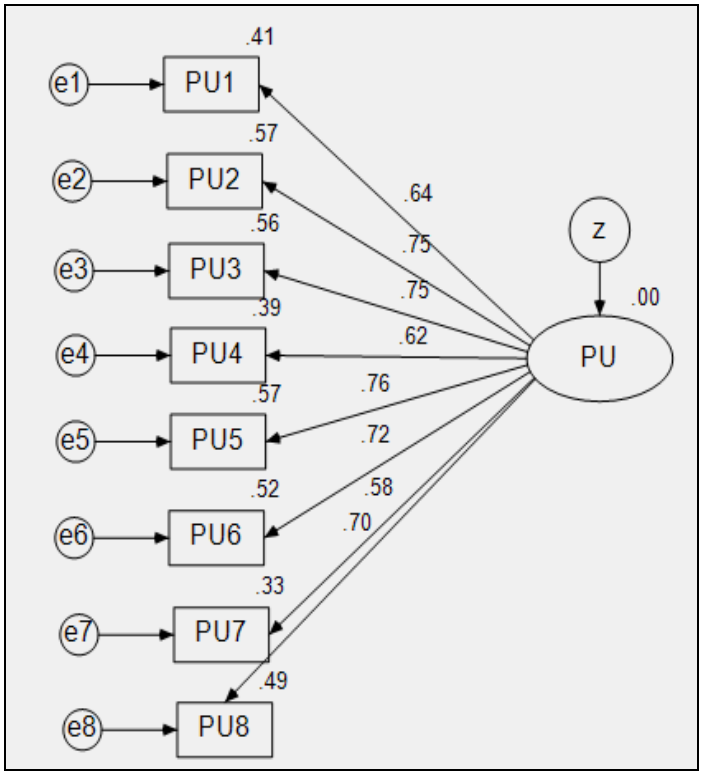
Source: Gallagher, Ting and Palmer (2008); Kline (2005); Schreiber et al. (2006)

5.6.2 Confirmatory Factor Analysis (CFA) Results

5.6.2.1 Measurement Model of Perceived Usefulness (PU)

The measurement model of perceived usefulness (PU) obtained from the CFA procedure is presented in Figure 5.8.

FIGURE 5.8 PERCEIVED USEFULNESS (PU) MEASUREMENT MODEL



AMOS version 17 was used to produce the measurement model of PU. As can be seen in Figure 5.8, the model presents the PU construct as reflected by eight indicators (PU1 to PU8) with all loadings above 0.5. This indicated high levels of convergence. To fully confirm the convergent validity, AVE and model fit indices were calculated (see Table 5.19). The procedure formulated by Fornell and Larcker (1981) was used to calculate AVE.

TABLE 5.19 AVERAGE VARIANCE EXTRACTED (AVE) - PERCEIVED USEFULNESS

ITEM	LOADING
PU1	0.64
PU2	0.75
PU3	0.75
PU4	0.62
PU5	0.76
PU6	0.72
PU7	0.58
PU8	0.7
AVE = 0.63	

As shown in Table 5.19 above, AVE for PU was above 0.5, demonstrating good convergent validity and confirming that more than 50% of the variance of PU was due to its indicators.

The model fit indices presented in Table 5.20 resulted in an acceptable fit of measurement model for PU. The IFI and CFI values were both equal to 0.91, whereas GFI was 0.92. These results reflected a good model fit according to the parameters suggested in Table 5.18, supporting the AVE analysis explained above and confirming the convergent validity for PU.

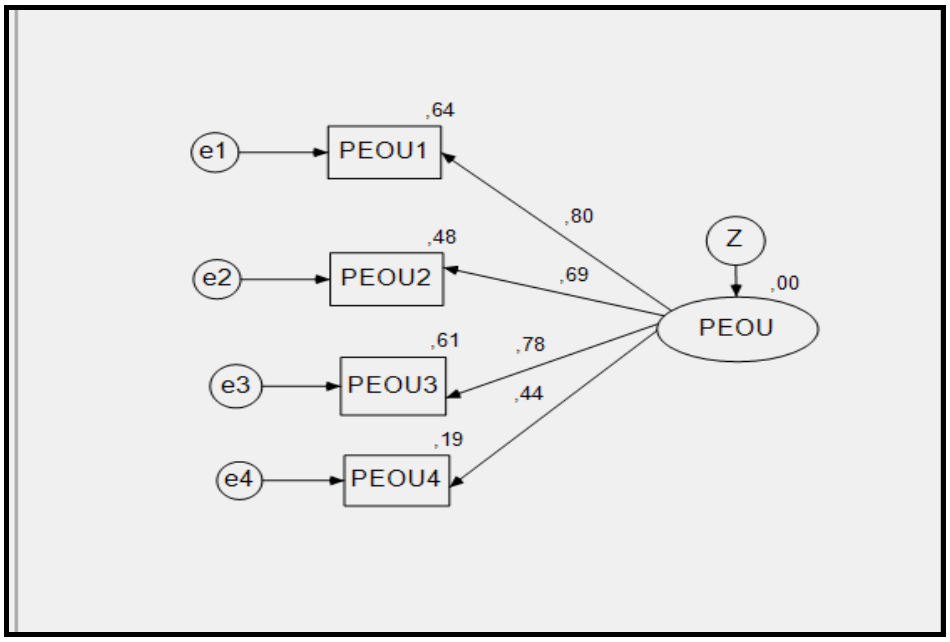
TABLE 5.20 MODEL FIT ANALYSIS – PERCEIVED USEFULNESS (PU)

Goodness-of-fit criterion	Acceptable level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	11.96
Chi-square value	Sig. Level > 0.05	0.00
RMSEA	< 0.05	0.13
Model comparison		
IFI	> 0.9	0.91
CFI	> 0.9	0.91
GFI	> 0.9	0.92
NFI	> 0.9	0.9

5.6.2.2 Measurement Model of Perceived Ease Of Use (PEOU)

The measurement model of perceived ease of use (PEOU) obtained through the CFA procedure is presented in Figure 5.9.

FIGURE 5.9 PERCEIVED EASE OF USE (PEOU) MEASUREMENT MODEL



As shown in Figure 5.9, the model presents the PEOU construct as reflected by four indicators (PEOU1 to PEOU4). The loadings of PEOU1 to PEOU4 were above 0.5, indicating high levels of convergence. To fully confirm the convergent validity, AVE and model fit indices were calculated (see Table 5.21).

TABLE 5.21 AVERAGE VARIANCE EXTRACTED (AVE) – PERCEIVED EASE OF USE

ITEM	LOADING
PEOU1	0.80
PEOU2	0.69
PEOU3	0.78
PEOU4	0.44
AVE = 0.61	

As shown in Table 5.21, average variance extracted for PEOU items was above 0.5, demonstrating good convergent validity. Based on this result, it was confirmed that more than 50% of the variance of PEOU was due to its indicators.

The model fit indices presented in Table 5.22 resulted in an acceptable fit of the measurement model for PEOU. Nine statistical tests met the fit criteria, as the results in Table 5.18 reveal. They included CMIN/df (degree of freedom) (0.419), significant level of the chi-square value (0.0000), RMSEA (0.0000), IFI (1.002), CFI (1.00), GFI (0.999), AGFI

(0.997), TLI (1.005)and NFI (0.999). These findings supported the AVE analysis explained above and confirmed the convergent validity for PEOU.

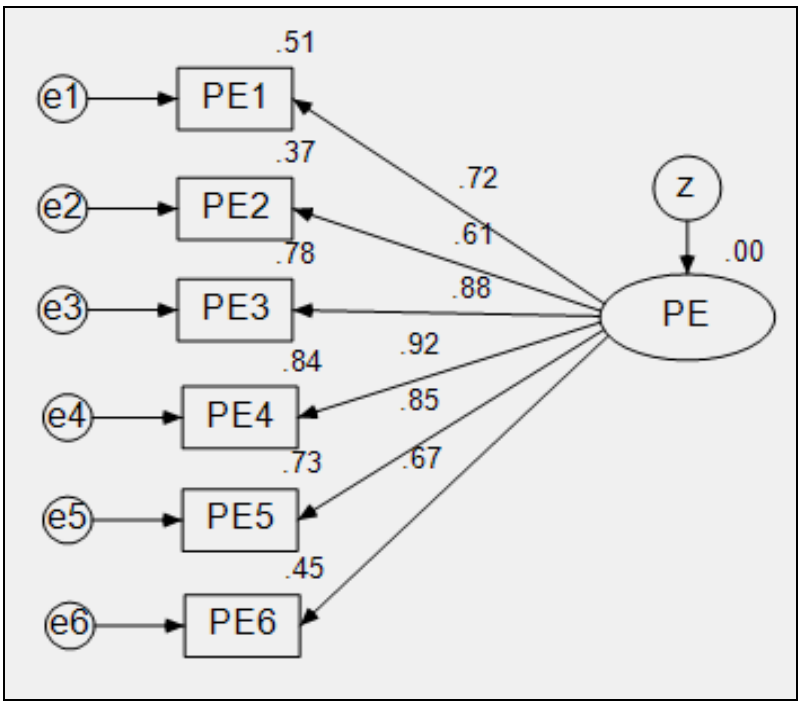
TABLE 5.22 MODEL FIT ANALYSIS - PERCEIVED EASE OF USE (PEOU)

Goodness-of-fit criterion	Acceptable level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	0.419
Chi-square value	Sig. Level > 0.05	0.000
RMSEA	< 0.05	0.000
Model comparison		
IFI	> 0.9	1.002
CFI	> 0.9	1.000
GFI	> 0.9	0.999
AGFI	> 0.9	0.997

5.6.2.3 Measurement Model of Perceived Enjoyment (PE)

The measurement model of perceived enjoyment (PE) obtained from the CFA procedure is presented in Figure 5.10.

FIGURE 5.10 PERCEIVED ENJOYMENT (PE) MEASUREMENT MODEL



As shown in Figure 5.10, the model depicts the PE construct as reflected by six indicators (PE1 to PU6), with all loadings above 0.5 indicating high convergence. Average variance extracted was then calculated and used to confirm convergent validity for PE.

TABLE 5.23 AVERAGE VARIANCE EXTRACTED (AVE) - PERCEIVED ENJOYMENT

ITEM	LOADING
PE1	0.72
PE2	0.61
PE3	0.88
PE4	0.92
PE5	0.85
PE6	0.67
AVE = 0.77	

As shown in Table 5.23, AVE for PE was above 0.5, demonstrating good convergent validity. This result confirmed that more than 50% of the variance of PE was due to its indicators.

The model fit indices presented in Table 5.24 resulted in an acceptable fit of the measurement model for PE. The GFI (0.98), AGFI (0.95) and CFI (0.98) were acceptable and the RMSEA was just under recommended levels, supporting the AVE analysis explained above and confirming the convergent validity for PE.

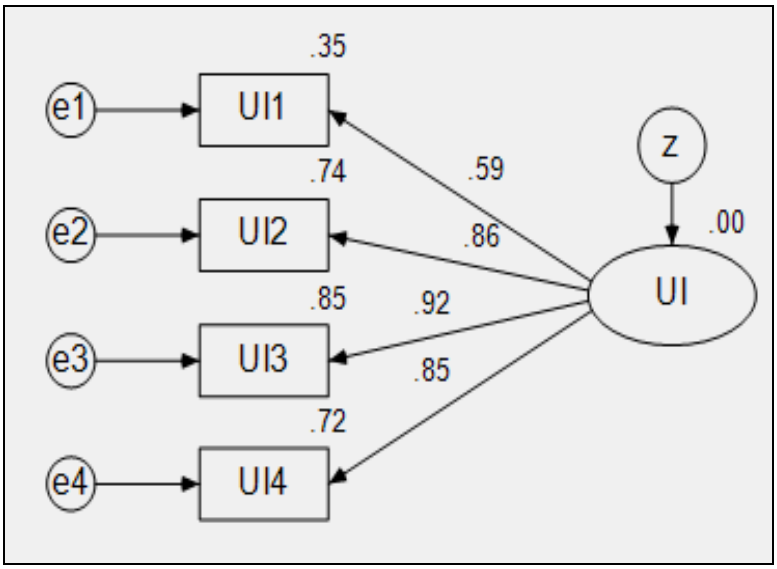
TABLE 5.24 MODEL FIT ANALYSIS – PERCEIVED ENJOYMENT (PE)

Goodness-of-fit criterion	Acceptable level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	5.56
Chi-square value	Sig. Level > 0.05	0.00
RMSEA	< 0.05	0.08
Model comparison		
IFI	> 0.9	0.98
CFI	> 0.9	0.98
GFI	> 0.9	0.98
AGFI	> 0.9	0.95

5.6.2.4 Measurement Model of Usage Intention (UI)

The measurement model of usage intention (UI) obtained from the CFA procedure is presented in Figure 5.11.

FIGURE 5.11 USAGE INTENTION (UI) MEASUREMENT MODEL



As shown in Figure 5.11, the model presents the UI construct as reflected by four indicators (UI1 to UI4), with all loadings above 0.5, thus indicating high convergence levels. To fully confirm the convergent validity, AVE for UI was accordingly calculated (see Table 5.25).

TABLE 5.25 AVERAGE VARIANCE EXTRACTED – USAGE INTENTION

ITEM	LOADING
UI1	0.59
UI2	0.86
UI3	0.92
UI4	0.85
AVE = 0.82	

As revealed in Table 5.25, average variance extracted for UI items was above 0.5, demonstrating good convergent validity. This result confirmed that more than 50% of the variance of UI was due to its indicators.

The model fit indices presented in Table 5.26 resulted in an acceptable fit of the measurement model for UI. CFI value was equal to 0.96 reflecting a good model fit according to the parameters suggested in Table 5.18. With the RMSEA value just under recommended levels, other indices including GFI and NFI also indicated adequate model

fit, with a value of 0.96 for both of these indices. These results supported the AVE analysis explained above and confirmed the convergent validity for UI.

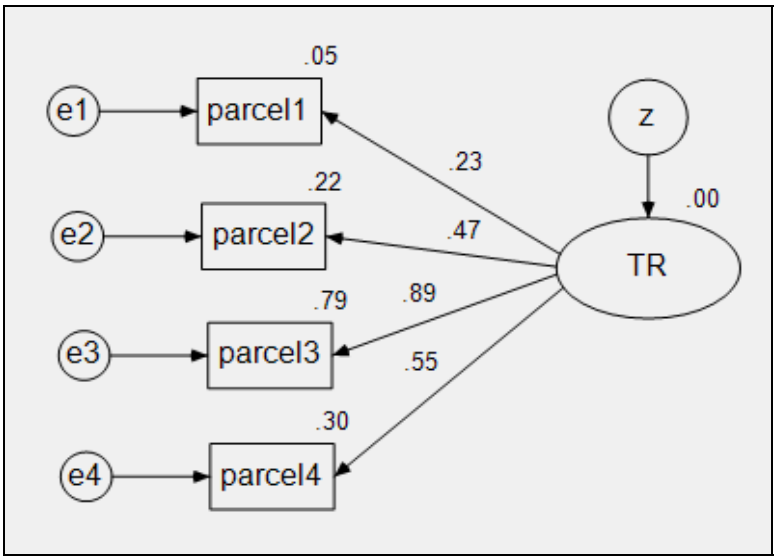
TABLE 5.26 MODEL FIT ANALYSIS – USAGE INTENTION (UI)

Goodness-of-fit criterion	Acceptable level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	33.96
Chi-square value	Sig. Level > 0.05	0.00
RMSEA	< 0.05	0.22
Model comparison		
CFI	> 0.9	0.96
GFI	> 0.9	0.96
AGFI	> 0.9	0.78

5.6.2.5 Measurement Model of Technology Readiness (TR)

The measurement model of technology readiness (TR) obtained from the confirmatory factor analysis procedure is presented in Figure 5.12.

FIGURE 5.12 TECHNOLOGY READINESS MEASUREMENT MODEL



As shown in Figure 5.12, the model depicts the TR construct as reflected by its four parcelled indicators. Three indicators (Parcels 2, 3 and 4) demonstrated factor loadings of above 0.5, indicating high levels of convergence. On the other hand, the loading for Parcel 1 was lower than 0.5 (0.23). However, there is a strong theoretical argument to keep Parcel 1 in the model as stated in the literature. Conceptually, technology readiness has to be measured by its four factors. The first two factors refer to the 'contributor component' that strengthens a user's technology readiness. The other two are the 'inhibitors' that

suppress technology readiness. These factors interact to create a certain psychological state in oneself, and a particular attitude toward new technology, called 'technology readiness'. The exclusion of one factor could potentially result in incompleteness of the instrument for measuring an integrative multidimensional attitude-related construct like TR. Therefore, technology readiness in this thesis will still be measured by the four parcels. Its convergent and discriminant validity were further examined by the AVE and measurement model fit analysis, reported in Tables 5.27 and 5.28. respectively.

TABLE 5.27 AVERAGE VARIANCE EXTRACTED FOR TECHNOLOGY READINESS

	Parcel 1	Parcel 2	Parcel 3	Parcel 4
Parcel1	**0.53**			
Parcel2	0.00	**0.52**		
Parcel3	0.03	0.34	**0.43**	
Parcel4	0.03	0.03	0.19	**0.53**

Table 5.27 presents the measurements of AVE for the TR parcels. Three of the four parcels—Parcels 1, 2 and 4—demonstrated values of over 0.5, confirming good convergent validity. AVE for Parcel 3 was 0.43, thus below the acceptable cut-off value of 0.5. However, the convergent validity of Parcel 3 was supported by the strong theoretical foundation to be accepted for further analysis. As has been explained previously in this section, in order to validly measure technology readiness, one must include all of its four dimensions. Therefore, it was decided to include Parcel 3 as a necessary TR dimension for the comprehensively measurement of technology readiness. This treatment was well supported by an adequate discriminant validity.

The examination of discriminant validity for the TR measurement model was conducted based on the assessment procedure initially proposed by Fornell and Larcker (1981). This procedure requires the AVE of each construct to be greater than the variance shared between each construct and the other constructs. Adopting Fornell and Lacker's procedure, in the case of TR (Table 5.27) the AVE measurements (principal diagonal) were compared with the correlation-square of each construct with the other constructs, to ensure that the former exceeded the latter (Carrasco & Foxall, 2006). The results of the comparison strongly confirmed discriminant validity.

As can be seen in Table 5.27, the average variance extracted for Parcel 1 (0.53) was greater than the correlation-square between Parcel 1 and the other parcels. The average variance extracted for Parcel 2 (0.52) was greater than the correlation-square between Parcel 2 and the other parcels. The average variance extracted for Parcel 3 (0.43) was greater than the correlation-square between Parcel 3 and the other parcels. Finally, the

average variance extracted for Parcel 4 (0.53) was greater than the correlation-square between Parcel 4 and the other parcels.

TABLE 5.28 MODEL FIT ANALYSIS – TECHNOLOGY READINESS (TR)

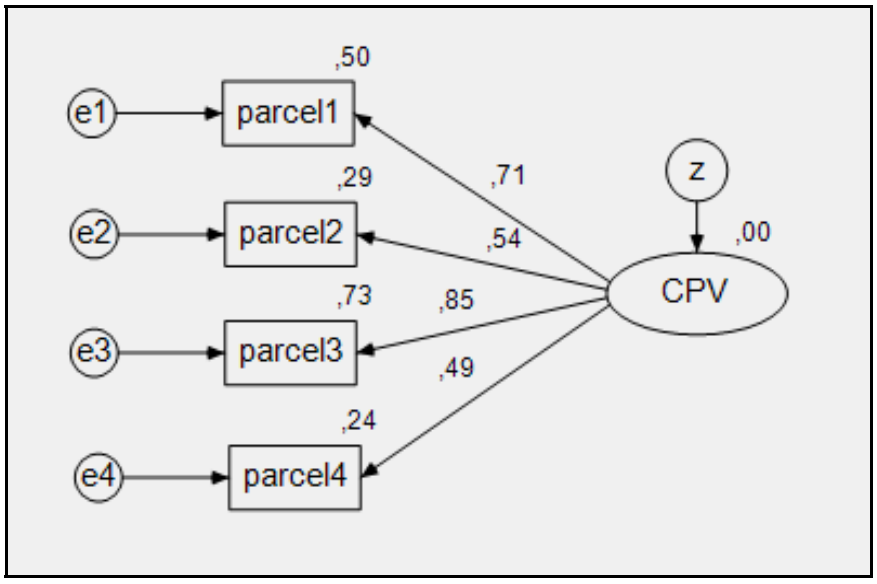
Goodness-of-fit criterion	Acceptable level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	1.014
Chi-square value	Sig. Level > 0.05	0.363
RMSEA	< 0.05	0.005
Model comparison		
CFI	> 0.9	1.000
GFI	> 0.9	1.000
AGFI	> 0.9	1.000

In the same direction, the model fit analysis results presented in Table 5.28, including CMIN/df (1.014), significant level of chi-square value (0.363), RMSEA (0.005), CFI (1.0), GFI (1.0), AGFI (1.0), TLI (1.0) and NFI (0.994), indicated an acceptable fit, and thus confirmed the convergent and discriminant validity.

5.6.2.6 Measurement Model of Consumer Perceived Value (CPV)

The measurement model of consumer perceived value (CPV) obtained from the CFA procedure is presented in Figure 5.13.

FIGURE 5.13 CONSUMER PERCEIVED VALUE (CPV) MEASUREMENT MODEL



As shown in Figure 5.13 above, the model indicates that the CPV construct is reflected by four parcelled indicators with all loadings of above 0.5, indicating high levels of

convergence. To further confirm the convergent and discriminant validity, AVE and model fit analysis was conducted.

TABLE 5.29 AVERAGE VARIANCE EXTRACTED – CONSUMER PERCEIVED VALUE

	Parcel 1	Parcel 2	Parcel 3	Parcel 4
Parcel1	**0.58**			
Parcel2	0.32	**0.58**		
Parcel3	0.44	0.23	**0.66**	
Parcel4	0,04	0,01	0.18	**0.61**

As shown in Table 5.29, average variance extracted for each of the four CPV parcelled factors was above 0.5, confirming good convergent validity. Furthermore, the comparison between AVE measurements (principal diagonal) with the correlations-square of each construct with the other constructs nicely confirmed discriminant validity. As revealed in Table 5.29, the AVE for Parcel 1 (0.58) was greater than the correlation-square between Parcel 1 and the other CPV parcelled factors. The AVE for Parcel 2 (0.58) was greater than the correlation-square between Parcel 2 and the other CPV factors. The AVE for Parcel 3 (0.66) was greater than the correlation-square between Parcel 3 and the other CPV factors. Finally, the AVE for Parcel 4 (0.61) was greater than the correlation-square between Parcel 4 and the other CPV factors.

TABLE 5.30 MODEL FIT ANALYSIS

Goodness-of-fit criterion	Acceptable Level	Value
Model fit		
C MIN/df	Ratio 2 to 1 or 3 to 1	45.89
Chi-square value	Sig. Level > 0.05	0.000
RMSEA	< 0.05	0.250
Model comparison		
CFI	> 0.9	0.87
GFI	> 0.9	0.93

The model fit indices presented in Table 5.30 showed that GFI value of 0.93 was acceptable and CFI value was just under the acceptable levels. As posited by Doll, Xia and Torkzadeh (1994), the criteria for judging model fit are relative rather than absolute and there are no standard cutoff values for evaluating model-data fit and the existence of higher-order constructs. Therefore it was decided to implement the CFA model for CPV

for further analysis in this study. To support our decision, we also took into consideration the high reliability of each CPV dimension (QUA = 0.810, EMO = 0.888, PRC = 0.716, SOC = 0.906), an acceptable internal consistency reliability and the evidence of content and construct validity. In other words, the measurement model used to evaluate CPV in this thesis was based on the four parcelled CFA model above.

5.6.2.7 Measurement Model of Schwartz's Cultural Orientation

Exploratory factor analysis (EFA) results suggested two parcelled factors to be used in measuring Schwartz's individual cultural orientation. The first factor was interpreted as conservatism and the second one refers to openness to change. The measurement model using CFA was not applied to these factors because the CFA procedure requires a minimum number of three manifest variables to form or reflect one latent construct. The validity of the two Schwartz factors was substantially supported by the theoretical concept behind Schwartz's value system.

The two dimensions were considered to be higher-order value types. These groups originally resulted from projections of the polarity between individualism and collectivism (Schwartz 1992). Here, it can be understood that the structure of Schwartz's value system still resembled the basic human requirement to serve personal (individual) needs and social needs, or, in other words, to be an individualist or a collectivist. Consequently, any measurement of individual cultural orientation that adopts Schwartz's value system in particular would have to follow the polarisation based on the two opposing dimensions. For this reason, the measurement model used to evaluate individual cultural orientation in this thesis was based on two parcelled dimensions.

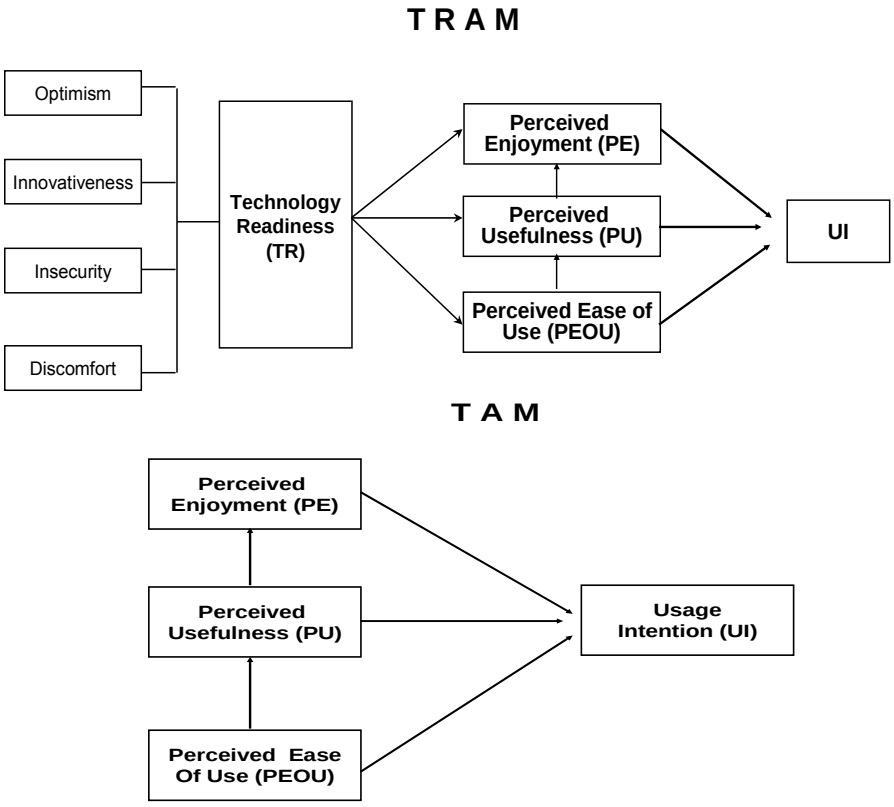
5.7 STRUCTURAL EQUATION MODELLING (SEM)

5.7.1 The Comparative Analysis of the Baseline Models: TRAM vs. TAM

The research model shown in Figure 3.9 was empirically tested by implementing the structural equation modelling (SEM) procedure based on its two major components. The first one is the baseline model displaying all the main constructs that form usage intention (UI) and its antecedents, i.e. PU, PEOU, PE and TR. The second component consists of the three identified moderator variables including consumer perceived value, individual cultural orientation and demographic factors. The baseline model was to be used in investigating the influence of moderator variables on the causal relationships that the model displayed.

The literature review conducted in Chapter 2 suggested two baseline models with the greatest potential for further investigation in this thesis. The first one is TRAM (Technology Readiness and Acceptance Model), and the second is known as TAM (Technology Acceptance Model). Both models are shown in Figure 5.14. Even though these models were reconstructed with the addition of perceived enjoyment (PE) as another usage intention predictor, their original names are retained in this thesis.

FIGURE 5.14 THE ALTERNATIVE BASELINE MODELS: TRAM AND TAM



Prior to performing a comparative analysis of TAM and TRAM (as displayed in Figure 5.14 above), it is important first to investigate the causal relationships among PEOU, PU and PE. This is because the literature review revealed dispersed research results when it came to the configuration of these three acceptance dimensions (Sun & Zhang 2006; Venkatesh 1999, 2000; Agarwal & Karahanna 2000; Yi & Hwang 2003; Davis et al. 1992; Iqbaria et al. 1995, 1996; Teo et al. 1996; Van der Heijden 2004). Based on the results of previous studies, three possible configurations of PE, PU and PEOU emerge, which are shown in Figure 5.48. As has been explained in section 3.3, the examination to determine the most appropriate configuration for this thesis was conducted was based on hypotheses 1a and 1b. The test results for hypotheses 1a and 1b are reported in the following section.

5.7.2 Test of Hypetheses 1a and 1b: PU, PEOU and PE configurations

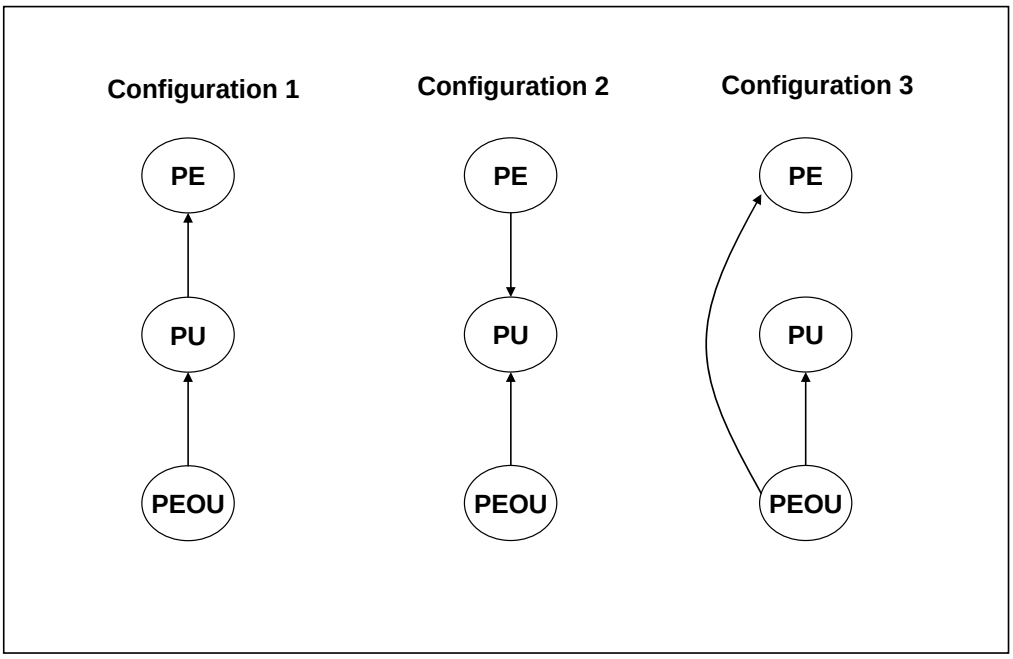
The three potential options for configuring PE, PU and PEOU in the model were tested based on hypotheses 1a and 1b. These hypotheses are illustrated in Figure 5.15. Configuration 1 shows that PE is influenced by PU which has PEOU acting as its antecedent. Configuration 2 displays PU to be influenced by both PE and PEOU, whereas Configuration 3 shows PEOU to have a direct influence on both PE and PU.

H1a: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PE → PU causal directions in extended TAM.

H1b: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PEOU → PE causal directions in extended TAM.

To examine which option would best align with the model, a comparative fit index analysis using an AIC (Akaike Information Criterion) indicator was conducted. AIC is a parsimonious measure widely used as a comparative index between alternative models (Akaike 1987; Bozdogan 1987; Wagenmakers & Farrell 2004). The smaller the AIC value the more parsimonious will be the model, and therefore the better the model will be fitted.

FIGURE 5.15 THREE POSSIBLE CONFIGURATIONS OF PE–PU–PEOU RELATIONSHIPS IN THE MODEL



The results of the AIC value calculation are presented in Table 5.31. As can be seen from this table, Configuration 1 (see Figure 5.15) resulted in a smaller AIC value of 1,994 than did Configuration 2 (2,186). These results therefore confirmed Configuration 1 to be a model that provides a more parsimonious fit. Thus, Hypothesis 1a was supported.

TABLE 5.31 AIC (AKAIKE INFORMATION CRITERION) TEST

CONFIGURATION	AIC
Configuration 1	1.994
Configuration 2	2.186
Configuration 3	2.020

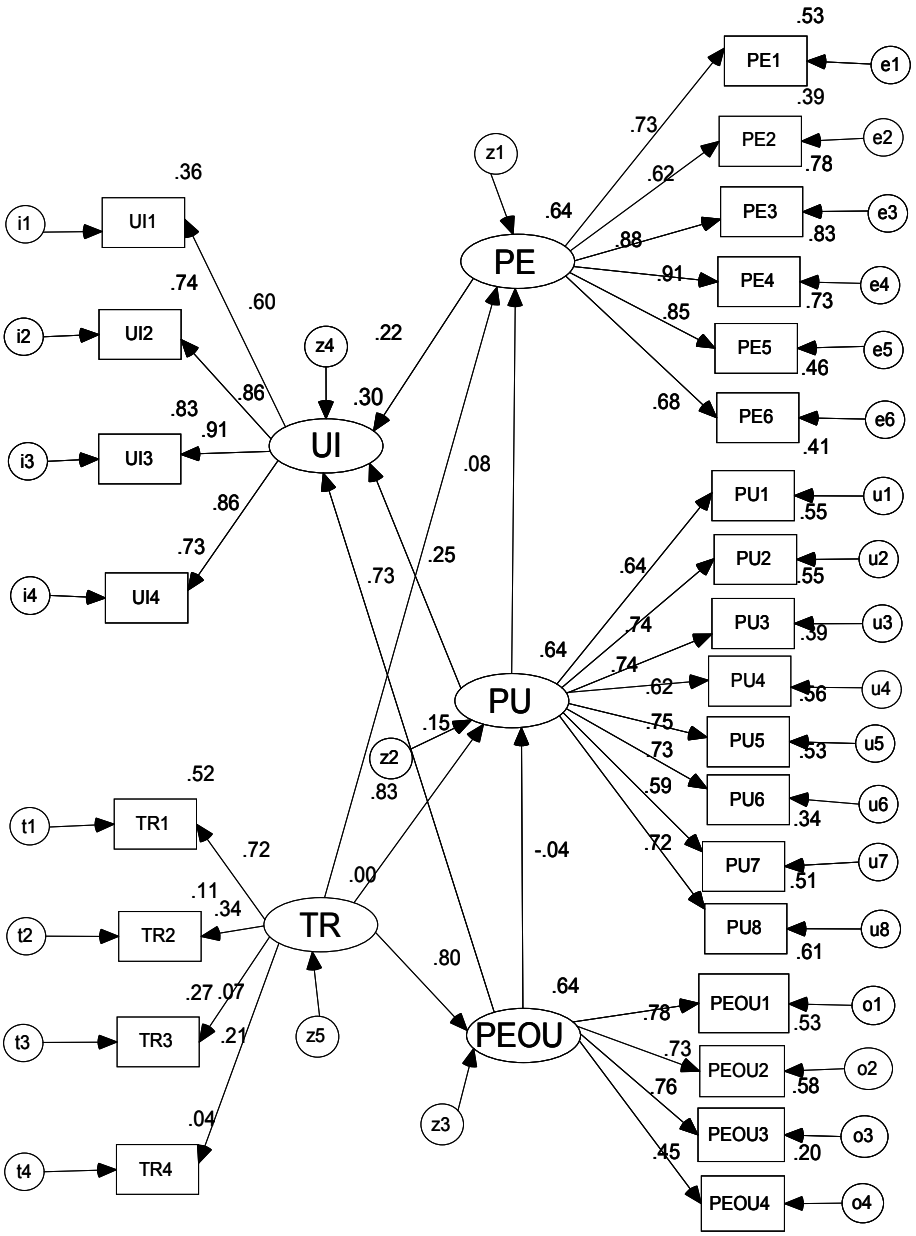
The comparison of the AIC value for Configuration 1 (1,994) with the value generated for Configuration 3 (2,020) presented in Table 5.31 confirmed the acceptance of Hypothesis 1b. These results therefore demonstrated that the configuration of PE, PU and PEOU illustrated in Configuration 1 constitutes the best fitted model. Configuration 1 was then applied to develop the structural models of TAM and TRAM, which is explained in the two following sections.

5.7.3 Structural Model of TRAM

5.7.3.1 Initial Structural Model - TRAM

The full structural model of TRAM is presented in Figure 5.16. The variables operationalised in the model were adopted from the results of the EFA and CFA procedures previously conducted. It can be seen from this figure that technology readiness is reflected by four parcels representing its dimensions. As suggested by Lin et al. (2007), TR was positioned as the main antecedent of the three TAM dimensions, i.e. perceived enjoyment (PE), perceived usefulness (PU) and perceived ease of use (PEOU). Paths in the model were estimated, resulting in a chi-square of 1833.2 with 291 degrees of freedom, thus indicating a low model fit and incompliance.

FIGURE 5.16 INITIAL FULL STRUCTURAL MODEL OF TRAM



5.7.3.2 Rectified Structural Model - TRAM

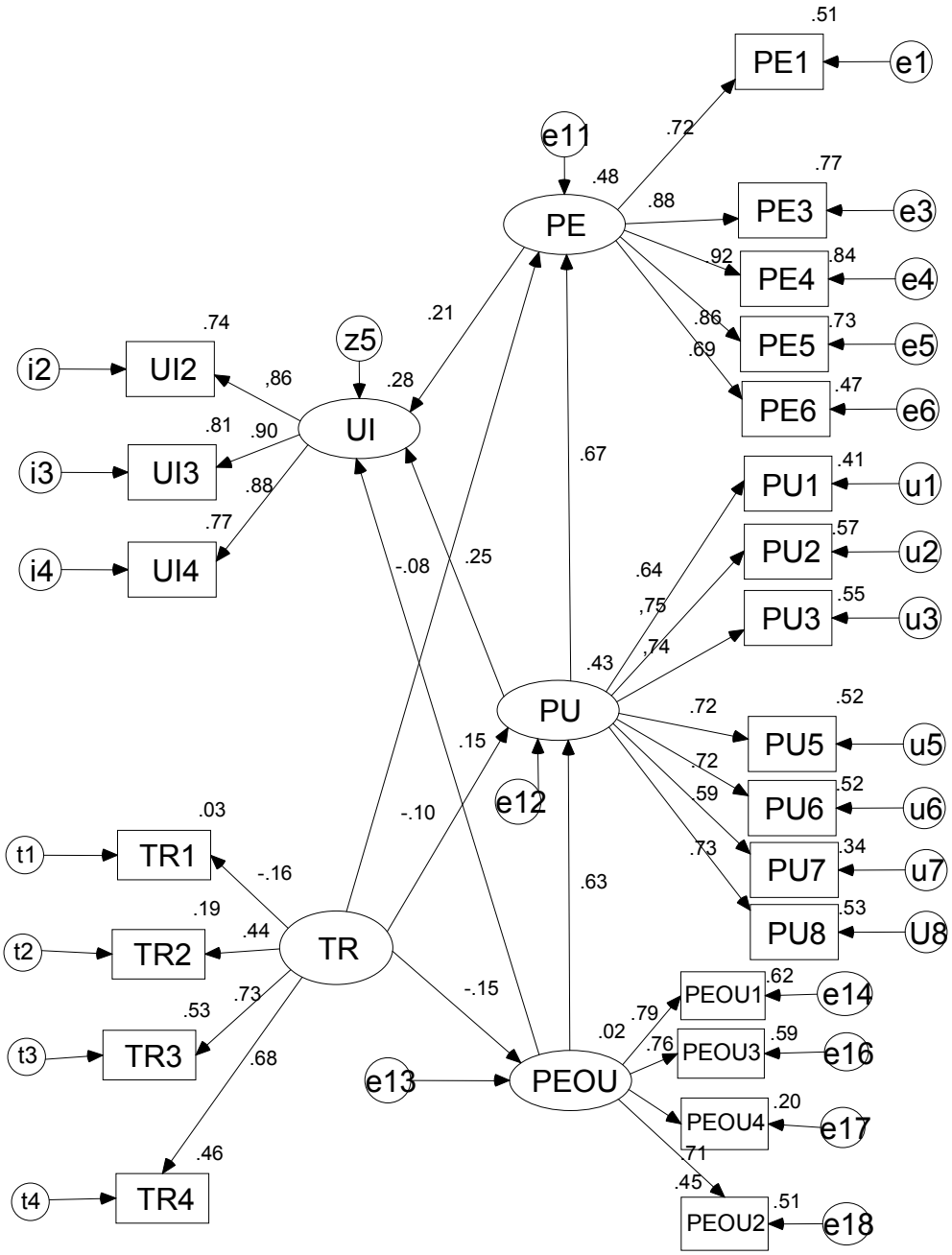
To achieve the model fit, a model rectification procedure was performed. High standardised covariance residual values of the model greater than 2 were observed and used to indicate those items causing the model fit incompliance. The items were further assessed to identify problems associated with interpretation bias, unexpected inter-item correlations and weak relevance to the research context. This procedure identified three items causing a low model fit (UI1, PE2 and PU4), and produced a final rectified model.

The removal of these three items produced the final modified model presented in Figure 5.17. As indicated by the fit indices shown in Table 5.32, this model demonstrated a notably improved fit. However, the fit indices did not confirm the final rectified model to display an adequate structural model fit.

TABLE 5.32 FIT INDICES OF RECTIFIED TRAM MODEL

Index	Final rectified model
Chi-square/df	6.396
CFI	0.857
GFI	0.846
RMSEA	0.090

FIGURE 5.17 THE FINAL RECTIFIED TRAM MODEL



5.7.4 Structural Model of TAM

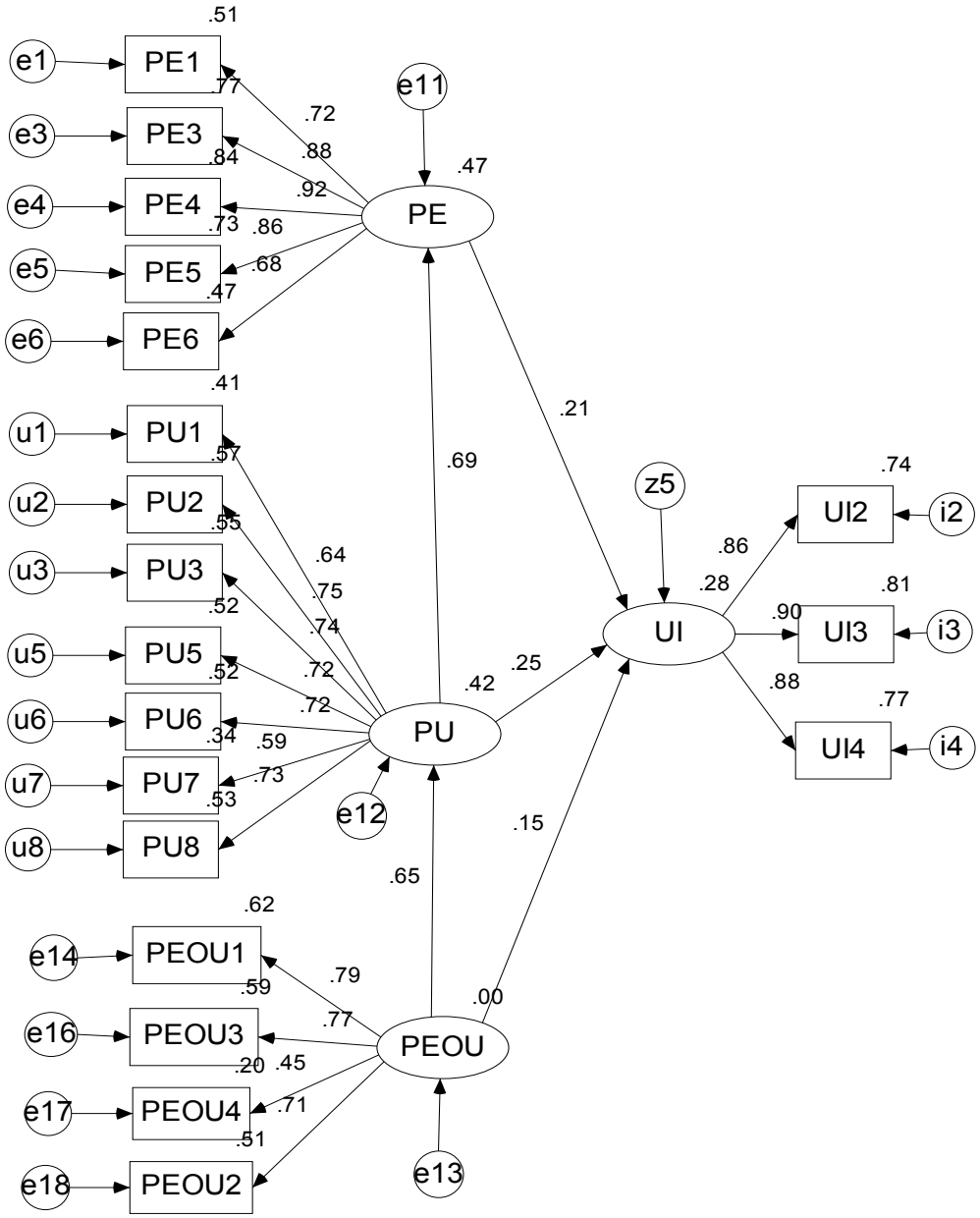
The structural model of TAM was obtained based on the model shown in Figure 5.18, where usage intention was predicted by PE, PU and PEOU without any influence from TR. To achieve the model fit, the same model rectification procedure as was carried out for TRAM was applied to the TAM structural model. This procedure also suggested the removal of the UI1, PE2 and PU4 items to gain a significant improvement of the model fit. As a result, the model performed an adequate model fit. This is indicated by the four

indices shown in Table 5.33. The chi-square/df value indicated a reasonable value of 6.396, which was well supported by an adequate Comparative Fit Index (CFI) value of 0.857. In the same direction, Goodness-of-Fit (GFI) and Root Mean Square Error of Approximation (RMSEA) also showed adequate values of 0.846 and 0.090, respectively.

TABLE 5.33 FIT INDICES OF RECTIFIED TAM MODEL

Index	Final rectified model
Chi-square/df	4.147
CFI	0.937
GFI	0.910
RMSEA	0.069

FIGURE 5.18 FINAL STRUCTURAL MODEL OF TAM



5.7.5 Test of Hypothesis 2: Structural Model Fit Analysis of TRAM and TAM

The results of the structural model fit analysis for the TRAM and TAM models revealed that the latter demonstrated the best fit to the data. The adequate fit of TAM was indicated by overall fit as shown in Table 5.34.

TABLE 5.34 FIT INDICES FOR TRAM AND TAM

	TRAM	TAM
Chi-square/df	6.396	4.147
CFI	0.857	0.937
GFI	0.846	0.910
RMSEA	0.090	0.069

As the results in Table 5.34 reveal, TAM performed adequate chi-square/df CFI, GFI and RMSEA values of 4.147, 0.937, 0.910 and 0.069, respectively. TRAM, on the other hand, failed to comply with the fit criteria: all fit indices used to assess the model did not result in acceptable levels. Both the chi-square/df (6.396) and RMSEA (0.090) were above the acceptable fit criteria, indicating poor model fit. Similarly, CFI and GFI were also under the fit cut-off value of 0.90. They both had low values of 0.857 and 0.846, indicating an inadequate fit of the model.

These results clearly confirmed that TAM as presented in Figure 5.18 is the model that provides a more parsimonious fit as a baseline model to test the moderator variables. Thus, the theoretical proposition suggesting the individual trait to be the main predictor of PE, PEOU and PU in forming usage intention as proposed by Lin, Shih and Sher (2007) in the original TRAM model was not proven in this thesis.

As a consequence, Hypothesis 2 (H2) was accepted, and is presented below:

H2: TAM provides a more parsimonious fit than TRAM for explaining mobile broadband technology acceptance.

The acceptance of H2 supports the strong theoretical insight that TAM can be used as a solid framework for explaining the process of mobile broadband technology acceptance, as well as for constructing a more integrated model. In addition, this thesis also confirmed that in the absence of moderator variable involvement, usage intention was influenced by the perception of ease of use of a technology through the mediation of PU and PE. This step also finalised confirmation of the structural model which produced the baseline model to be used in performing the moderator variable tests.

5.7.6 Investigation of the Role of Technology Readiness (TR) in the Model

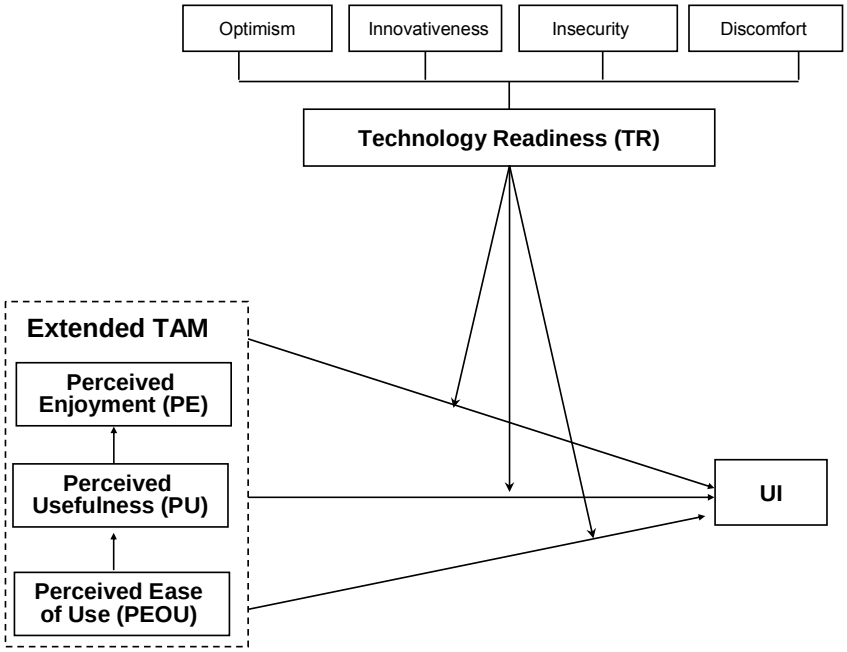
The results of the comparative model analysis reported in section 5.7.5 confirmed TAM to be a better fit baseline model for use in examining the moderator variable influence. This finding also suggested that TRAM should not be used due to its weak compliance with the

fit criteria. Accordingly, TR as the main construct of TRAM was also eliminated from the baseline model, leading to the question of what role it might play in the formation of usage intention. It has therefore become the intention of this thesis to also investigate the role of TR in the research model. Using TAM as the basis for hypothesising its role, only one possible role for TR emerges: that it is a moderator. To further investigate the potential role of TR as a moderator, research question 4 was developed as follows:

Research Question 4 (RQ4): 'In what way does technology readiness (TR) moderate TAM?'

The potential moderating role of technology readiness has been indicated by a number of previous studies. Agarwal and Prasad (1998) believed that potential adopters' innitiate innovativeness and propensity to take risk with regard to technology moderated their willingness to accept new technology. As revealed in a newer study conducted by Parasuraman (2000), innovativeness and propensity were important factors constructing an individual's technology readiness. In the same way, Lam et al. (2008) supported the belief about technology readiness moderating role. They referred technology readiness to the generalised beliefs and affects about technology which would enter into the evaluation process of technology ease of use and usefulness aspects. For that reason, underpinned by research question one and endorsed by the previous studies, it was considered essential to empirically test the possible moderating influence of TR on all paths of the model based on some specific hypotheses. For this purpose, hypothetical moderating role of TR were specifically indicated by the influence of TR on the relationships between consumers' perception of usefulness, ease of use and enjoyment about mobile broadband technology with usage intention. The hypothetical influence of TR in TAM is illustrated in the model displayed in Figure 5.19.

FIGURE 5.19 HYPOTHETICAL MODERATING ROLE OF TECHNOLOGY READINESS IN TAM



With reference to the model displayed in Figure 5.19, Hypotheses 10, 11 and 12 were developed to be tested based on the data.

H10: The positive influence of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by technology readiness.

H11: The positive influence of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by technology readiness.

H12: The positive influence of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by technology readiness.

5.8 MODERATOR VARIABLE INFLUENCE TEST

The definition of a moderator variable is a third variable that can strengthen or weaken the influence of a variable or sets of variables on other influenced variable(s) (Frazier, Barron & Tix 2004; Holmbeck 1997; Hopwood 2007; Wu & Zumbo 2007, 2008). A moderator

variable differs from a mediator variable based on its number of characteristics. Wu and Zumbo (2007) have summarised the characteristics of a moderator variable in an attempt to draw a clear distinction between moderators and mediators. Some of these characteristics were addressed in this thesis to develop a procedure for testing a variable's moderating influence in the model. The first characteristic is related to the nature of the variable. It is important to note that, while a mediator is associated with a temporary condition, a moderator is a trait. One can understand a trait as something that is relatively stable. It could be an attribute, an enduring process, or a background, context or orientation that can be measured based on either a continuous scale or a categorical scale. The second characteristic indicates its function as a third variable that modifies a causal effect but does not correlate with the independent variable. Finally, as the third characteristic, in terms of sequence of operation, a moderator variable precedes both an independent variable and a dependent variable.

This thesis focuses on moderator variables that display the above-mentioned characteristics. All of the variables, including CPV, Schwartz's cultural orientation, demographic factors and TR, acted as the third variables in the cause and effect relationship model. In addition, they were also associated with a trait, contextual condition, orientation and attribute preceding the TAM dimensions and usage intention in the technology acceptance process. TR, CPV and Schwartz's cultural orientation were measured based on a continuous Likert scale. The demographic factor was the only moderator measured by a categorical scale. James and Brett (1984), as cited by Sauer and Dick (1993), have suggested to transform the continuous scale used to measure moderator variable into discrete. Hence, to operate TR, CPV and Schwartz's cultural orientation in the moderating influence test procedure, the values of these variables were grouped into high and low categories. K-means cluster analysis was used for this purpose, because the number of clusters for grouping the data was predetermined, i.e two clusters. The high and low groups of data were used to develop unconstrained high and low data group models, a constrained model and a partially constrained model, to which the chi-square difference tests were applied. The results of these tests indicated whether the differences in the hypothesised relationships in the research model were significant across groups (Wang, CL 2008). A significant result confirmed the influence of moderator variables.

The step-by-step procedure used to test the influence of moderator variables is explained below:

1. For each moderator variable, the high and low data group models were developed.

2. Paths were estimated simultaneously for both groups and also for the baseline model where paths that were allowed to differ produced a chi-square with degrees of freedom.

3. The parameter estimates were then constrained to be equal, and a chi-square value resulted.

4. Paths were estimated simultaneously for both groups and the baseline model where paths that were allowed to differ produced a chi-square with degrees of freedom

5. Chi-square () and df of the high and low data group models were compared to those of the constrained model to identify any differences.

6. The difference was compared to the value in the table for the df obtained in step 6 above.

7. If the table value obtained in step 7 was less than the difference of values of high and low and constrained models, the moderator influence was concluded to be significant.

8. To identify in which paths the influence of the moderator occurred, individual analyses were performed by constraining one path at a time to obtain the chi-square of the individual constrained model.

9. Steps 5 to 8 were repeated to confirm whether there was a significant moderator variable influence on the constrained path.

5.8.1 Test of H3, H4 and H5: Moderating Influence of Consumer Perceived Value (CPV)

The hypothetical moderating influence of CPV on the relationships between the three dimensions of TAM (PU, PEOU and PE) and UI was examined based on Hypotheses H3, H4 and H5. To empirically test these hypotheses, the procedure for examining moderator variables explained in section 5.10 above was applied.

H3: The positive influence of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by consumer perceived value.

H4: The positive influence of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by consumer perceived value.

H5: The positive influence of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by consumer perceived value.

5.8.1.1 CPV High-Low Moderating Influence Structural Model

The structural model involving CPV as a moderator variable was obtained by applying the SEM procedure based on its high and low values. The model is shown in Figures 5.20 and 5.21, which resulted in chi-square and df values equal to 815.9 and 294, respectively.

FIGURE 5.20 HIGH CPV GROUP MODERATING INFLUENCE STRUCTURAL MODEL

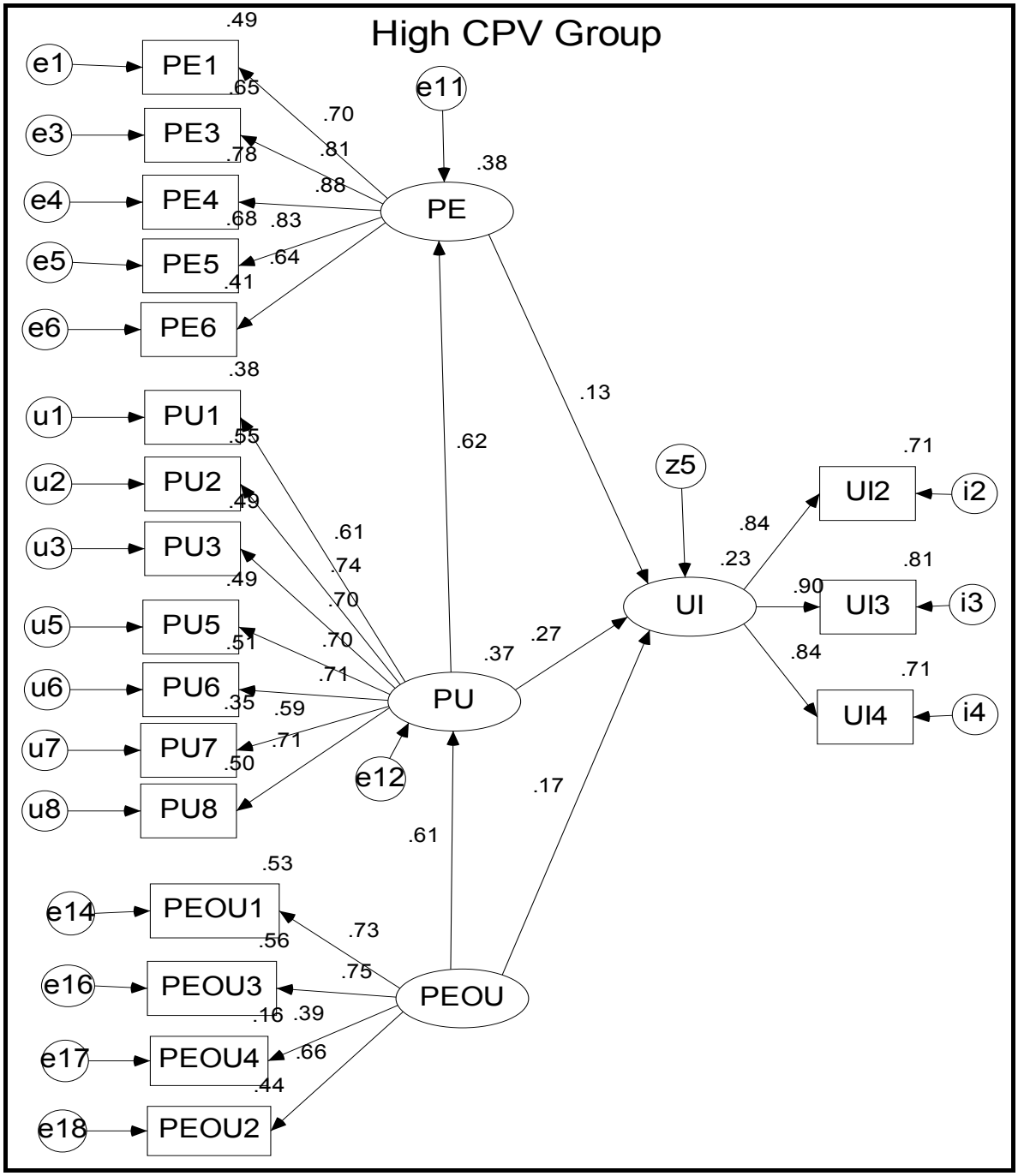
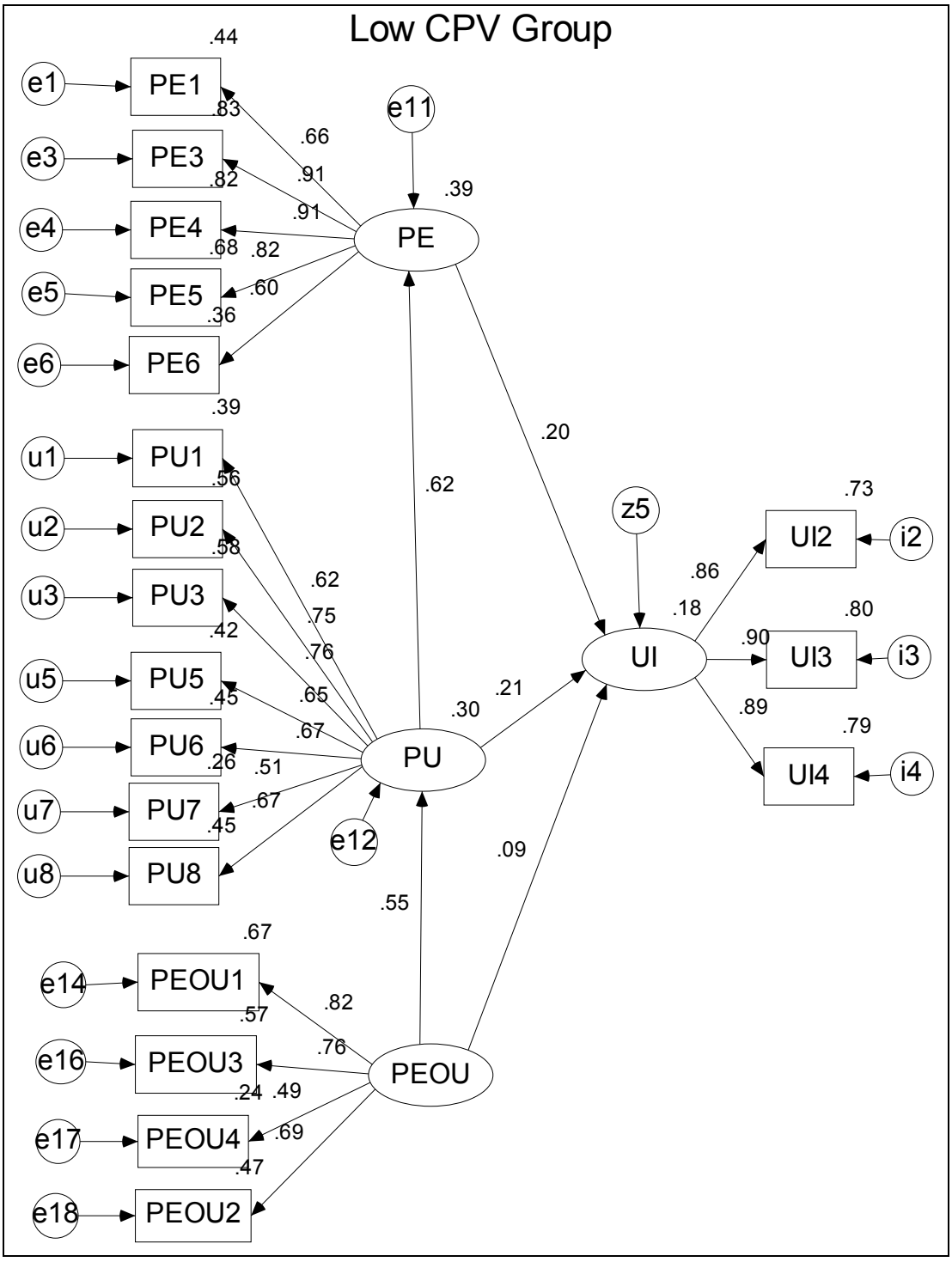


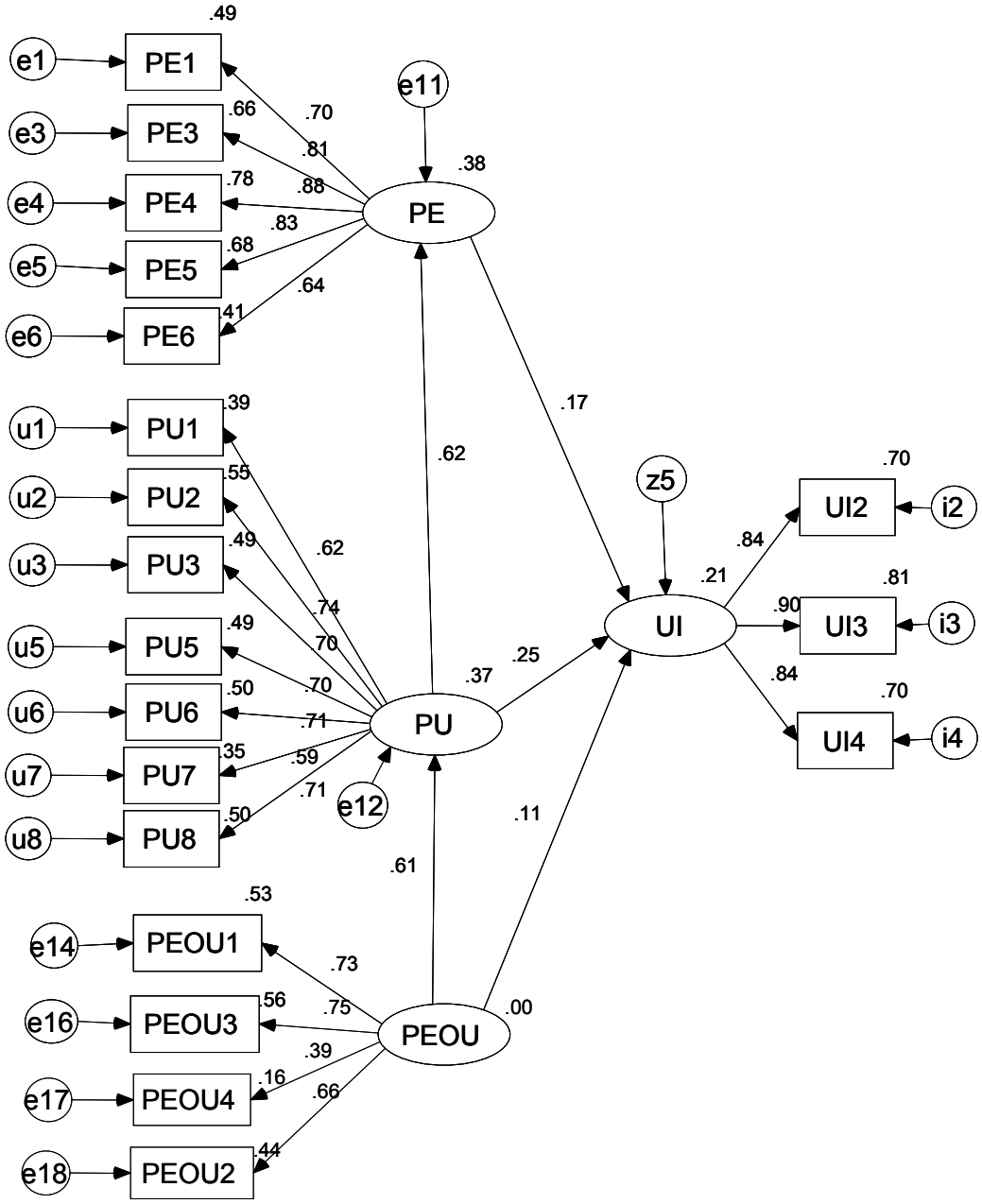
FIGURE 5.21 LOW CPV GROUP MODERATING INFLUENCE STRUCTURAL MODEL



5.8.1.2 CPV fully constrained model

In order to examine the moderating efffect of CPV on the structural model, the paths of PE–UI, PU–UI and PEOU–UI were fully constrained, resulting in chi-square = 817.9 and df = 297. The fully constrained model is presented in Figure 5.22 and was used as a comparison model in the CPV moderating influence test.

FIGURE 5.22 CPV MODERATED FULLY CONSTRAINED MODEL



5.8.1.3 Comparison of the CPV Fully Constrained and High-Low Moderating Models

At this point we have obtained two models to test the moderating influence of CPV. The first model is the baseline where the paths between group levels are allowed to freely differ. This model was named the CPV High & Low moderating model The second one is the fully constrained model in which the paths for each group are constrained to be equal. As shown in Table 5.35, the two models were compared based on their chi-square and degree of freedom (df) values to empirically test significant differences between the two caused by the CPV moderating influence.

TABLE 5.35 COMPARISON OF CHI-SQUARE AND DF VALUES FOR CPV

	CPV fully constrained model	CPV High & Low moderating model	Difference
Chi-Square	817.9	815.9	2
df	297	294	3

As shown in Table 5.35, the comparison of the two models above yielded the values of chi-square = 2 at df = 3. This value was compared with the chi-square table resulting in a value that is more than 0.05. This result confirmed an acceptance of null hypothesis, indicating that the CPV High-Low model is not significantly different from the fully constrained model. The acceptance of null hypothesis confirmed that there is no significant moderating influence of CPV on the paths of PE–UI, PU–UI and PEOU–UI in the structural model. As a result, H3, H4 and H5 were not supported.

5.8.2 Moderating Influence of Individual Cultural Orientation

The measurement model and SEM procedures previously performed on the 10 Schwartz universal human values confirmed two dimensions for measuring individual cultural orientation. These dimensions were to be tested and act as moderator variables, reflected by the two parcels obtained. As was explained in section 5.6.3, the first parcel was termed ‘conservatism’, or the conservative cultural orientation, and consisted of benevolence (BNV), conformity (CON), tradition (TRA) and security (SEC) values. The second parcel was referred to as ‘openness to change’, and represented by universalism (UNI), self-direction (SDR), stimulation (STI), hedonism (HED) and achievement (ACV) values. The moderating influence test of each culture dimension will be conducted separately in the next two sections.

5.8.2.1 Test of H6a1, H6a2 and H6a3: Moderating Influence of Conservatism

The hypothetical positive influence of conservatism on the relationships between PU, PEOU and PE and UI was examined based on the hypotheses H6a1, H6a2 and H6a3. The procedure for examining moderator variable as explained in section 5.10 above was applied to test these hypotheses.

H6a1: The positive influence of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by the conservative cultural orientation.

H6a2: The positive influence of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by the conservative cultural orientation.

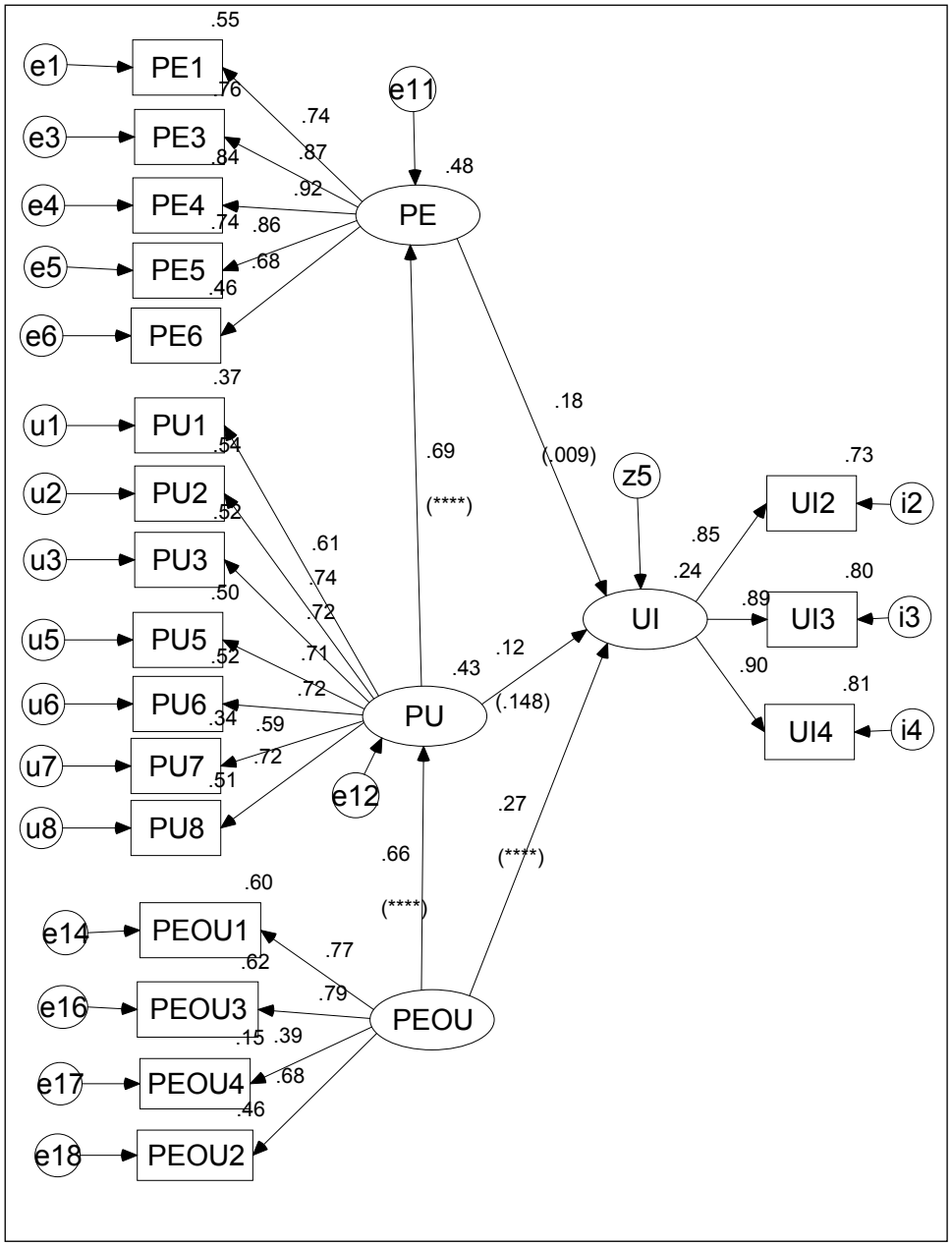
H6a3: The positive influence of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by the conservative cultural orientation.

5.8.2.1.1 Conservatism High-Low Moderating Influence Structural Model

The conservatism high-low model produced chi-square = 799.5 with 294 degrees of freedom. Figures 5.23 and 5.24 display these models and their estimate values.

FIGURE 5.23 HIGH CONSERVATISM STRUCTURAL MODEL

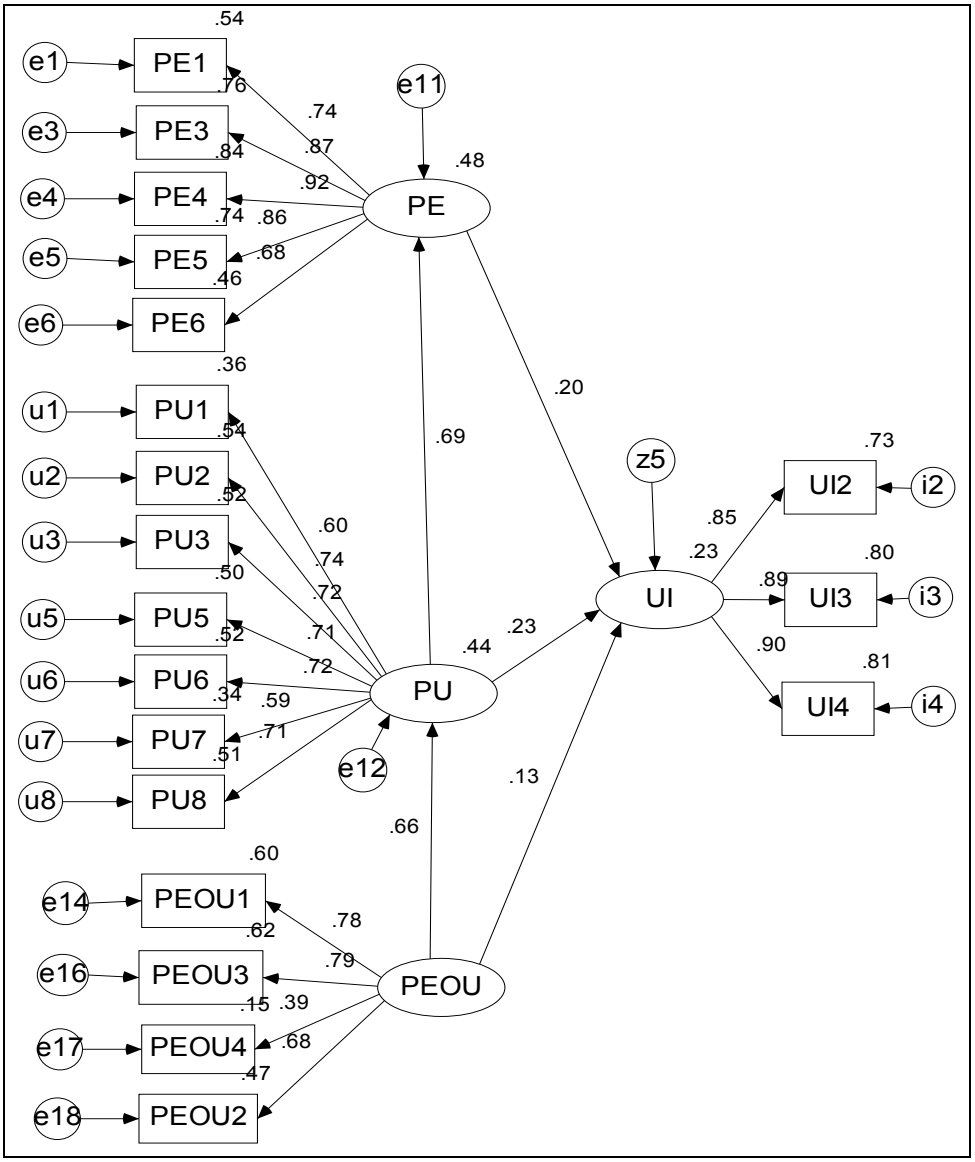
FIGURE 5.24 LOW CONSERVATISM STRUCTURAL MODEL



5.8.2.1.2 Conservatism Fully Constrained Model

In order to examine the moderating influence of the conservative cultural orientation, a model constraining the PE–UI, PU–UI and PEOU–UI path estimates was deployed, and is shown in Figure 5.25. A chi-square of 809.39 was obtained with 297 degrees of freedom, which will be compared with that of the high-low sample structural model.

FIGURE 5.25 CONSERVATISM FULLY CONSTRAINED MODEL



5.8.2.1.3 Comparison of the Fully Constrained and Conservatism High-Low Moderating Models

A comparison of chi-square and degree of freedom (df) values produced by the fully constrained and the conservatism high-low moderating models resulted in the value differences presented in Table 5.36.

TABLE 5.36 COMPARISON OF FULLY CONSTRAINED AND CONSERVATISM HIGH-LOW MODERATING MODELS

	Conservatism fully constrained model	Conservatism High & Low moderating model	Difference
Chi-square	809.3	799.5	9.8
Df	297	294	3

As shown in Table 5.36, the comparison of the two models above resulted in chi-square = 9.8 value difference with 3 degrees of freedom. This value was compared with the chi-square table, resulting in a value of less than 0.05. This result suggested that Ho was rejected, indicating there were significant estimate value differences between the high and low conservatism models occurring in the PE–UI, PU–UI and PEOU–UI relationships. As a result, a significant moderating influence of the conservative cultural orientation was strongly confirmed.

5.8.2.1.4 Conservatism Moderating Influence Test on PE–UI Path

To trace these differences, individual analyses were performed. The PU–UI and PEOU–UI constrained model estimates were obtained based on a structural model in which PU–UI and PEOU–UI were constrained. The model yielded a value of chi-square equal to 808.9, with 296 degrees of freedom, which will be compared to that of the fully constrained model. The comparison results are presented in Table 5.37.

TABLE 5.37 COMPARISON OF CHI-SQUARE AND DF VALUES FOR PU–UI AND PEOU–UI AND FULLY CONSTRAINED MODELS – CONSERVATISM

	Conservatism fully constrained model	PU–UI and PEOU–UI constrained model	Difference
Chi-Square	809.3	808.9	0.4
Df	297	296	1

As shown in Table 5.37, the chi-square value difference of 0.8 with 1 degree of freedom was compared to the chi-square table, providing a value that is greater than 0.05. This result suggested that Ho was accepted, indicating that there is no significant PE–UI estimate value difference in the high and low value models. The findings also confirmed that the cultural dimension of conservatism exerts no moderating influence on the PE–UI path in the structural model.

5.8.2.1.5 Conservatism Moderating Influence Test on PU–UI Path

The PE–UI and PEOU–UI constrained model estimates were obtained based on the structural model shown in Figure 5.26. The model yielded a chi-square equal to 808.5 with 296 degrees of freedom, to be compared to that produced by the fully constrained model. The comparison results are presented in Table 5.38.

FIGURE 5.26 THE PU–UI UNCONSTRAINED MODEL FOR CONSERVATISM MODERATING INFLUENCE TEST

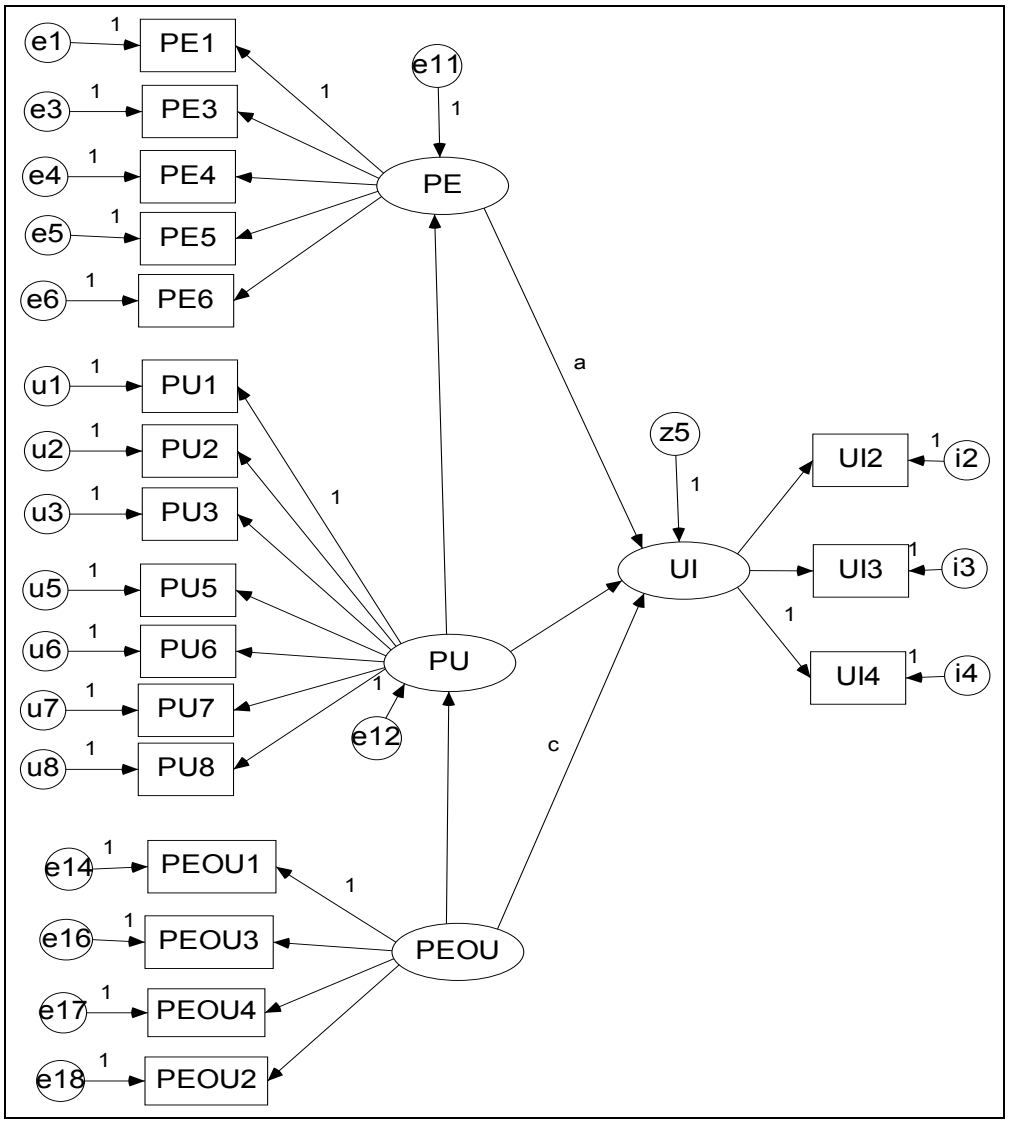


TABLE 5.38 COMPARISON OF CHI-SQUARE AND DF VALUES FOR PU–UI UNCONSTRAINED AND FULLY CONSTRAINED MODELS – CONSERVATISM

	Conservatism fully constrained model	PU–UI unconstrained model	Difference
Chi-square	809.3	808.5	0.8
Df	297	296	1

As shown in Table 5.38, the chi-square value difference of 0.8 with 1 degree of freedom was compared to the chi-square table, providing a value that is greater than 0.05. This result suggested that Ho was accepted, indicating that there is no significant PU–UI estimate value difference in the high and low value models. The result also confirmed that the conservative cultural dimension displays no moderating influence on the PU–UI path in the structural model.

5.8.2.1.6 Conservatism Moderating Influence Test on PEOU–UI Path

The PE–UI and PU–UI constrained model estimates were obtained based on the model shown in Figure 5.27. This model yielded a value of chi-square equal to 805.5, with 296 degrees of freedom, which will compared to that of the fully constrained model. The comparison results are presented in Table 5.39.

FIGURE 5.27 THE PEOU–UI UNCONSTRAINED MODEL FOR CONSERVATISM MODERATING INFLUENCE TEST

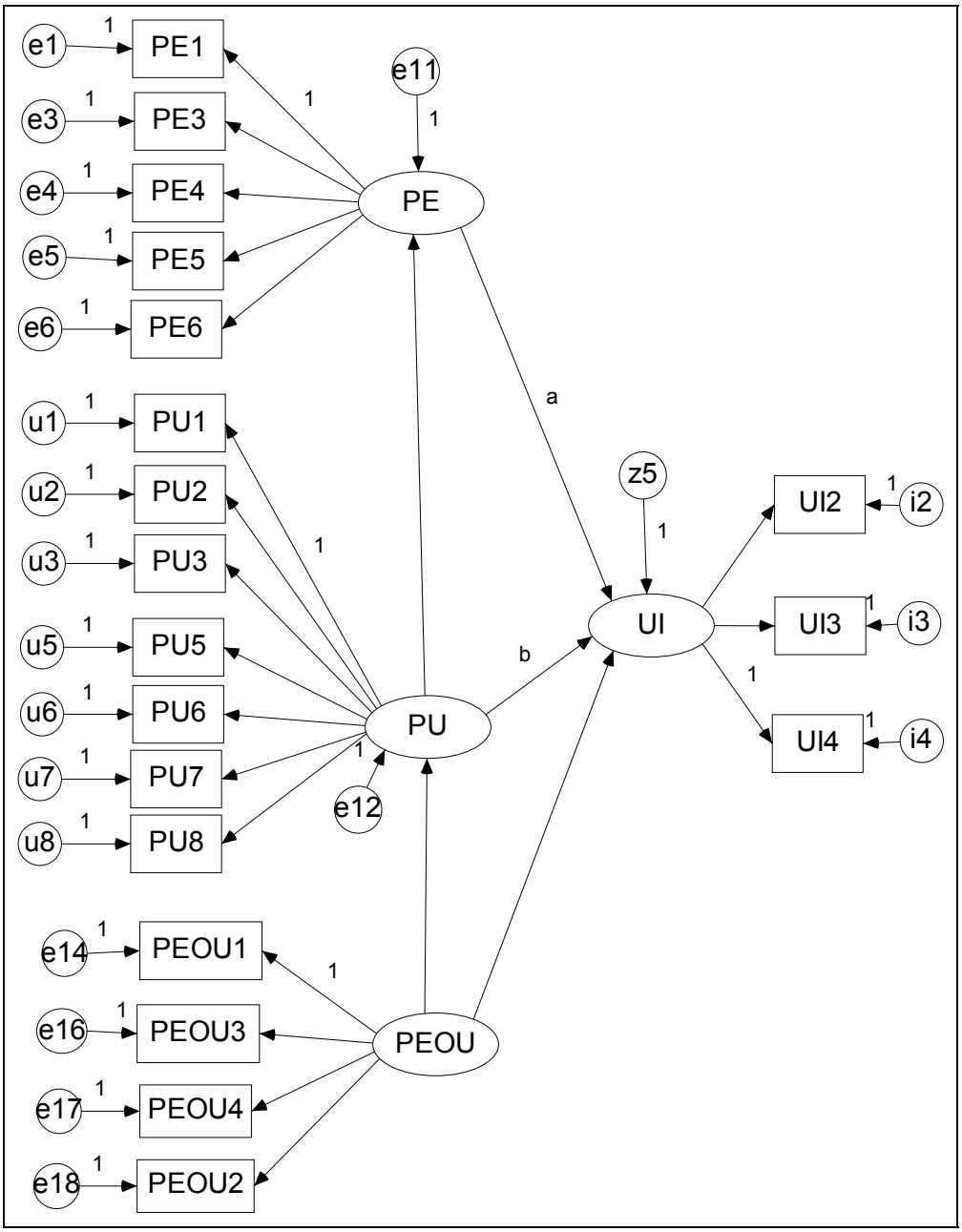


TABLE 5.39 COMPARISON OF CHI-SQUARE AND DF VALUES FOR PEOU–UI UNCONSTRAINED AND FULLY CONSTRAINED MODELS

	Conservatism fully constrained model	PEOU–UI unconstrained model	Difference
Chi-square	809.3	808.5	3.8
Df	297	296	1

As shown in Table 5.39, the chi-square value difference of 3.8 with 1 degree of freedom was compared to the chi-square table, providing a value greater than 0.05. This result suggested that Ho was accepted, indicating that there is no significant PEOU–UI estimate value difference in the high and low value models. The result also evidenced that conservatism exerts no moderating influence on the PEOU–UI path in the structural model.

5.8.2.1.7 Summary of Conservatism Moderating Influence Test Results

The conservatism moderating influence test confirmed significant results on the overall structural model as well as for the PE–UI, PU–UI and PEOU–UI paths, as shown in Table 5.40.

TABLE 5.40 SUMMARY OF CONSERVATISM MODERATING INFLUENCE TEST RESULTS

Variable	Overall moderating influence	Moderating influence on PE-UI	Moderating influence on PU-UI	Moderating influence on PEOU-UI
Conservatism (BNV, CON, TRA, SEC)	Significant	Not Significant	Not Significant	Not Significant

5.8.2.1.8 All-Path/Five-Path Constrained Model

Conservatism has been proven to have a significant overall influence on the acceptance model. However, the moderating test conducted individually on the PE–UI, PU–UI and PEOU–UI paths did not provide any significant results. To further investigate this, a full moderating influence of conservatism test was conducted on all five paths including PEOU–PU and PU–PE. The full test was performed by constraining the five paths in the moderated model, as shown in Figure 5.28.

FIGURE 5.28 CONSERVATISM FULL 5-PATH FULLY CONSTRAINED MODEL

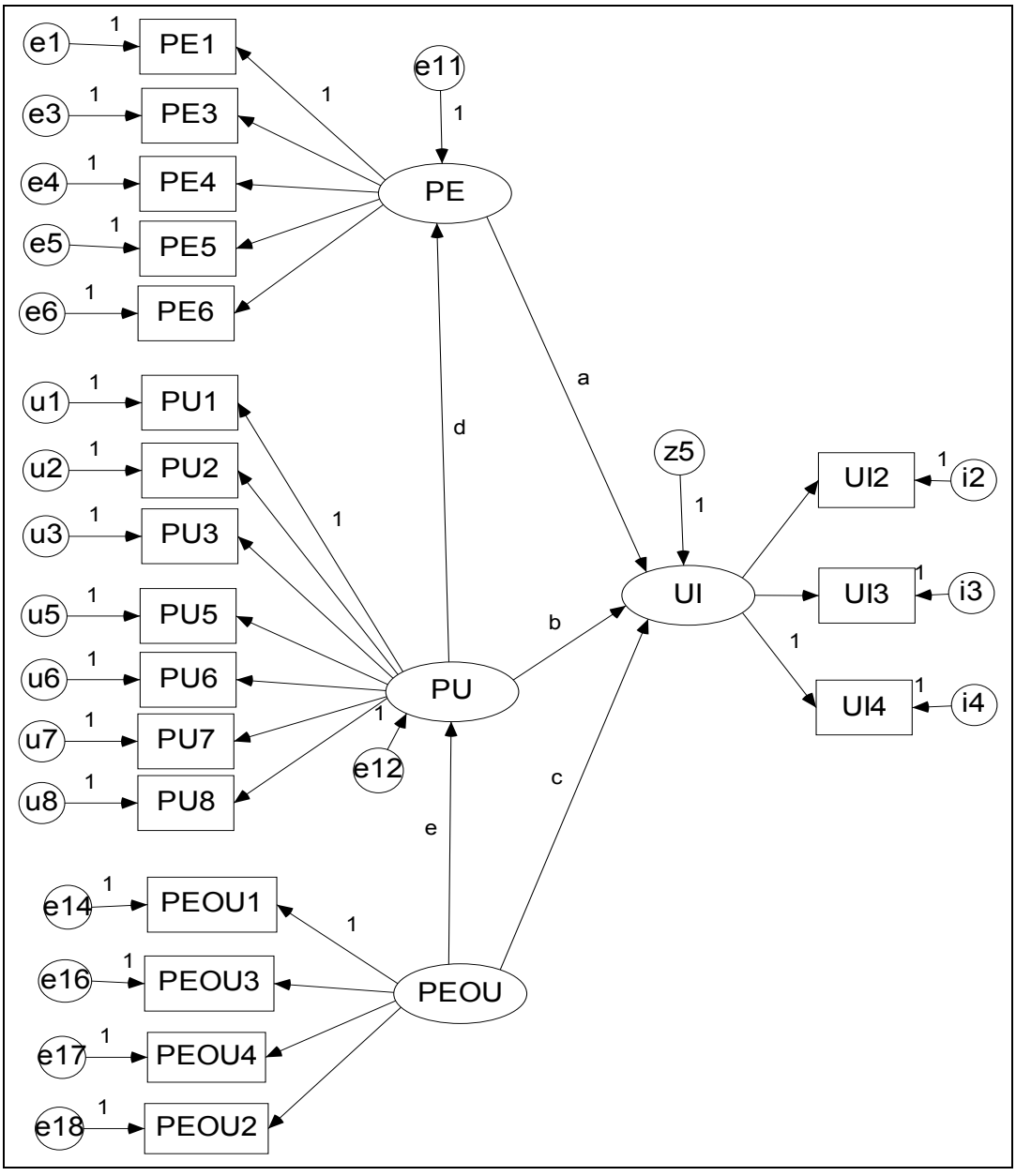


TABLE 5.41 SUMMARY OF CONSERVATISM INFLUENCE TEST ON ALL PATHS OF THE STRUCTURAL MODEL

	λ^2	df	Compared to Constrained Model		Result
			$\triangle \lambda^2$	$\triangle$ df	
Moderating	799.5	294	20.5	5	Significant
5 Paths Constrained	820.0	299	-	-	-
PE-UI	819.9	298	0.1	1	Not Significant
PU-UI	819.1	298	0.9	1	Not Significant
PEOU-UI	816.6	298	3.4	1	Not Significant
PU-PE	809.8	298	10.2	1	Significant
PEOU-PU	817.3	298	2.7	1	Not Significant

The test results of the conservatism influence test based on the five-path constrained model are presented in Table 5.41 above, indicating that the PU–PE path is significantly moderated by conservatism. Therefore, even though the overall influence of conservatism was found to be significant, the moderator variable influence test on the five paths suggested that H6a1, H6a2 and H6a3 were not supported. The significant moderating influence of conservatism was only exerted on the PU–PE relationship.

5.8.2.2 Test of H6b1, H6b2 and H6b3: Moderating Influence of Openness to Change

As reported in sections 5.5 and 5.6, in addition to the conservatism dimension, individual cultural orientation was also measured by another Schwartz parcelled dimension known as 'openness to change'. This finding was supported by the EFA and CFA procedures, which also indicated that the 'self-enhancement and self-transcendence' dimensions were not evidenced in the case of Indonesian consumers.

To better understand the influence of individual cultural orientation indicated by the openness to change dimension, Hypotheses H6b1, H6b2 and H6b3 were tested. The procedure for examining the moderator variable influence as explained in section 5.10 above was applied in order to test these hypotheses.

H6b1: The positive effect of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by the openness to change cultural orientation.

H6b2: The positive effect of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by the openness to change cultural orientation.

H6b3: The positive effect of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by the openness to change cultural orientation.

5.8.2.2.1 Openness to Change High-Low Moderating Influence Structural Model

The openness to change data divided into high and low groups were used to produce structural models to conduct the moderation test, in which its paths were allowed to differ. The models were estimated and produced a value of chi-square = 835.4 with 294 degrees of freedom. Figures 5.29 and 5.30 display the high and low openness to change moderated models.

FIGURE 5.29 HIGH OPENNESS TO CHANGE MODERATED STRUCTURAL MODEL

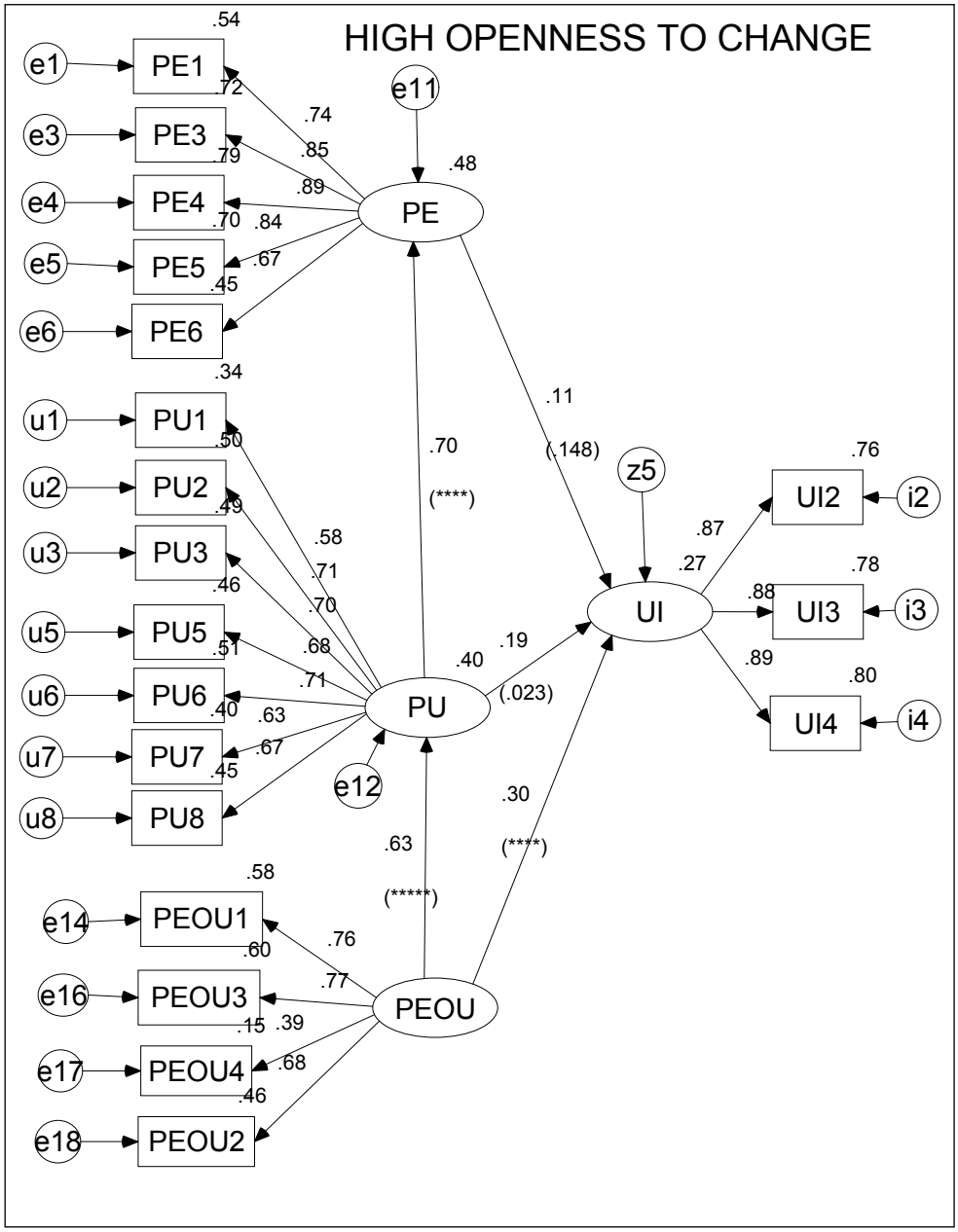
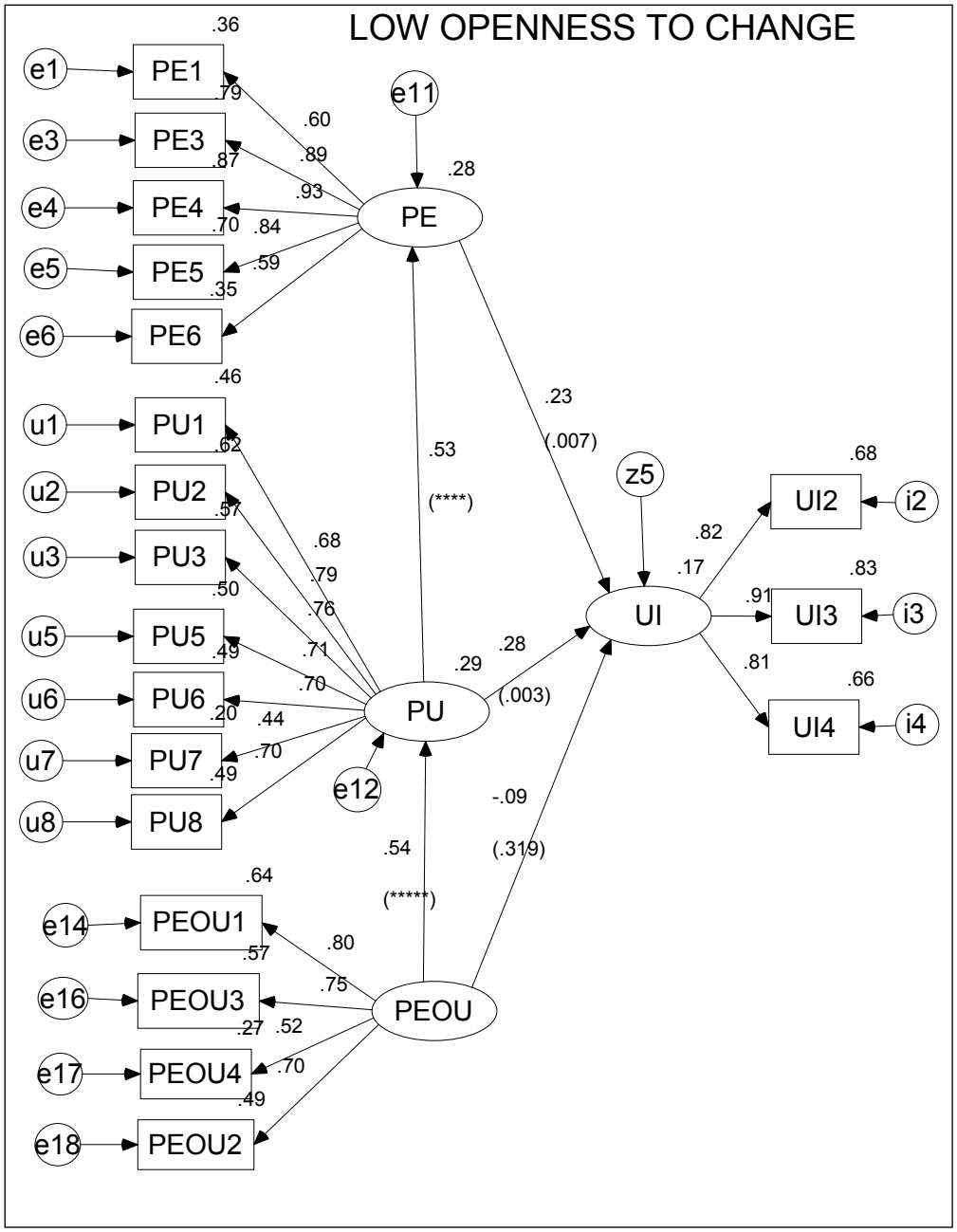


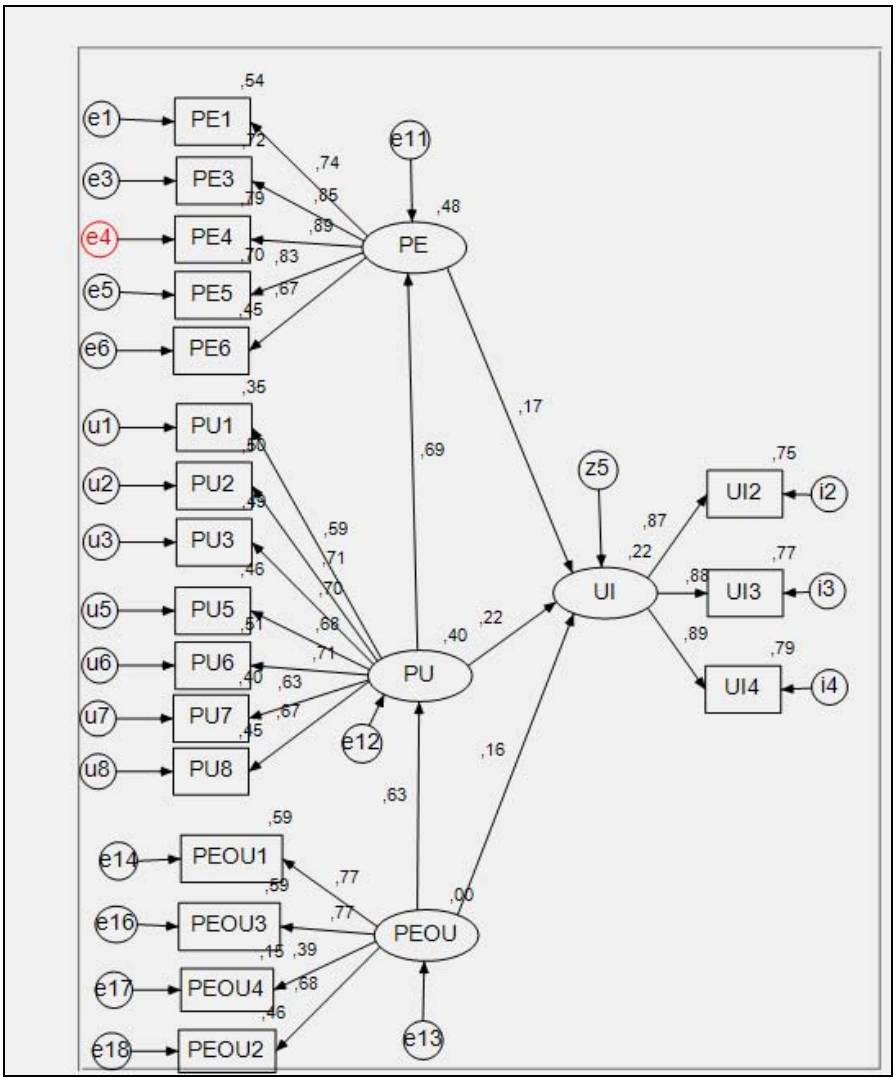
FIGURE 5.30 LOW OPENNESS TO CHANGE MODERATED INFLUENCE STRUCTURAL MODEL



5.8.2.2.2 Openness to Change Fully Constrained Model

A model constraining the PE–UI, PU–UI and PEOU–UI path estimates, as shown in Figure 5.61, was used to detect the moderating influence of the openness to change cultural orientation. A chi-square of 848 was obtained with 297 degrees of freedom, which will be compared with that of the high-low sample structural model.

FIGURE 5.31 OPENNESS TO CHANGE MODERATED FULLY CONSTRAINED MODEL



5.8.2.2.3 Comparison of the Fully Constrained and High-Low Openness To Change Moderating Models

A comparison of the chi-square and degree of freedom (df) values produced by the fully constrained and high-low openness to change moderating models resulted in the value differences presented in Table 5.42.

TABLE 5.42 COMPARISON OF CHI-SQUARE AND DF VALUES OF FULLY CONSTRAINED VS. HIGH-LOW MODERATING MODELS - OPENNESS TO CHANGE

	Openness to change fully constrained model	Openness to change High & Low moderating model	Differences
Chi-square	848	835,4	12.6
Df	297	294	3

As shown in Table 5.41, the comparison between the two models above resulted in chi-square = 12.6 with 3 degrees of freedom. This value was compared with the chi-square table, resulting in a value that is less than 0.05. The result suggested that Ho was rejected, indicating that there were significant estimate value differences between the high and low Openness to change models occurring in the PE–UI, PU–UI and PEOU–UI relationships. As a result, a significant moderating influence of the openness to change cultural orientation was strongly confirmed.

5.8.2.2.4 Openness to Change Moderating Influence Test on PE–UI Path

To more closely specify these differences, individual analyses were performed. The PU–UI and PEOU–UI constrained model estimates were obtained based on the openness to change moderated model, in which PU–UI and PEOU–UI were constrained. The model yielded a chi-square value equal to 848, with 296 degrees of freedom, which will compared to that produced by the fully constrained model. The comparison results are presented in Table 5.43.

TABLE 5.43 COMPARISON OF CHI-SQUARE AND DF VALUES: FULLY CONSTRAINED VS. PE–UI UNCONSTRAINED MODELS – OPENNESS TO CHANGE

	Openness to change fully constrained model	Openness to change PE–UI unconstrained model	Difference
Chi-square	848	848	0
Df	297	296	1

As shown in Table 5.43, the chi-square value difference of 0 with 1 degree of freedom was compared to the chi-square table, providing a value that is slighlty less than 0.05. This result suggested that Ho was rejected, indicating a significant PE–UI estimate value

difference in the high and low value models. The result also confirmed a significant moderating influence of the openness to change cultural dimension on the PE–UI relationship in the structural model.

5.8.2.2.5 Test of Openness to Change Moderating Influence on PU–UI Path

To test the moderating influence of the openness to change cultural dimension on the PU–UI path, a PE–UI and PEOU–UI constrained path model was developed. The model produced a chi-square value of equal to 846 with 296 degrees of freedom. The comparison results between this value and that of the openness to change fully constrained model are presented in Table 5.44.

TABLE 5.44 COMPARISON OF CHI-SQUARE AND DF VALUES: FULLY CONSTRAINED VS. PE–UI AND PEOU–UI CONSTRAINED MODEL - OPENNESS TO CHANGE

	Openness to change fully constrained model	PE–UI and PEOU–UI constrained model	Difference
Chi-square	848	846.8	1.2
Df	297	296	1

As shown in Table 5.44, the chi-square value difference of 1.2 with 1 degree of freedom was compared to the chi-square table, providing a value that is greater than 0.05. This result suggested that Ho was accepted, indicating no significant PU–UI estimate value difference in the high and low value models. The result also confirmed that the openness to change cultural dimension exerts no moderating influence the PU–UI path in the structural model.

5.8.2.2.6 Test of Openness to Change Moderating Influence on PEOU–UI Path

The moderating influence of the openness to change cultural dimension on the PEOU–UI path was tested using a PE–UI and PEOU–UI constrained path model. The model generated chi-square value equal to 838.1, with 296 degrees of freedom. The comparison results of this value with that of the openness to change fully constrained model are presented in Table 5.45.

TABLE 5.45 COMPARISON OF CHI-SQUARE AND DF VALUES: FULLY CONSTRAINED VS. PE–UI AND PU–UI CONSTRAINED MODELS - OPENNESS TO CHANGE

	Openness to change fully constrained model	PE–UI and PU–UI constrained model	Difference
Chi-square	848	838.1	9.9
Df	297	296	1

As shown in Table 5.45, the chi-square value difference of 9.9 with 1 degree of freedom was compared to the chi-square table, providing a value that is less than 0.05. This result suggested that Ho was rejected, indicating a significant PEOU–UI estimate value difference in the high and low value models. The result also confirmed that the openness to change cultural dimension demonstrated a sigfinicant moderating influence on the PEOU–UI path in the structural model.

5.8.2.2.7 Summary of Openness to Change Moderating Influence Test Results

It can be seen from the results presented in Table 5.46 that the openness to change moderating influence test confirmed significant results on the overall structural model. The moderating influence of Openness to change was also proven to be significant on PE–UI and PEOU–UI. However, no significant evidence was found confirming a moderating influence of openness to change on PU–UI. Thus, based on these results we concluded that H6b2 and H6b3 were supported, but H6b1 was not accepted.

TABLE 5.46 SUMMARY OF OPENNESS TO CHANGE MODERATING INFLUENCE TEST RESULTS

Variable	Overall moderating influence	Moderating influence on PE-UI	Moderating influence on PU-UI	Moderating influence on PEOU-UI
Openness to change (SDR, STI, UNI, ACV, HED)	Significant	Significant	Not Significant	Significant

5.8.3 Moderating Influence Test of Demographic Factors

The hypothetical moderating influence of demographic factors on the relationships between the three dimensions of TAM (PU, PEOU and PE) and UI was examined based on the hypotheses H12, H13 and H14.

H12: The positive effect of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by demographic factors.

H13: The positive effect of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by demographic factors.

H14: The positive effect of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by demographic factors.

As was outlined in section 3.2.3, age and gender were found to be the demographic variables to have the greatest potential moderating influences in the acceptance model. Therefore, age and gender were used to classify the respondents into demographic groups to test Hypotheses 12, 13 and 14. The data were first split into male and female groups, then each gender group was further divided into young and old categories. As a result, four demographic groups were obtained: male young, male old, female young and female old. The cut-off point of age for grouping the respondents into young and old categories was empirically determined based on the results of a K-mean cluster analysis applied to the data. This analysis indicated the age of 30 as the cut-off limit between young and old. This age limit was considered appropriate in reflecting the actual situation in the population for two reasons. First, the potential users of mobile broadband technology primarily come from the younger age group of 18 to 34 years (86.3%), as reported in section 4.6.4. Second, the findings drawn from the literature showed that previous studies have applied different demarcation lines to categorise age into old and young.

The moderating influence of demographic factors were empirically tested based on the procedure explained in section 5.10. The procedure was first applied to the female old and female young groups, then to the male old and young groups.

5.8.3.1 Test of Female Group Moderating Influence

5.8.3.1.1 Female Old and Young Group Models

The old and young female group moderating influence models, with chi-square value of equal to 664.6 and df = 294, are presented in Figures 5.32 and 5.33.

FIGURE 5.32 OLD FEMALE GROUP MODERATING INFLUENCE STRUCTURAL MODEL

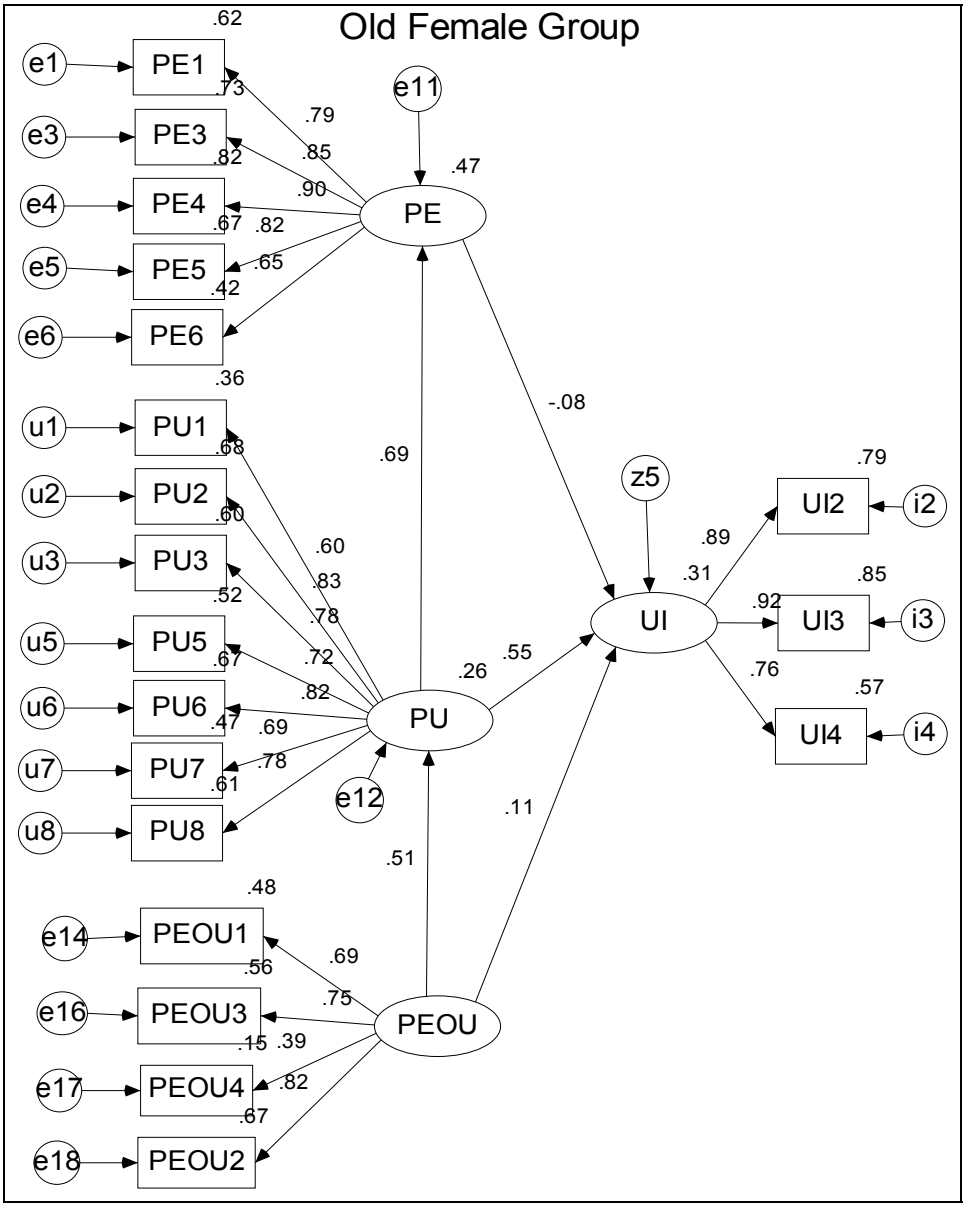
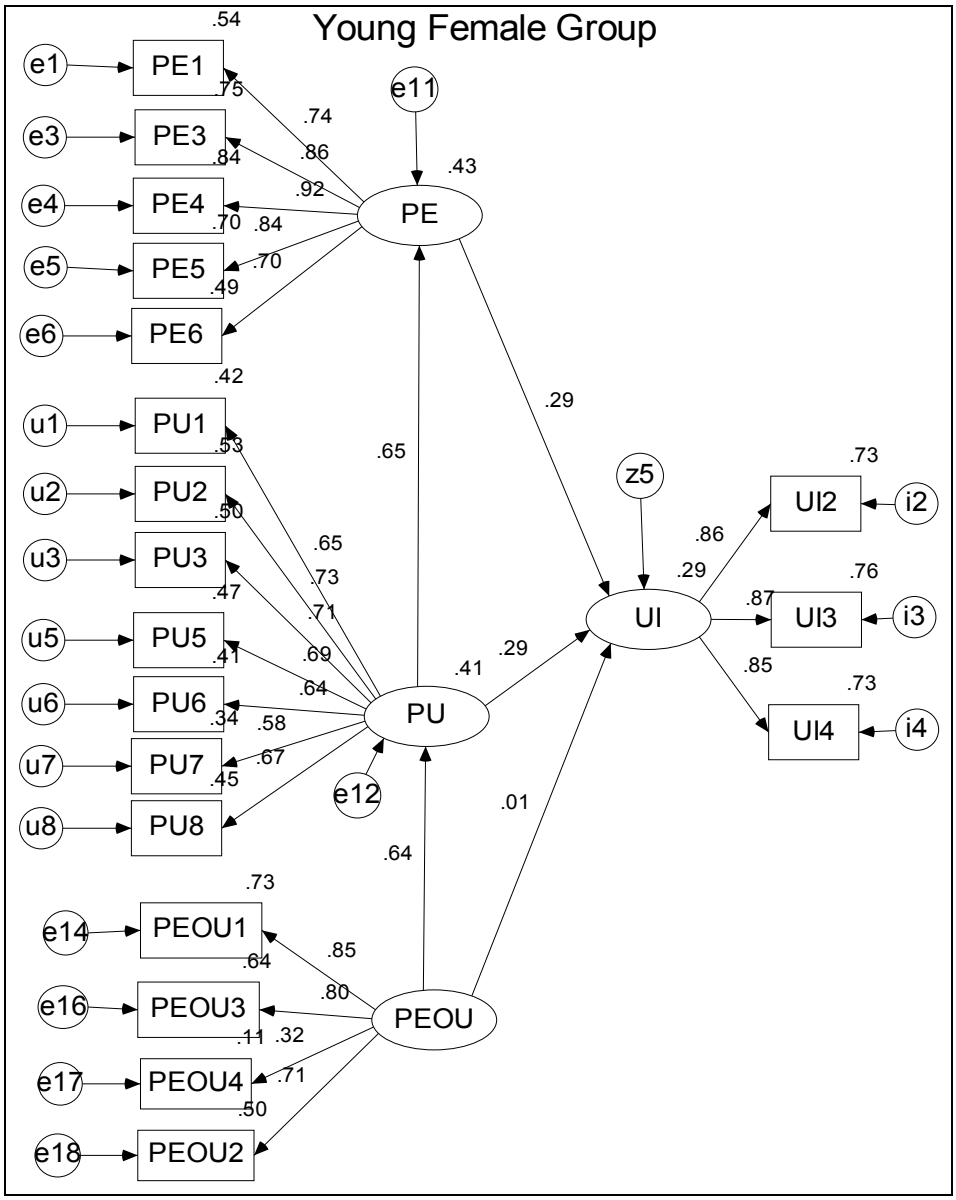


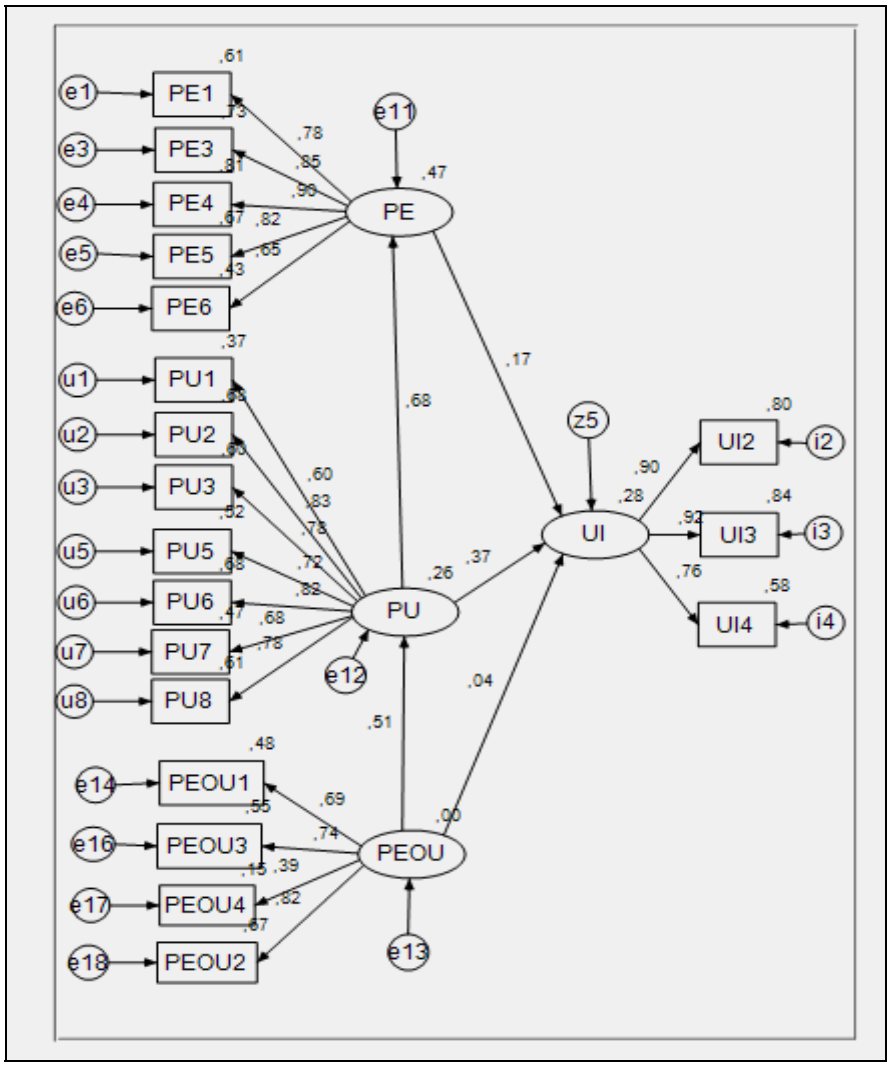
FIGURE 5.33 YOUNG FEMALE GROUP MODERATING INFLUENCE STRUCTURAL MODEL



5.8.3.1.2 Female Fully Constrained Model

The old and young female fully constrained model with chi-square = 669.2 and df = 297 is presented in Figure 34.

FIGURE 5.34 FEMALE FULLY CONSTRAINED MODEL



5.8.3.1.3 Comparison of Female Old andYoung Group Models and Fully Constrained Model

The two models were compared based on their chi-square and degree of freedom (df) values to empirically test significant differences between the two caused by the moderating influence of the female age demographic factor. The comparison results are shown in Table 5.47 below.

TABLE 5.47 Comparison of chi-square and df values

	Female old and young fully constrained model	Female old and young moderating model	Difference
Chi-square	669.2	664.6	4.6
df	297	294	3

As shown in Table 5.47, the comparison of the two models above yielded chi-square = 4.6 at df = 3. This value was further compared with the chi-square table, resulting in a value that is more than 0.05. This result confirmed acceptance of Ho, indicating that the female old-young model was not significantly different from the fully constrained model. The acceptance of Ho confirmed that there is no significant moderating influence of the demographic factor of age in the female category on all paths of PE–UI, PU–UI and PEOU–UI of the structural model.

5.8.3.2 Test of Male Group Moderating Influence

5.8.3.2.1 Male Old and Young Group Models

The old and young male group moderating influence models with a chi-square equal to 558.8 and df = 294 are displayed in Figures 5.35 and 5.36 below.

FIGURE 5.35 OLD MALE GROUP MODERATING INFLUENCE STRUCTURAL MODEL

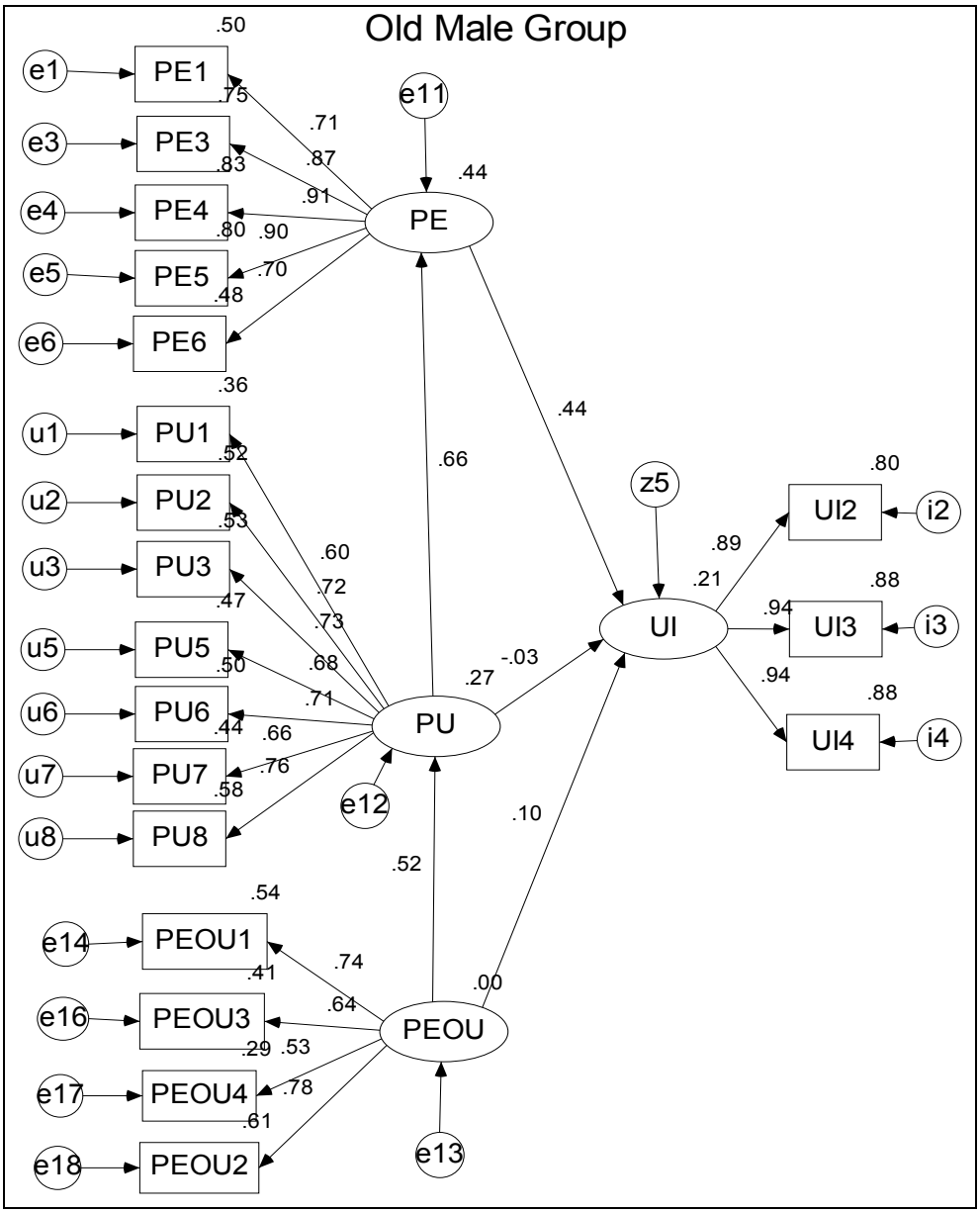
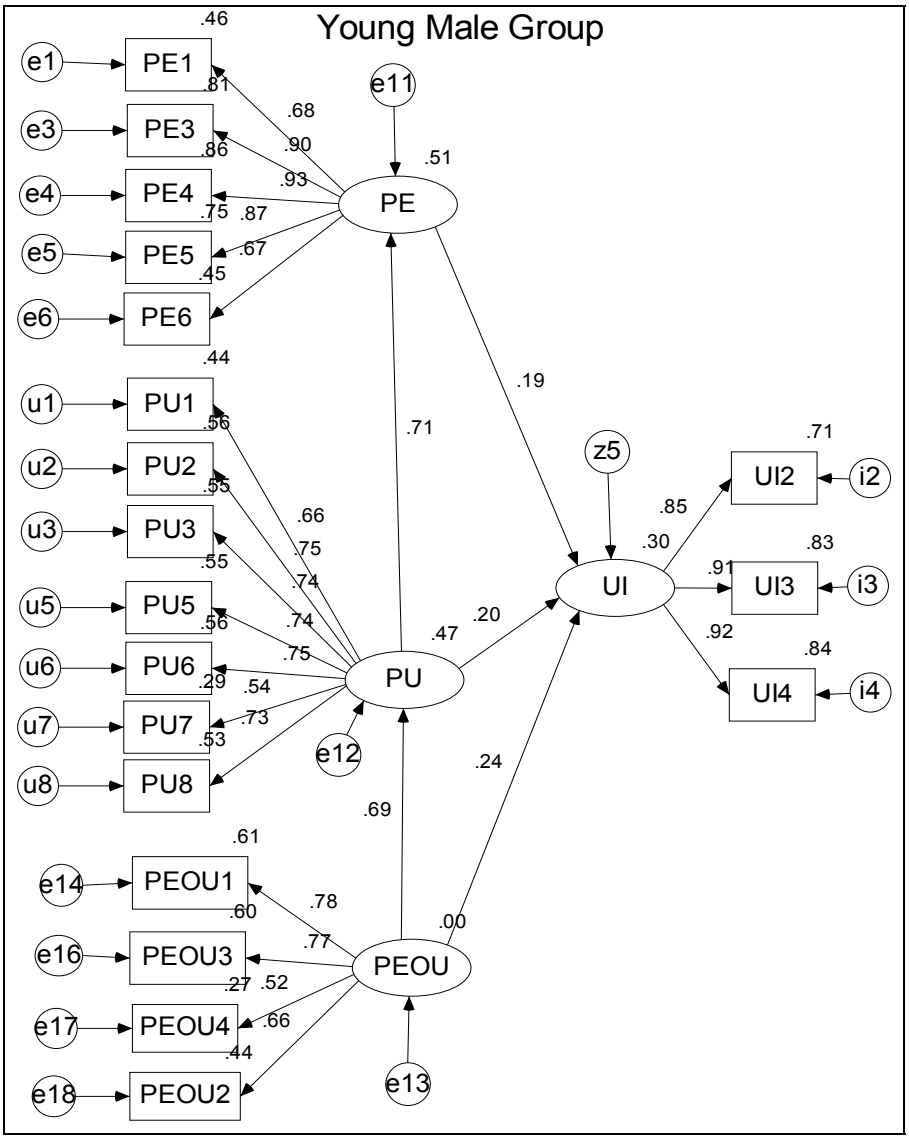


FIGURE 5.36 YOUNG MALE GROUP MODERATING INFLUENCE STRUCTURAL MODEL

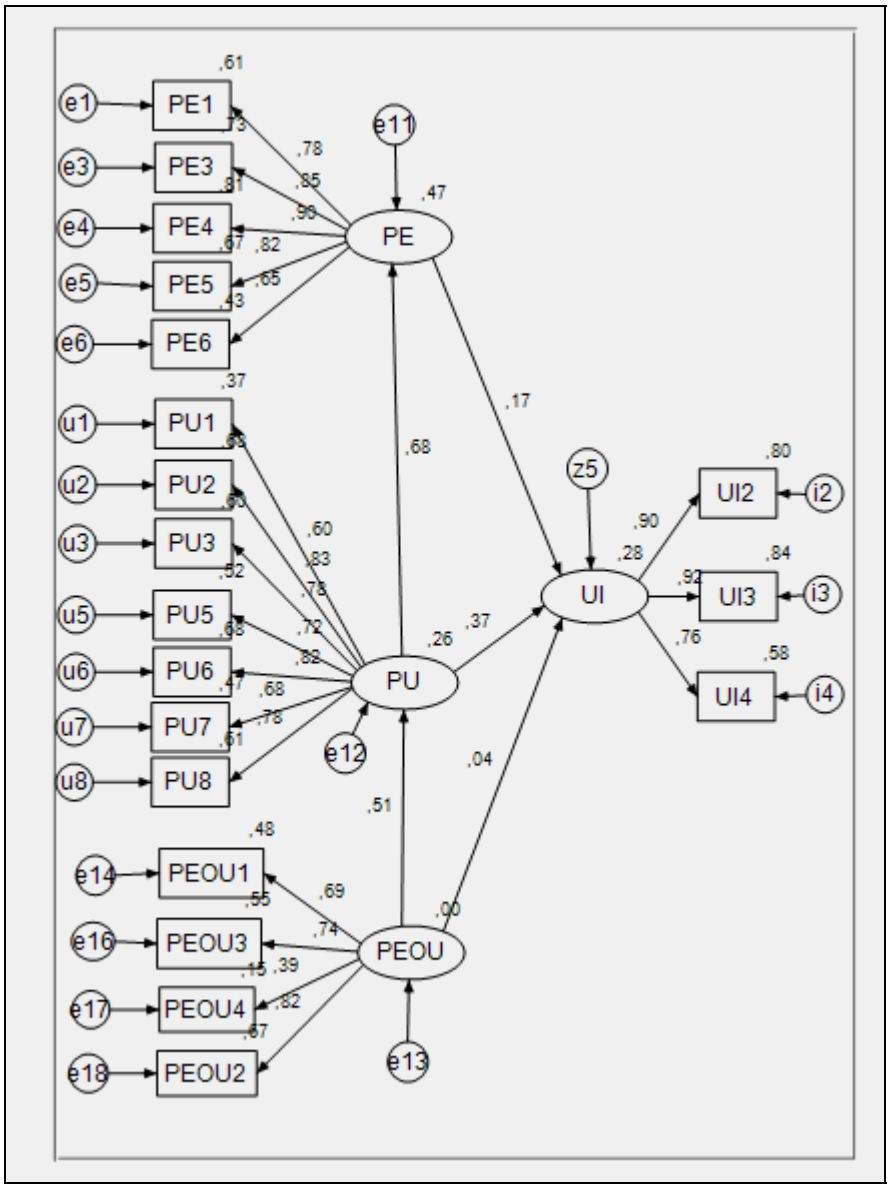


5.8.3.2.2 Male Fully Constrained Model

The old and young male fully constrained model with chi-square = 561.6 and df = 297 is presented in Figure 5.37.

FIGURE 5.37 MALE FULLY CONSTRAINED MODEL

:



5.8.3.2.3 Comparison of Old and Young Male Group Models and Fully Constrained Model

The two models were compared based on their chi-square and degree of freedom (df) values to empirically test significant differences between the two caused by the moderating influence of the male age demographic factor. The comparison is shown in Table 5.48 below.

TABLE 5.48 COMPARISON OF CHI-SQUARE AND DF VALUES

	Old and young male fully constrained model	Old and young male moderating model	Difference
Chi-square	561.6	558.8	2.8
df	297	294	3

As shown in Table 5.48, the comparison of the two models above yielded chi-square = 2.6 at df = 3. This value was further compared with the chi-square table, resulting in a value of more than 0.05. This result confirmed an acceptance of Ho, indicating that the male old-young model was not significantly different from the fully constrained model. The acceptance of Ho confirmed that there is no significant moderating influence of the demographic factor of age in the male category on all paths of PE–UI, PU–UI and PEOU–UI of the structural model.

In conclusion, the moderating influence test of demographic factors suggested that H12, H13 and H14 were not supported.

5.8.4 Technology Readiness (TR) Moderating Influence Test

The hypothetical positive influence of technology readiness in the conceptual model was examined based on the following Hypotheses 10, 11 and 12:

H10: The positive influence of consumers' perception of usefulness about mobile broadband technology on their usage intention is moderated by technology readiness.

H11: The positive influence of consumers' perception of ease of use about mobile broadband technology on their usage intention is moderated by technology readiness.

H12: The positive influence of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by technology readiness.

To test the above hypotheses, the procedure for examining moderator variables described in section 5.10 was applied, and the results are reported in the following sections.

5.8.4.1 High and Low TR Group Models

As previously explained, the procedure used to obtain the final rectified model positioned TR as a moderator variable in the acceptance model. To further observe its moderating influence, a statistical test was applied. The aggregate technology readiness (TR) value was obtained by calculating its composite score derived from averaging the four parcels resulting from the EFA and CFA procedures. The high and low groups of TR values were then obtained to produce the high and low TR models presented in Figures 5.38 and 5.69. These models were used to perform the moderating influence test. All paths of the models were first set to move freely, and estimated producing chi-square = 768.8 with 294 degrees of freedom.

FIGURE 5.38 HIGH TECHNOLOGY READINESS STRUCTURAL MODEL

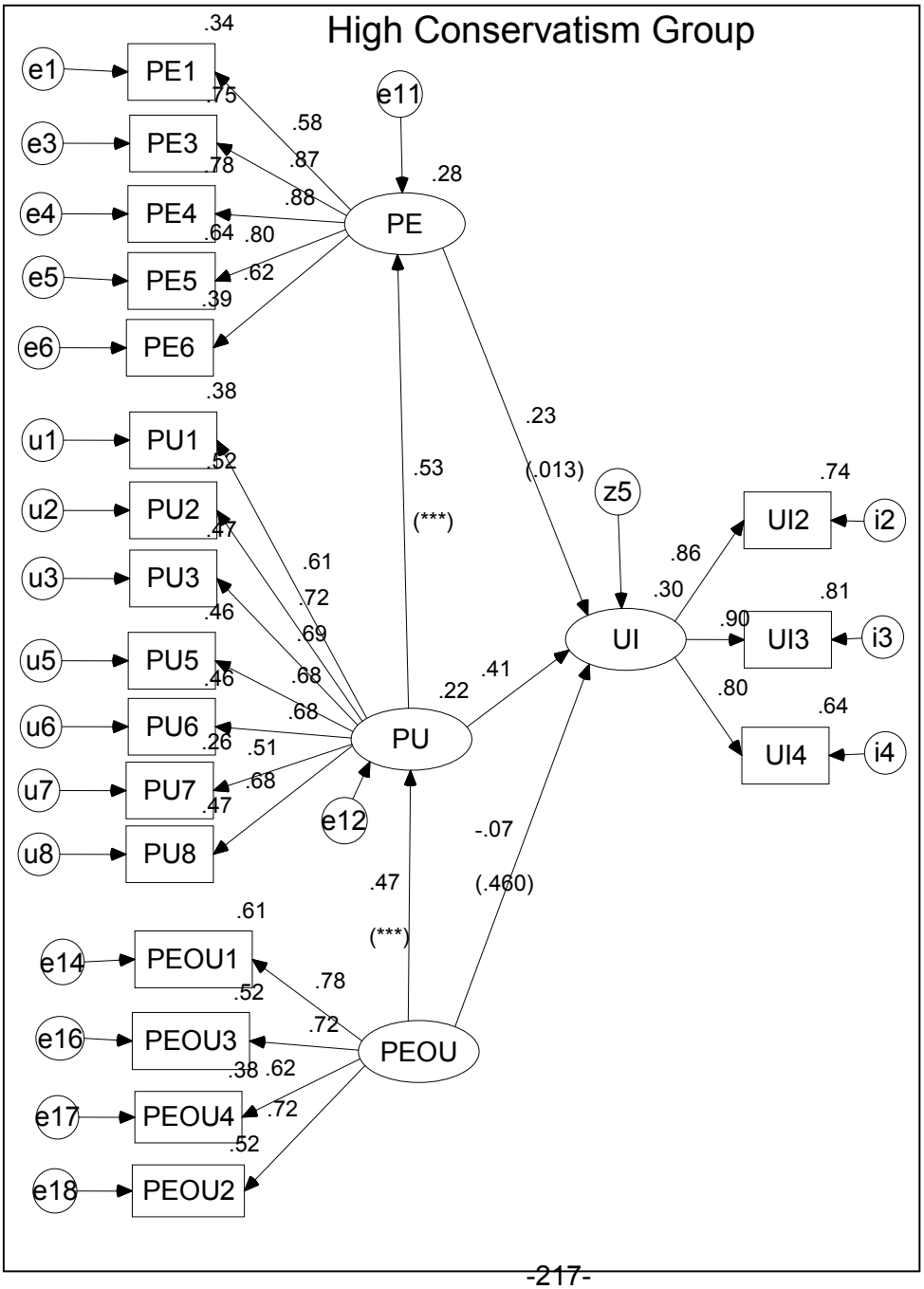
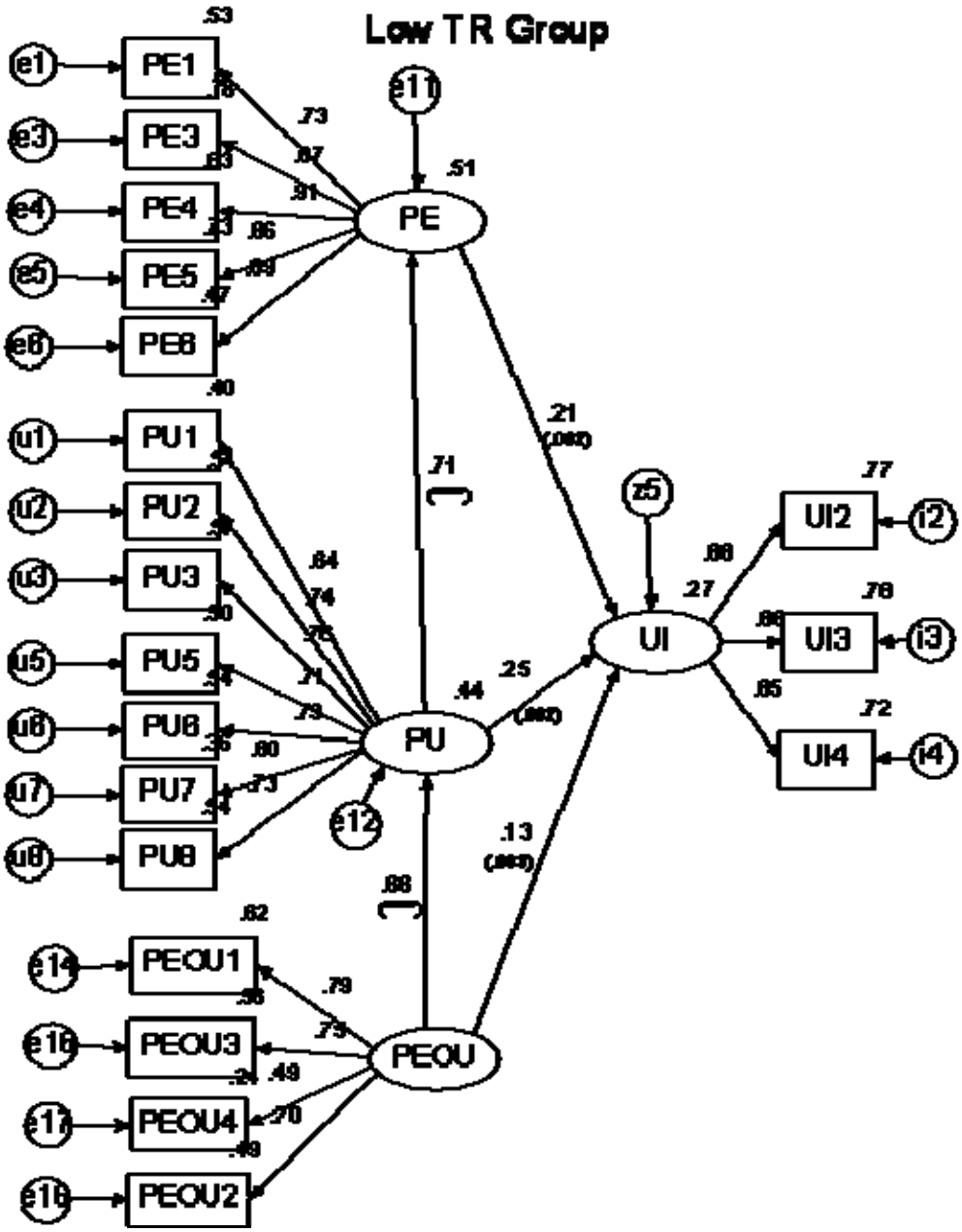


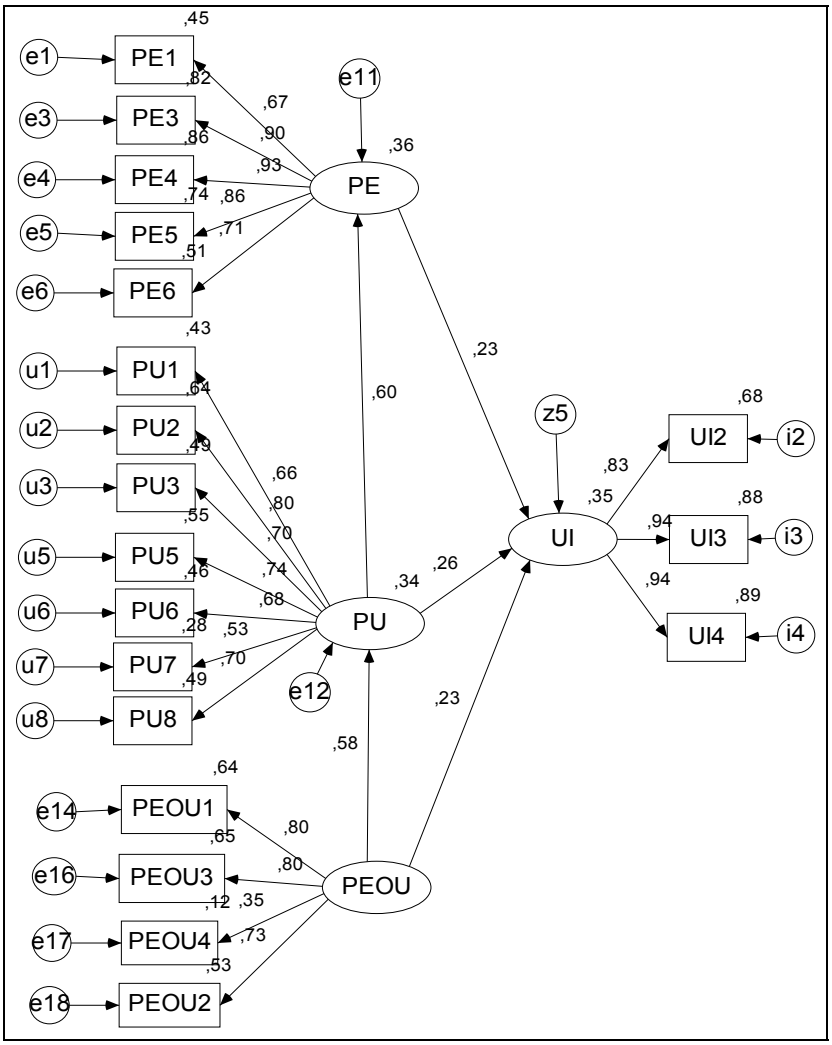
FIGURE 5.39 LOW TECHNOLOGY READINESS STRUCTURAL MODEL



5.8.4.2 TR Fully Constrained Model

A model constraining the PE–UI, PU–UI and PEOU–UI paths, as shown in Figure 5.40, was used to evaluate the moderating influence of TR. A chi-square of 777.3 was obtained with 297 degrees of freedom, which will be compared with that of the high-low sample structural models.

FIGURE 5.40 TR MODERATED FULLY CONSTRAINED MODEL



5.8.4.3 Comparison of TR Fully Constrained and High-Low Moderating Models

A comparison of the chi-square and degree of freedom (df) values produced by the fully constrained and TR high-low moderating models resulted in the value differences presented in Table 5.49.

TABLE 5.49 COMPARISON OF CHI-SQUARE AND DF VALUES FOR TR HIGH-LOW AND CONSTRAINED MODELS

	TR fully constrained model	TR high and low moderating models	Differences
Chi-square	777.3	768.8	8.5
Df	297	294	3

As shown in Table 5.49, the comparison of the two models above resulted in chi-square = 8.5 and 3 degrees of freedom differences. This value was compared with the chi-square

table, resulting in a value that is less than 0.05. The result suggested that Ho was rejected, indicating that there were significant estimate value differences between the high and low TR models occurring in the PE–UI, PU–UI and PEOU–UI relationships. As a result, a significant moderating influence of TR was confirmed.

5.8.4.4 TR Moderating Influence Test on PE–UI Path

To trace these differences more closely in order to test H3, H4 and H5, individual analyses were performed. The PU–UI and PEOU–UI constrained model estimates were first obtained based on a TR structural model in which PU–UI and PEOU–UI were constrained. The model yielded a value of chi-square equal to 771.6 with 296 degrees of freedom, which will be compared to those of the fully constrained model. The comparison results are presented in Table 5.50.

TABLE 5.50 COMPARISON OF CHI-SQUARE AND DF VALUES FOR TR FULLY CONSTRAINED AND PE–UI UNCONSTRAINED MODELS

	TR fully constrained model	PE–UI unconstrained model	Difference
Chi-square	777.3	771.6	5.7
df	297	296	1

As shown in Table 5.50, the chi-square value difference of 5.51 with 1 degree of freedom was compared to the chi-square table, providing a value of less than 0.05. This result suggested that Ho was rejected, indicating a significant PE–UI estimate value difference in the high and low value models. The result also confirmed a significant moderating influence of the TR cultural dimension on the PE–UI relationship in the structural model.

5.8.4.5 TR Moderating Influence Test on PU–UI Path

To test the moderating influence of TR on the PU–UI path, a model constraining PE–UI and PEOU–UI was developed. The model produced a chi-square value equal to 771.2, with 296 degrees of freedom. The comparison results of this value with that of the TR fully constrained model are presented in Table 5.51.

TABLE 5.51 COMPARISON OF CHI-SQUARE AND DF VALUES FOR PU–UI UNCONSTRAINED AND FULLY CONSTRAINED MODELS – TECHNOLOGY READINESS

	TR fully constrained model	PU–UI unconstrained model	Difference
Chi-square	777.3	771.2	6.1
df	297	296	1

As shown in Table 5.51, the chi-square value difference of 6.1 with 1 degree of freedom was compared to the chi-square table, providing a value that is less than 0.05. This result suggested that Ho was rejected, indicating a significant PU–UI estimate value difference in the high and low value models. The results also evidenced that TR demonsrated a significant moderating influence on the PU–UI path in the structural model.

5.8.4.6 TR Moderating Influence Test on PEOU–UI Path

The moderating influence of the TR dimension on the PEOU–UI path was tested through a PE–UI and PEOU–UI constrained path model. The model generated a chi-square value of equal to 770.3, with 296 degrees of freedom. The comparison results of this value with that of the TR fully constrained model are presented in Table 5.52.

TABLE 5.52 COMPARISON OF CHI-SQUARE AND DF VALUES FOR TR PEOU UNCONSTRAINED AND FULLY CONSTRAINED MODELS

	TR fully constrained model	PEOU unconstrained model	Difference
Chi-square	777.3	770.3	7
df	297	296	1

As shown in Table 5.52, the chi-square value difference of 7 with 1 degree of freedom was compared to the chi-square table, providing a value that is less than 0.05. This result suggested that Ho was rejected, indicating a significant PEOU–UI estimate value difference in the high and low value models. The result also confirmed that TR demonstrated a significant moderating influence on the PEOU–UI path in the structural model.

5.8.4.7 Summary of TR Moderating Influence Test Results

The TR moderating influence tests confirmed significant results on the overall structural model as well as on the PE–UI, PU–UI and PEOU–UI paths, as shown in Table 5.53. As a result, H15, H16 and H17 were fully supported.

TABLE 5.53 SUMMARY OF TR MODERATING INFLUENCE TEST RESULTS

Variable	Overall Moderating Impact	Path Moderated		
		PE-UI	PU-UI	PEOU-UI
Technology Readiness (TR)	Significant	Significant	Significant	Significant

5.9 SUMMARY OF MODERATOR VARIABLE INFLUENCE TEST RESULTS

The results of the moderator variable influence test are presented in Table 5.54. Eight moderator variables were investigated for their influence in the technology acceptance model. The three variables of technology readiness (TR), conservatism and openness to change demostrated an overall moderating influence in the model. More specifically, it was observed in this thesis that technology readiness moderated the relationships between perceived enjoyment (PE) and usage intention (UI), perceived usefulness (PU) and usage intention (UI), and also between perceived ease of use (PEOU) and usage intention (UI). The results for Schwartz's individual cultural orientation represented by openness to change provided a slightly different outcome. Openness to change was found to moderate two of the three relationships. It significantly moderated the relationships between PE and UI, and between PEOU and UI. The openness to change moderating influence on the relationship between PU and UI, however, was not identified as significant. An interesting finding was obtained in regards to the results of the conservatism moderating influence test. Although significant evidence was obtained to support that overall conservatism moderated the technology acceptance model, no significant results were found to confirm a moderating influence of conservatism on any of the PE–UI, PU–UI and PEOU–UI relationships. A significant result was found on the relationship between PU and PE, where conservatism demonstrated a moderating influence.

TABLE 5.54 SUMMARY OF MODERATOR VARIABLE INFLUENCE TEST RESULTS

No	Variable	Overall Moderating Impact	Path Moderated		
			PE-UI	PU-UI	PEOU-UI
1	Consumer Perceived Value (CPV)	NS	NS	NS	NS
2	Conservatism (Culture) *) (UNI, SDR, STI, HED, ACV)	S	S	NS	S
3	Openness to change (Culture) (BNV, CON, TRA, SEC)	S	NS	NS	NS
4	Demographic Factor -1 (Young Male vs Old Male)	NS	NS	NS	NS
5	Demographic Factor -2 (Young Female vs Old Female)	NS	NS	NS	NS
7	Age	NS	NS	NS	NS
8	Gender	NS	NS	NS	NS
9	Technology Readiness (TR)	S	S	S	S

Note: S = Significant
NS= Non -Significant

*) Conservatism has a moderating significant influence on PU-PE path

Finally, the results presented in Table 5.54 demonstrate that there was no significant moderating influence of CPV, demographic 1, demographic 2, age or gender on any of the relationships in the technology acceptance model.

Chapter 6: FINDINGS AND DISCUSSION

6.1 INTRODUCTION

The objective of this chapter is to present the key findings generated in this thesis, with reference to the results of the data analysis reported in Chapter 5. The outcome of the hypothesis testing are also discussed, and the implications for both theory and the field of marketing are reviewed.

6.2 BASELINE FRAMEWORK FOR DEVELOPING THE INTEGRATED MOBILE BROADBAND TECHNOLOGY ACCEPTANCE MODEL

The first key finding of this thesis concerns the identification of the two frameworks with the most potential to be used as a baseline model for developing the integrated model of mobile broadband technology acceptance. The first framework is the prominent Technology Acceptance Model (TAM) developed by Davis (1989), and the second one is the recently developed model called the Technology Readiness and Acceptance Model (TRAM), proposed by Lin et al. (2007). In this thesis these two models have been reconstructed through the addition of Perceived Enjoyment (PE) as another predictor of usage intention positioned at the same level with Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The insertion of PE into the TAM dimension configuration is supported by many studies including those conducted by Ha et al. (2007), Shin (2007) and Bruner and Kumar (2005).

TAM and TRAM were tested in two sequential stages in this research. In the first stage, the causal relationships between PU, PEOU and PE in both models were tested, and in the second stage their structural models were examined to determine which model has a more parsimonious fit to the population sample under study. The tests resulted in further important findings to be taken into account in establishing a baseline model for an integrated model of technology acceptance. The following sections will elaborate these findings.

6.2.1 Causal relationships of PU, PEOU and PE

As was explained in Chapter 5, prior to performing the comparative fit analysis of TAM and TRAM, the causal relationships among PEOU, PU and PE in both models were investigated. The reason for conducting this investigation relates to the dispersed research results found in the literature when it came to the determinaton of the

configuration of these three acceptance dimensions (Sun & Zhang 2006; Venkatesh 1999, 2000; Agarwal & Karahanna 2000; Yi & Hwang 2003; Davis et al. 1992; Iqbaria et al. 1995, 1996; Teo et al. 1996; Van der Heijden 2004). Based on the diverse results of previous studies three possible configurations can be postulated. These hypotheses were illustrated in Figure 5.15. Configuration 1 shows that PE is influenced by PU which has PEOU acting as its antecedent, Configuration 2 represents PU as influenced by both PE and PEOU, and Configuration 3 shows PEOU to have a direct influence on both PE and PU. The examination to determine which configuration provides the most parsimonious fit was conducted based on Hypotheses 1a and 1b (below).

H1a: The PEOU → PU and PU → PE causal directions provide a more parsimonious fit than the PEOU → PU and PE → PU causal directions in TAM and TRAM

H1b: The PEOU → PU and PU → PE causal directions provide a more parsimonious fit than the PEOU → PU and PEOU → PE causal directions in TAM and TRAM

The Akaike Information Criterion (AIC) analysis procedure applied to test H1a and H1b indicates that PE is influenced by PU which has PEOU acting as its antecedent (see again Table 5.35). This causal relationship pattern was found to be significant in both TRAM and TAM. This result further confirms that PEOU contributes a strong direct influence of .63 and .65 on PU in TRAM and TAM, respectively. PU has then a direct influence on UI (.25) in both models. Even though the direct influence of PU on UI is significant ($p<.05$) and has a stronger intensity than that of PE on UI, its indirect influence through PE cannot be underestimated. This is because the PU–PE link indicates a strong causal relationship. PU demonstrates a significant influence ($p<.05$) on PE of .67 in TRAM and .69 in TAM.

These results suggest that Indonesian consumers perceive a new technology as useful when it is easy to use, and perceived usefulness may not be understood well if users do not try it. This requires some degree of ease of use. This is a general relationship as first postulated by Davis (1989) and empirically supported by, for example, Kwon and Chidambaram (2000), Lu et al. (2005) and Bagozzi (2007). This also explains why the dimensions related to the ease of use of technology in Roger's theory of innovation diffusion as represented by complexity, observability, compatibility and trialability provide more effect than the technology's relative advantage in the diffusion phase (see Roger 1983). Therefore, the findings confirm this general relationship as found in the extant literature. Moreover, appreciation of a service's usefulness will make users happy and enjoy using it. Thus, perceived usefulness will strongly mediate the relationship between PEOU and PE. Perceived usefulness further affects perceived enjoyment, a specific

variable to be included in mobile broadband technology adoption due to its hedonic nature (see the explanations in Kwon and Chidambaram (2000), Bruner and Kumar (2005), Nysveen et al. (2005) and Pagani and Fine (2007)). This is logical since someone may not be able to enjoy a technology if they cannot apprehend its function (Kwon & Chidambaram 2000).

The above mentioned finding is different from that of Bruner and Kumar (2005), who proposed a direct relationship between PEOU → PU and PEOU → PE and no relationship between PU → PE. This is due to the difference in the focus of these studies. Brunner and Kumar (2005) studied the adoption of internet devices, while this thesis studies the adoption of mobile broadband connection services. Perceived enjoyment in Bruner and Kumar's study is strongly influenced more by the novelty and newly upgraded features of the device which were developed as tangible components of a marketing strategy to attract consumers. Consumers perceive the new device as fun not because they fully understand that the mobile technology technically meets the quality of reliable connection such as its bit rate, drop call rate or coverage in supporting fun activities when the device is connected to the network. Rather, they comprehend and conclude that the technology is fun because the new device physically looks nicer and has more embedded functions or features. This explains why perceived usefulness was not found to influence the fun variable (or perceived enjoyment in the original TAM) in their study. One can see two different scopes of analysis occurring in this study which potentially causes inconsistent results. This thesis resolved this issue by focusing only on the mobile broadband technology connection service, avoiding it being mistakenly perceived by respondents as a physical device.

The results of the H1a and H1b tests reveal a new important finding that provides essential knowledge for mobile broadband technology operators. This finding indicates that PEOU is the central variable for predicting consumers' perception about the usefulness and enjoyment aspects of the technology. More specifically, based on the structure of the PEOU factor obtained from the exploratory factor analysis, this thesis discovered that mobile broadband product adoption is notably focused on the ease of operating a wireless device and the procedures to get the broadband connection. This includes the procedures needed to install the modem and software applications into the computer or other types of customer premises equipment (CPE). Operators must be aware of this new and important discovery to ensure that they promote the most appropriate characteristics of their products. Meanwhile, this thesis also identified that consumers are concerned more with perceived usefulness when dealing with procedures that enable them to perform activities over the internet while they are using a mobile

device. Another important finding was that the PU dimension in the model addresses the aspects of network quality and performance of the mobile broadband technology such as network capacity, network reliability, bit rate speed, website accessibility and traffic-handling capability as indicated by the items grouped in the PU factor.

In the next section we explain another key finding that relates to the establishment of the baseline model.

6.2.2 The baseline model

This thesis validated and established a baseline model for examining the influence of the moderator variables, to develop an integrated model of mobile broadband technology acceptance. The comparative analytical test shows that TAM fits the data better than TRAM for this population sample. This finding was obtained after both models were assessed based on a set of adequate fit criteria. Based on the population represented by the data, we can interpret this result to conclude that TAM provides a better fit in explaining the respondents' behaviour in mobile broadband acceptance. One can see this in Table 5.34, where TAM has a higher score of fit measures than does TRAM. The chi-square value/df of TAM achieved an adequate fit level of 4.147 in comparison to the value of 6.396 generated by TRAM. In the same vein, the RMSEA value of .069 for TAM indicated a better fit compared to TRAM which showed a higher value of .090. Finally, the superior robustness of TAM over TRAM was also supported by the CFI (Comparative Fit Index) and GFI (Goodness-of-Fit) index values. TAM demonstrated adequate CFI and GFI values of .937 and .910 respectively, while TRAM showed a poorer fit with values of .857 and .846. These results support Hypothesis 2 (H2), reproduced below.

H2: TAM provides a more parsimonious fit than TRAM in explaining mobile broadband technology acceptance

The acceptance of H2 supports the robustness of perceived ease of use, perceived usefulness and perceived enjoyment as the specific beliefs that consumers hold in assessing mobile broadband technology. Not only does this result raise the importance of further investigating the role of technology readiness in the model of acceptance, it also points to the opportunity to develop a more integrated model. The confirmation of TAM as the model that performs a more parsimonious fit enables us to continue studying the presence of moderator variables to be incorporated into it. This finding supports the need for future research to strengthen TAM, as suggested by Davis (1989) and Venkatesh et al. (2003). In this thesis, the study of moderator variables in TAM was initiated by identifying the variables potentially demonstrating a moderating influence in the model through a

comprehensive literature review. The findings obtained from this stage are described in the following section.

6.3 PRESENCE AND ROLE OF MODERATOR VARIABLES IN ACCEPTANCE MODEL

As was explained in Chapter 3, the exploratory literature review revealed three potential moderating variables in the model. These are individual cultural orientation, consumer perceived value (CPV) and demographic factors. With the acceptance of H2 suggesting TAM instead of TRAM for use as the better fitted baseline model (this will be further explained later in this chapter), this thesis also tested technology readiness for its potential to have a moderating influence in the model. This makes a total of four moderator variables tested in this thesis. The results of these tests on the moderator variable influence were reported in Chapter 5. We discuss the findings generated from these results in the following sections.

6.3.1 Moderating role of Consumer Perceived Value (CPV)

6.3.1.1 Newly discovered structure of CPV

The exploratory factor analysis of CPV resulted in an important finding that can be used to better understand how Indonesian consumers perceive the concept of value of a highly technology-based product. This finding is reflected in the new structure of CPV. As was explained in Chapter 5, EFA confirmed four factors in CPV. However, its structure and content have changed as reflected by the new dimensions obtained from the parcelling technique conducted in Chapter 5. The original names and new names of the CPV dimensions obtained from its four parcels are presented in Table 6.1 below.

TABLE 6.1 NEW AND ORIGINAL NAMES OF CPV DIMENSIONS

No	Original dimension names	New dimension names
1	Quality	Technical Quality
2	Emotional	Personalised Standard of Quality
3	Price	Value for Money
4	Social	Social

Observation of the factors' content suggests that the new dimensions presented in Table 6.1 above need different names and qualitative interpretation. The main reasons for this were the reduction in the number of items and the presence of cross-loaded items in the new dimensions. Two of those dimensions (Price and Quality) had a smaller number of items. The first one contained three items instead of four. One item was grouped into the Emotion dimension, which was PRC4: 'High-speed mobile broadband would be economical'. The other price items, PRC1, PRC2 and PRC3, formed a factor with a high mean value of 5.34. Of these three items, PRC2 had the highest and very dominant loadings in this dimension. This item was: 'High-speed mobile broadband service offers value for money'. The other two items were comparable with each other and an shared equal loading of about .55. According to Hair et al. (2006), factor loadings are the means for interpreting the role each variable plays in defining each factor because they are the correlation of each variable on each factor. Hair et al. further add that loadings indicate the degree of correspondence between the variable and the factor. Higher loadings of a variable signify its stronger representativeness of the factor. Accordingly, this thesis proposes to name this dimension 'Value for Money', which is interpreted from the combinaton of PRC1: 'High-speed mobile broadband service is reasonably priced,' PRC2 states: 'High-speed mobile broadband service offers value for money' and PRC3: 'High-speed mobile broadband service is a good product for the price'.

The Quality dimension was reduced to contain only three items, where originally it had six items. The rest revealed their place in the Emotion dimension. The original Quality dimension is renamed 'Technical Quality' since it contains more technical criteria in defining quality, such as technological development, reliable connection and consistent performance.

The Social dimension retained its original items. This finding supported the robustness of the social dimension as a variable representing the consumer perceived value construct, as was also found by Sheth et al. (1991) and Sweeney and Soutar (2001).

In contrast, the Emotion dimension is now mixed with the Quality and Price items. Quality items of QUA1, QUA2 and QUA3 are now grouped in the same factor with EMO1, EMO2, EMO3, EMO4, EMO5 and PRC4 demonstrating a new strong dimension as indicated by its mean value of 5.52. The Quality items, QUA2 and QUA3, rank first and second respectively in terms of factor loadings. QUA2 states that:

'High-speed mobile broadband internet service is well designed.'

QUA3 is formulated as follows:

'High-speed mobile broadband internet service has an acceptable standard of quality.'

As QUA2 relates to 'design' elements, it is logical that it should load high on the emotion dimension since design evaluation involves the emotional responses of a person. QUA3 refers to standards. In its new location, the standard may refer to a personal standard because a personal standard may involve personal and emotion-based judgement. This standard is explained by QUA1, which is a stable connection with few drop-out rates and is also economical (PRC4). People may have different criteria for judging whether something is economical, and different sensitivities toward connection stability. For example, a technology savvy person may have higher standards than an average user in terms of this criteria. Accordingly, it is reasonable to rename this dimension 'Personal Standard of Quality'.

To conclude, value for money, social, personalised standard of quality and technical quality now constitute consumer perception of the value of a broadband internet service offering. The percentage of variance explained by these four dimensions was 67.19%. In this new structure of CPV, value for money (renamed from price) and social were the two most dominant dimensions representing the value construct. The structure places the CPV conceptualisation and measurement within the Indonesian context, since it is different from the original structure proposed by Sweeney and Soutar (2001). The original structure was strongly dominated by quality and emotion. These findings suggest that Indonesian consumers tend to be concerned about the price in assessing the value of a new technology product. Furthermore, these findings also confirm that social status signifies how Indonesian consumers describe value, reflecting the main benefits they seek from a new technology product.

6.3.1.2 Moderating influence of CPV

The moderating influence of consumer perceived value is not significant, as shown in Table 5.52 where the chi-square and its corresponding degree of freedom are not significant to reject H0. Therefore, the following hypotheses are not supported by the research findings:

H3: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by consumer perceived value.

H4: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by consumer perceived value.

H5: The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by consumer perceived value.

The strong correlation between Value for Money and Personalised Standard of Quality indicates that self-oriented measures are more important in determining the perceived value of a broadband internet service offering. This is supported by the fact that the two share 63% of the total scale variance in CPV (please refer to Table 5.14). Due to the absence of a strong influence of socially and technically oriented measure, we can argue that the perceived value has a strong resemblance with the salient perceptions of technology (PEOU, PE and PU) as the three reflect people's perceptions of technology according to their self-focused point of view. In short, it appears that people evaluate the same thing when asked to perceive technology and its value. Based on these findings, this thesis posits that the issue—which has been present for some time in the literature—of the potential role of CPV to act as a moderator of TAM be closed. One can refer to these findings in choosing not to continue examining or testing the moderating influence of CPV in TAM, in order to focus more on other variables instead.

The following sections now explain the findings concerning the discovery of the Indonesian consumer cultural orientation dimensions, and the moderating role and influence of individual cultural orientation.

6.3.2 Moderating role of individual cultural orientation

6.3.2.1 Dimensions of Indonesian consumer cultural orientation

Another important finding of this thesis revealed the individual cultural orientation of Indonesian consumers to be characterised by two Schwartz culture dimensions. The first dimension is called Conservatism, and consists of four values: Benevolence, Security, Conformance and Tradition. The other is Openness to Change, comprised of the values of Stimulus, Self-Direction, Universalism, Achievement, and Hedonism. The results have once again proven the robustness of Schwartz's value structure. Power has been excluded from the culture dimensions due to its small loading, indicating that this value is not an influential variable in Indonesian consumers' conceptualising of their cultural orientation. Recognising that Hedonism is not also a strong representative of the Openness to Change dimension, we posit that Indonesian respondents do not like to be characterised as hedonistic or powerful persons.

Further observation suggests that EFA in individual cultural orientation corresponds well with that of technology readiness and CPV. The tendency of cultural dimensions to group into either Conservatism and Openness to Change instead of Self-Transcendence and Self-Enhancement support the findings we found for TR and CPV. The findings in the first

one inform us that Indonesian respondents are optimistic about technology (open to change), but lack innovativeness and tend to want to maintain the current situation (Conservatism). Meanwhile, the restructuring of CPV dimensions also indicates that Indonesian respondents are conservative. This can be inferred from the respondents' emphasis on Value for Money and adherence to personal standards when evaluating the value of market offerings.

The fact that power is not significant by this thesis to characterise the individual cultural orientation in Indonesia supports the previous findings of Hofstede (2005), who suggests that Indonesian people tend to accept the superiority of the person who possesses both a formal and an informal authority in their culture group. In other words, Indonesians accept the fact that people are unequal within a society. As a consequence, they do not see power as the value that they have to reflect in themselves through their cultural orientation.

The low factor loading obtained for hedonism (.338) suggests that Indonesian consumers tend to display modest consumption behaviour. Hedonism, defined by Schwartz and Bardi (2001) as a person's orientation towards seeking pleasure and sensuous gratification for him or herself, conflicts with this modest tendency. Therefore, hedonism does not sit harmoniously with the desirability of modest behaviour.

6.3.2.2 Moderating influence of individual cultural orientation

Through the test of moderating influence explained in Chapter 5, this thesis provided essential findings to understand how individual cultural orientation influences technology acceptance. The moderating influence of cultural orientation was examined according to the following hypotheses:

H6a1: The positive influence of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by a conservative cultural orientation.

H6a2: The positive influence of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by a conservative cultural orientation.

H6a3: The positive influence of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by a conservative cultural orientation.

H6b1: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.

H6b2: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.

H6b3: The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.

The results of the hypothesis testing indicate that individual cultural orientation has a limited moderating effect. Openness to change, which is comprised of the values of Universalism, Self-Direction, Stimulation, Hedonism and Achievement, moderates the relationship between PEOU–UI and PE–UI; whereas Conservatism, consisting of the Benevolence, Security, Conformity and Tradition values, moderates the relationship between PU–PE (see Table 55). Based on these results, it is concluded that the above hypotheses, except for H6b and H6c, are rejected.

As can be seen in Figure 5.29, the PE–UI link is not significant (p-value=.148) in the high openness-to-change value group, indicating that this group of consumers keeps well up to date with the latest technology. They have already acquired the basic knowledge needed to understand or assume that entertainment capability is inherently embedded in current broadband technologies as part of their usefulness. This is indicated by the significant PU–PE link, showing a strong influence of PU on PE (beta value=.70). In contrast, PE significantly influences UI (p-value<.05) in the low value group. The tendency of being less open to a change is likely to trigger an apathetic view about new technology and its capabilities. Consequently, when a new technology product is offered, its entertainment-enabled features can be seen as a new thing that is able to stimulate a positive attitude towards acceptance of this new technology.

For the high openness-to-change value group (see Figure 5.29), PEOU is clearly an important infuential factor. It has a significant (p-value<.05) and strong influence on UI (beta value=.30). The knowledge of previous and current technologies gained from their openness towards new things in general makes them more likely to be familiar with the current technology and its user-friendliness. They have been enjoying the technology that is simple and easy to use for its users, and do not want to deal with the complexities of learning to use newer versions or features. They need to be sure that the user-friendliness

of any new technology has improved, or at least has remained the same. As a result, they place a strong emphasis on the ease of use aspect of the new technology, which in turn affects their intention to adopt. On the other hand, PEOU does not significantly influence UI for the low value group as indicated by the p-value of the PEOU–UI link (0.319). Consumers driven by this cultural orientation tend to be less knowledgeable of advances in technology. They may not have experienced newer technology that offers greater ease of use as they choose to keep using old versions. For them, ease of use is not a particularly important factor to take into account in considering to adopt a new technology. Their intention to use is influenced more by the usefulness of the new system as indicated by the significant PU–UI link (p-value=.003), and then by its enjoyment aspect.

Different from what was previously expected, conservatism demonstrates a significant moderating influence on the relationship between PU and PE. This significant moderating influence is found in high as well as low value groups, specifically on the PU–PE link. Nevertheless, by referring to the high loadings of the value items that form the conservatism dimension, this finding can be logically understood. These results show that Indonesian consumers who praise the conservation of values such as benevolence, conformity, security and tradition seem to be more careful in accepting what can and cannot be consumed as enjoyment of a new product. The benefits of a new product are perceived to be useful then enjoyable based on a compliance with traditional values such as the family values and norms held by society. In the low conservatism value group, PU demonstrates a stronger influence on PE (beta value=.69) than it does in the high value group (beta value=.53). Consumers with a low conservatism cultural orientation are believed to pay more attention to the entertaining aspects of new technology. Obedience to tradition and the values of the society in which they live and interact is more relaxing. This situation enables them to more freely embrace not only the usefulness aspect but also the entertaining side of the new product or service. This finding explains why PEOU is proven to be a significant influential antecedent of usage intention for the low value group (p-value<.05), and not for the high value group (p-value=.460). Consumers who embrace the new technology for entertainment purposes would expect the system to be easy to operate, not only for work-related functions but also for fun activities. This is understandable because people who do not feel that they have to conform to traditional values will appreciate any technology made easy to use. This is indicated by the significant PEOU–UI link that demonstrates the strongest influence of PEOU on UI (beta value=.27) than those of PU (beta value=.12) and PE (beta value=.18).

In addition, the EFA of individual cultural orientation items suggests that the respondents are characterised more by their conservatism and openness to change, than by self-

transcendence or self-enhancement. This is why hypotheses 6a to 6f include neither self-enhancement nor self-antecedence. These findings are consistent with the findings of this thesis concerning the technology readiness dimensions, in which people are characterised by their lack of innovativeness, discomfort and insecurity, and creating a tendency towards conservatism. Accordingly, we may argue that this individual cultural or value orientation will show similar results to those for the technology readiness dimensions. However, the total influence will not be identical since technology readiness is significant in the links between PEOU–UI, PU–UI, and PE–UI whereas individual cultural orientation is significant in the links between PEOU–UI, PE–UI and PU–PE. The finding on PU-PE can be disregarded in this comparison since it was added after we could not identify a significant moderating relationship with conservatism. In other words, individual cultural orientation lacks a significant moderating influence in the link between PU–UI. This can be explained by the lack of orientation toward self-transcendece or self-enhancement. We argue that the usefulness of technology is more relevant when people are going to use technology for enhancing or transcending themselves. Therefore, when these orientations are absent people will only care about the ease of use and enjoyment of a technology in choosing to use it. This will then be moderated by their orientation toward conservatism or openness to change.

The significant moderating influence of individual cultural orientation has implications for the marketing of this technology involving the process of the consumer's decision to purchase. This process is a widely accepted theoretical framework in the marketing field. It is commonly used to understand the buying behaviour of the target market in order to develop effective marketing programs. This framework suggests that the decision process in which a potential consumer engages follows the generic 'need recognition–information search–evaluation of alternatives–purchase decision–post-purchase behaviour' stages. We will discuss the implications that each cultural dimension has for marketing based on these generic stages. The first is the implication that relates to the moderating influence of conservatism in the model. The second implication is associated with the moderating influence of openness to change.

The results of this thesis suggest that conservatism has a significant moderating influence on the relationship between perceived usefulness and perceived enjoyment. Specifically, the influence of conservatism resulted in different consumers' appreciation of the enjoyment aspect of the new technology. For consumers with a low conservatism cultural orientation, this appreciation is found to be higher since the need to comply with traditions is reduced. In contrast, consumers who are more oriented towards conforming with traditional and social values will be more prudent in accepting and consuming any

enjoyment offered by a new product. This finding leads to an important implication for marketing indicating that consumers in this category will restrict the technology product to be enjoyed as early as at the information search stage of their buying decision process based on their values. The norms and values that they hold will direct their efforts in searching for detailed information about the product to satisfy their broadband-based communications needs and, at the same time, to meet their value expectations. They will try to find the product that is not only able to deliver a reliable broadband connection, but also provides additional features that conform with their need for value compliance—for example, a mobile broadband connection service that comes with online protection tools. At the end of the purchase decision process, the orientation towards value compliance will be consistently applied to the final purchase decision.

For a marketing company operating the mobile broadband technology, these consumer needs should be addressed through product design and concept development. The core benefits of a mobile broadband connection as a product must be accompanied by augmented services and features which may include a web surfing security system, internet monitoring software or a parental control system, internet filtering software and free access to preferred content such as educational information or religious content. Consumers should be well informed of and persuaded by these additional services. For this purpose, companies need to develop effective marketing communications programs conveying a strong message that they are concerned with such value compliance issues, as demonstrated by the designated augmented services provided for their consumers.

An integrated marketing communications program is one marketing response that may be considered for implementation, since the consumers with high conservatism orientation are likely to perform an intensive information search for particular augmented services. At the below-the-line level, the information must be made available in easy-to-read informational and promotional materials such as brochures, fliers or booklets. Point of sales material including posters and billboards should be designed to emphasise this message. Support from above-the-line materials also cannot be underestimated. Above-the-line media, particularly TV and newspapers, play a pivotal role in convincing potential consumers that the new technology is safe and meets value compliance requirements. In this context, the message could be more effective if it were endorsed by a strong corporate brand, positioned based on value compliance considerations. A corporate brand is believed to create a more powerful endorsement in strengthening this positioning. It is considered effective for convincing consumers that a company has assured the product is intentionally developed to meet consumers' specific value needs.

This thesis has also confirmed that the openness to change cultural orientation has a significant moderating influence on the relationships between perceived ease of use and usage intention, as well as perceived enjoyment and usage intention. Based on these findings, this thesis further revealed that consumers with high openness to change orientation appreciate the importance of the ease of use of mobile broadband technology. They expect new technology to be user friendly, and equipped with devices and software applications that are easy to operate. The message here is clear: operators need to provide simple procedures to connect with a mobile broadband network supported by user-friendly features such as a plug-and-play modem and automatic pre-installed start-up software. However, if we look more deeply at the value items that form the openness to change orientation we find more complicated issues of which marketing people need to be aware.

The openness to change cultural orientation is comprised of the values of universalism, self-direction, stimulation, hedonism and achievement. Each value is characterised by a number of value items (Schwartz 1992). Most of the value items indicate an individual's orientation towards curiosity in new things and life experiences, such as creativity, freedom, independence, choosing one's own goals, leading an exciting, varied and gratifying life, gratification of desires, and self-indulgence. By referring to these value items we can infer that consumers who hold them are more sophisticated and not so predictable. They are likely to embrace changing trends in life by trying to keep updated with progress and advances occurring in many areas, including those in mobile communications technology. On the one hand, this orientation could make the job of marketing easier, since these consumers tend to be more open to promotional information about new technology products. On the other hand, it is not easy for a mobile technology operator to direct such consumers to follow a specified buying behaviour to adopt the company's product. They might change their mind at any time, in response to a range of influencers or new information. In this scenario, marketers cannot simply inform consumers that a mobile broadband product is more user friendly or has more easy-to-operate features. These consumers necessitate a creative marketing strategy that ensures that the mobile broadband product currently offered is perceived by the potential consumers to have the latest technology and to provide optimal ease of use.

This marketing strategy might be developed by addressing the above-mentioned value items which indicate the consumer need to have new things, convincing source of updated information to make a purchase decision and new experiences. This strategy is to be implemented in relation to each component or feature of the product. First, as a product, the mobile broadband connection service must be easy to operate, which can be

ensured by providing a plug-and-play modem equipped with pre-installed connection start-up software to enable self-installation into the consumer's computer. To address consumer expectations about novelty as indicated by their cultural orientation, there is need to create an impression that innovative improvements are continuously being made to the software. For this purpose, operators must perform a continuous software upgrade program, and the progress of this program must be communicated to the consumers to develop the desired impression. Second, marketing communication programs aimed at disseminating marketing messages about the product need to involve the role of influencers as a buying reference. A buying reference is needed to convince and strongly influence the buying decision process of potential consumers who have an openness to change orientation. The buying reference could increase consumer confidence in the product, and is expected to be able to make them less vulnerable to the exposure of other destructive information that does not endorse the technology to be adopted . The role of influencer can be assumed by a person or a group of people to whom the consumers are likely to refer. The influencers are those who previously did not have an understanding about how to operate a mobile broadband technology product but have now become active users, and are pleased with the product because it is easy to use. They can be public figures or other people whose personality and prior experience can support the enhancement of the product image and inform its audiences that it is now becoming widely used. Lastly, mobile broadband operators might consider developing an experiential marketing program in response to the curiosity of openness to change oriented consumers about new things. The program is designed to give consumers an opportunity to interact with the product, to experience using the product and see its benefits for themselves. This program can be implemented in the distribution channel by providing a product demonstration room at each outlet. In this room consumers are invited to try the product and test the high-speed internet access provided by the mobile broadband network. To help answer consumers' questions, knowledgeable and proactive sales representatives must staff these rooms.

We can now progress to explain the findings concerning the moderating role of demographic factors in the technology acceptance model.

6.3.3 Moderating role of demographic factors

Based on the population sample used in this thesis, the moderating effect of demographic factors is not found to have a significant influence on the technology acceptance process of mobile broadband technology in Indonesia. As was reported in Chapter 5, there is no significant difference between respondents from different age (young vs. adult), gender

(male vs. female) or different age in each gender group (e.g. young vs. old female). Based on this result, the following hypotheses are all rejected:

H7: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by demographic factors

H8: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by demographic factors

H9: The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by demographic factors

These findings reveal that the loadings of PEOU, PU and PE on UI are low regardless of gender or age. This means that gender and age differences were not found to be factors that influence the perception of technology adoption dimensions. An possible explanation for these findings is that the respondents in this study were purely mobile phone users who had not adopted any mobile broadband products, and thus were likely to show some similarities in dealing with this technology. First, they were likely to have the same level of understanding or knowledge about mobile broadband technology. Second, their experience in terms of using wireless technology was also likely to be similar as the access to mobile broadband network in the cities in which they lived had been made available to all users regardless of gender or age. This explanation enabled us to conclude that the marketing approach taken by operators, particularly in terms of their efforts at promoting and disseminating information about this new technology to consumers, was not yet distinctively designed for a specific market segment. This finding proved that such an approach is less likely to be effective in addressing the various needs of consumers from different segments. The need for distinct marketing programs to effectively penetrate different segments is explained in the following section, based on the findings about the role of technology readiness in the technology acceptance model.

6.4 ROLE OF TECHNOLOGY READINESS

6.4.1 Newly identified structure of technology readiness

This thesis identified a new structure of technology readiness, as indicated by its new dimensions resulting from the EFA procedure.

TABLE 6.2 NEW AND ORIGINAL NAMES OF TR DIMENSION

No	Original dimension names	New dimension names
1	Optimism	Rational Optimism
2	Innovativeness	Constrained Innovativeness
3	Insecurity	Insecurity
4	Discomfort	Personal Discomfort

As can be seen from Table 6.2 above, even though the structure still consists of four dimensions, it differs from the original one as found in Parasuraman (2000). Some factors had cross-loadings, especially in the innovativeness dimension. Accordingly, there is a need to redefine the dimension to fit the new items in it. In doing this, the original name was retained as part of the new name in order to maintain a connection with the old factor.

First, the optimism factor was able to maintain all of the existing items with one addition, INN5. The new item is stated as follows:

'I keep up with the latest technological developments in my areas of interest.'

The item loading was quite high, at .677, which put it at the middle level among the items in this dimension. For this reason, it was considered that the new dimension should be renamed in such a way that reflected the existence of this item. It was therefore decided to rename it 'rational optimism', insofar as a person's optimism can be justified by their knowledge of the latest developments in technology.

Second, innovativeness was renamed 'Constrained Innovativeness'. The original items of this dimension were reduced from 7 to 4 items. This new dimension contained more items, i.e. 9 items. Three items came from the 'Discomfort' dimension and two came from the 'Insecurity' dimension. The top three items (those with high loadings) were not original items. INS9, DIS4 and DIS1 were in the first, second and third place, respectively. One original item took fourth place, i.e. INN3, which was succeeded by two other insecurity items with considerably high loadings, .681 and .673 respectively. The newly constructed dimension was unique since it contained a mix of innovativeness, discomfort and insecurity items. The dimension can be seen as 'constrained innovativeness' because a person's innovative potential is now constrained by their feelings of discomfort and insecurity.

Third, the discomfort dimension experienced some changes. Three of the original items were included within the 'constrained innovativeness' dimension. The new discomfort dimension received two new items, one each from the insecurity and innovativeness dimensions (INS1 and INN2). INS1 was formulated as follows:

'I do not consider it safe giving out a credit card number over a computer.'

INN2 was formulated as follows:

'It seems my friends are learning more about the newest technologies than I am.'

These two items tell us that discomfort is created not only by interaction between a person and technology. It is also associated with personal matters, like one's personal identity or dignity, people may start feeling discomfort also. Even though the new item has a lower score on average than the original discomfort items, it was stilll considered important to rename the Discomfort dimension in order to stress the personal concerns in this dimension. As such, the discomfort dimension was relabelled as 'Personal Discomfort'.

Finally, the insecurity dimension retained its old name because there was no addition of new items. The items were reduced, but this did not alter the meaning of this new dimension.

Overall, this creates a new situation. Theoretically, technology readiness is constructed by two main factors: contributor and inhibitor. The contributor contains optimism and innovativeness and the inhibitor contains discomfort and insecurity. This structure is altered following the renaming of the innovativeness dimension into constrained innovativeness. The new dimension can no longer be considered as a pure contributor. Rather, it is now the determinant dimension that will affect the balance between the contributor (optimism) and the inhibitor (discomfort and insecurity). When the score leans toward the contributor, it will increase people's readiness to adopt new technology. If it scores low and puts more weight on the inhibitor, it may hinder people from adopting new technology. This finding is consistent with the latest thinking about technology readiness, as expressed by Lam et al. (2008), in which TR is separated into two main blocks: innovativeness and generalised beliefs/affects about technology. In this regard, these authors state:

> The psychological process that accounts for the innovativeness effect does not involve evaluation of the target product. We acknowledge that in parallel with this process, an evaluative process is also likely to take place in consumers' minds after they are exposed to a technology-based product. (Lam et al. 2008, 23)

As the name implies, the first block consists of the innovativeness dimension, while the second consists of optimism, discomfort and insecurity. Lam et al. (2008) propose a new structure for TR, suggesting that innovativeness plays a unique determinant role that works more independently. All dimensions are still creating a combined effect on people's readiness to adopt technology, but the final effect will be determined by their innovativeness.

6.4.2 Influence of technology readiness in the model of acceptance

The new structure of technology readiness may explain its moderating role in this thesis. The influence test results presented in Table 5.36 confirmed the moderating effect of TR. There is a significant difference in effect between high and low technology readiness on the relationships between PEOU and UI, PU and UI and PE and UI. These results firmly support the acceptance of H10, H11 and H12 as stated below:

H10: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by technology readiness.

H11: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by technology readiness.

H12: The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by technology readiness.

This finding is somewhat surprising since some earlier studies suggested the opposite (Lin et al. 2007; Walczuch et al. 2007). Further review of more recent studies, indeed, reveals another perspective. Lam et al. (2008) have empirically verified that the technology readiness of a person will influence his/her adoption time of broadband technology. They suggest that technology learning takes place earlier and technology adoption will follow later. In other words, it is generally accepted that when people face a choice around whether or not to accept a new technology by firstly having to evaluate that technology, their prior experience and knowledge may be employed to anchor, for example, perceptions of usefulness. However, at the same time and from the same perspective, one can also find another logical process occurring—that the length of time from acceptance to adoption will be contingent upon the technology readiness of the person, which highlights the moderating role of this construct in technology adoption. In addition, it is ambiguous to state that TR is a causal antecedent of TAM, since the theoretical propositions proposed by TRAM proponents state that TAM is specific for a particular system such as a high-tech or low-tech system, while TR was measured for

general technology beliefs (i.e. individual specific). Inconsistencies occur at this point, in defining a domain for TR and TAM to be studied under the same consistent platform. Lam et al. (2008) addressed this issue. According to these authors, the different levels of adoption occur because they are moderated by the respondents' technology readiness.

The moderating role of TR is also examined by Liljander et al. (2006), who state that TR affects technology evaluation and adoption. When users are familiar with the technology, their technology readiness will dictate when they will adopt it (Liljander et al. 2006). Empirical findings about the moderating role of TR can also be found in Yi et al. (2006). Such previous research as cited above has provided another perspective that TR acts as a moderator in technology adoption models.

TR discovered in this thesis arguably contains more constraints. Innovativeness is constrained, thus limiting people's likelihood of trying and using new technology. Therefore, people are more dominated by a lack of innovativeness, discomfort and insecurity when facing new technology. They now feel that they may not be able to use technology properly. This explains why the moderating effect of TR on PEOU–UI is found to cause very different situations in the high and low value group models. As can be seen from Figures 5.38 and 5.39, for the high technology readiness value group, the relationships between PEOU and UI, PU and UI and PE and UI were found to be significant (p-value less than .05), with beta values equal to .23, .26 and .23, respectively. In the low technology readiness value group model, UI was signficantly influenced by PU (p-value=.002) and PE (p-value=.002), but not by PEOU since its p-value was greater than .05.

The significant influences of PEOU, PU and PE on UI in the high technology readiness value group are logically explicable. These results showed that consumers with high technology readiness had already obtained adequate knowledge about the mobile broadband technology being introduced. This knowledge enabled them to perform a comprehensive evaluation of the new technology in making an adoption decision by assessing major aspects associated with it. Not only could they assess the main benefits offered by the technology, but they were also able to evaluate the procedures and devices needed to operate it. This is proven by the significant influence of PEOU on UI. As has been mentioned earlier, while PEOU has an indirect effect on UI through PU and PE in the low value group, this variable is an influential determinant of usage itention for the high value group. These findings are not unexpected. People who have been technologically ready to embrace and utilise a new broadband technology platform will be more

concerned about how easy it is going to be to operate. This is consistent with the explanation offered by Lam et al. (2008), who state that:

> ...the technology acceptance model (TAM) assumes that people form evaluative beliefs or perceptions about the ease of use and usefulness of a target technology, and integrate these beliefs to form their usage intention of the technology. The generalised beliefs and affects about technology would *enter into this evaluative process*, as they may affect the beliefs about the target product. (p. 23)

This thesis posits that the highlighted words in the above quotation are to be interpreted as describing a moderating effect of generalised beliefs about technology or technology readiness because it moderates the effect of evaluative beliefs or perceptions about the ease of use and usefulness of a technology. Agarwal and Prasad (1998) mentioned that potential adopters' willingness to eventually accept new technology will be moderated by their innate innovativeness and propensity to take risks with regard to technology (p. 213). Additionally, the above hyphothesis testing results show that these consumers demonstrate a comprehension about the capability of the new technology in enabling them to engage in online entertainment or fun activities. This finding is believed to be a strong indication of users' high expectations of the capability and reliability of mobile broadband technology in fulfiling their needs. This further leads us to understand the implications that the above explained findings could have for marketing in practice.

First, to introduce mobile broadband technology to consumers who have high technology readiness, the technology must be deployed and transformed into commercialised products or applications that not only provide a reliable mobile broadband connection as a core benefit, but also other features and augmented services supporting it. These may include an easy-to-use modem, pre-installed set-up software, content and supporting applications, and 24-hour, 7-day-a-week customer support and service. As the consumer expectation of the products tends to be high, it is considered essential to assure that the quality of service as well as quality of user experience meet the expectation. The assurance can be provided through a service level guarantee (SLG) as part of service level agreement (SLA) or other types of service contract with consumers. An SLG may be applied in assuring network availability determined by the certain agreed level of end-to-end mobile broadband network connectivity. The service contract in which the levels of network connectivity and reliability are formally defined assure the delivery of expected network performance. Performance is evaluated periodically based on certain technical measures such as data rates, mean time to failure (MTTF), mean time to recovery (MTTR), indicating the average time that a device will take to recover from any failure, and

other relevant measures. Consumers are financially compensated for underperformance of the service as agreed in the contract, which should work to minimise the product/service not meeting their expectations.

Second, to effectively apply the service level agreement program as a unique selling proposition in triggering potential consumers to adopt the mobile broadband product, operators must incorporate this program into the main message of their marketing communication program. This approach should be implemented based on an appropriate branding strategy consistently applied to all elements used in the marketing communication materials. Brand delivery is the name given to the recommended strategy. It a strategic direction implemented in order to develop a strong brand for a product (mobile broadband in this case) that provides evidence to the consumers as promised by the product. The SLA is the major component of brand delivery and is explicitly highlighted in the above-the-line materials, and explained through promotional communication materials displayed in relevant below-the-line media such as advertorial and product review columns. The objective is not only to inform potential consumers of the program, but also to strongly persuade them in making a buy-in action. This approach is considered essential, particularly if we look at the new structure of the technology readiness construct in this thesis which reveals how it is developed in the context of Indonesia. As has been explained earlier, one of the dimensions that forms technology readiness among Indonesian consumers is 'constrained innovativeness'. This dimension reflects a consumer's potential for innovation that is formed by their innovativeness but uniquely constrained by his/her feelings of discomfort and insecurity. The existence of discomfort and insecurity items in the constrained innovativeness dimension reveals that the potential consumers possess mixed feelings about the new technology. Even though they have demonstrated a positive tendency to embrace and use the new technology, they also express some doubt or uncertainty about it. The provision of a service level guarantee is considered an appropriate way to respond to this issue.

Third, the brand delivery strategy mentioned above should be strengthened with tangible evidence. The consumers must be given an opportunity to experience the benefits of having access to the mobile broadband network and to witness its performance. An online speed test that can be used to measure the actual data rates may be developed for this purpose. By using this facility, consumers are given access to a specific website address, enabling them to test the data rates and make a comparison with the previous technology. Because it is a web-based application, the online speed test can be used in product demonstration rooms located at the distribution channels and in a consumer's residence with the help of an assigned sales representative. Operators may also use exhibitions and

other relevant promotional events to demonstrate the product/facility in order to reach a larger audience.

Meanwhile, a marketing response necessary for dealing with consumers who have low technology readiness may be developed based on the insecurity and discomfort items that form the constrained innovativeness dimension. As was explained earlier in this chapter, this dimension was found to be a determinant dimension which affects the balance between the contributor (optimism) and the inhibitor (discomfort and insecurity). Low technology readiness is formed mainly by a low score in this dimension in which insecurity and discomfort items have a dominant contribution. By examining at these items more closely, it can be understood that consumers in this category are concerned about how they can be protected when performing online activities and professionally supported or served by a content provider that they can trust. Since they have not used the mobile broadband technology before, this concern could be a result of their subjective perceptions. The limited knowledge that they have about the availability of internet security systems and other online protection software applications may have caused them to develop such opinions. This also explains why the evaluation process to accept the technology is strongly driven by perceived usefulness and perceived enjoyment. These variables reflect their concern about whether or not using particular systems would effectively enhance his/her job or task at hand and give them something they can enjoy without having to be troubled by security or privacy issues. In responding to this issue, operators may consider implementing a marketing customer education program coupled with a product trial program. These programs are provided to convince the consumers that they can safely use the technology for online activities if they know how to do it properly. A product trial program can also be provided at the operators' outlets or the consumer's residence, offered at no charge for a certain promotional period of time.

Finally, the acceptance of H10, H11 and H12 also confirms that TR can be used as a criterion to divide the market into more homogeneous segments, a process known as market segmentation. The high and low TR value groups of consumers can be comparably analogised into market segments. Each group has been proven to demonstrate distinct behavioural responses to a new technology product through unique mechanisms occurring among PEOU, PU and PE. Distinct behavioural responses performed by a group of consumers towards a specific full or partial set of marketing mix is a strong indicator characterising the group as a solid market segment (Kotler 2001; McDonald & Dunbar 2004). This finding supports the Techno-Ready Marketing (TRM) concept proposed by Parasuraman and Colby (2000), in which they suggest an approach to classifying consumers based on different levels of technology readiness into

homogeneous groups. The acceptance of new technology is expected to be more effective if it is driven by marketing approaches designed by taking into account the distinct adoption behaviours of each group. These researchers support this concept with the two following arguments, called TRM principles:

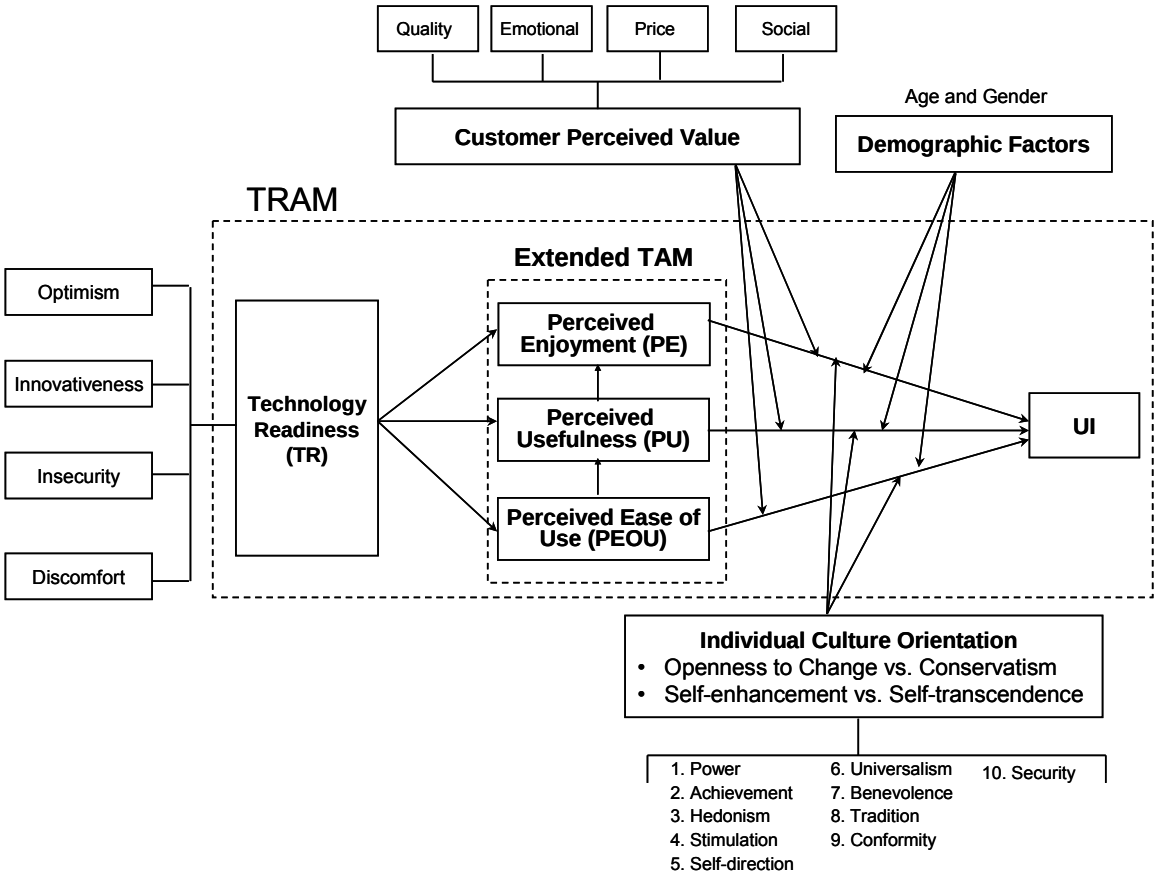
- 'technology product adoption is a process distinct from other product adoptions because of varying levels of optimism about technology, tendency to innovate, discomfort with technology, and inherent security'.
- 'The marketing strategies for technology products are different from other products because the technology product adoption process is distinct' (Parasuraman & Colby 2000).

The proven significant influence of TR demonstrated in the high and low value groups reported in this thesis supports implementation of the first TRM principle. Different levels of TR based on varying levels of its four dimensions result in distinct processes of acceptance. UI is uniquely influenced by PEOU, PU and PE in both the high and low technology readiness models. This conveys an important message for researchers: that to comprehensively understand the technology acceptance process, the scope of analysis should be directed to individual levels or segmented groups of consumers. As a logical consequence, there is no universal technology acceptance model that can be applied to explain the acceptance process for all types of consumers. The second principle of TRM endorses this proposition from the practical perspective, stating that marketing approaches used by operators of technology products should be distinctively designed around the behavioural mechanisms underlying UI and its predictors which characterise each targeted segment's acceptance process.

6.5 THEORETICAL CONTRIBUTION

This thesis was initiated with the objective to provide an integrated model of mobile broadband internet service acceptance, which was practically nonexistent in the literature. The integration is achieved by extending TAM to include a comprehensive set of individual factors that have strong theoretical foundation to affect the relationship between technology perception and intention to use it. These factors are technology readiness (TR), consumer perceived value (CPV), individual cultural orientaton and demographics. Technology readiness was proposed to act as a direct predictor of TAM, creating a new model, known as TRAM in the literature. The others were proposed to give moderating effect in the model, which is represented in Figure 6.1 below,

FIGURE 6.1 INITIAL CONCEPTUAL MODEL



This thesis adopts standard measures of those factors, which were reported in the papers originally proposed them. Technology readiness, for example, was measured using its original items as found in Parasuraman (2000). Prior to conducting SEM, the items are evaluated using exploratory factor analysis in order to ensure their validity for the Indonesian context, resulting in the following findings:

1. Technology readiness is restructured. Although it still contains four dimensions, its interpretation is totally different. The new structure suggests that TR is reflected by four newly contextualised dimensions including rational optimism, constrained innovativeness, discomfort and insecurity. In this new structure, constrained innovativeness plays a dominant role by affecting the balance between rational optimism and a combination of discomfort and insecurity.

2. Consumer perceived value has gained a new structure. The new structure is dominated by personalised standard of quality, which consists of nine items. The others are value for money, social and technical quality dimensions.

3. Individual cultural orientation in this (Indonesian) context leans toward conservation and openness to change. One factor, power, is removed, which is explained in Chapter 5. The conservation orientation is more dominant than openness to change in explaining the cultural orientation of Indonesian people.

The above leads to the first theoretical contribution of this research. These findings suggest that in a context where conservation, inertia and lack of innovativeness are dominant, there will be an adjustment of TR, CPV and the individual cultural orientation structure, which were originally formulated in a very different context. The new structure will reflect the new situation, and is characterised by close resemblance to conservation and lack of innovativeness.

The structural equation modelling (SEM) procedure was conducted to compare TAM with TRAM in terms of their ability to explain mobile broadband technology acceptance in Indonesia. The results suggest that TAM is a better predictor of mobile broadband internet adoption than TRAM.

Finally, a summary of the findings and theoretical implications is presented in Tables 6.3, 6.4 and 6.5.

TABLE 6.3 SUMMARY OF TEST RESULTS FOR HYPOTHESES H1a to H5 AND THEORETICAL IMPLICATIONS

Hypotheses	Empirical Conclusion	Theoretical Implications
H1a: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PE → PU causal directions in extended TAM	Supported	This result is consistent with findings in Pagani and Fine (2007) and Kwon and Chidambaram (2000). Accordingly, perceived ease of use is very important in mobile broadband service adoptions since it will affect perceived usefulness and enjoyment of the technology.
H1b: The PEOU → PU and PU → PE causal directions are more appropriate than the PEOU → PU and PEOU → PE causal directions in extended TAM	Supported	See the above analysis
H2:TAM provides a more parsimonious fit than TRAM in explaining mobile broadband technology acceptance	Supported	This supports Davis (1989) and Venkatesh et al. (2003) that TAM is more appropriate and that its explanatory power can be increased by adding moderating factors.
H3: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by consumer perceived value.	Not supported	Due to the absence of a strong influence of socially and technically oriented measure, we can argue that the perceived value has a strong resemblance to the salient perceptions of technology (PEOU, PE and PU) as the three reflect people's perception of technology according to their self-focused point of view. In short, we believe that people evaluate the same thing when asked to perceive technology and its value.
H4: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by consumer perceived value.	Not supported	
H5:The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by consumer perceived value.	Not supported	

As shown in Table 6.3 above, the findings associated with the test results for H1a, H1b and H2 confirmed the causal relationships among perceived usefulness, perceived ease of use and perceived enjoyment in the baseline model. These findings suggest that perceived ease of use is the main predictor of perceived enjoyment through the mediation of perceived usefulness.

TABLE 6.4 SUMMARY OF TEST RESULTS FOR HYPOTHESES H6a1 to H6b3 AND THEORETICAL IMPLICATIONS

Hypotheses	Empirical Conclusion	Theoretical Implications
H6a1: The positive influence of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by a conservatism cultural orientation.	Not supported	Individual cultural orientation lacks a significant moderating influence in the link between PU–UI. This can be explained by the lack of orientation toward self-transcendence or self-enhancement. We argue that the usefulness of technology is more relevant when people are going to use technology to enhance or transcend themselves. Therefore, when these orientations are absent people will only care about the ease of use and enjoyment of technology when deciding to use it. This will be moderated by their orientation toward conservatism or openness to change.
H6a2: The positive influence of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by a conservative cultural orientation.	Supported	
H6a3: The positive influence of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by a conservative cultural orientation.	Supported	
H6b1: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.	Not supported	
H6b2: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.	Not supported	
H6b3: The positive effect of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by an openness to change cultural orientation.	Supported	

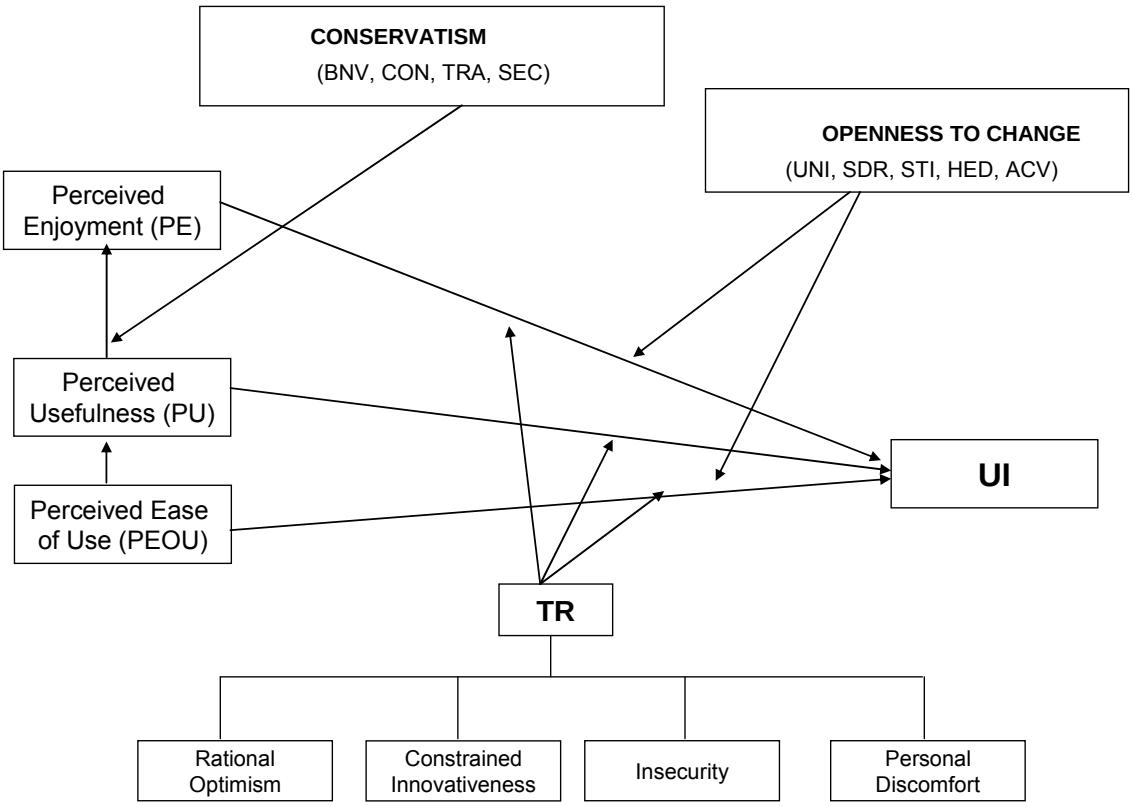
The test results for H3 to H12, as summarised in Tables 6.4 and 6.5, revealed the significance of three moderator variables in the technology acceptance model, including the conservative cultural orientation, the openness to change cultural orientation and technology readiness. Conservatism was found to have a significant influence on the relationship between perceived usefulness and perceived enjoyment; whereas openness to change was proven to have a moderating influence on the relationships between PEOU and UI, PU and UI and PE and UI. Meanwhile, technology readiness was also found to significantly moderate the positive influences of perceived ease of use, perceived usefulness and perceived enjoyment on usage intention.

TABLE 6.5 SUMMARY OF TEST RESULTS FOR HYPOTHESES H7 to H12 AND THEORETICAL IMPLICATIONS

Hypotheses	Empirical Conclusion	Theoretical Implications
H7: The positive effect of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by demographic factors.	Not supported	The findings reveal that the loadings of PEOU, PU and PE on UI are low regardless of gender and age. The findings further suggest that demographic factors do not moderate any relationships in the acceptance model of mobile broadband technology in Indonesia.
H8: The positive effect of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by demographic factors.	Not supported	
H9: The positive effect of consumers' perception of enjoyment about mobile broadband technology on their usage intention is moderated by demographic factors.	Not supported	
H10: The positive influence of consumers' perception of usefulness of mobile broadband technology on their usage intention is moderated by technology readiness.	Supported	This is consistent with the explanation in Lam et al. (2008) that generalised beliefs about technology or technology readiness moderates the effect of evaluative beliefs or perceptions about the ease of use and usefulness of a technology on the intention to use the technology. It is also in accordance with Agarwal and Prasad (1998), who mentioned that potential adopters' willingness to eventually accept new technology will be moderated by their innate innovativeness and propensity to take risks with regard to technology (p. 213). This concludes that technology readiness plays a significant role as a moderator in TAM.
H11: The positive influence of consumers' perception of ease of use of mobile broadband technology on their usage intention is moderated by technology readiness.	Supported	
H12: The positive influence of consumers' perception of enjoyment of mobile broadband technology on their usage intention is moderated by technology readiness.	Supported	

The results summarised in Tables 6.3, 6.4 and 6.5 above suggested that the relationship between TAM and TR be reconfigured, as seen in the final acceptance model displayed in Figure 6.2.

FIGURE 6.2 FINAL MOBILE BROADBAND TECHNOLOGY ACCEPTANCE MODEL



The final model proposes that TR moderates the effect of technology evaluation (along its ease of use, usefulness and enjoyment dimensions) on user intention to use the technology. The moderating influence of individual cultural orientation is present in the link between PEOU–UI, PE–UI and PU–PE.

6.6 SUMMARY

The key findings in this thesis were implemented to construct the main components of the integrated mobile broadband technology acceptance model. The first two key findings were applied in establishing the baseline model and confirming the causal relationships of perceived usefulness, perceived ease of use and perceived enjoyment in that model. The other key findings that relate to the presence, role and influence of moderator variables in the acceptance model were implemented to incorporate identified moderating variables into the baseline model. In addition, the key finding specifically investigating the role of technology readiness was applied to strengthen the model through the integration of this variable as a moderator in the final model. Finally, all findings generated in this thesis extend the theoretical foundation to better understand the technology acceptance process at the individual level occurring under the influence of various moderator variables.

CHAPTER 7: CONCLUSIONS

7.1 INTRODUCTION

The objective of this chapter is to present the final empirical model of mobile broadband technology acceptance developed based on the key findings of this thesis. For this purpose, the key findings are highlighted and explained in relation to research questions and supporting hypotheses. Besides, key additional empirical findings obtained in this thesis are also reported, followed by a discussion of the implications of the findings for theories of technology acceptance, as well as managerial and social implications, and the limitations of this research. Finally, recommendations for future research are suggested at the end of the chapter.

7.2 OVERVIEW OF CONCLUSIONS FROM KEY FINDINGS

The key findings presented in the following sections are elaborated based on the two main sequential stages involved in developing the integrated model of mobile broadband technology acceptance. The first two key findings are associated with the establishment of a baseline model used to construct the integrated model. The other four key findings are explained in relation to the identification and examination of moderator variables to be incorporated into the baseline model.

7.2.1 The role of technology acceptance in the Technology Acceptance Model

This thesis provided empirical evidence to resolve the question in the technology acceptance literature around the relationships between technology readiness and the dimensions of extended TAM. The establishment of TAM as the baseline model generates an essential finding proving that consumers' technology readiness does not directly influence perceptions about ease of use, usefulness and enjoyment. Contrary to some studies found in the literature, this thesis revealed that technology readiness demonstrated a moderating influence in extended TAM.

This key finding is cited to establish the actual role of technology readiness in TAM which has been posited differently in previous studies. It confirmed that technology readiness will act as a moderating variable when the technology has been diffused to some extent and people are aware of its applications. This is the situation in Indonesia covered by this thesis. The identified relationship between technology readiness and technology adoption may find its ground in Indonesia as we note that mobile broadband has been available on

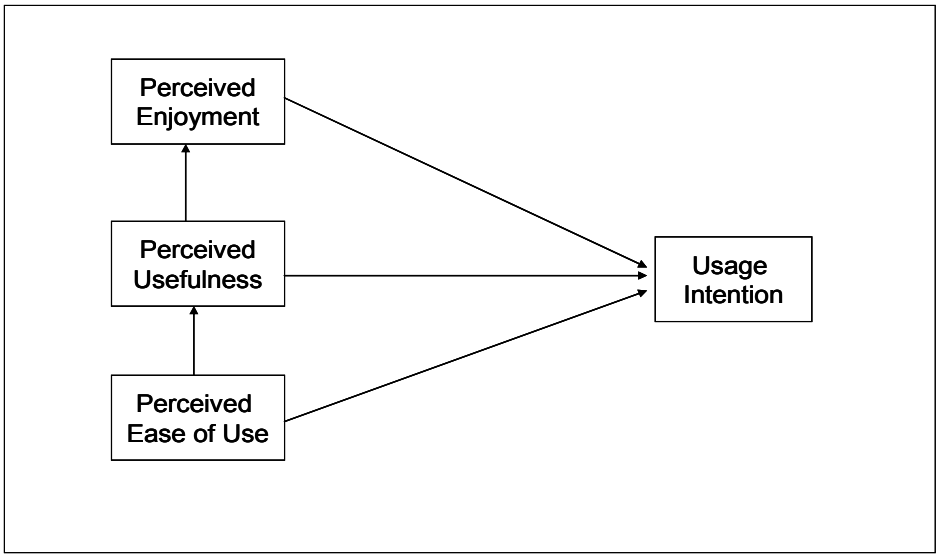
the market and promoted to its target market, which is also the population of this thesis. The respondents participating in this research are notably informed about mobile broadband technology and its applications. Therefore, their technology readiness level plays a minimal role in shaping their perceptions about the ease of use, usefulness and enjoyment of the technology. It was also found in this thesis that the level of adoption varies among them, which suggests that the respondents are different in terms of time of adoption. In this particular situation, technology readiness determines the time of technology adoption. In a situation in which a technology is totally new to the market, consumers would not be fully aware of or familiar with it, and so technology readiness would assume a quite different role—as a predictor of technology adoption antecedences.

The specific moderating influences of technology readiness in the technology acceptance model have also been investigated in this thesis and are explained in section 7.2.7.

7.2.2 The causal relationships of PU, PEOU and PE

This thesis validated the causal relationships of perceived usefulness, perceived ease of use and perceived enjoyment in the baseline model. The validation produced an essential key finding: that perceived ease of use is the main predictor of perceived enjoyment through the mediation of perceived usefulness, providing an essential foundation to establish the baseline model presented in Figure 7.1.

FIGURE 7.1 THE BASELINE MODEL: EXTENDED TAM

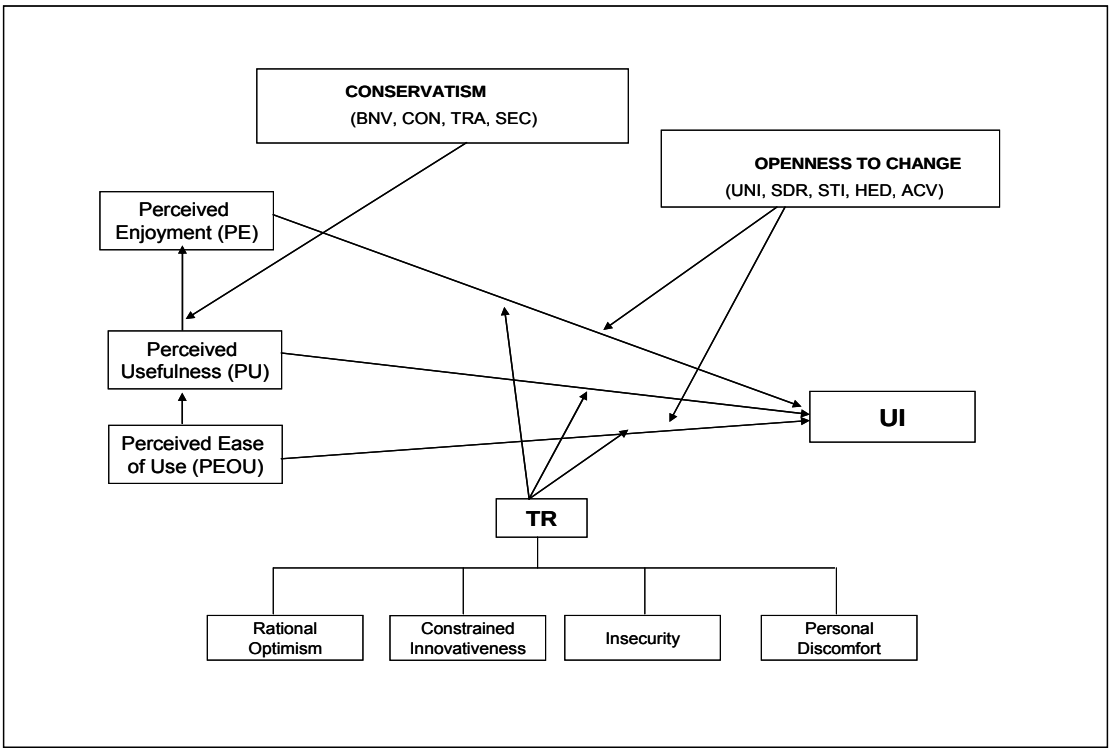


Source: Adapted from Davis (1989), Pagani (2004), Ha et al. (2007), Shin (2007), and Bruner and Kumar (2005).

As illustrated in Figure 7.1, the baseline model validated in this thesis provides fundamental information revealing that consumers can better understand the benefits of mobile broadband technology, both in terms of usefulness and enjoyment, if they first know how to use it. In addition, perceived usefulness was found to further affect perceived enjoyment, a specific variable to be included in mobile broadband technology adoption due to its hedonic nature.

Other key findings explained in the following sections are associated with the identification of moderator variables and their influences in the acceptance model. These key findings are illustrated in the final integrated technology acceptance model of mobile broadband technology which is shown in Figure 7.2.

FIGURE 7.2 FINAL MOBILE BROADBAND TECHNOLOGY ACCEPTANCE MODEL



Source: Author

The final model displayed in Figure 7.2 above answers the research questions of this thesis by providing an integrated framework that comprehensively explains the mobile broadband technology acceptance process in Indonesia and the ways in which the moderator variables influence the causal relationships in that framework.

7.2.3 Moderator variables of the Technology Acceptance Model

This study filled a gap in the literature by confirming the following three moderator variables of technology acceptance model: conservative cultural orientation, openness to change cultural orientation and technology readiness (see Figure 7.2). These moderator variables are validated for technology acceptance occurring in a non-work situation in which the technology adoption is not formally directed. The findings about the moderating infuences of conservatism and openness to change further advanced previous findings in the literature which, as was reported earlier in Chapter 3, show that most studies about culture and technology acceptance limit their analysis to the group or national level arising from the issues of ecological fallacy. This is the fallacy which assumes that one can validly adopt ecological correlations to substitute for individual correlations by applying generalised conclusions drawn from collective entities such as groups. This thesis contributed to the literature by resolving the ecological fallacy issue as reflected in the implemented methodology in which the investigation of the influence of culture was conducted at the individual level. As a result, not only did this thesis provide a more accurate analysis of the moderating influence of culture in technology acceptance, but it also resolved the ecological fallacy problem by performing the individual level–based analysis in which the cultural factor was treated as an individual difference variable. Therefore, the findings offered by this study can be used to understand more clearly how an individual accepts new technology as driven by his or her cultural orientation.

7.2.4 The moderating influence of the conservative cultural orientation in the technology acceptance model

This thesis contributed to the theory by examining the moderating influence of the conservative cultural orientation on the causal relationships of variables in the Technology Acceptance Model. A moderating influence of conservatism was found to be significant on the relationship between perceived usefulness and perceived enjoyment. In other words, the positive influence of perceived usefulness on perceived enjoyment was moderated by this cultural orientation. This finding enriched the technology acceptance literature, particulary in dealing with technology adoption issues within the hedonic system domain such as mobile broadband technology. By referring to the results of conservatism's moderating influence test produced by this thesis, we can now better understand how Indonesian consumers reference traditional values such as norms, family and religious values in evaluating and accepting a new technology, specifically when they have to evaluate the usefulness and enjoyable or entertaining aspects of the technology. The

results reveal that consumers with different orientations towards traditional or conservative values express different perceptions about the importance of perceived usefulness and perceived enjoyment. Consumers who are more likely to comply with such values tend to place more import on usefulness in accepting a new technology, while those who are more relaxed about these values place a stonger emphasis on the enjoyment or entertaining aspects of it.

7.2.5 The moderating influence of the openness to change cultural orientation in the technology acceptance model

This thesis enriched the literature with new knowledge about how the openness to change cultural orientation influences the technology acceptance process. The knowledge was generated based on the key finding obtained from the results of this cultural orientation influence test. Based on these results, it has been discovered that the openness to change orientation demonstrates significant moderating influences in the technology acceptance model. Specifically, it moderates the positive influences of perceived ease of use and perceived enjoyment on usage intention. By referring to these findings, it can now be understood that consumers with a more dominant openness to change orientation tend to give more attention to the ease of use dimension and less on the enjoyment aspect in evaluating and accepting a new technology. Familliarity with the current technology characteristics equipped with an easy operation capability has caused this type of consumer in particular to demand user-friendly features of the new technology. In the same vein, keeping themselves updated with the latest technology trends and developments also ensures they understand that entertainment capability has now become a standard feature of such technology. They believe that this feature is inherently embedded as part of the technology's advancement. Therefore, perceived enjoyment is not a dominant influential factor in determining their tendency to accept the new technology.

7.2.6 The moderating influence of technology readiness in the technology acceptance model

This thesis further contributed to the theory by identifying the role of technology readiness in the acceptance model and also examining its specific influence in that model. The influence test conducted for technology readiness revealed that this variable demonstrated moderating influences on the relationships between perceived ease of use, perceived usefulness and perceived enjoyment on usage intention. These findings suggested that technology readiness influences how consumers evaluate, respond to, and

accept a new technology. Consumers with different levels of technology readiness perform different patterns of the evaluation process in accepting a new technology. Consumers who have a high level of technology readiness tend to consider more aspects of a technology as important criteria than those with low technology readiness. They believe that a new technology may be accepted if it is useful, easy to use and enjoyable. On the other hand, consumers who are less technologically ready evaluate the technology based only on its usefulness and enjoyment aspects. This type of consumer has not yet acquired a comprehensive understanding of how the technology is operated, and therefore is not able to comprehend the ease of use aspect when evaluating the technology.

7.2.7 Key additional empirical findings

This thesis provided three additional key findings as a new contribution to the literature by exploring and confirming the dimensionality of multi-item variables involved in the research model. The exploration and confirmation of dimensionality were performed to contextualise all elements of the model to the Indonesian situation, resulting in new structures for technology readiness, consumer perceived value, and Scwartz's cultural orientation constructs. The new structures reflect the actual situation to ensure the validity of the model for implementation in the context of this country. The first key additional finding suggested that technology readiness is contextualised through its new restuctured construct. The new structure is reflected by four new dimensions consisting of rational optimism, constrained innovativeness, discomfort and insecurity. The second finding indicated a new structure for consumer perceived value that is dominated by personalised standard of quality, which forms the construct together with the three other dimensions of value for money, social and technical quality. Finally, the third finding signified the Schwartz individual cultural orientation construct, which now leans toward the conservatism and openness to change dimensions. These dimensions are proven to significantly characterise the cultural orientation of Indonesian people.

7.2.8 Implications for managerial practice

The very important message for managers relates to the importance of developing a good understanding of the differences in Indonesian consumers' behaviours. Two fundamental differences related to the technology acceptance process were discovered in this thesis. First, it has been found that Indonesian consumers are different in terms of their readiness to respond positively to new technology. Second, it was also proven that they are different in embracing values that reflect their cultural orientation. These differences further deliver

another important message that consumers holding the same technology readiness level perform specific behaviours towards new technology acceptance. The specific technology adoption behaviour pattern is also found in consumers with the same cultural orientation. For technology operators these findings raise the need to take an important first step in their efforts to roll out and market mobile broadband technology in the country—the need to conduct behavioural market segmentation. The Indonesian market must first be divided into homogeneous market segments reflecting similarities in behaviour towards technology acceptance. Technology readiness and individual cultural orientation can be considered to be implemented as the bases for this purpose.

The outcome of behavioural segmentation is vital for developing more effective marketing programs to ensure the mobile broadband technology products are successfully accepted in this country. The marketing mix programs must be distinctively designed around the needs and behaviours of each targeted segment. More specifically, mobile broadband technology must be deployed as a user-friendly application, which addresses consumers' need for an effortless software installation procedure in obtaining the wireless broadband connection. This issue will be particularly important when seeking to reach those segments with high technology readiness level and cultural orientation characterised by low conservatism and high openness to change. Consumers in this segment have been proven to be more concerned about whether or not the new technology is going to be easily operated. Operators must in this case be able to build a strong impression that the technology product is intentionally designed to meet this specific need through a sound marketing communication program. For example, a stronger emphasis needs to be placed on the user-friendliness aspect of the product in the communication program directed to that segment. At the below-the-line level, the marketing communication programs should also be supported by a network of outlets providing product demonstrations, which should include an explanation of how to install the modem, find the signal and get online.

7.2.9 Social implications

The findings produced in this thesis may be referred to by the Indonesian Government and its telecommunications operators in implementing an extensive capital investment plan to develop nation-wide broadband infrastructure. Some key findings enable us to identify a number of important social implications related to mobile broadband technology adoption among Indonesian consumers. For the Indonesian Government in its role as a regulator, it is essential to take into account how the implementation of this new technology will impact socially on users and the society more broadly.

The first social implication identified in this thesis relates to two key findings. The first is the fact that technology readiness has been proven to have a significant influence on how consumers accept new mobile broadband technology. The second one is the discovered market reality showing that the Indonesian consumers studied in this thesis display differences in terms of their technology readiness. Bearing this in mind, we may find a similar market situation in other cities and other areas in the country, which in turn will affect the acceptance behaviour of potential consumers in those areas also. The aspects of technology that these consumers might tend to emphasise would vary between those who have high and low readiness levels. To assure the success of the nation-wide broadband development program, the government and operators need to address this issue because it has a potential to positively as well as negatively influence the targeted consumers and society. On the one side, the findings drawn from the final model show that potential consumers view usefulness as an important aspect to consider when accepting mobile broadband services. Here we can expect that the technology would have a positive impact in helping people to carry out more productive activities such as accessing important information, educational content or even doing business over the internet. However, on the other side, if we look at the findings showing that the consumer segment with low technology readiness level tends to be strongly impressed by the 'fun' aspect of this new technology, then we need to be aware of the potential negative social impacts of the technology. The Indonesian Government needs to find ways to ensure that people, particularly young people, do not become trapped in enjoying unproductive activities and negative content made available by the presence of broadband technology. The government needs to consider providing educational programs to address these potential social implications.

The other important social implication of this thesis is reflected by the finding we obtained in discovering the cultural orientation of Indonesian consumers. In a culture in which traditional values and social conformity are expected, product and other applications of mobile broadband technology must be designed with adequate value compliance to be successfully accepted. Therefore, it is essential to address the finding that indicated that Indonesian consumers tend to be conservative because it has been proven in this thesis to influence consumers' decision of whether or not the technology is useful and enjoyable. When the enjoyable aspect or useful aspect is perceived as an ability of the technology to deliver content or information that potentially violates traditional values such as religion-based values, the success of mobile broadband infrastructure development plan will be put at significant risk.

7.2.10 Limitations

In part due to Indonesia's geography, characterised by thousands of islands, this thesis was conducted only in big cities where the introduction and diffusion of new technologies has already commenced. Consumers living in smaller cities or remote areas were not involved in the surveys as this was beyond the resources available to conduct the survey. Besides, the mobile broadband products were not yet available in those areas at the time this study was conducted. This could be a limitation of this thesis.

It is the objective of this thesis to understand the mobile broadband technology acceptance process conducted by potential consumers. Therefore, the respondents interviewed in the main study were those who have not adopted the technology and subscribed to any mobile broadband service provider. Consumers who have already become subscribers were not involved because there were only few of them that could be found when the study was conducted. At that time, the service had only just been rolled out into the market. A comparative analysis between user and non-user data groups was not yet statistically possible. Thus, insufficiency of data about adopters became a limitation in performing such an analysis.

The other limitation of this thesis is associated with the risks of method variance, which are probable, as all of the data were drawn from surveys and the population sample was comprised solely of Indonesian respondents.

As stated in chapter 1, the findings used to develop the acceptance model could be the interest for some industry participants needed to specifically commercialise mobile broadband technology. This could be considered as a limitation of this thesis. However, the aim of this study was to understand the acceptance process, and this outcome could also be useful for general, non-industry groups.

7.2.11 Directions for future research

Future research can be directed towards investigating Indonesian consumers' technology acceptance process in smaller cities and islands not studied in this thesis. This future direction is suggested to address the fact that Indonesian consumers live in many scattered islands and provinces with different social backgrounds, and are therefore particularly culturally and socially diverse. Such research might apply the model proposed in this thesis since it has adopted cultural factors as one of its constructs. In line with this direction, it is also recommended that future research investigate the acceptance process

occurring in micro segments such as communities and social networks to examine whether segment characteristics demonstrate a significant moderating influence in the acceptance model. The understanding generated from this research can be used to strengthen the applicability of the model. Besides, it can also be used in the development of effective marketing programs to increase the market penetration of mobile broadband technology. In a country where cultural orientation towards society is dominant, new technology products can potentially be diffused and penetrated through extant community and social networks.

Over the next few years, once the broadband network has been completely developed throughout the country and the broadband technology is fully deployed into more new commercialised products and applications, the model proposed by this thesis may need further validation. This validation can be conducted by performing a similar study implementing the model to investigate the acceptance of those products and applications. Such research needs to cover the newly developed product characteristics, and special attention should be given to the quality of the mobile broadband connection in terms of its coverage, reliability and access. This is because the full implementation of the broadband network is predicted to significantly improve the network performance in providing a more reliable internet connection with higher speed of access and wider wireless coverage, which in turns will affect consumers' perceptions about usefulness, ease of use, enjoyment aspects, and specifically the value of the new products. In this context, two dimensions of the consumer perceived value construct will be directly impacted: the technical quality dimension, and the personalised standard of quality dimension. As a result, we could possibly gain different consumer value levels as perceived by the consumers which will further influence the relationships between the variables currently configured in the model.

As the number of mobile broadband users increases, it will be possible to accurately measure the actual usage of the products they use. Therefore, another direction for future research might be to include an actual usage variable in the model to examine post-adoption behaviour. Understanding this behaviour will contribute to the literature since it will empirically confirm or validate the positive relationship between intention and adoption behaviour reflected by actual usage. To meet this objective, research will need to involve both users and non-users as respondents. A comparative analysis could then be conducted to investigate whether or not different processes of adoption are performed by these two groups of people. These analytical results are essential to confirm the nature of the relationship between intention and actual usage and to establish a robust indicator for measuring adoption.

Another aspect of the mobile broadband product that needs to be further examined is its price. As the customer base of this product is developed and growing, its operators can gain a better economy of scale while at the same time facing more intense competition. In a competitive market such as this, the price of the product will arguably decrease and reach an optimal market price level. The price will predictably become much lower than that at the present time. From a theoretical perspective, a lower price will have an impact on the value for money dimension of consumer perceived value. Furthermore, the changing consumer perceived value could affect its moderating influence in the acceptance model. To address this issue, a model validation is required which replicates the research stages involved in this thesis and uses the same sampling frame.

7.2.12 Summary

The main objective of this research was to investigate the role of moderating variables on mobile broadband technology acceptance in order to develop a more integrative mobile broadband service acceptance model for the Indonesian context. This thesis has achieved its objective by establishing an empirical model constructed with two components: a baseline model and a set of moderator variables. A baseline model expanded from the Technology Acceptance Model (TAM) was confirmed to validly indicate that acceptance can be predicted based on consumers' perceptions about ease of use, usefulness and enjoyment. The establishment of TAM as the baseline model highlights another important insight proving that consumers' technology readiness does not directly influence perceptions of ease of use, usefulness and enjoyment. Instead, the influence of technology readiness was confirmed to be significant through its role as a moderator variable which completed the second component composition of the models coupled with two other moderators—individual cultural orientation and consumer perceived value. These three moderators then finalised the construction of the integrated model that can be used to explain the process of acceptance of mobile broadband technology.

In conclusion, to comprehensively understand the process that consumers undertake in accepting a new technology, a more integrative model that involves moderator variables is required. This thesis discovered that such a model is culturally sensitive and should be implemented by taking into account consumers' readiness to embrace new technology. Through the integrated model developed and proposed in this thesis, both the theoretical and managerial understanding of technology acceptance has been advanced.

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APPENDIX A: ANZIBA 2010 PAPER

A Paper presented at ANZIBA 2010 CONFERENCE
Sydney, 14–17 April 2010

The Moderating Role of Consumer Perceived Value on Broadband Usage Intentions

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Consumer Perceived Value as a Moderator Variable in the Technology Readiness and Acceptance Model

Abstract

This study examines the effects of consumer perceived value on an extended technology acceptance model in the Indonesian telecommunications market. The population sample was comprised of Indonesians living across thirteen localities and yielded 704 responses. The findings show different levels of value perceptions moderate a consumer's intention formation process. These differences have implications for product design and marketing communication strategies for industry. To date, the literature shows no integrated model that includes moderator variables thus indicating the importance of studying this framework. This study makes a significant contribution to understanding the impact of moderator variables on Technology Readiness and Acceptance Model (TRAM) and leads both researchers and practitioners to the development of a more integrated framework for understanding technology acceptance.

Keywords

Consumer perceived value; Technology readiness; Technology acceptance; Moderation; New product development; Indonesia.

BIOS:

Priyantono Rudito is a PhD scholar at the School of Management, RMIT Business and is researching mobile broadband technology acceptance in Indonesia. He previously spent 16 years in the Indonesian telecommunications industry and held a number of middle and senior managerial positions in various telecommunications organisations. He was an invited lecturer at the Institute Technology Telkom (ITT), School of Business and Management Institute of Technology Bandung (SBM-ITB), and the Institute Management Telkom (IMT) where he was the recipient of teaching awards from the School of Business and Management Institute of Technology Bandung. Priyantono has published numerous articles in international forums such

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Dr Christopher White moved into higher education in 1995 after a thirteen-year career in the international hospitality management field. Since that time he has worked at universities in Australia and Switzerland, won teaching awards and has published numerous research articles in leading international journals and conference proceedings. His research interests relate to the way emotions, psychological needs, values and cognition impact on judgements of service quality and satisfaction, word-of-mouth communication and consumer loyalty.

Introduction

Over the past five years, mobile communication subscriptions in Indonesia have witnessed a 792% growth (Evans, 2005; Telkom, 2008); thus all major Indonesian operators have taken steps to improve Indonesia's communications infrastructure by transforming their network into a broadband-based convergence network. The competition amongst operators is intense and sees heavy pricing-based promotional activities to deal with the competition and to attract new consumers.

It is the contention of this paper that pricing is over-emphasised as a factor predominantly influencing technology adoption and, following an extensive international literature review, we assert that a potential foundation model that could be further developed and applied to the Indonesian context is the Technology Readiness and Acceptance Model (TRAM). Furthermore, we propose there are other moderating factors that may also influence an end user's adoption of technology. The presence of moderator variable influences in extant models of user technology acceptance was identified by Chin et al. (2003) with Venkatesh, Sun et al. (2006) reporting that moderating factors may enhance the limited explanatory power of technology acceptance models. Yet the actual role of the moderator variable in influencing technology acceptance is still not well understood.

Literature review

In the first attempt to integrate individual and system characteristics of technology acceptance Lin et al. (2007) combined the technology readiness (TR) model and the technology acceptance model (TAM) into a single model which these authors labeled TRAM. TR is comprised of four sub-dimensions—optimism, innovativeness, discomfort, and insecurity—which are aimed to capture an individual's propensity to embrace and use new technologies to accomplish goals in home life and at work. TAM postulated that users' intention to use a new system was influenced by their beliefs about the system's perceived usefulness and perceived ease of use. Clearly,

TRAM provides an opportunity to analyse technology acceptance from a comprehensive perspective; however, there are two critical issues to address before this model may be applied to a consumer marketing context.

First, the TAM framework as a part of the TRAM model was developed in a 'controlled' work situation. Thus, to confirm the model's applicability in an uncontrolled context, such as the open marketplace, it is essential that the model be tested in a normal life activity environment (Lin, Shih, Sher, & Yen-Li, 2007). Research that has focused on technology acceptance in primarily non-work settings (Pagani, 2004) suggests that before the transition from a work to a market context can succeed, another variable, identified as perceived enjoyment (PE), should be incorporated into TRAM.

Perceived enjoyment originally referred to the extent to which the activity of using computers was perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis, Bagozzi & Warshaw, 1992). PE has been posited to influence user technology acceptance and to have implications for hedonic systems, and as such we have incorporated PE into the TRAM model and propose that PE will have a positive and significant impact on user intention (UI) and that the perception of usefulness (PU) directly influences PE. Our rationale for specifying this relationship is based on substantial evidence published in the social psychology and marketing literature (Bagozzi, R, Gopinath & Nyer 1999; Roseman 1996; Roseman & Evdokas 2004; Spreng, Shi & Page 2005) that shows cognitive appraisals, in this case perceptions of usefulness, as influencing affective or emotional states that in turn influence intentions. Given that TRAM is a relatively new concept, two hypotheses were developed. Hypothesis 1a,b,c, which tests the relationship between TR and TAM, and Hypothesis 2, which addresses the inclusion of perceived enjoyment into TRAM.

- *H1a,b,c: A consumer's technology readiness is positively correlated with their perception of a) usefulness, b) ease of use, and c) enjoyment about mobile broadband technology.*

- *H2: The perceived usefulness of mobile broadband product technology will positively impact on perceptions of enjoyment which in turn will influence usage intentions.*

The second issue related to the use of the TRAM in consumer contexts is that the model was developed using variables internal to the constructs of TR and TAM. Yet the effects of moderator variables on the relationship between TR and TAM has not been thoroughly investigated, and to fully confirm the TRAM as a valid integrated model of technology adoption, a study on the impact of other types of variables, such as antecedents, is required. For example, Venkatesh et al. (2003) reported on age, gender, experience and voluntariness of use; (Srite & Karahanna 2006b) looked at national culture; and (Nasco et al. 2008) examined the task type, dominance and social influence. A potentially influential variable that has not attracted the attention of technology acceptance researchers is the combined effect of a firm's marketing efforts as this has been shown to influence user attitudes (Teng & Laroche, 2007), trial probability (Steenkamp & Gielens, 2003) and purchase intention (Laroche, 2002; Laroche et al., 1996).

While most agree that marketing effort or effectiveness is a vital component of a firm's competitive strategy, there is little consensus as to how this strategy should be measured. Clark (1999) identified around 20 measures, Ambler and Riley (2000) focused on 38, Davidson (1999) considered 10 and Meyer (1998) noted hundreds of possible marketing metrics. Such an array of possibilities may have led to the reluctance of researchers to further explore the potential of marketing effectiveness. However, recent work has challenged the predominantly quantitative

measures that have been used in favour of conceptualising effectiveness in relation to a consumer's perception of value.

Consumer perceived value (CPV) has gained worldwide acceptance as a marketing effectiveness metric. Graf and Maas (2008) added that during the last few years, the value concept has always been the fundamental basis for all marketing activity and many studies have explored the mechanisms by which marketing actions affect consumers' value perceptions (e.g., Bolton & Drew, 1991; Dodds, William, Kent, Monroe, & Grewal, 1991; Teas & Agarwal, 2000; Zeithaml, 1988). Sweneey and Soutar (2001) developed a valid measurement of CPV for durable goods that has also been adapted and extended to examine mobile phone services. Yang (2006) found that CPV explained differences between American and Korean consumers' adoption behaviour of mobile data services, and Turel et al. (2007) reported that CPV influenced intentions to use information technology.

Traditionally, research related to consumer value perceptions has focused on value as an antecedent of behavioural intentions (e.g. Zeithaml, 1988; Grewal et al., 1998; Sweeney et al., 1999; Cronin, Brady, & Hult, 2000; Kashyap & Bojanic, 2000; Chen & Dubinsky, 2003). However, the literature confirms that emerging research supports the notion that value is an important moderator variable (Anderson & Srinivasan 2003; Caruana, Money & Berthon 2000; Chiu, H-C, Hsieh & Kao 2005; Hsin Hsin, Yao-Hua & Wen-Ying 2009; Sharma 2008; Srini et al. 1998; Srinivasan, Anderson & Ponnavolu 2002).

Given that perceived value is an outcome of a firm's marketing effectiveness, it makes sense that different levels of value will influence relationships among the TRAM constructs. Thus, analysis of the key literature raises the following research question:

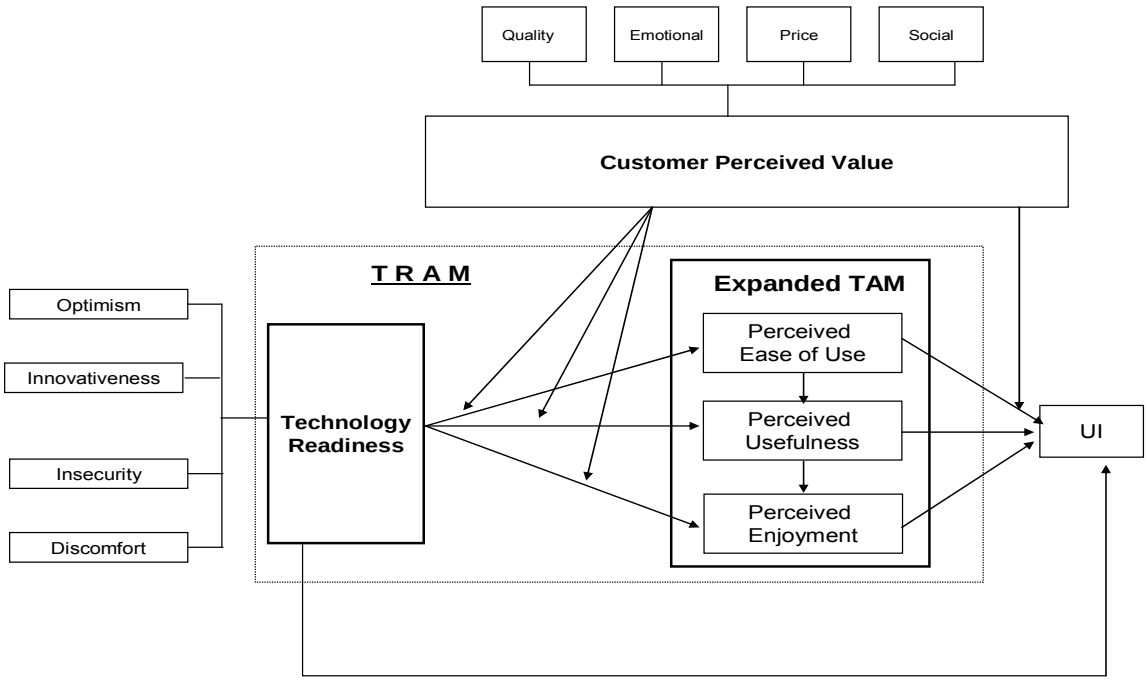
Question 1: 'In what way does CPV moderate TRAM?'

We contend that CPV is important to technology readiness and thus acceptance. CPV may be influential at different levels of analysis. In this regard, we suggest the following four hypotheses to guide the next phase of our research, which is underpinned by research question one.

- *H3a: The positive effect of consumers' technology readiness on their perceptions of usefulness about mobile broadband technology is moderated by consumer perceived value.*
- *H3b: The positive effect of consumers' technology readiness on their perceptions of ease of use about mobile broadband technology is moderated by consumer perceived value.*
- *H3c: The positive effect of consumers' technology readiness on their perceptions of enjoyment about mobile broadband technology is moderated by consumer perceived value.*
- *H3d: The relationship between perceived use and usage intentions will be moderated by consumer perceived value.*

In consolidating the literature review, and to illustrate hypotheses 3 a,b,c, and d, we propose the following conceptual model, shown in Figure 1 below.

Figure 1: The moderating role of CPV in TRAM



The moderating role of CPV in TRAM, as presented in Figure 1, shows that consumer perceived value moderates the relationships between technology readiness and perceived ease of use, technology readiness and perceived usefulness, technology readiness and perceived enjoyment, and perceived ease of use and usage intention. We now move to the next stage of our study which is to test our conceptual theoretical model.

Research methods

The research design of our study was comprised of a comprehensive literature review, followed by a pre-test, pilot study and the main study. The 91-item questionnaire was comprised of the 19-item Technology Acceptance Model instrument, the 6-item Perceived Enjoyment instrument, the 35-item Technology Readiness instrument, the 19-item Consumer Perceived Value instrument, and a 12-item demographic section. A copy of the questionnaire is available upon request from the corresponding author.

Literature review

In-depth documentary analysis of the existing international literature is a widely accepted approach to critiquing and analysing extant models of TR and TRAM that have been proposed and adopted in various contexts. In this study, we reviewed more than 300 articles and utilised 75 in the refinement of the TRAM model.

A systematic sequence of steps to develop reliable instruments for marketing research is prescribed by Churchill (Churchill Jr 1979), who asserts that the coefficient alpha must be the first measure used to assess the quality of the instrument. In cases where reliability is low, the instrument should be 'purified' by eliminating the poorly associated measurement items (McMurray & Karim, 2008). The content adequacy of any instrument should be assessed in a pre-test as this provides the opportunity to refine and/or replace instrument items.

Pre-test

Following university ethics approval, a pre-test was undertaken to strengthen the content validity of the instrument items by examining the relevance of the item variables and obtaining feedback from experts to confirm their acceptance of the proposed conceptual model, particularly from a practical perspective. Eleven experts, comprised of research and development heads, vice presidents, assistant vice presidents, general managers, executive regional general managers and managers at Telkom Indonesia who were involved in mobile broadband technology development, participated in the pre-test phase of this study. The results confirmed agreement among the experts that the content validity of the item variables was relevant and appropriate to the industry. The next phase of the research design was to progress to the pilot study.

Pilot study

The pilot study was comprised of 100 respondents and was conducted to establish the reliability and validity of the questionnaire's 91 items. Data were collected via a face-to-face survey across 13 localities in Greater Jakarta, Indonesia. Cronbach's alpha was used as a measure of reliability and construct validity. Analysis of the pilot study data revealed coefficient alpha (α) values of PU = 0.862, PEOU = 0.7.56, PE = 0.909, UI = 0.882, TR = 8.75, CPV = 0.879, and Schwartz = 0.805, thus confirming acceptable internal consistency reliability and evidence of content and construct validity. Exceeding a minimum α value of 0.70 for variables indicates that the variables are internally consistent and are good measures of the concept under study (Nunnally, 1978; Hair, Anderson, Tatham, & Black, 2006).

Main study

Sample

Indonesian mobile and fixed phone consumers over 18 years of age were determined to be the target population for this study because wireless broadband services are utilised by consumers who use mobile and fixed telephones. The criteria for inclusion in the study were as follows:

- The respondents had to be Indonesian citizens.

- The respondents had to come from the AB SES (Social Economic Status) category of those with a minimum monthly household spending of 200 dollars and who were located in Greater Jakarta and Bandung.
- The respondents had to be aged between 18 and 55 years (based on Indonesian law, their accessibility to mobile services information and their availability).
- The respondents were required to not be users of mobile broadband technology and services but had been exposed to information about this technology.
- The respondents had to own cellular devices that support mobile service applications.
- The respondents needed to consent to participate in the survey.

Procedure

Self-administered questionnaires were distributed to anonymous respondents in the Greater Jakarta and Bandung cities. These were chosen as the most suitable cities in which to conduct the survey because these areas are where the greatest number of potential consumers of wireless broadband services may be randomly found in Indonesia (Indonesian Bureau of Statistics, 2006). Bandung was selected because of its proximity to Jakarta, thus providing good comparisons to Jakarta. In addition, a considerable number of mobile phone users live in both cities. The survey was conducted in major internet wireless equipped malls, electronics and mobile phone shops located in Bandung, and eight suburbs of Jakarta including Tangerang, Central Jakarta, East Jakarta, South Jakarta, West Jakarta, Bogor, Bekasi and North Jakarta.

A systematic random sampling technique was employed to determine potential respondents to participate in our study. The data of potential mobile broadband service demand for 2009 produced by the Indonesian national Telkom was referred to in calculating the sample proportion. This technique was implemented by adopting the shopping mall intercept method in which potential respondents who had just finished visiting an electronics shop or using a free ‘hot spot’ facility at the mall were approached and asked to participate in the study, and if they consented they then completed the questionnaire.

The survey was conducted from July until October 2009 and resulted in 704 respondents yielding a response rate of 55%. The breakdown of the locations and respondents is shown in Table 1 below.

Table 1 Location and number of respondents

No	Location	Number of respondents
1	Tangerang	57
2	Central Jakarta	28
3	East Jakarta	107
4	South Jakarta	97
5	West Jakarta	86
6	Bogor	45
7	Bekasi	99
8	North Jakarta	43
9	West Bandung	22
10	East Bandung	26
11	North Bandung	22
12	Central Bandung	30
13	South Bandung	42
	T o t a l	704

In total, 13 locations were surveyed, yielding the 704 usable responses with the highest number of respondents drawn from East Jakarta (107), followed by Bekasi (99) and South Jakarta (97).

Instrumentation

The consumer perceived value scale was based on the 19-item four-dimensional model developed by Sweeney and Soutar (2001). This model has been used in a variety of contexts and has demonstrated strong validity and reliability. As mentioned above, the TRAM is comprised of the Technology Readiness Model (TR) and the Technology Acceptance Model (TAM). The four dimensions of TR were operationalised with a 35-item scale first proposed by Parasuraman

(2008) and a further 25 items captured the three TAM components. All items were anchored to a 7-point strongly agree/disagree interval scale. Following Triandis's (1983) method, the scales were translated into Bahasa Indonesia, then into English, and then back into Bahasa before being pilot-tested on a representative sample of telecommunications consumers in Indonesia. This precaution indicated that minor changes to the questionnaire format were necessary, and once completed the study proper was able to proceed with confidence.

Data analysis

Prior to analysis the data were screened for outliers, missing values, normality, linearity and multicollinearity. Some negative skewness was evident in the majority of items; however, this was not deemed to threaten the integrity of the findings, particularly in this study as items were to be combined to form composite variables. Exploratory factor analysis using maximum likelihood with direct oblimin rotation was used as correlations between the components were expected and items that double loaded or contributed less than .4 to the factor were removed. The remaining items were then summed and averaged to form variables that were entered into path analysis using AMOS17. The items and factor loadings for each dimension can be found in Appendix 1. The significance of indirect effects were calculated by using a bootstrapping option in AMOS 17 that is based on a nonparametric resampling procedure that computes confidence intervals by taking repeated samples from the data set (MacKinnon et al. 2002; Preacher & Hayes 2008).

Results

The Alpha values of the main study measures yielded similar Alpha results as for the pilot study with α scores of over 0.7, thus supporting Hinkin's (1995) assertion that the reliability of a measurement instrument is a fundamental aspect of its quality and rigour (Hinkin, 1995). These are shown in Table 2 below, which displays the means, alpha coefficients and correlations between the various constructs. The correlations are significant and the alpha coefficients comfortably exceed the recommended 0.7 (Nunnally, J 1978).

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Table 2 Means, alphas and correlations

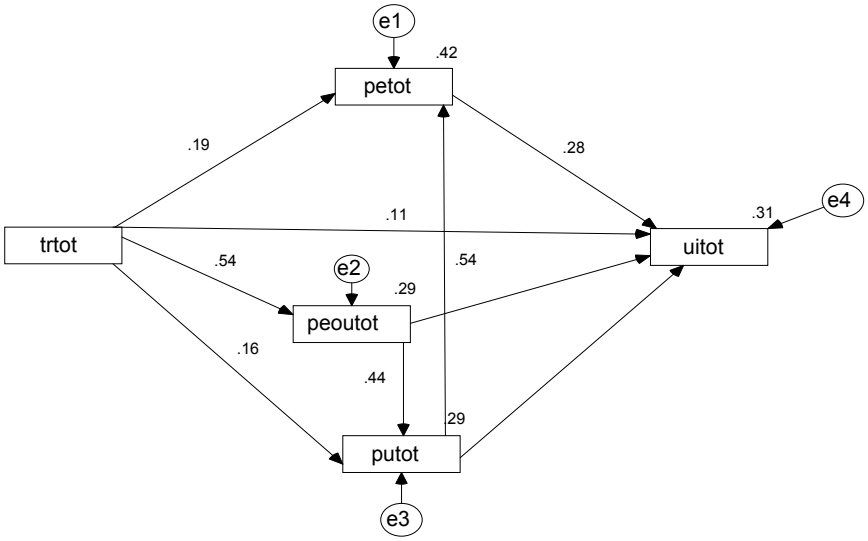
	Mean	Alpha	peou	pe	pu	ui	tr	cpv
peou	5.12	.88	1.000					
pe	5.60	.74	.521**	1.000				
pu	5.74	.88	.522**	.620**	1.000			
ui	4.91	.90	.392**	.500**	.480**	1.000		
tr	5.09	na	.533**	.421**	.404**	.360**	1000	
cpv	5.37	na	.468**	.623**	.534**	.449**	.502**	1.000

** p = .001

As can be seen in Table 2, the correlations are significant and the alpha coefficients comfortably exceed the recommended 0.7 (Nunnally, J 1978).

Figure 2 displays the path coefficients and R squared values for the TRAM and with the exception of PEOU all paths were found to be significant and in the expected direction, with the four predictors explaining 31% of the variance in UI. Despite the chi-square statistic of 37.2 with 2 degrees of freedom being significant (p = .000) the GFI (.979), CFI (.968) and the NFI (.996) suggest that the model was an acceptable fit to the data. In addition to having a direct effect on UI, TR had a significant indirect or mediated effect through PE, PU and PEOU. On the basis of these findings H1 a, b and c may be accepted and the strong and significant impact of PU on PE and from PE to UI provided support for H2. Thus H1 a, b and c and H2 are confirmed.

Figure 2 Path analysis showing significant estimates and R Squared values



Figures 3 and 4 display path diagrams for low and high value samples and clearly different patterns have emerged. To formally test for moderation, paths were estimated simultaneously for both groups and the baseline model where paths were allowed to differ produced a chi-square of 34.1 with 2 degrees of freedom (p = 000). The parameter estimates were then constrained to be equal and a chi-square of 56.9 with 11 degrees of freedom (p = .000) resulted. A chi-square difference test indicated a significant difference across the free and constrained models (chi-square with 9 degrees of freedom = 22.80, p=0.01), suggesting that different levels of perceived value moderate the UI formation process. In order to isolate where the differences were, individual analyses were conducted, which indicated that the differences were between TR to PU, TR to PE and PEOU to UI. Therefore, hypotheses H3a, c and d may be accepted and H3b is rejected as no significant differences at any conventional level were found.

Figure 3 Path diagram for the low value group

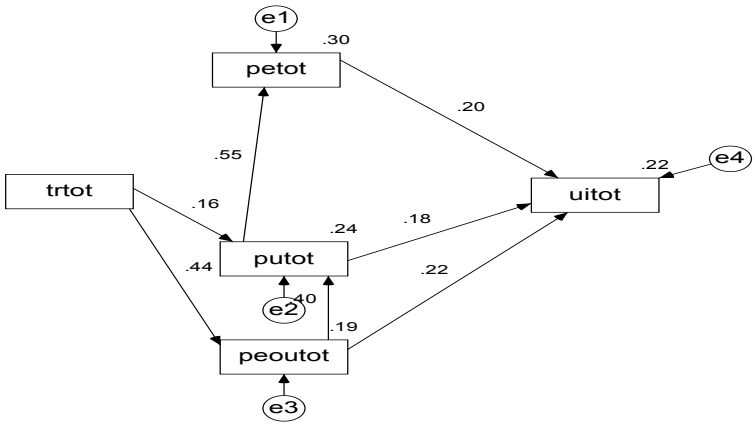
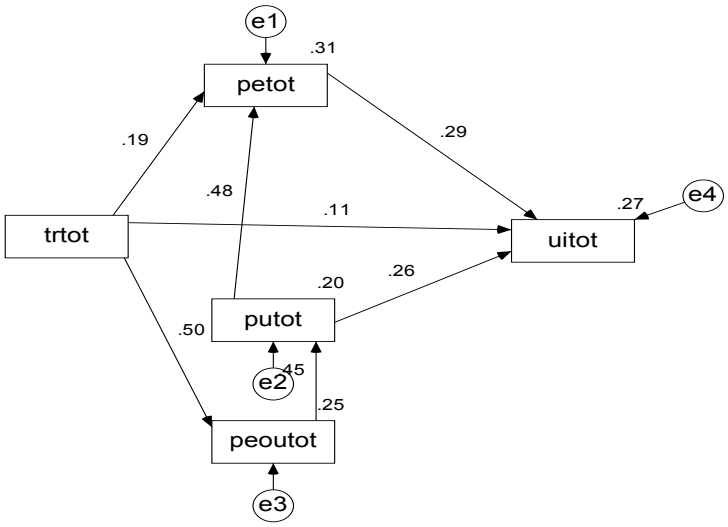


Figure 4 Path diagram for the high value group



Findings and discussion

To generate quality data, a model's constructs need to be tested and purified in order to ensure validity and reliability so that the same results are consistently produced whenever the instrument is administered (Nunnally & Bernstein, 1994). Utilising a rigorous research design comprised of a pre-test, pilot study and main study we established the validity and reliability of our findings and thus we may assert our findings with confidence.

The TRAM has recently been used to understand and explain usage intentions for a diverse range of technologies and contexts. The extended model tested here provides practitioners and researchers with a viable option when seeking to enhance insights into the process of technology usage intentions and market development in a country whose thirst for new telecommunications technology is a long way from being quenched.

In particular, referring to Figure 4, it may be seen that TR has a strong impact on PEOU; however, the latter does not influence UI directly but has a significant indirect effect through PU (.18). The non-significant direct effect from PEOU to UI has been noted elsewhere (Elliott & Fu, 2008) in certain contexts, supporting the argument that other variables may moderate this relationship.

The predicted associations depicted in H1a, b and c and H2 support the robustness of the model in that similar findings have been noted across geographic and industry boundaries. The role that TR plays in influencing UI cannot be underestimated and while some of the influence is channelled through PE, PEOU and PU a significant amount (.11) has a direct impact. This finding again highlights the limitations of relying solely on TAM to explain UI and practitioners need to ensure that the components of TR are fully addressed before considering factors such as usefulness, ease of use and enjoyment.

The causal relationship between PEOU and PU has received substantial support in the IT literature; however, the PU–PE link has been relatively understudied, with some arguing that PE is an antecedent to PU (Heshan & Ping 2006). The present authors argue that the latter conceptualisation and subsequent empirical findings should be disregarded as the premise was not based on sound theoretical justification. What has been proposed here is well grounded

theoretically and supported by the study's findings. The path from PEOU to PU (.44) is significant as is the PU–PE path (.54), with PEOU contributing an indirect effect on PE of .25. Despite the appeal of the model, the predictors account for only 31% of the variance in UI, suggesting that either other variables should be included in the model or the existing constructs need to be enhanced or reconceptualised.

For the first time CPV has been shown to moderate the UI formation process in the telecommunications industry and the acceptance of three out of four hypotheses indicates that it has done so in a theoretically consistent manner. It appears that CPV does provide a legitimate basis for understanding the broadband market in Indonesia. For the low value group TR does not influence PE, suggesting that for this group, something other than TR is driving PE, and in order to manage the latter more research is needed to understand what these factors may be.

Clearly PEOU is an important determinant of UI for the low value group, so communication and promotion strategies directed towards this group need to reinforce ease of use aspects. It would be wise for practitioners to segment the market based on perceived value levels and develop different strategies for each as it is unknown how conspicuous ease of use messages would affect the high value group given there was no significant relationship identified between PEOU and UI. These findings go some way to explaining the inconsistent relationship between PEOU and UI in other non-moderated studies because if samples consisted of individuals with predominantly high value perceptions then a significant relationship would most likely not be found.

Despite the non-significant impact of TR on PU in the high value segment PU and PE still have a stronger impact on UI than in the low value model, so functionality in terms of usefulness and enjoyment need a strong presence when attempting to influence UI for the high value segment.

Moreover, the significant albeit weaker direct effect (.11) of TR on UI cannot be ignored when attempting to influence UI in this segment. The TR components of optimism, innovativeness, discomfort and insecurity must be addressed from a marketing communications and product development perspective more so for this segment than the low value segment, which once again indicates a need to develop different strategies for each perceived value level.

Conclusion and contribution

We conclude that an understanding of how moderator variables influence the mobile broadband technology acceptance process in order to develop an integrated model technology acceptance in a marketing setting is non-existent in the academic literature. Yet this knowledge and understanding is urgently required by the industry as it provides essential market knowledge in developing technology investment and deployment, new product development, market education, and more effective marketing programs.

Furthermore, by integrating the individual propensity based approach, system perceived perspective approach and incorporating moderator variables, our study provides a more comprehensive conceptual framework to better understand the technology acceptance phenomenon than is currently found in the literature

The presence of moderator variables in a new technology acceptance process has been recognised as an essential determinant for developing an integrated model. This study justifies the marketing effectiveness factor to be the potential moderator variable of the technology acceptance model where marketing effectiveness may be examined by measuring consumer perceived value of the product deployed and commercialised by utilising the technology.

This study has advanced knowledge related to technology acceptance and the outcome of this process has generated interesting research opportunities. While attempting to minimise bias and

error in the way this study was designed, a cross-sectional research approach is limited to the specific data collection period. A longitudinal enquiry, while more difficult to implement, would be very well received by academics and practitioners alike. This study has highlighted the importance of understanding the effects of moderating factors and observing the way CPV influences acceptance formation in different industries and countries would provide deeper insights into this potentially valuable construct. The search for other moderators should also continue, and a promising candidate variable would be national culture. An immense amount of work has examined the role of culture or cultural values as a moderating construct, but to date this avenue has not been explored in relation to technology acceptance.

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Figure 1: The moderating role of CPV in TRAM

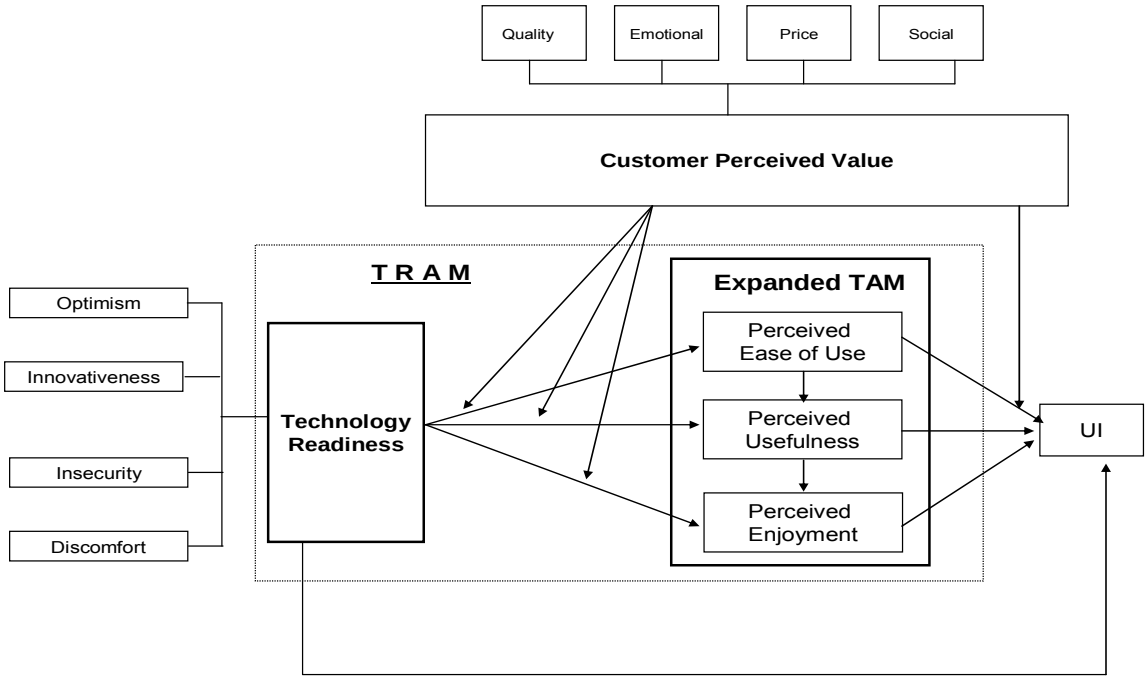


Table 1 Location and number of respondents

No	Location	Number of Respondents
1	Tangerang	57
2	Central Jakarta	28
3	East Jakarta	107
4	South Jakarta	97
5	West Jakarta	86
6	Bogor	45
7	Bekasi	99
8	North Jakarta	43
9	West Bandung	22
10	East Bandung	26
11	North Bandung	22
12	Central Bandung	30
13	South Bandung	42
	T o t a l:	704

Table 2 Means, alphas and correlations

	Mean	Alpha	peou	pe	pu	ui	tr	cpv
peou	5.12	.88	1.000					
pe	5.60	.74	.521**	1.000				
pu	5.74	.88	.522**	.620**	1.000			
ui	4.91	.90	.392**	.500**	.480**	1.000		
tr	5.09	na	.533**	.421**	.404**	.360**	1000	
cpv	5.37	na	.468**	.623**	.534**	.449**	.502**	1.000

** p = .001

Figure 2 Path analysis showing significant estimates and R Squared values

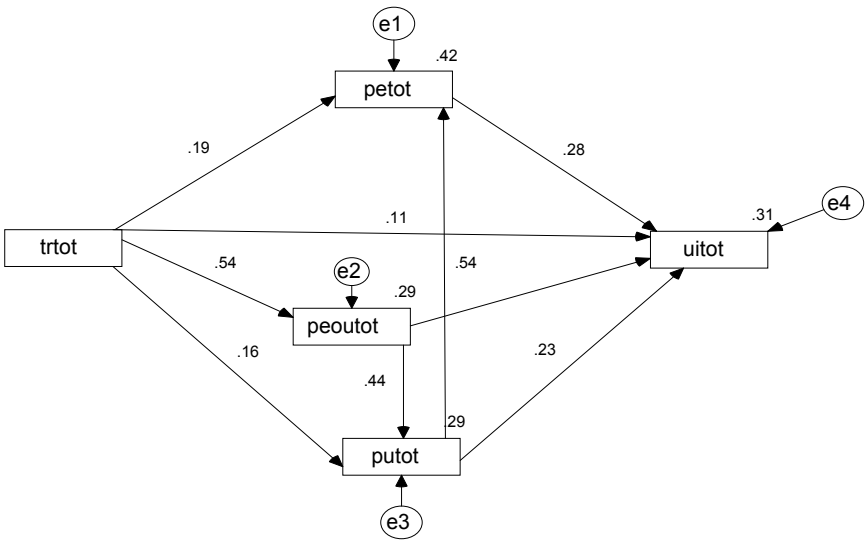


Figure 3 Path diagram for the low value group

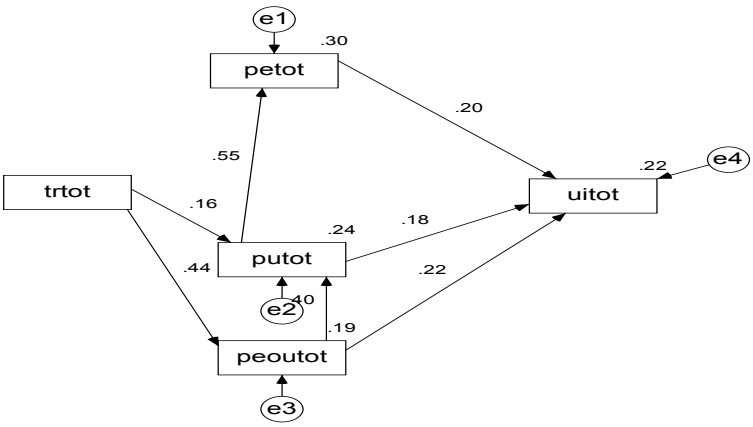
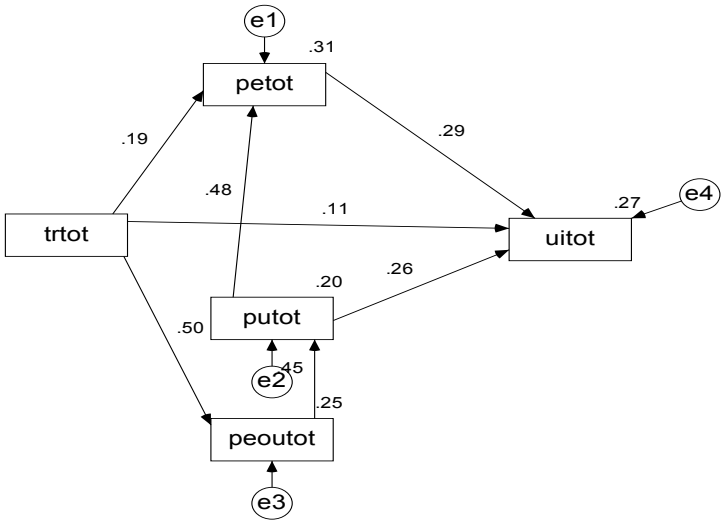


Figure 4 Path diagram for the high value group



APPENDIX B: QUESTIONNAIRES WITH INDONESIAN TRANSLATION

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Judul Penelitian: *Pilot Study* - Model terpadu akseptansi teknologi *mobile broadband* di Indonesia: Peran variabel moderator pada model akseptansi.

Investigator: Priyantono Rudito

Supervisor:
Associate Professor Adela J McMurray (adela.mcmurray@rmit.edu.au; Tel. +61 3 99255946)
Christopher White, PhD (christopher.white@rmit.edu.au; Tel. +61 3 99255907)

Yth Bapak/Ibu responden survey,

Bapak/ibu kami pilih untuk berpartisipasi dalam proyek penelitian ini yang diselenggarakan di bawah RMIT University, yang memerlukan waktu sekitar 30 sampai dengan 40 menit untuk menyelesaikannya.

Penelitian ini merupakan bagian dari program Doktor/PhD kami pada School of Management RMIT, di bawah bimbingan Associate Professor Adela J McMurray dan Doktor Christopher White. Tujuan penelitian ini adalah untuk melakukan investigasi terhadap faktor-faktor yang mempengaruhi pelanggan di Indonesia dalam menilai teknologi mobile broadband sebelum mereka memutuskan untuk menggunakannya. Satu set kuesioner telah dipersiapkan untuk menggali pendapat pelanggan tentang karakterisitik dari teknologi baru ini yang meliputi aspek tingkat kegunaan, kemudahan penggunaan dan nilai kemanfaatannya jika digunakan pada kehidupan sehari-hari. Faktor-faktor lain yang juga memiliki kemungkinan dalam mempengaruhi pendapat mereka tentang teknologi mobile broadband seperti sikap terhadap teknologi secara umum dan nilai-nilai tertentu yang menjadi concern mereka merupakan hal-hal yang juga akan ditanyakan dan dievaluasi.

Partisipasi di dalam penelitian ini bersifat sukarela, dan tidak ada resiko apapun yang berkenaan dengannya. Ibu dan bapak dapat membatalkan keikutsertaan dalam penelitian ini dan juga menarik kembali data-data yang diberikan setiap saat. Partisipasi ibu dan bapak akan membantu kami dalam memperoleh pemahaman yang diperlukan untuk menyusun rekomendasi bagi upaya pengembangan layanan *mobile broadband* yang sesuai dengan kebutuhan ibu dan bapak sebagai calon pengguna.

Seluruh data yang diperoleh dari penelitian ini akan disimpan selama 5 tahun di *School of Management*, Universitas RMIT, dan setelah melewati jangka waktu tersebut, data akan dimusnahkan. Data-data ini bersifat rahasia dan hanya dapat diakses oleh kami sebagai peneliti untuk keperluan penyelesaian disertasi/thesis PhD. Hasil penelitian akan dipublikasikan. Hasil ini akan dilaporkan dengan tetap menjaga kerahasiaan identitas anda.

Informasi apapun yang anda berikan hanya dapat dibuka kepada pihak tertentu untuk tujuan (1) melindungi anda dan orang lain dari hal-hal yang membahayakan/tidak diinginkan, (2) pengadilan memerintahkan hal tersebut atau (3) anda memberikan ijin tertulis kepada kami untuk melakukan hal tersebut untuk suatu kepentingan.

Hal-hal yang mungkin menjadi perhatian ibu dan bapak tentang penelitian ini dapat disampaikan kepada kami atau kepada promotor/pembimbing program doktor kami.

Terima kasih kami ucapkan untuk kesediaan ibu dan bapak untuk berpartisipasi.

Hormat kami,

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Pada bagian 1 sampai dengan 7, anda diminta untuk memberikan penilaian atas pernyataan yang terkait dengan berbagai aspek dari teknologi dan layanan mobile broadband berdasarkan apa yang anda yakini atau percayai. Dalam menyampaikan pendapat anda ini, berilah tanda silang (X) di bawah angka jawaban yang menjadi pilihan anda, sebagaimana terlihat dalam contoh.

BAGIAN 1

Contoh:

Saya percaya bahwa
Teknologi *mobile broadband* penting dalam mendukung aktivitas *on-line* saya.

Sangat tidak setuju — Sangat setuju

1	2	3	4	5	6	7
					X	

Jawaban ini menunjukkan anda setuju bahwa teknologi *mobile broadband* mendukung aktivitas *on-line* anda.

Sangat tidak setuju — Sangat setuju

	Pernyataan							
	Saya percaya bahwa:							
1	Teknologi *mobile broadband* bermanfaat bagi saya	1	2	3	4	5	6	7
2	Teknologi *mobile broadband* meningkatkan produktivitas saya	1	2	3	4	5	6	7
3	Teknologi *mobile broadband* membantu saya dalam melakukan aktivitas *on-line* secara lebih efektif.	1	2	3	4	5	6	7
4	Teknologi *mobile broadband* memungkinkan saya untuk memperoleh koneksi *on-line* kecepatan tinggi dengan lebih mudah di mana saja	1	2	3	4	5	6	7
5	Teknologi *mobile broadband* memberi saya koneksi *on-line* yang lebih handal.	1	2	3	4	5	6	7
6	Teknologi *mobile broadband* memberikan kendali yang lebih besar terhadap koneksi *on-line* saya.	1	2	3	4	5	6	7
7	Teknologi *mobile broadband* memungkinkan saya untuk menggunakan waktu secara lebih baik	1	2	3	4	5	6	7
8	Teknologi *mobile broadband* memberikan hal-hal penting yang saya perlukan untuk mendapatkan koneksi *on-line*	1	2	3	4	5	6	7

BAGIAN 2

Contoh:
Saya percaya bahwa prosedur pengoperasian teknologi *mobile broadband* mudah

Sangat tidak setuju						Sangat setuju
1	2	3	4	5	6	7
X						

Jawaban ini menunjukkan bahwa anda sangat tidak setuju dengan pernyataan bahwa prosedur pengoperasian teknologi mobile broadband mudah.

Sangat tidak Setuju — Sangat setuju

	Pernyataan							
	Saya percaya bahwa:							
1	Teknologi *mobile broadband* mudah bagi saya	1	2	3	4	5	6	7
2	Mudah untuk mendapatkan teknologi *mobile broadband* untuk melakukan apapun yang saya ingin lakukan	1	2	3	4	5	6	7
3	Mempelajari pengoperasian teknologi *mobile broadband* mudah bagi saya	1	2	3	4	5	6	7
4	Teknologi *mobile broadband* fleksibel	1	2	3	4	5	6	7
5	Melakukan set up teknologi *mobile broadband* adalah sesuatu yang tidak rumit	1	2	3	4	5	6	7
6	Diperlukan banyak usaha untuk mahir dalam menggunakan teknologi *mobile broadband*	1	2	3	4	5	6	7
7	Pengoperasian teknologi *mobile broadband* memerlukan banyak upaya yang bersifat mental	1	2	3	4	5	6	7

BAGIAN 3

Contoh:
Saya percaya bahwa menggunakan teknologi *mobile broadband* menghibur

Sangat tidak Setuju						Sangat setuju
1	2	3	4	5	6	7
						X

Jawaban ini menunjukan anda sangat setuju bahwa menggunakan teknologi mobile broadband menghibur

	Pernyataan	Sangat tidak Setuju						Sangat setuju
	Saya percaya bahwa:							
1	Memiliki teknologi *mobile broadband* menyenangkan/mengasyikan	1	2	3	4	5	6	7
2	Proses pengoperasian dari penggunaan teknologi *mobile broadband* menyenangkan	1	2	3	4	5	6	7
3	Menyenangkan menggunakan teknologi *mobile broadband*	1	2	3	4	5	6	7
4	Menggunakan teknologi *mobile broadband* mengasyikan	1	2	3	4	5	6	7
5	Menggunakan teknologi *mobile broadband* memberikan keasyikan/sesuatu yang menyenangkan bagi saya	1	2	3	4	5	6	7
6	Teknologi *mobile broadband* menjadikan saya bahagia	1	2	3	4	5	6	7

BAGIAN 4

Contoh:

Jika memungkinkan saya berkeinginan untuk menggunakan teknologi *mobile broadband*

Sangat tidak Setuju						Sangat setuju
1	2	3	4	5	6	7
				X		

Hal ini menunjukkan bahwa anda cukup setuju bahwa jika memungkinkan saya berkeinginan untuk menggunakan teknologi mobile broadband

		Sangat tidak Setuju						Sangat setuju
	Pernyataan							
1	Saat ini saya sangat ingin menggunakan teknologi *mobile broadband* agar dapat *on-line*.	1	2	3	4	5	6	7
2	Saya sangat ingin untuk menggunakan teknologi *mobile broadband* bulan depan.	1	2	3	4	5	6	7
3	Saya perkirakan bulan depan saya sudah menggunakan teknologi *mobile broadband*.	1	2	3	4	5	6	7
4	Saya berencana untuk menggunakan teknologi *mobile broadband* bulan depan.	1	2	3	4	5	6	7

BAGIAN 5

Contoh:

Teknologi membantu manusia memperoleh hidup yang lebih baik

Sangat tidak Setuju						Sangat setuju
1	2	3	4	5	6	7
						X

Hal ini menunjukkan anda sangat bercaya bahwa teknologi membantu manusia memperoleh hidup yang lebih baik

	Pernyataan							
Opt 1	Teknologi membuat manusia memiliki kendali atas hidupnya sehari-hari	1	2	3	4	5	6	7
Opt 2	Produk dan layanan yang menggunakan teknologi terbaru lebih nyaman untuk digunakan	1	2	3	4	5	6	7
Opt 3	Saya suka menggunakan teknologi *mobile broadband* karena memberikan kebebasan/fleksibilitas bagi saya untuk *on-line*.	1	2	3	4	5	6	7
Opt 4	Saya lebih menyukai teknologi mutakhir yang ada saat ini	1	2	3	4	5	6	7
Opt 5	Saya menyukai teknologi yang dapat disesuaikan menurut kebutuhan saya sendiri	1	2	3	4	5	6	7
Opt 6	Teknologi membuat saya menjadi lebih efisien dalam pekerjaan	1	2	3	4	5	6	7

Opt 7	Teknologi baru membuat mental saya semakin terinspirasi	1	2	3	4	5	6	7
Opt 8	Teknologi mendukung saya untuk memiliki lebih banyak mobilitas	1	2	3	4	5	6	7
Opt 9	Mempelajari teknologi adalah sesuatu yang bermanfaat	1	2	3	4	5	6	7
Opt10	Saya merasa percaya diri bahwa mesin akan mengikuti apapun yang saya perintahkan untuk dilakukan	1	2	3	4	5	6	7
Inn 1	Orang lain meminta saran saya mengenai kemungkinan penggunaan teknologi terbaru	1	2	3	4	5	6	7
Inn 2	Rekan saya lebih memahami teknologi terbaru apabila dibandingkan dengan saya	1	2	3	4	5	6	7
Inn 3	Biasanya, saya adalah orang yang pertama di antara rekan-rekan saya yang menggunakan teknologi terbaru	1	2	3	4	5	6	7
Inn 4	Saya dapat memahami teknologi *high-tech* terkini tanpa bantuan dari orang lain	1	2	3	4	5	6	7
Inn 5	Saya terus mengikuti perkembangan teknologi yang sesuai dengan minat saya	1	2	3	4	5	6	7
Inn 6	Saya lebih sedikit menemui kesulitan dalam menggunakan teknologi dibandingkan orang lain	1	2	3	4	5	6	7
Dis 1	Dukungan teknis dari *provider* teknologi yang saya gunakan tidak membantu karena tidak mampu memberikan penjelasan yang membuat saya mengerti	1	2	3	4	5	6	7
Dis 2	Terkadang saya berpikir bahwa teknologi tidak dirancang untuk digunakan oleh orang awam	1	2	3	4	5	6	7
Dis 3	Petunjuk penggunaan produk *high-tech* tidak disajikan dalam bahasa yang sederhana	1	2	3	4	5	6	7
Dis 4	Ketika mendapat layanan dari *technical support* sebuah *provider* teknologi *high-tech*, saya merasa bahwa saya hanya dimanfaatkan oleh seseorang yang lebih mengerti dibandingkan saya	1	2	3	4	5	6	7
Dis 5	Jika saya membeli produk *high-tech*, saya lebih senang dengan dengan model yang lebih sederhana dibandingkan dengan model yang lebih banyak fiturnya	1	2	3	4	5	6	7
Dis 6	Sangat memalukan jika ada yang melihat saya mengalami masalah dalam penggunaan peralatan *high-tech*	1	2	3	4	5	6	7
Dis 7	Harus ekstra hati-hati dalam mengganti pekerjaan penting yang biasa dikerjakan oleh manusia dengan teknologi karena seringkali teknologi baru tidak bekerja dengan baik	1	2	3	4	5	6	7
Dis 8	Resiko keselamatan dan kesehatan dari kebanyakan teknologi terkini secara umum justru ditemukan ketika manusia telah terlanjur menggunakannya	1	2	3	4	5	6	7

Dis 9	Teknologi terbaru membuat aktifitas manusia lebih mudah untuk dimata-matai oleh pihak pemerintah dan perusahaan	1	2	3	4	5	6	7
Dis 10	Teknologi cenderung untuk gagal ketika diandalkan dalam kondisi yang terburuk	1	2	3	4	5	6	7
Ins 1	Saya tidak merasa aman memberikan nomor kartu kredit saya melalui jaringan komputer	1	2	3	4	5	6	7
Ins 2	Saya sebenarnya tidak merasa aman apabila harus melakukan suatu aktifitas finansial secara *on-line*	1	2	3	4	5	6	7
Ins 3	Saya khawatir jika informasi/data yang saya kirim melalui internet akan diketahui orang lain	1	2	3	4	5	6	7
Ins 4	Saya tidak merasa yakin harus melakukan suatu aktifitas yang hanya dapat dijangkau secara online	1	2	3	4	5	6	7
Ins 5	Segala transaksi bisnis yang saya lakukan secara elektronik harus memiliki bukti fisik	1	2	3	4	5	6	7
Ins 6	Ketika sesuatu berjalan secara otomatis, saya selalu berusaha untuk memeriksa secara hati-hati dan memastikan bahwa mesin atau komputernya tidak melakukan kesalahan	1	2	3	4	5	6	7
Ins 7	Peran manusia jauh lebih penting daripada mesin ketika melakukan aktifitas bisnis	1	2	3	4	5	6	7
Ins 8	Ketika berbisnis, saya lebih cenderung berinteraksi dengan manusia secara langsung dibandingkan dengan mesin	1	2	3	4	5	6	7
Ins 9	Jika saya melengkapi informasi pada atau melalui internet, sebenarnya saya tidak yakin jika saya telah meletakkannya pada tempat yang benar	1	2	3	4	5	6	7

BAGIAN 6

Pertanyaan-pertanyaan di bagian ini disusun dalam kaitannya dengan layanan akses internet mobile broadband berkecepatan tinggi. Dalam menyampaikan pendapat anda ini, berilah tanda silang (X) di bawah angka jawaban yang menjadi pilihan anda, sebagaimana terlihat dalam contoh.

Contoh:

Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki koneksi yang paling handal

Sangat tidak Setuju						Sangat setuju
1	2	3	4	5	6	7
						X

Hal ini menunjukkan anda sangat setuju bahwa layanan akses internet mobile broadband berkecepatan tinggi memiliki koneksi yang paling handal

	Pernyataan	Sangat tidak Setuju						Sangat Setuju
	Saya percaya bahwa:							
Qua 1	Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki koneksi yang stabil dan tidak putus-putus di manapun digunakan	1	2	3	4	5	6	7
Qua 2	Layanan akses internet *mobile broadband* berkecepatan tinggi didisain dengan baik	1	2	3	4	5	6	7
Qua3	Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki kualitas yang memenuhi standar	1	2	3	4	5	6	7
Qua 4	Layanan akses internet *mobile broadband* berkecepatan tinggi melalui pengembangan yang baik	1	2	3	4	5	6	7
Qua 5	Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki koneksi yang stabil	1	2	3	4	5	6	7
Qua 6	Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki performansi yang stabil/konsisten	1	2	3	4	5	6	7
Emo 1	Layanan akses internet *mobile broadband* berkecepatan tinggi merupakan hal yang saya sukai/nikmati	1	2	3	4	5	6	7
Emo 2	Layanan akses internet *mobile broadband* berkecepatan tinggi membuat saya ingin menggunakannya	1	2	3	4	5	6	7
Emo 3	Layanan akses internet *mobile broadband* berkecepatan tinggi merupakan hal menyenangkan untuk digunakan	1	2	3	4	5	6	7
Emo 4	Layanan akses internet *mobile broadband* berkecepatan tinggi memberikan perasaan yang menyenangkan bagi saya	1	2	3	4	5	6	7
Emo 5	Layanan akses internet *mobile broadband* berkecepatan tinggi memberi saya kesenangan	1	2	3	4	5	6	7

Prc 1	Layanan akses internet *mobile broadband* berkecepatan tinggi memiliki harga yang pantas	1	2	3	4	5	6	7
Prc 2	Layanan akses internet *mobile broadband* berkecepatan tinggi menawarkan nilai sesuai dengan harganya	1	2	3	4	5	6	7
Prc 3	Layanan akses internet *mobile broadband* berkecepatan tinggi adalah produk yang baik sesuai harganya	1	2	3	4	5	6	7
Prc 4	Akses internet *mobile broadband* berkecepatan tinggi merupakan layanan yang ekonomis	1	2	3	4	5	6	7
Soc 1	Layanan akses internet *mobile broadband* berkecepatan tinggi membantu saya memiliki perasaan diterima oleh orang lain	1	2	3	4	5	6	7
Soc 2	Layanan akses internet *mobile broadband* berkecepatan tinggi meningkatkan persepsi terhadap diri saya	1	2	3	4	5	6	7
Soc 3	Layanan akses internet *mobile broadband* berkecepatan tinggi membuat saya memiliki kesan baik di hadapan orang lain	1	2	3	4	5	6	7
Soc 4	Layanan akses internet *mobile broadband* berkecepatan tinggi memberikan penggunanya pengakuan sosial	1	2	3	4	5	6	7

BAGIAN 7

Contoh:

Penentuan diri menunjukkan prinsip penting yang mengilhami and mempengaruhi arah fundamental dari tujuan-tujuan hidup saya.

Sangat tidak Setuju — Sangat Setuju

1	2	3	4	5	6	7
					X	

Hal ini menunjukkan anda setuju bahwa penentuan diri menunjukan prinsip penting yang mengilhami and mempengaruhi arah fundamental dari tujuan-tujuan hidup saya.

		Sangat tidak Setuju						Sangat Setuju
	Item variabel/pernyataan							
	Nilai-nilai di bawah ini mencerminkan prinsip-prinsip penting yang mengilhami dan mempengaruhi arah tujuan-tujuan yang ingin saya capai dalam hidup.							
1	Kekuasaan (kekuasaan sosial, kewenangan, kekayaan)	1	2	3	4	5	6	7
2	PENCAPAIAN/PRESTASI (sukses, kemampuan, ambisi, pengaruh terhadap orang lain)	1	2	3	4	5	6	7
3	HEDONISME (keinginan untuk mendapat kegembiraan, kesenangan hidup, kesenangan diri)	1	2	3	4	5	6	7
4	STIMULAN (tantangan, hidup yang bervariasi dan memiliki tantangan, hidup yang bergairah)	1	2	3	4	5	6	7
5	*SELF-DIRECTION* (kreativitas, kebebasan, keingintahuan, kemandirian, menentukan tujuan hidup sendiri)	1	2	3	4	5	6	7
6	UNIVERSALITAS (wawasan luas, keindahan alam dan seni, keadilan, dunia yang damai, kesetaraan, kebijaksanaan, kesatuan dengan alam, perlindungan lingkungan)	1	2	3	4	5	6	7
7	KEBAJIKAN (kedermawanan, kejujuran, pemaaf, loyalitas, tanggung jawab)	1	2	3	4	5	6	7
8	TRADISI (respek terhadap tradisi, kerendahan hati, mengakui/menerima bagian orang lain dari hidup, kesetiaan, kesederhanaan)	1	2	3	4	5	6	7
9	KEPATUHAN (patuh, menghormati orang tua dan yang lebih tua, disiplin diri, kesopansantunan)	1	2	3	4	5	6	7
10	KEAMANAN (keamanan nasional, keamanan keluarga, tatanan sosial, kebersihan, pembalas budi baik)	1	2	3	4	5	6	7

8. PERTANYAAN ASPEK DEMOGRAFIS

1. Berapakah usia anda?

   .....

2. Jenis kelamin anda:
   - ☐ Laki-laki
   - ☐ Perempuan

3. Pendidikan terakhir anda?
   - ☐ SMA
   - ☐ D3
   - ☐ S1
   - ☐ Paska Sarjana
   - ☐ Lain-lain

4. Apakah saat ini anda menggunakan layanan *mobile broadband* (HSDPA, WCDMA, WIMAX) dari salah satu provider yang ada:
   - ☐ Ya .....stop
   - ☐ Tidak

5. Apakah anda pernah memperoleh informasi tentang teknologi *mobile broadband*?
   - ☐ Ya
   - ☐ Tidak..... stop

6. Apakah anda tahu biaya yang diperlukan untuk menggunakan layanan akses internet *mobile broadband* berkecepatan tinggi?
   - ☐ Ya
   - ☐ Tidak..... stop

7. Apakah pekerjaan anda?
   - ☐ Karyawan
   - ☐ Dosen
   - ☐ Wiraswasta
   - ☐ Pelajar
   - ☐ Professional (konsultan, dokter, dll)
   - ☐ Lainnya

Terima kasih anda telah menyelesaikan kuesioner ini

8. Dari mana anda memperoleh informasi tentang teknologi dan layanan *mobile broadband*?

   ☐ Program komersial/iklan

   Tuliskan secara spesifik jenis atau nama media dimana anda menemukan informasi tersebut:

   .....

   .....

   .....

   .....

   Sebutkan nama provider dari program komersial yang menyajikan informasi tentang layanan *mobile broadband* tersebut:
   .....
   .....
   .....
   .....
   .....

   ☐ Program non-komersial

   Tulisan secara spesifik jenis atau nama media dimana anda menemukan informasi tersebut

   .....
   .....
   .....
   .....

9. Di provinsi mana anda dilahirkan?
   .....

10 Status pernikahan:
   .....

11. Berapakah penghasilan anda per bulan?
   .....

12. Berapakah pengeluaran anda untuk produk telekomunikasi? Berapakan pengeluaran bulanan anda untuk internet?
   .....
   .....

APPENDIX C DESCRIPTIVE STATISTICS FOR ALL VARIABLES

Descriptives

			Statistic	Std. Error
PU1	Mean		5.9619	.03527
	95% Confidence Interval for Mean	Lower Bound	5.8927	
		Upper Bound	6.0312	
	5% Trimmed Mean		6.0217	
	Median		6.0000	
	Variance		.817	
	Std. Deviation		.90396	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		2.00	
	Skewness		-.621	.095
	Kurtosis		-.068	.190
PU2	Mean		5.6423	.03728
	95% Confidence Interval for Mean	Lower Bound	5.5691	
		Upper Bound	5.7155	
	5% Trimmed Mean		5.6818	
	Median		6.0000	
	Variance		.913	
	Std. Deviation		.95552	
	Minimum		2.00	
	Maximum		7.00	
	Range		5.00	
	Interquartile Range		1.00	
	Skewness		-.474	.095
	Kurtosis		.297	.190
PU3	Mean		5.8524	.03587
	95% Confidence Interval for Mean	Lower Bound	5.7819	
		Upper Bound	5.9228	
	5% Trimmed Mean		5.9017	
	Median		6.0000	
	Variance		.846	
	Std. Deviation		.91954	
	Minimum		2.00	

	Maximum		7.00	
	Range		5.00	
	Interquartile Range		2.00	
	Skewness		-.470	.095
	Kurtosis		-.107	.190
PU4	Mean		6.0000	.03835
	95% Confidence Interval for	Lower Bound	5.9247	
	Mean	Upper Bound	6.0753	
	5% Trimmed Mean		6.0826	
	Median		6.0000	
	Variance		.966	
	Std. Deviation		.98309	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.50	
	Skewness		-1.101	.095
	Kurtosis		1.628	.190
PU5	Mean		5.6865	.03628
	95% Confidence Interval for	Lower Bound	5.6152	
	Mean	Upper Bound	5.7577	
	5% Trimmed Mean		5.7275	
	Median		6.0000	
	Variance		.865	
	Std. Deviation		.93003	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.479	.095
	Kurtosis		-.006	.190
PU6	Mean		5.5160	.03955
	95% Confidence Interval for	Lower Bound	5.4383	
	Mean	Upper Bound	5.5936	
	5% Trimmed Mean		5.5668	
	Median		6.0000	
	Variance		1.028	
	Std. Deviation		1.01369	
	Minimum		1.00	

	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.753	.095
	Kurtosis		.908	.190
PU7	Mean		5.5723	.04474
	95% Confidence Interval for Mean	Lower Bound	5.4844	
		Upper Bound	5.6602	
	5% Trimmed Mean		5.6598	
	Median		6.0000	
	Variance		1.315	
	Std. Deviation		1.14685	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.923	.095
	Kurtosis		1.141	.190
PU8	Mean		5.7732	.03583
	95% Confidence Interval for Mean	Lower Bound	5.7029	
		Upper Bound	5.8436	
	5% Trimmed Mean		5.8171	
	Median		6.0000	
	Variance		.843	
	Std. Deviation		.91832	
	Minimum		2.00	
	Maximum		7.00	
	Range		5.00	
	Interquartile Range		1.00	
	Skewness		-.531	.095
	Kurtosis		.263	.190

Descriptives

			Statistic	Std. Error
PE1	Mean		5.8798	.03301
	95% Confidence Interval for Mean	Lower Bound	5.8149	
		Upper Bound	5.9446	
	5% Trimmed Mean		5.9287	

	Median		6.0000	
	Variance		.716	
	Std. Deviation		.84599	
	Minimum		2.00	
	Maximum		7.00	
	Range		5.00	
	Interquartile Range		1.00	
	Skewness		-.602	.095
	Kurtosis		.444	.190
PE2	Mean		5.5145	.04076
	95% Confidence Interval for	Lower Bound	5.4344	
	Mean	Upper Bound	5.5945	
	5% Trimmed Mean		5.5786	
	Median		6.0000	
	Variance		1.092	
	Std. Deviation		1.04481	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.851	.095
	Kurtosis		1.779	.190
PE3	Mean		5.6880	.03537
	95% Confidence Interval for	Lower Bound	5.6185	
	Mean	Upper Bound	5.7574	
	5% Trimmed Mean		5.7156	
	Median		6.0000	
	Variance		.822	
	Std. Deviation		.90648	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.280	.095
	Kurtosis		-.463	.190
PE4	Mean		5.6651	.03521
	95% Confidence Interval for	Lower Bound	5.5960	
	Mean	Upper Bound	5.7343	
	5% Trimmed Mean		5.6903	

	Median		6.0000	
	Variance		.815	
	Std. Deviation		.90251	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.288	.095
	Kurtosis		-.438	.190
PE5	Mean		5.6834	.03605
	95% Confidence Interval for	Lower Bound	5.6126	
	Mean	Upper Bound	5.7542	
	5% Trimmed Mean		5.7122	
	Median		6.0000	
	Variance		.854	
	Std. Deviation		.92406	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		1.00	
	Skewness		-.250	.095
	Kurtosis		-.509	.190
PE6	Mean		5.2024	.04325
	95% Confidence Interval for	Lower Bound	5.1175	
	Mean	Upper Bound	5.2874	
	5% Trimmed Mean		5.2418	
	Median		5.0000	
	Variance		1.229	
	Std. Deviation		1.10850	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.332	.095
	Kurtosis		.285	.190
UI1	Mean		5.4429	.04969
	95% Confidence Interval for	Lower Bound	5.3454	
	Mean	Upper Bound	5.5405	
	5% Trimmed Mean		5.5598	

	Median		6.0000	
	Variance		1.622	
	Std. Deviation		1.27362	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-1.282	.095
	Kurtosis		2.393	.190
UI2	Mean		4.8432	.05176
	95% Confidence Interval for	Lower Bound	4.7416	
	Mean	Upper Bound	4.9449	
	5% Trimmed Mean		4.8949	
	Median		5.0000	
	Variance		1.760	
	Std. Deviation		1.32682	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		2.00	
	Skewness		-.527	.095
	Kurtosis		-.040	.190
UI3	Mean		4.5906	.05578
	95% Confidence Interval for	Lower Bound	4.4810	
	Mean	Upper Bound	4.7001	
	5% Trimmed Mean		4.6378	
	Median		5.0000	
	Variance		2.044	
	Std. Deviation		1.42968	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		2.00	
	Skewness		-.539	.095
	Kurtosis		-.127	.190
UI4	Mean		4.8189	.05051
	95% Confidence Interval for	Lower Bound	4.7197	
	Mean	Upper Bound	4.9180	
	5% Trimmed Mean		4.8695	

	Median	5.0000	
	Variance	1.676	
	Std. Deviation	1.29460	
	Minimum	1.00	
	Maximum	7.00	
	Range	6.00	
	Interquartile Range	2.00	
	Skewness	-.586	.095
	Kurtosis	.128	.190

Descriptives

			Statistic	Std. Error
PEOU1	Mean		5.5540	.03745
	95% Confidence Interval for Mean	Lower Bound	5.4805	
		Upper Bound	5.6276	
	5% Trimmed Mean		5.5972	
	Median		6.0000	
	Variance		.921	
	Std. Deviation		.95981	
	Minimum		2.00	
	Maximum		7.00	
	Range		5.00	
	Interquartile Range		1.00	
	Skewness		-.606	.095
	Kurtosis		.400	.190
PEOU2	Mean		5.4049	.03979
	95% Confidence Interval for Mean	Lower Bound	5.3267	
		Upper Bound	5.4830	
	5% Trimmed Mean		5.4417	
	Median		6.0000	
	Variance		1.040	
	Std. Deviation		1.01985	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.563	.095
	Kurtosis		.418	.190

PEOU3	Mean		5.2785	.03966
	95% Confidence Interval for Mean	Lower Bound	5.2007	
		Upper Bound	5.3564	
	5% Trimmed Mean		5.3247	
	Median		5.0000	
	Variance		1.034	
	Std. Deviation		1.01665	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-.579	.095
	Kurtosis		.806	.190
PEOU4	Mean		5.4718	.04729
	95% Confidence Interval for Mean	Lower Bound	5.3790	
		Upper Bound	5.5647	
	5% Trimmed Mean		5.5649	
	Median		6.0000	
	Variance		1.469	
	Std. Deviation		1.21206	
	Minimum		1.00	
	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.00	
	Skewness		-1.037	.095
	Kurtosis		1.266	.190
PEOU5	Mean		5.09	.048
	95% Confidence Interval for Mean	Lower Bound	4.99	
		Upper Bound	5.18	
	5% Trimmed Mean		5.13	
	Median		5.00	
	Variance		1.496	
	Std. Deviation		1.223	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		2	
	Skewness		-.600	.095
	Kurtosis		.105	.190

PEOU6	Mean		4.71	.056
	95% Confidence Interval for Mean	Lower Bound	4.60	
		Upper Bound	4.82	
	5% Trimmed Mean		4.76	
	Median		5.00	
	Variance		2.026	
	Std. Deviation		1.423	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		2	
	Skewness		-.480	.095
	Kurtosis		-.351	.190
PEOU7	Mean		4.41	.058
	95% Confidence Interval for Mean	Lower Bound	4.30	
		Upper Bound	4.53	
	5% Trimmed Mean		4.46	
	Median		5.00	
	Variance		2.182	
	Std. Deviation		1.477	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		3	
	Skewness		-.446	.095
	Kurtosis		-.408	.190

Descriptives

			Statistic	Std. Error
CPV1Q	Mean		5.3470	.03442
	95% Confidence Interval for Mean	Lower Bound	5.2794	
		Upper Bound	5.4146	
	5% Trimmed Mean		5.3615	
	Median		5.3333	
	Variance		.778	
	Std. Deviation		.88229	
	Minimum		1.00	

	Maximum		7.00	
	Range		6.00	
	Interquartile Range		1.33	
	Skewness		-.456	.095
	Kurtosis		.443	.190
CPV2E	Mean		5.0377	.04165
	95% Confidence Interval for	Lower Bound	4.9559	
	Mean	Upper Bound	5.1194	
	5% Trimmed Mean		5.0777	
	Median		5.0000	
	Variance		1.139	
	Std. Deviation		1.06747	
	Minimum		1.50	
	Maximum		7.00	
	Range		5.50	
	Interquartile Range		1.50	
	Skewness		-.523	.095
	Kurtosis		.158	.190
CPV3P	Mean		5.5344	.02711
	95% Confidence Interval for	Lower Bound	5.4812	
	Mean	Upper Bound	5.5876	
	5% Trimmed Mean		5.5517	
	Median		5.5556	
	Variance		.483	
	Std. Deviation		.69483	
	Minimum		3.00	
	Maximum		7.00	
	Range		4.00	
	Interquartile Range		.89	
	Skewness		-.357	.095
	Kurtosis		-.008	.190
CPV4S	Mean		5.2714	.03602
	95% Confidence Interval for	Lower Bound	5.2007	
	Mean	Upper Bound	5.3422	
	5% Trimmed Mean		5.3039	
	Median		5.3333	
	Variance		.853	
	Std. Deviation		.92333	
	Minimum		2.00	

	Maximum		7.00	
	Range		5.00	
	Interquartile Range		1.33	
	Skewness		-.596	.095
	Kurtosis		.073	.190
opt	Mean		5.6301	.02545
	95% Confidence Interval for	Lower Bound	5.5802	
	Mean	Upper Bound	5.6801	
	5% Trimmed Mean		5.6457	
	Median		5.7273	
	Variance		.425	
	Std. Deviation		.65228	
	Minimum		3.64	
	Maximum		7.00	
	Range		3.36	
	Interquartile Range		.91	
	Skewness		-.339	.095
	Kurtosis		-.314	.190
inn	Mean		4.3727	.03875
	95% Confidence Interval for	Lower Bound	4.2967	
	Mean	Upper Bound	4.4488	
	5% Trimmed Mean		4.3883	
	Median		4.3333	
	Variance		.986	
	Std. Deviation		.99322	
	Minimum		1.56	
	Maximum		6.56	
	Range		5.00	
	Interquartile Range		1.44	
	Skewness		-.207	.095
	Kurtosis		-.402	.190
dis	Mean		4.7909	.03050
	95% Confidence Interval for	Lower Bound	4.7310	
	Mean	Upper Bound	4.8508	
	5% Trimmed Mean		4.8025	
	Median		4.8000	
	Variance		.611	
	Std. Deviation		.78171	
	Minimum		2.40	

	Maximum		6.60	
	Range		4.20	
	Interquartile Range		1.05	
	Skewness		-.200	.095
	Kurtosis		-.165	.190
ins	Mean		5.4292	.03051
	95% Confidence Interval for Mean	Lower Bound	5.3693	
		Upper Bound	5.4891	
	5% Trimmed Mean		5.4470	
	Median		5.4000	
	Variance		.612	
	Std. Deviation		.78212	
	Minimum		2.80	
	Maximum		7.00	
	Range		4.20	
	Interquartile Range		1.00	
	Skewness		-.355	.095
	Kurtosis		-.214	.190

Descriptives

			Statistic	Std. Error
POW	Mean		4.99	.056
	95% Confidence Interval for Mean	Lower Bound	4.88	
		Upper Bound	5.10	
	5% Trimmed Mean		5.08	
	Median		5.00	
	Variance		2.112	
	Std. Deviation		1.453	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		2	
	Skewness		-.884	.094
	Kurtosis		.503	.188
ACV	Mean		5.56	.041
	95% Confidence Interval for Mean	Lower Bound	5.48	
		Upper Bound	5.64	
	5% Trimmed Mean		5.60	

	Median		6.00	
	Variance		1.112	
	Std. Deviation		1.055	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		1	
	Skewness		-.581	.094
	Kurtosis		.347	.188
HED	Mean		5.42	.044
	95% Confidence Interval for	Lower Bound	5.33	
	Mean	Upper Bound	5.51	
	5% Trimmed Mean		5.50	
	Median		6.00	
	Variance		1.321	
	Std. Deviation		1.150	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		1	
	Skewness		-1.033	.094
	Kurtosis		1.878	.188
STI	Mean		5.71	.036
	95% Confidence Interval for	Lower Bound	5.64	
	Mean	Upper Bound	5.78	
	5% Trimmed Mean		5.75	
	Median		6.00	
	Variance		.860	
	Std. Deviation		.927	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		1	
	Skewness		-.500	.094
	Kurtosis		-.065	.188
SDR	Mean		5.96	.035
	95% Confidence Interval for	Lower Bound	5.89	
	Mean	Upper Bound	6.02	
	5% Trimmed Mean		6.02	

	Median		6.00	
	Variance		.807	
	Std. Deviation		.898	
	Minimum		2	
	Maximum		7	
	Range		5	
	Interquartile Range		2	
	Skewness		-.742	.094
	Kurtosis		.435	.188
UNI	Mean		6.01	.032
	95% Confidence Interval for	Lower Bound	5.95	
	Mean	Upper Bound	6.07	
	5% Trimmed Mean		6.06	
	Median		6.00	
	Variance		.704	
	Std. Deviation		.839	
	Minimum		2	
	Maximum		7	
	Range		5	
	Interquartile Range		1	
	Skewness		-.655	.094
	Kurtosis		.413	.188
BNV	Mean		6.00	.036
	95% Confidence Interval for	Lower Bound	5.93	
	Mean	Upper Bound	6.07	
	5% Trimmed Mean		6.07	
	Median		6.00	
	Variance		.881	
	Std. Deviation		.938	
	Minimum		2	
	Maximum		7	
	Range		5	
	Interquartile Range		2	
	Skewness		-.723	.094
	Kurtosis		.053	.188
TRA	Mean		5.91	.037
	95% Confidence Interval for	Lower Bound	5.83	
	Mean	Upper Bound	5.98	
	5% Trimmed Mean		5.96	

	Median		6.00	
	Variance		.924	
	Std. Deviation		.961	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		2	
	Skewness		-.620	.094
	Kurtosis		-.265	.188
CON	Mean		6.12	.036
	95% Confidence Interval for Mean	Lower Bound	6.05	
		Upper Bound	6.19	
	5% Trimmed Mean		6.20	
	Median		6.00	
	Variance		.891	
	Std. Deviation		.944	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		1	
	Skewness		-.968	.094
	Kurtosis		.856	.188
SEC	Mean		5.99	.037
	95% Confidence Interval for Mean	Lower Bound	5.92	
		Upper Bound	6.06	
	5% Trimmed Mean		6.06	
	Median		6.00	
	Variance		.927	
	Std. Deviation		.963	
	Minimum		2	
	Maximum		7	
	Range		5	
	Interquartile Range		2	
	Skewness		-.805	.094
	Kurtosis		.396	.188