REALLY NEW PRODUCT ADOPTION: THE ROLE OF CONSUMER INNOVATIVENESS

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ABSTRACT

This research focuses on examining the relationships between Consumer Innate Innovativeness, Domain Specific Innovativeness, Vicarious Innovativeness, the Desire for Unique Consumer Products, Opinion Leadership, Consumer demographics and the adoption of really new products. It does so across three countries: Australia, China and Taiwan. The foundation of this research is drawn from Hauser, Tellis, and Griffin (2005), Im, Bayus, Masson (2003), and Im, Mason, and Houston (2007) who suggest that further research needs to be done to clarify the role of consumer innovativeness across product categories, services, and countries. The importance of this research is underpinned by calls from Hauser, Tellis, and Griffin (2005) and others for more research on consumer innovativeness in order to expand our understanding of relationships and approaches to measuring innovativeness and adoption. The purpose of this research is to examine the early adopters and to understand what characterizes them and their adoption behaviour in order to develop a theoretically derived, empirically tested model of the antecedents and implications of consumer innovativeness.

Based on the nature of the research problem identified in the literature review section, the research adopts a descriptive approach. Quantitative data were collected to test the hypotheses. Online and face-to-face surveys were both identified as appropriate methods for data collection in the study. The key informants of the study were individuals above age of 18 who are considered to have independent financial status for purchasing really new products. The final sample was 256 usable questionnaires for Australia, 207 for China; and 209 for Taiwan.

This study adopted and modified existing scales for consumer innate innovativeness, domain specific innovativeness, the desire for unique consumer products, opinion leadership and vicarious innovativeness. All scales had acceptable psychometric properties including convergent and discriminant validity. Multiple regression and structural equation modeling were used to test the hypothesized relationships. The structural equation modeling supported the various regression analyses and confirmed an acceptable fit between the data and the conceptual model.

The principal findings of the study show that only the desire for unique consumer products is a unidimensional scale. There was supports for consumer innate innovativeness as positively related to domain specific innovativeness across the three countries; consumer innate innovativeness has no positive effect on the desire for unique consumer products for the three countries; consumer innate innovativeness has a negative influence on vicarious innovativeness across the three countries; consumer innate innovativeness is positively related to opinion leadership for all three countries; consumer innate innovativeness has no effect on really new product adoption across the three countries.

In terms of really new product adoption, domain specific innovativeness was found to have a positive relationship with both ownership and relative time of really new product adoption. Further, the desire for unique consumer products was suggested to have strong impacts on really new product adoption for the three countries. In terms of mediating effects, domain specific innovativeness was found to mediate the relationship between consumer innate innovativeness and really new product adoption. Further, the results of moderation analysis indicate that the desire for unique consumer products moderates the relationship between consumer innate

innovativeness and really new product adoption in Australia, while the vicarious adoption aspect of Advertising moderates the relationship between consumer innate innovativeness and really new product adoption in China.

The major contribution of this study is the establishment of an empirical link between consumer innate innovativeness and really new product adoption behaviour through DSI. This research adds to the body of knowledge on the theoretical clarification in defining consumer innovativeness. The study demonstrates that consumer innate innovativeness is not the best predictor of really new consumer electronic product adoption behaviour. The antecedents of consumer innate innovativeness should be further investigated in order to gain complete understanding of this specific personality trait.

A second contribution involves the concept of measurement invariance which needs to be investigated when conducting cross-country research. The results of measure equivalence support the notion that innovators differ across countries and product categories. Marketers need be aware of the fact that countries differ systematically in both consumer innovativeness. This study found that even though China and Taiwan share a similar cultural background and the same language, consumers in these two countries have different levels of consumer innovativeness and responses to really new product adoption. For this purpose, it is recommended that firms should consider introducing really new products for each country separately with different strategies.

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DECLARATION

This thesis contains no material that has been accepted for the award of any other degree or diploma in any university or other institution, and to the best of my knowledge, contains no material previously published or written by another person, except where due references is made in the text of this thesis.

Signed…………………...

Notice 1

Notice 2

ACKNOLEDGEMENTS

No man is an island, entire of itself – John Donne

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In loving memory of my Dad

Zhong-I Chao

11/11/1941 – 24/01/2001

CHAPTER 1 - INTRODUCTION

1.1   RESEARCH BACKGROUND

New Product Development (NPD), which is the complete process of introducing new products to the market, is an important research area in business (Foxall, 1988; Schotts, 1981). New product development and diffusion of product innovations have been studied for decades (Cooper, 1982; Rogers, 2003). In terms of new product development, the rapid development of technology and increased customer demand for the varieties of new products have pushed organizations to develop a constant stream of new products (Halman, Hofer, and Vuuren, 2003; Markides, 2006). Further, most firms believe that the continual introduction of new products will help attract more demand and maintain a competitive position in a market (Cooper and Kleinschmidt, 1987; Griffin and Page, 1996; Lundvall and Christensen, 2004). In order to create new markets and to alter the value dynamics in a competitive market, firms need to develop more **Really New Products** rather than radical or incremental products. Really new products are new products result in a market discontinuity or a technological discontinuity.

Even though the NPD framework, which includes pre-development activities, development activities, and commercial activities, has been proposed as guidance to achieve the success of new products in the markets (Cooper, 1987; Cooper and Kleinschmidt, 1993b; Ernst, 2002), in the aspect of diffusion of product innovations, are all new products accepted by customers, and do they obtain success in the diffusion process in the markets? The answer is obviously negative. The reason is that really new products provide high uncertainty and risks to both firms and customers

(Veryzer, 2005). A significant number of introduced new products become failures during the early stage of their product life cycle (Booz, Allen, and Hamilton, 1982). Gourville (2006) reports that the new product failure rate remains high, between 40% and 90%. Even the world's most admired companies are finding that their new products do not achieve desired financial objectives and that the failure rate is above 50% (Schnurr, 2005). As a consequence, one issue that still remains important in the success of new products is the diffusion process of product innovations, which determines whether the consumers accept an innovation or not, and factors that influence customers' purchasing decisions (Hauser, Tellis, and Griffin, 2006). Firms are advised to specifically look into understanding the factors influencing customer adoption of really new products, because the success of this type of product is related to the consumer acceptance in the diffusion process (Hauser, Tellis, Griffin, 2006). Rogers (2003) suggests four aspects influencing individuals' adoption decision. They are characteristics of product innovations, communication channels, consumer innovativeness, and social system. Further, Hauser, Tellis, and Griffin (2006) identify that the role of consumer innovativeness is one of the key directions for innovation research.

This research therefore proposes to examine the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, and the adoption of really new products within a specific product category of high tech consumer electronic products such as the e-book readers and blu-ray players etc. There are reasons for selecting the specific product category. First, because of rapid technology development, high-tech electronic products have more really new products introduced to the market each year. Second, empirical studies suggest that looking at the diffusion of product innovations in a more defined product category helps

understand the factors influencing customers' new product adoption (Clark and Goldsmith, 2006; Foster, 1986; Rogers, 2003).

Broadly, the success of new products heavily depends on how well consumers accept them. In order to increase customers' acceptance of product innovations, firms need to understand consumers' characteristics and needs and thus develop products to satisfy them (Hauser, Tellis, and Griffin, 2006). Empirical research suggests that consumer innovativeness plays a major role in influencing consumer acceptance of new products (Im, Bayus, Mason, 2003; Im, Mason, Houston, 2007; Roehrich, 2004; Rogers, 2003), and a range of scales have been developed to measure it (Goldsmith and Hofacker, 1991; Kirton, 1976; Raju, 1980). However, in the study of measurement of consumer innovativeness, Roehrich (2004) and Hauser, Tellis, and Griffin (2006) note that the results of different consumer innovativeness scales indicate a lack of consensus, and the strength of the relationship between scales of measuring consumer innovativeness and adoption behaviour have been mixed. This research subsequently draws on the calls by Im, Mason and Houston, (2007), Roehrich, (2004), and Hauser, Tellis and Griffin, (2006) for further research on consumer innovativeness, its measurement, and its link to really new product adoption. Importantly, this research also examines these relationships in a cross-cultural setting, thereby assessing issues of measurement invariance and cross cultural equivalence in determining the influences on really new product adoption (Tellis, Yin, and Bell, 2005; Steenkamp, Hofstede and Wedel, 1999).

The lack of consensus on classifying new products, such as radical vs. incremental, is also an issue in studies related to new product adoption. Radical product innovations, in particular, are a new-to-world phenomenon and bring a much higher degree of

uncertainty and risks for both firms and consumers than other types of new products (Veryzer, 2005). However, radical product innovations suggested to be less than 12.5% of all new products are rare in the market, and to claim the rest, 88% of new products, as incremental products is too simplistic (Garcia and Calantone, 2002). As a result, in order to more specifically classify new products, Garcia and Calantone (2002) identify "really new products" as a third categorization between radical and incremental product innovations. This study adopts really new products as the focus of the research based on Garcia and Calantone's (2002) definition, which is "…on a macro level, a really new product will result in a market discontinuity or a technological discontinuity but will not incorporate both. On a micro level any combination of marketing and/or technological discontinuity can occur in the firm." (p. 122).

The focus on really new product innovations is primarily driven by the following motives. First, because of rapid technology development and various customer demands, more and more firms believe that only introducing new products to satisfy customer needs will result in reducing the threat of competition and providing the gap for market entrance (Hauser, Tellis, and Griffin, 2006). Second, the consideration of really new products has become increasingly important (Chandy and Tellis, 1998; Cooper, 2000; Elenkov and Manev, 2005; Markides, 2006). For example, Sood and Tellis (2005) note that companies devote remarkable resources to R&D each year to speed up product innovations. Chandy and Tellis (1998) observe the profits that really new products contribute to the firms are large and positive, and the success of really new products will lead to an organization's success.

Third, according to Garcia and Calantone (2002), really new products represent 50% of all new product innovations in the market each year. Foster (1986) suggests that, without understanding really new products, there is a risk of the failure of really new products that is capable of destroying a firm's fortunes. Lastly, really new products require greater behaviour change from customers than incremental innovations. A really new product has the ability to reshape people's working or living style (Cooper, 2000). As a consequence, understanding the factors influencing customers' acceptance of really new products is closely related to the success of diffusion of really new products.

1.2   CONTEXT OF THE STUDY

The purpose of this research is to examine consumers and to understand what characterizes them and their really new product adoption behaviour. The literature review, outlined in Chapter Two, provides a fundamental overview of product innovation issues. The following paragraphs identify some important aspects for conducting diffusion research.

— Even though prior research has proposed that NPD framework is related to the success of new products, the failure rate of new products still remains high (Schnurr, 2005). Hultink, Hart, Robben, and Griffin (2000) suggest that the problem of the new product high failure rate may be in the diffusion process, which plays a critical role in NPD activities and lack of systematic investigation, rather than in the product development stage in the NPD process. Consequently, there is a need to look specifically into each stage of the NPD process. The current study is focusing on the aspect of commercialization/diffusion – the final stage of

the NPD process.

— Because of rapid technological development and various customer demands, the adoption of really new products has become an important issue to researchers and practitioners (Markides, 2006). Many organizations are making heavy investment for developing really new products in order to create new markets and maintain their competitive position (Cooper and Kleinschmidt, 1987; Griffin and Page, 1996; Lundvall and Christensen, 2004). As a consequence, without further understanding the factors influencing really new product adoption, the failures of really new products are capable of damaging a firm's future (Foster, 1986).

— Innovators and early adopters play an important role in the diffusion of product innovations by communicating their experiences of adopting new products with other later adopters (Bass, 1969; Rogers, 2003). Empirical research has indicated that innovators and early adopters are the key to successful diffusion (Clark and Goldsmith, 2006; Goldsmith, d'Hauteville, and Flynn, 1998). In Bass's (1969) study, he suggests that innovators and early adopters are only affected by mass media – an external factor. Other researchers, however, note that innovators and early adopters are also influenced by internal factors such as demographics and consumer innovativeness (Im, Bayus, Mason, 2003; Midgley and Dowling, 1993; Rogers, 2003). As a consequence, identifying characteristics of consumers who may be innovators and early adopters has become an important issue in the diffusion of really new innovations.

— Prior studies suggest that in order to promote the success of new products, it is necessary to understand consumers' needs in every stage of the NPD process (Cooper and Kleinshmidt, 1995; Kahn, Barczak, and Moss, 2006). In particular, with a really new product that provides a higher degree of risk and requires greater consumer behaviour change than incremental products (Cooper, 2000), it is difficult for marketers to predict the performance of really new products before the general diffusion process takes place (Veryzer, 2005). Therefore, by increasing understanding of consumer factors such as consumer innovativeness, this research helps researchers and practitioners identify the key aspects influencing the success of really new products.

— The various definitions and measurements of consumer innovativeness are suggested to be a lack of consensus, which needs further research (Hauser, Tellis, and Griffin, 2006). Empirical studies have proposed various forms of consumer innovativeness such as consumer innate innovativeness (CII) (Midgley and Dowling, 1978), domain specific innovativeness (DSI) (Goldsmith and Hofacker, 1991) and vicarious innovativeness (VI) (Hirschman,1980). Further, prior research suggests that the relationship between consumer innate innovativeness and adoption of product innovations is positive but weak (Foxall and Bhate, 1992; Goldsmith, Freiden, and Eastman, 1995; Im, Bayus, and Mason, 2003; Im, Mason and Houston, 2007). As a result, domain specific innovativeness and vicarious innovativeness may play an effective mediating role between consumer innate innovativeness and the adoption of really new products (Im, Mason, and Houston, 2007), and it is necessary for the current study to include various forms of consumer innovativeness and empirically examine their relationships. Further, other factors such as the desire for unique consumer products (DUC)) and opinion

leadership (OL) have been suggested to have an influence on new product adoption behaviour (Lassar, Manolis, and Lassar, 2005; Ruvio, Shoham and Brencic, 2007). They are also included in the current study.

— Because of market globalization and competition, managers are seeking more market opportunities in multiple countries. However, it is not unusual that even though customers in different countries perceive the same characteristics from a given new product, these customers do not accept it at the same time (Kumar, Ganesh, and Echambadi, 1998; Van Everdingen and Waarts, 2003). National differences may also play an important role in affecting the nature of consumers' buying behaviour. As a consequence, really new product adoption needs further study from a cross-country perspective.

— Most studies of new product diffusion have been done in the U.S. and Europe. The Asia – Pacific regions has not attracted much attention. Empirical consumer innovativeness scales used in the U.S. and Europe have not yet been widely tested for their validity and usefulness cross-culturally, especially in relation to non-English speaking countries. The current study is responding to this gap.

1.3 RESEARCH PROBLEM AND PROPOSITIONS

The research problem to be investigated is:

What is the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, and the adoption of really new products?

Several sub questions also exist in this study.

1. Does domain specific innovativeness mediate the relationship between consumer innate innovativeness and the adoption of really new products?

2. Does vicarious innovativeness mediate the relationship between consumer innate innovativeness and the adoption of really new products?

3. Do personal characteristics have direct relationships with the adoption of really new products?

4. Does the desire for unique consumer products mediate the relationship between consumer innate innovativeness and the adoption of really new products?

5. Does opinion leadership mediate the relationship between consumer innate innovativeness and the adoption of really new products?

6. Do these relationships hold true across different countries?

Consumer innovativeness has a certain degree of influence on really new product adoption. The basic premise of this study is to develop a theoretically derived conceptual framework as outlined in Figure 1.1. The objective of the research is to investigate the role of consumer factors such as consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and consumer characteristics in influencing the adoption of really new products in the Australian, Chinese, and Taiwanese markets.

Nine research propositions are developed for this study. These propositions are established and explained in detail in Chapter Two.

Figure 1.1 The Conceptual Framework
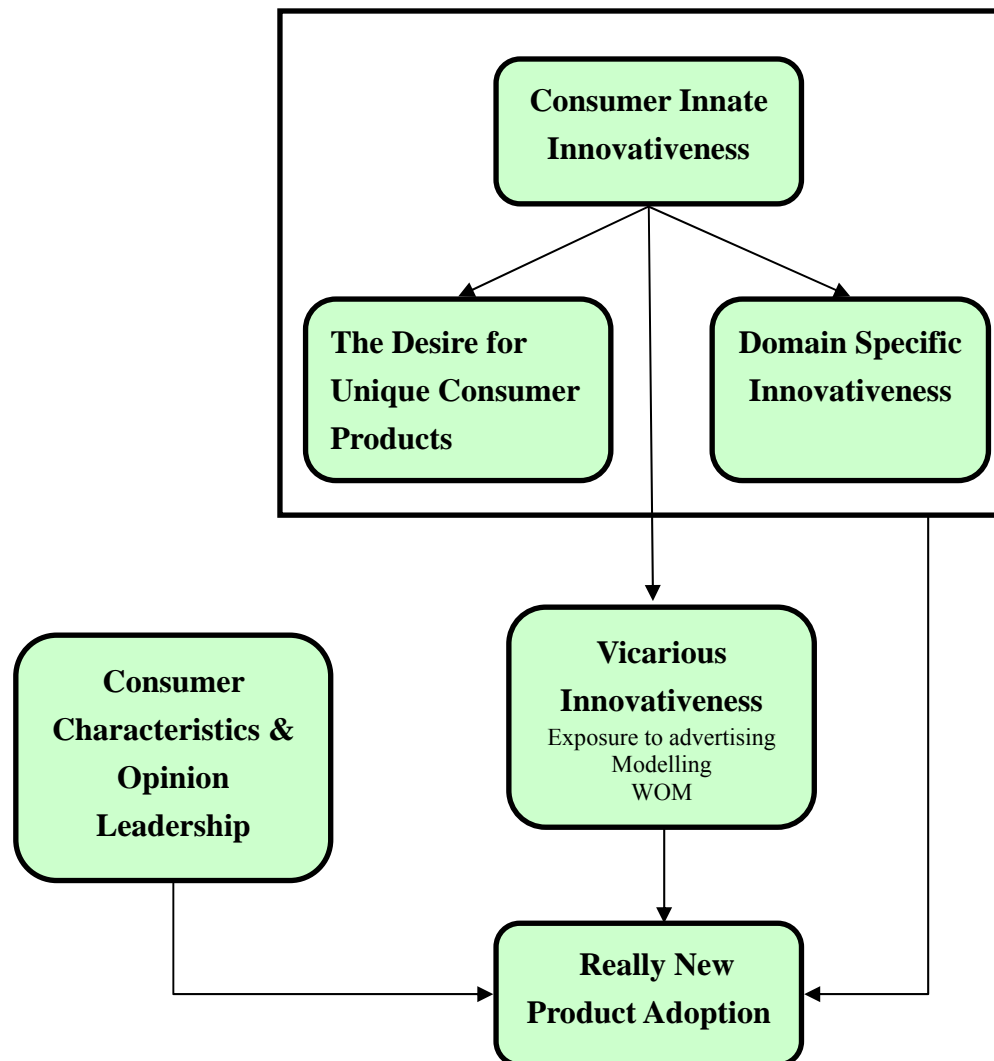
The nine research propositions in this thesis are:

Proposition 1: CII is associated with ownership of really new products and relative time of really new product adoption

Proposition 2: DSI is associated with ownership of really new products and relative time of really new product adoption

Proposition 3: VI is associated with ownership of really new products and relative time of really new product adoption

Proposition 4: DUCP is associated with ownership of really new products and relative time of really new product adoption

Proposition 5: OL is associated with ownership of really new products and relative time of really new product adoption

Proposition 6: Demographics is associated with ownership of really new products and relative time of really new product adoption

Proposition 7: CII is associated with DSI, VI, DUCP and OL

Proposition 8: DSI, VI, DUCP and OL mediate the relationship between CII and ownership of really new products and relative time of really new product adoption

Proposition 9: VI, DUCP and OL moderate the relationship between CII and ownership of really new products and relative time of really new product adoption

In summary, consumer innovativeness is the central focus of this thesis; it has various forms which include consumer innate innovativeness, domain specific innovativeness, and vicarious innovativeness. It is expected that there is a certain degree of association between these constructs. The various forms of consumer innovativeness are assumed to have direct relationships with really new product adoption. Because of the weak influence of consumer innate innovativeness on really new product adoption found in previous studies (Foxall and Bhate, 1992; Im, Mason and Houston, 2007), domain specific innovativeness and vicarious innovativeness are also expected as mediating variables in the relationships between consumer innate innovativeness and really new product adoption (Im, Mason, and Houston, 2007; Roehrich, 2004; Vandecasteele and Geuens (2006). Further, consumer characteristics such as age, gender, income, education and number of children, the desire for unique consumer products and opinion leadership are considered as other factors to have an impact on really new product adoption.

1.4   RESEARCH METHODOLOGY

The following sections present a brief overview of the research methodology used in this study. A comprehensive discussion of statistical analysis which illustrates the analysis techniques used in the current research will be presented in Chapter Three.

1.4.1   Conceptual Development

The purpose of this research is to examine the influences of consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and personal demographics on the

adoption of really new products among Australian, Chinese, and Taiwanese customers.

The outcome of the literature review leads to the development of the conceptual

framework and hypotheses for the current research (Goldsmith and Hofacker, 1991;

Hauser, Tellis, and Griffin, 2006; Im, Bayus, Mason, 2003; Im, Mason, Houston,

2007; Roehrich, 2004; Rogers, 2003).

1.4.2 Operationalisation of the Constructs

This research adopts and modifies existing scales identified through the literature

review in order to suit the research purpose and sample. The utilized measurement

items for the two Chinese speaking countries were translated into their respective

languages and were subsequently reviewed by bilingual experts. The descriptive

quantitative research approach is undertaken in order to properly examine the

hypotheses and data by following the procedure suggested by research specialists

(Bagozzi, Yi, and Phillips, 1991; Churchill, 1979; Nunnally, 1967; Steenkamp and

Baumgartner, 1998).

1.4.3 Unit of Analysis

The study examines how CII, DSI, VI, DUCP and OL influence the adoption of really

new products in particular consumer electronics. The primary unit of analysis focused

in this study was in the country unit level. Even though each country was taken as a

separate unit in the study, the least homogeneous segments within each country were

targeted. Individual consumers were considered as the most appropriate respondents

due to their personal experiences of owning and/or using really new products. Their

perceptions, attitudes, and behaviours towards really new product adoption were

aggregated to represent the views of the country.

1.4.4   Instrument

A questionnaire, which is comprised of existing and modified measurement items, was the primary research instrument in the study. A letter of introduction from the researcher accompanied each questionnaire.

1.4.5   Data Collection

This study was conducted in Australia, China, and Taiwan for a cross-national comparison on consumer acceptance of really new products. The questionnaire was translated into Chinese by the researcher and reviewed by a qualified bilingual translator, and then translated back into English by two qualified bilingual translators. The research used two related methods for data collection. In Australia, the questionnaire was distributed to individuals who had voluntarily joined an on-line research database of a qualified market research company contracted to collect the data. For China and Taiwan, participants were randomly selected from individuals in front of shopping centers in two major cities of Taipei, Taiwan and Shanghai, China. Participants were requested face to face to complete the questionnaires by numbers of hired university students.

1.4.6   Data Entry and Analysis

SPSS 12.0 was utilized to enter data and to analyze the questionnaire responses. Cronbach's alpha (Cronbach, 1951) and exploratory factor analysis were used to

examine measurement reliability and unidimensionality. Confirmatory factor analysis and multigroup confirmatory factor analysis were used to investigate validity and measurement invariance. Various multivariate analyses, including ANOVA, multiple regression, structural equation modeling, chi-squared difference analysis, and the product of coefficients test were utilized to test the relationships between variables.

1.5 CONTRIBUTION OF THE RESEARCH

This thesis makes a number of contributions to knowledge in the research domains of consumer innovativeness and really new product adoption.

■ **Integration of theory**

There is limited consensus on definitions and measurements of consumer innovativeness among researchers and the result in consumer innovativeness research is inconsistent in literature (Hauser, Tellis, and Griffin, 2005 and Im, Mason, Houston, 2007). This research aims to explore the relationship between consumer innate innovativeness, vicarious innovativeness, domain specific innovativeness, and the adoption of really new products. The research examines these relationships across three countries, Australia, China, and Taiwan and thereby, also examines the issues of measurement invariance in cross-cultural research. The theoretically derived and empirically tested conceptual framework contributes to the body of academic knowledge and managerial practice.

By identifying the relationships among consumer innate innovativeness, domain specific innovativeness and vicarious innovativeness, this study provides theoretical clarification in defining consumer innovativeness. That is, consumer innate innovativeness is not the appropriate predictor of really new product adoption. In addition, the study found that the relationships among constructs to be supported differently across the three countries. The antecedents of consumer innovativeness should be further investigated in order to provide a more comprehensive measurement of consumer innovativeness for an improved consensus in the literature. The examination of these relationships adds to current knowledge and understanding of how consumer innovativeness influences really new product adoption.

■ **Classification of new products**

Secondly, the classification of product innovations is a lack of consensus, and new products have been misclassified in the literature. The review of the literature provides a better understanding of the definitions of various new products and adds to the body of knowledge on how to classify new products. Further product innovation studies should have a more comprehensive overview of the classification of product innovation.

■ **The importance of measurement invariance**

Vandenberg and Lance (2000) and Steenkamp and Baumgartner (1998) suggest that measurement invariance needs to be investigated first when conducting cross-group comparisons research. Importantly, by adopting empirical scales in studying the relationship between consumer innovativeness and really new product adoption in

Australia, China, and Taiwan, this research is well designed to test measurement invariance of these scales and adds to current knowledge about validity, reliability, and generalisability of consumer innovativeness measuring instruments. This is also a prerequisite for building a foundation for future cross-cultural research to further explore aspects of consumer innovativeness.

■ **Cross-country differences**

Few previous studies of consumer innovativeness have focused on the Asia - Pacific markets; instead, they have predominantly concentrated on the U.S. and Europe. This study provides insights specifically about the Australian and Chinese contexts, and informs previous studies of consumer innovativeness. Further, an examination of the influence of consumer innovativeness provides further insight into the following. First, consumer innate innovativeness is not a good predictor of new product adoption across countries. Other scales adopted in the study have various results across countries. Domain specific innovativeness has a mediating effect on the relationship between consumer innate innovativeness and really new product adoption across the three countries. The desire for unique consumer products and vicarious innovativeness – Advertising have moderating effects in Australia and China. There is not yet a single scale to measure consumer innovativeness and new product adoption behaviour efficiently and effectively across countries. The results of the study would at least enhance marketers' capabilities to develop various launching strategies in different countries.

■ **Opportunities for further research**

The scope of this thesis is limited to one product category – consumer electronic products, which are suggested as having more really new products in the market. Future research should examine other product categories and/or really new services to expand the scope of this research field.

The study did not exhibit a consistent result for the measurements of consumer innovativeness across three countries. There is an opportunity for improvement concerning the measurement of the consumer innovativeness concept across countries. The research will contribute to academic understanding via the better conceptualization of consumer innovativeness and its relationship with its proposed antecedents and really new product adoption.

1.6   OUTLINE OF THESIS

This thesis consists of six chapters, which are briefly outlined below.

Chapter 1 Introduction

Chapter One provides an introduction and background to the research.

Chapter 2 Conceptual Development

Chapter Two reviews the literature concerning consumer innovativeness and really new product adoption associated with the research topic. A review of various

definitions of product innovations is undertaken to specifically justify the classification of new products. A discussion of empirical theories of diffusion of product innovations is presented to address the research proposition, which posits that consumer innovativeness has an impact on the adoption of product innovations. Consumer innovativeness is then identified as the key research aspect in the current study. This is followed by a review of the various definitional approaches that have been proposed in the literature.

Three major types of consumer innovativeness are then introduced and examined. The three types of consumer innovativeness identified are consumer innate innovativeness, domain specific innovativeness, and vicarious innovativeness. Other external factors such as the desire for unique consumer products, opinion leadership, and personal characteristics are investigated to discuss their influence on really new product adoption. The roles of consumer innovativeness and external factors are explored, and relevant research propositions and hypotheses are developed. This chapter concludes by drawing together the proposed key constructs and relationships, and proposes a conceptual model which is empirically tested in the following chapters.

Chapter 3 Methodology

Chapter Three outlines the research methods utilized to test the hypothesis derived from the literature review in chapter Two. In the overview, details concerning the administration of the survey such as pre-test, sample selection, data collection are discussed. A presentation of questionnaire development which is the major research instrument, and its development follows. The presentation provides how and why the empirical measurement scales are selected. This chapter concludes with a discussion

of statistical analysis illustrating the analysis techniques utilized in the study.

Chapter 4 Constructs Measurement

Chapter Four provides detailed information on construct measurement. Two phases are discussed –operationalisation of the pilot study and the final study. The first section explains the operationalisation of the constructs and adoption of existing measurement scales introduced in Chapter Two. Based on the findings and analysis of the pre-test, the second section discusses the analysis of the final study in order to assess the reliability and validity of the measurement instruments via coefficient alphas, exploratory and confirmatory factor analysis and correlation analysis. Further, an investigation of measurement invariance through multi-group confirmatory factor analysis is also outlined in the second section.

Chapter 5 Results and Discussion

Chapter Five presents the results of the analysis undertaken in order to examine the proposed hypotheses associated with the thesis. ANOVA, multiple regression, and structural equation modeling are used to examine the influence of consumer innovativeness and other factors on really new product adoption in the study. Further, four structural models based on theoretical reasoning are incorporated into the direct and mediating relationships hypothesized in Chapter Two. They are discussed separately.

Chapter 6 Conclusions and Implications

Chapter Six identifies and summarizes the main findings from the literature review and each of the proposed hypotheses. The academic and managerial contributions from the study are highlighted. The limitations of the study and future research directions for extending the knowledge of consumer innovativeness and diffusion of product innovation research are identified.

1.7   CHAPTER SUMMARY

This main focus of the research is to examine the relationships between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership, personal characteristics and the adoption of really new products. The foundation of this research is drawn from Hauser, Tellis, and Griffin (2005), Im, Bayus, Masson (2003), and Im, Mason, and Houston (2007) who suggest that further research needs to be done to clarify the role of consumer innovativeness across product categories, services, and countries. The importance of this research is underpinned by calls from Hauser, Tellis, and Griffin (2005) for more research on consumer innovativeness in order to expand our understanding of relationships and approaches to measuring consumer innovativeness and adoption.

Chapter Two will provide an extensive overview of the literature relevant to the research problem addressed in Chapter One.

CHAPTER 2 – LITERATURE REVIEW

2.1   INTRODUCTION

Chapter One presented a brief outline of the thesis, including the background and context of the research, and the subsequent research problem and hypotheses. Chapter Two will now present a review of relevant literature by first understanding the nature of product innovation. Second, the chapter will investigate prevalent concepts of various types of new products and discuss the empirical support for the classification of product innovations used in the study. Third, the chapter will present an overview of relevant literature across two diffusion models. Fourth, the chapter will analyze the concept of consumer innovativeness, which is the central focus of the thesis. Consumer innovativeness has been identified as having a significant but poorly understood impact on really new product adoption. The results of empirical consumer innovativeness studies are lack of consensus. Finally, this chapter will analyze previous cross-cultural studies on consumer innovativeness and new product adoption in order to gain more insights to form the basis of the conceptual framework in the study.

2.2   DEFINITION OF INNOVATION

In terms of innovation, various definitions exist in today's literature. Table 2.1 provides general definitions of innovation in prior research. Overstreet (2007) defines innovation as creating new things. Dundon (2002) considers that innovation should be considered as implementing strategic creativity profitably rather than creativity, which is the generation of new or novel ideas. Byrd and Brown (2002) suggest that

innovation can be represented by: Innovation = Creativity x Risk Taking.

Table 2.1: General Definitions of Innovation

1. The process of making improvements by introducing something new

2. The act of introducing something new; something newly introduced

3. The introduction of something new

4. A new idea, method or device

5. The successful exploitation of new ideas

Source: based on Foxall (1988) and Overstreet (2007)

2.2.1   Classification of Innovation

Through reviewing literature, it is apparent that researchers and practitioners are considering two types of innovation; process innovation and product innovation. **Process/Organizational Innovation** is one type of innovation which introduces new processes to organizational structure (Elenkov and Manev, 2005; Markides, 2006). It is considered as a business-model innovation which discovers and implements a different business model in an existing business. Another type of innovation is **Product Innovation,** which refers to the introduction of a new product to the market (Elenkov and Manev, 2005). The current study is practically interested in product innovation. A specific definition of product innovation is as follows:

"At one extreme, innovation can imply simple investment in new manufacturing

equipment or any technical measures to improve methods of production; at the

other it might mean the whole sequence of scientific research, market research,

invention, development, design, tooling, first productions and marketing of a new

product. " (Foxall, 1988, p231).

Furthermore, Schott (1981) states that product innovation is a process that starts with

an idea, to the development, through to the introduction of new product, and ends at

the adoption of new product. In the current study, "Product Innovation" is considered

as a physical new product rather than the process of new product development. The

study defines product innovation as the creation of a new product – new for both

organizations and consumers. The meaning of "new" to the organizations and

consumers is a product either with totally new or unfamiliar performance features or

with already precedent features that offer potential improvements in performance or

cost (O'Connor, 1998; Veryzer, 2005).

2.2.2   The Nature of Product Innovation

The rapidly changing and hypercompetitive market has made the introduction of

product innovation a primary strategy for most organizations. In order to achieve

success with new products, organizations are focusing on the factors influencing new

product project success and NPD framework, as reported by previous studies (Cooper,

1982; Cooper, 1984; Cooper and Kleinschmidt, 1987; Cooper and Kleinschmidt, 1995;

Ernst, 2002; Johne and Snelson, 1988; Kahn, Barczak and Moss, 2006; Lundvall and

Christensen, 2004; Millson, Raj and Wilemon, 1992; Mishra, Kim and Lee, 1996;

Shepherd and Ahmed, 2000; Souder and Jenssen, 1999). The reasons for introducing

new products frequently are that new products hold the promise of the future for most companies, and firms want to attract more demand and maintain a competitive position in consumer markets (Cooper and Kleinschmidt, 1987; Griffin and Page, 1996; Lundvall and Christensen, 2004). Gomory and Schmitt (1988) and John and Snelson (1998) observe that in order to create barriers for the introduction of more attractive products by competitors, firms are continuing to change their products. Further, increased consumer demand for variety and rapidly changing technologies are also the forces that drive product innovations. In terms of consumer demand, organizations have to meet customers' various needs by offering a large amount of various new products to compete more effectively in the market (Halman, Hofer, and Vuuren, 2003). Therefore, when customers demand changes, product innovations have to follow. On the other hand, technology also plays a major role in product innovations. Firms are pushed to update their products, and even to develop a new product with an advanced technology (Johne and Snelson, 1988). Without satisfying market demand and following up technology development, firms are unable to maintain their position in the market, and will be overtaken by competitors.

2.2.3   Classification of Product Innovation

Booz, Allen and Hamilton (1982) classify new products to six categories:

- Products that are new to the world – These products face completely new segments and markets.
- Products that are new to the company – These products have been established in the market but new to the firms.

- Additions to existing product lines – These new products are able to be produced within a firm's existing product lines.

- Improvement – These new products are improved from established products.

- Repositioning – This occurs when firms promote existing products in different target markets.

- Cost reductions – The primary object of new products is to reduce the cost and retain similar performance.

Wheelwright and Clark (1992) classify product innovations into two types: a new platform and derivative products. Tatikonda (1999) considers that derivative products, whose subsystems and components remain constant, are the extensions to an existing product family. In contrast to derivative products, a new platform is a product that initiates a new product family for a company, where new subsystems and components will be implemented for the new generation. Therefore, a new platform involves a higher degree of newness to organizations (new product technology, new product characteristics and new market), whereas derivative products involve less newness in technologies of the prior generation.

More recently, many of the empirical studies categorize product innovations by regarding the level of technological changes in the products and the degree of newness to the market and consumers (Reid and de Brentani, 2004). Researchers use various classifications to classify product innovations such as "disruptive", "revolutionary", "discontinuous", "new platform", or "radical" (Cooper, 2000; Markides, 2006; Sood and Tellis, 2005). By considering the level of technological change, Sood and Tellis (2005) identify three types of product innovation: platform

innovation, component innovation, and design innovation. They define "a platform innovation as the emergence of a new technology based on scientific principles that are distinctly different from those of existing technology…a component innovation as one that uses new parts or materials within the same technological platform…a design innovation as a reconfiguration of the linkages and layout of components within the same technological platform" (p153). From these scholars' point of view, the basic principle to classify product innovations is through considering the level of newness of product innovations. In general, radical and incremental product innovations are mainly used as a dichotomous classification for identifying the types of product innovations (Garcia and Calantone, 2002).

2.2.4   Really New Products

"Radical product innovations" as well as "discontinuous product innovations", "disruptive product innovations", and "new platform" are all used to describe "new-to-the-world" products (Cooper, 2000; Markides, 2006; Reid and Brentani, 2004). A radical product innovation is defined as the introduction of new products which implement the newest technology other than existing products and provide better or new benefits to customers (Chandy and Tellis, 1998). In addition, Sood and Tellis (2005) define a radical product innovation as a "platform innovation" to which its technology is totally different from existing technologies. Radical product innovations are disruptive to both markets and companies because they require behaviour changes for customers and new technology implementation for producers (Markides, 2006).

In contrast, an incremental product innovation which is not a new-to-the-world phenomenon involves relatively minor change, or improvement of current products, and targets on existing segments (Reid and de Brentani, 2004). However, it has been argued that the dichotomous classification of product innovation is too simplistic (Garcia and Calantone, 2002). Chandy and Tellis (1998) consider two further types of product innovation between incremental product innovation and radical product innovation. Table 2.2 presents the various categories of product innovation.

Table 2.2: Type of Product Innovation

| | | Customer Benefits | |
		Low	High
Technology Change	Low	Incremental Innovation	Market Breakthroughs
	High	Technology Breakthroughs	Radical Innovation

Source: Based on Chandy and Tellis (1998)

Market breakthroughs represent a new product utilizing similar technology to existing products but providing greater benefits to customers. Technology breakthroughs involve a new technology different from existing products but provide the same benefits to customers. Further, in considering both micro and macro level of

marketing and technology discontinuities, Garcia and Calantone (2002) suggest a third category other than radical and incremental product innovations – really new products which included both market breakthroughs and technology breakthroughs. From their point of view, the use of radical and incremental products in classifying new products is too simplistic to be adopted in product innovation research. Because of a lack of consensus on definitions of various types of product innovations in the literature, the terms of radical product innovations and really new products are often misclassified (Garcia and Calantone, 2002).

In other words, a product innovation which is termed "really new product" by one scholar may be termed "radical product innovation" by another. Table 2.3 presents various definitions of "radical" and "really new" product innovations used in empirical studies. Consequently, a new product may be classified differently among researchers. For example, Moreau, Markman, and Lehmann (2001) consider a digital camera as both "really new" and "radical" product innovation. Chandy and Tellis (2000) classify a digital camera as a radical product innovation, while other empirical works consider a digital camera as an incremental product innovation (Song and Montoya-Weiss, 1998; O'Connor and Veryzer, 2001; Veryzer, Jr., 1998). In order to solve the problem of misclassification of new products, Garcia and Calantone (2002) proposed more specific definitions of different types of innovations. "Radical innovations are innovations that cause marketing and technological discontinuities on both a macro and micro level. Incremental innovations occur only at a micro level and cause either a marketing or technological discontinuity but not both. Really new innovations cover the combinations in between these two extremes." (p. 120).

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Table 2.3: Classification and Definition of Product Innovation Used in Empirical Studies

Publications	Classification of Product Innovation	Definition & New Product Identified in the Study
Chandy and Tellis (2000)	Radical Product Innovation	A new product that incorporates a substantially different core technology and provides substantially higher customer benefits relative to previous products in the industry - Digital Camera; DVD Player; Cellular Telephone; Electronic Typewriter; Laptop Computer...etc
O'Connor and DeMartino (2006)	Radical Product Innovation	Radical Innovations are products and technologies that have high impact on the market in terms of offering wholly new benefits, significant improvement in known benefits, or significant reduction in cost
O'Connor and Veryzer (2001)	Radical Product Innovation	A radical innovation is a product that creates a new line of business-new for both the firm and the marketplace
Veryzer, Jr. (1998)	Radical Product Innovation/Really New Products/Discontinuous Product Innovation	Radically new products involve dramatic leaps in terms of customer familiarity and use, and the development or application of significant new technologies. - First Airplanes, Automobiles, Personal Computers, and Television
Veryzer (2005)	Radical Product Innovation/Discontinuous Product Innovation	Discontinuous products involve unprecedented performance features and creation of new lines of business and often are developed in a context of extremely high market and technical uncertainty
Herzenstein, Posavac, and Brakus (2007)	Really New Products	Really new products are innovations that defy straightforward classification in terms of existing product concepts and thus create or at least substantially expand a category rather than reallocate shares within an existing one (Gregan-Paxton and Roedder John 1997, p. 275) - Segway: A single-person battery-powered vehicle that negotiates curbs and ruts; Aquada: A vehicle that could function as a car and a boat
Moreau, Markman, and Lehmann (2001)	Really New Products	Really new products are innovations that defy straightforward classification in terms of existing product concepts and thus create or at least substantially expand a category rather than reallocate shares within an existing one (Gregan-Paxton and Roedder John 1997, p. 275) - Digital Camera
Schmidt and Calantone (1998)	Really New Products	Really new products are those that create, or at least substantially expand, a category rather than reallocate shares - Sony Walkman; Personal Computer; GM Electric Automobile
Song and Montoya-Weiss (1998)	Really New Products	A really new products is an entirely new product category and/or production and delivery system - First CD Player; High-Definition TV; Cellular Telephones; Web-TV Service; Internet Service…etc

As a consequence, this study focuses on really new products and adopts Garcia and Calantone's (2002) definition which is "on a macro level, a really new product will result in a market discontinuity or a technological discontinuity but will not incorporate both. On a micro level, any combination of marketing and/or technological discontinuity can occur in the firm" (p. 122). Furthermore, in Garcia and Calantone's (2002) classification, radical innovations are rare and should represent less than 12.5% of all innovations in the marketplace. Really new products are suggested to account for 50%, and incremental innovations represent 37.5% of all product innovations. For example, space travel which is a radical new product brings extremely high uncertainty for all customers in the world. In contrast, the first introduction of Apple iPod is a really new portable music player which requires customers knowing how to download music from the internet; Skype, a really new internet phone service, is becoming popular among people with basic computer and internet skills. Nintendo Wii, a really new video game player, is changing the way customers play video games.

2.2.5   Section Summary

Product innovation is a key element for most companies whose competitive advantages are highly related to the emergence of new products (Wind and Mahajan, 1997). It is common to hear that companies are using product innovation to describe those of their products that involve some degree of change. Previous discussion in this section has clearly identified different types of product innovation by considering the degree of newness of product innovations. According to Reid and de Brentani (2004), the technological and market conditions of incremental product innovations which require less technological change are much easier to be anticipated and analyzed by

1

organizations. Radical product innovations which involve the highest degree of technology and consumer behaviour changes create the most uncertainty for both customers and companies (Veryzer, 2005). However, Garcia and Calantone (2002) suggest that radical product innovations are rare in the market. On the other hand, really new products, which are suggested to represent 50% of all new products in the market, have had relatively little attention in the literature and warrant further investigation (Garcia and Calantone, 2002).

2.3 SUCCESS AND FAILURE FACTORS OF PRODUCT INNOVATION

2.3.1 Definition of New Product Success

As discussed in previous sections, new product development is the complete process by which a firm brings its new product to the market. Success of a new product is a major point for evaluating an organization's performance. However, how individuals define success with their own perspective will influence success determinants (Cooper and Kleinshmidt, 1995). Cooper and Kleinshmidt (1995) state that even in the same organization, individuals in different positions look at success differently: for instance, managing directors look at profitability, product managers think of success rate, and engineers pay attention to technical success. More importantly, consumers are the major factor influencing the success of new products. Hultink and Robben (1995) suggest that consumer satisfaction is the most important measurement for a company's short-term and long-term success. According to Griffin and Page (1993), there are a total of 75 different NPD success measures used by both researchers and practitioners. It is worthy to note that Hultink and Robben (1995) state that firms are more interested in success at a project level while academics place more emphasis on

an overall program level. Further, Cooper (1984) suggests that researchers and practitioners need to decide what kind of success they are after and then, select the most appropriate measurement.

2.3.2   Factors Influencing Really New Product Success at Program Level

Lundvall and Christensen (2004) state that the introduction of new products is the foundation of economic growth. Empirical research all points out that benefits such as cost reduction of product development, time to market and new product advantages will flow from the successful implementation of the NPD framework (Cooper and Kleinschmidt, 1987; Hultink and Robben, 1995; Millson and Wilemon, 1992; Shepherd and Ahmed, 2000). Therefore, since NPD is the main strategy and brings competitive benefits to organizations, the success factors of NPD are the most important concern to the majority of managers. Ernst (2002), who addresses an overview of NPD work based on Cooper and Kleinschmidt's research, identifies four categories of success factors of NPD at program level: Organization, Culture and Climate, Involvement of Senior Management, and Strategy.

Organization

The way a firm organizes its new product development activities is an important factor influencing new product success. From an organizational perspective, Cooper and Kleinschmidt (1995) believe that cross-functional teams, the responsibilities cross NPD teams, and internal communication among team members promote positive new product performance. Further, Ernst (2002) considers that a responsible project leader, the commitment of the project leader, and the team member to the NPD project should

be additional organizational factors for accomplishing new product success.

Culture and Climate

According to Denison (1984), organization culture provides a cluster of standards, attitudes, and behaviour patterns within organizations, and it plays a major role in influencing the working climate, employees' behavior, and the process of the company. Voss (1985) suggests that organizations with an innovation-friendly climate and risk-taking atmosphere have a great opportunity to be success. Cooper (1995) also believes that a positive organization culture for NPD is essential to new product success. Therefore, firms with a positive, open, and innovative NPD culture are found to have the best performance in the market (de Brentani and Kleinschmidt, 2004).The primary goal of organizations is to realize that product innovation is a major competitive advantage and to create an open organization culture toward product innovation among their employees (Overstreet, 2007). To date, more and more firms are competing in global markets. Hence, de Brentani and Kleinschmidt (2004) suggest that an organization needs to have a more comprehensive culture, which includes not only the openness to world market opportunities but also the openness to understand consumers' various needs and preferences and different national cultures.

Involvement of Senior Management

Ernst (2002) notes that the more the senior management is involved, the greater the probability that the new product project will be terminated decreases. The roles of senior management in NPD include risk taking, clear goal definition of new products, regular monitoring of new product programs, and monetary supports. Without the

involvement of senior management, the chance of achieving new product success will remain low (Cooper and Kleinschmidt, 1995). De Brentani and Kleinschmidt (2004) also identify that those organizations with minimal level of senior management commitment have a lower overall performance and miss some market opportunities.

Strategy

Strategy which is defined as a focus for the NPD effort of a product line or individual projects should be considered as an important factor for NPD success (Kahn, Barczak, and Moss, 2006). Cooper, Edgett, and Kleinschmidt (2002) state that almost 65% of companies have appropriately defined the strategy for their NPD endeavor. The works of Cooper and Kleinschnidt (1995) suggest a strategic focus by which new products do not apply technology that is totally new to organizations. Instead, it is better to utilize in-house or existing technology. However, this is not a suitable strategy for enterprises today because really new products are playing a major role in the success of firms (Reid and Brentani, 2004; Veryzer, 2005). In contrast, really new products need to be considered as a key NPD strategy for companies which are ambitious to generate great profits and to dominate high market share.

2.3.3 Factors Influencing Really New Product Success at Project Level

The importance of the NPD process affecting the performance of new products has been identified in various studies at the project level (Cooper, 1982; Cooper and Kleinschmidt, 1987; Johne and Snelson, 1988a; Johne and Snelson, 1988). Ernst (2002) suggests that the proficiency of the NPD process has a significant positive influence on new product success. Further, prior researchers note that understanding

customers' needs is one of the important factors influencing the success of product innovation that should not be neglected in the diffusion studies (Cooper and Kleinschmidt, 1987; Ernst, 2002; Hultink and Robben, 1995).

NPD PROCESS

Cooper (1994) and Cooper and Kleinschmidt (1993b) indicate the aspects of NPD process which can be grouped to three areas include pre-development activities, development activities, and commercialization activities as Table 2.4. In terms of pre-development activities, the preparatory work of a new product, which includes generating new ideas, understanding customer needs through market study, having clear product definitions, and assessing preliminary market and technology has been found to be correlated with success of new products (Cooper and Kleinshmidt, 1995). Furthermore, Kahn, Barczak and Moss (2006) also suggest that market research before the physical product development stage will facilitate organizations in learning about customers, competitors, and environmental forces in the marketplace in developing an unique and superior product in the eyes of the customer. Like Cooper's work, other research also suggests that the proficiency of activities of the existing formal NPD process, especially in terms of evaluation and selection of new ideas, product development and market introduction, all link together and have a positive effect on the success of new products (Kahn, Barczak and Moss, 2006).

Therefore, an organization's major objective is to identify consumers' needs in the pre-development stage, to develop a suitable product to meet those needs in the physical development stage, and to communicate those needs effectively through the efficiency commercialization activities (Hultink, Hart, Robben, and Griffin, 1999).

The current study is investigating consumers' acceptance of really new products. As a consequence, it is more helpful to focus in the study on commercialization activities, the final stage of NPD process, rather than pre-development and development activities.

Table 2.4: NPD Process Model
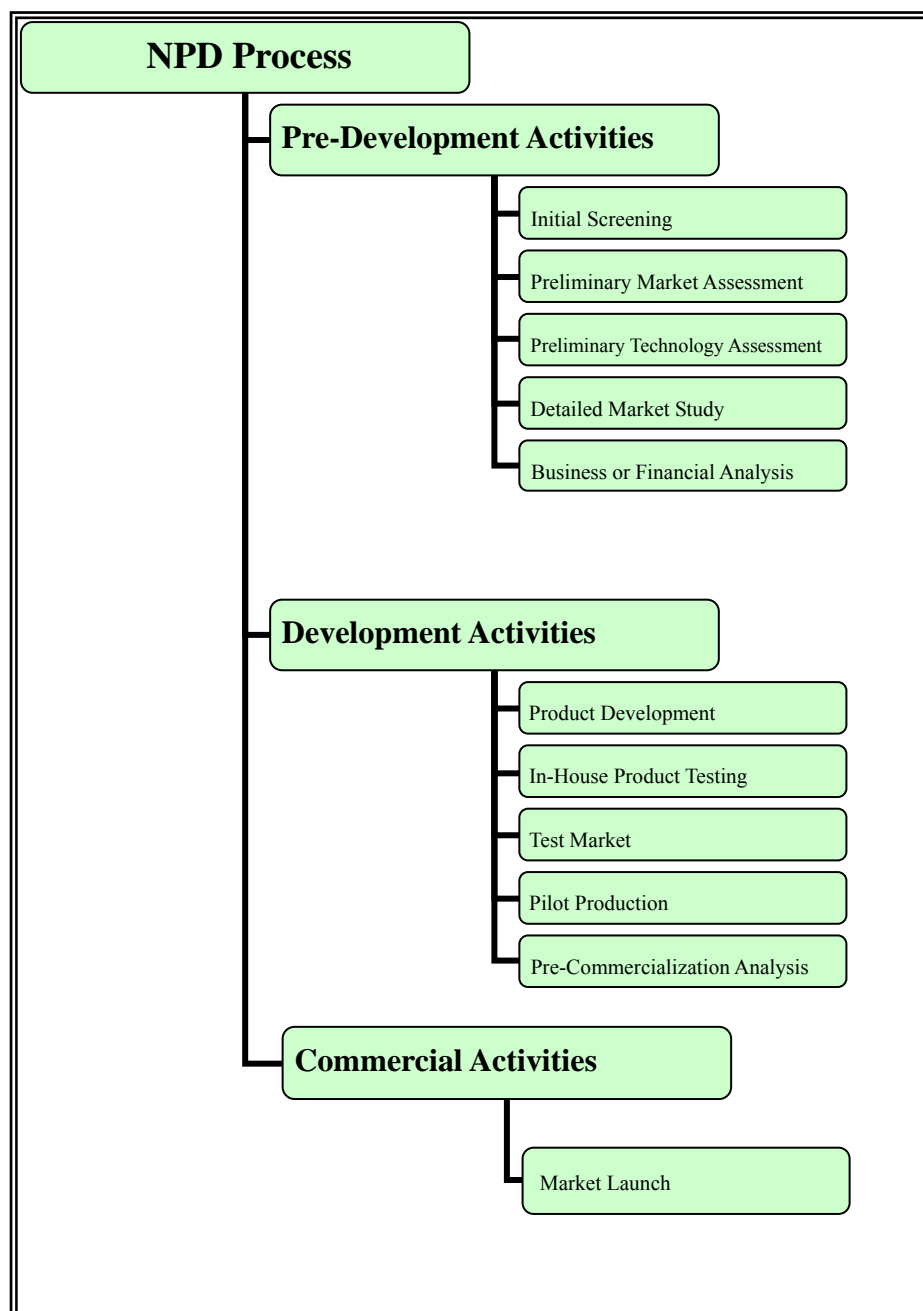
Source: Based on Cooper and Kleinschmidt (1986); Cooper (1988, 1990)

Commercialization/Diffusion of Product Innovation

Commercialization, the final stage of NPD, contains activities which are necessary for organizations to introduce new products to their target market (Cooper and Kleinschmidt, 1986). Commercialization activities have also been referred to as product launch, introduction, market launch, or diffusion of product innovation (Langerak, Hultink and Robben, 2004; Rogers, 2003). The major roles of commercialization are to stimulate market demand, to maximize customer acceptance, and to generate a firm's income (Guiltinan, 1999). Empirical research has proven the importance of commercialization. For example, Cooper (1979) reports that measures of test marketing and launch proficiency are closely related to new product success. Beard and Easingwood (1996) believe that the diffusion process is a critical stage in NPD process and the new product success relies heavily on a firm's appropriate launch decisions. Song and Parry (1996) indicate that the proficiencies in market research and diffusion will directly link to new product success. Di Benedetto (1999) suggests that a higher success rate will be achieved by improving the diffusion process. Further, Langerak, Hultink and Robben (2004) note that the greater the proficiency in launch activities, the better the new product performance.

Since the diffusion of product innovations is an important factor for new product success, researchers have provided the product launch framework for organizational implementation. Langerak, Hultink, and Robben (2004) identify market preparation, launch budgeting, launch strategy, and launch tactics as necessary launch activities, shown in Table 2.5, to introduce a new product to the target market.

Table 2.5: Commercialization Process Model
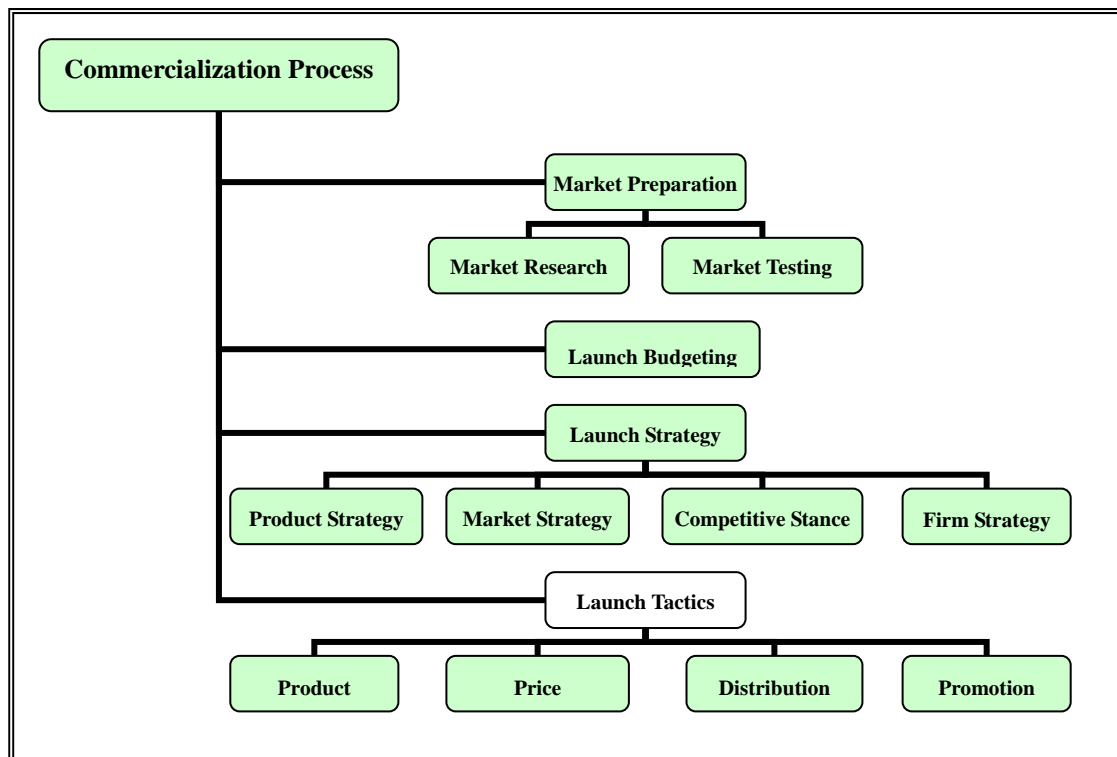
Source: Based on Langerak, Hultink, and Robben (2004)

Market preparation, which includes market research and test activities, needs to be executed carefully in order to obtain customer information and the effectiveness of the marketing activities undertaken in the target market. Thus, the gathered information will allow firms to finalize their plans for marketing and production (Di Benedetto, 1999). Launch budgeting consists of a firm's financial plans in developing, implementing, and monitoring launch activities (Langerak, Hultink and Robben, 2004). In Hultink, Hart, Robben, and Griffin's work (2000), launch strategy is described as the intention for answering the what, when, where, and who to launch question and includes what characteristics of the new product to be developed (product strategy), which market and customer segmentation of the new product to be launched (market strategy), the competitive strength of the new product (competitive stance), and the organization's overall orientation toward NPD (firm strategy).

Launch tactics which involve decisions and activities related to the marketing mix (i.e., product, price, distribution, and promotion) represent the question of how to attach the target market (Guiltinan, 1999). The aim of launch tactics is used to focus on the target market in order to achieve new product success (Beard and Easingwood, 1996). The difference between launch strategy and launch tactics is that launch strategy occurs prior to launch and even prior to the beginning of product development. On the other hand, launch tactics, which are the most visible part of the launch process, are central to the actual commercialization stage and bring the new product to the eyes of customers (Hultink, Hart, Robben, and Griffin, 2000).

Prior research realizes that diffusion of the product innovations is the most costly and riskiest stage in the NPD process (Beard and Esingwood, 1996; Guiltinan, 1999; Hultink, Hart, Robben, and Griffin, 2000; Langerak, Hultink, and Robben, 2004; Ziamou, 2002). Beard and Easingwood (1996) explain that the launch stage, which is critical, is necessary because that the new product usually has only one shot at the market. Therefore, in order to communicate a new product effectively and efficiently through a proficient commercialization, the central objective of organizations is to understand customer needs and to develop a superior product with those needs (Hultink, Hart, Robben, and Griffin, 2000). For example, in 1985, the Coca Cola Company introduced a new Coke formulation to replace the old one. Without understanding its customers, the outcome was a disaster. Coca Cola's customers almost immediately rejected the "New" coke and wanted the old one back (Dhebar, 1995). Cooper and Kleinschmidt (1987) suggest that financial success will be higher when the new product is developed with a clear specification toward a target market's needs. Ernst (2002) states that an explicit orientation of the whole NPD process to market demands is one of the aspects with positive influence on the financial success

of a new product. Langerak, Hultink, and Robben (2004) suggest that the ability of a firm to identify and to use customer needs for developing and introducing products will lead to better new product performance.

In previous discussion, commercialization process includes market preparation, launch budgeting, launch strategy, and launch tactics. In the market preparation stage, customers' information should be obtained and their needs should be identified for the following launch processes. By understanding consumers, it would help define what product advantage the customers desire the most, which target market needs to be focused, when the new product should be launched, and what launch strategies should be used. Most importantly, this research project is focusing on discovering factors influencing consumers' willingness to adopt a really new product by considering the various empirical diffusion theories.

Christensen (1997) notes that market research or consumer research which is one of the key activities of the NPD process is not necessary for really new products. However, a really new product is classified as one type of product innovations; therefore, according to Tatikonda (1999), the conventional NPD process is well-suited for really new product innovations. Cooper (2000) also argues that companies which neglect market research will not succeed in their really new product innovations. Cooper (1979) reports the understanding of consumers is closely related to new product success. Further, Benedetto (1999) notes that market preparation which includes consumer research and test activities needs to be executed carefully in order to obtain customer information and the effectiveness of the marketing activities undertaken in the target market. Thus, the gathered consumer information will allow firms to finalize their plans for marketing and production. Furthermore, Veryzer (2005)

suggests that, indeed, the development process of really new products differs from the traditional NPD process. However, the only difference is that a valid consumer research will occur later rather than disappearing from the NPD process.

2.3.4   High Failure Rate of Really New Products

Many researchers have investigated NPD success factors and provided frameworks for managerial implementation (Cooper, 1982; Cooper, 1994; Cooper and Kleinschmidt, 1987; Cooper and Kleinschmidt, 1995; Ernst, 2002; Johne and Snelson, 1988; Kahn, Barczak and Moss, 2006; Lundvall and Christensen, 2004; Millson, Raj and Wilemon, 1992; Mishra, Kim and Lee, 1996; Shepherd and Ahmed, 2000; Souder and Jenssen, 1999). They have identified that the causes of poor performance of new products include insufficient market research, lack of product advantage, ineffective organizational structures, inadequate management support, and weak activities in the NPD processes (Cooper and Kleinshmidt, 1987). Factors of NPD success have been learned from the results and have been implemented in practice. Companies are relying heavily on the success of new products for competing in the competitive markets and making considerable profits (Steenkamp, Hofstede, and Wedel, 1999).

However, not all well-developed products succeed in the market. Hopkins (1980) found that 67% of industrial producers feel that their new product success rate is unacceptable. Cooper and Kleinschmidt (1987) identify that 35% of new products which are launched fail commercially. Redmond (1995) states that after practitioners and researchers have emphasized the causes of new product failures, new product failure rates still not decrease. Even the world's most admired companies are reporting that their products do not achieve the financial targets and the failure rate is

above 50% (Schnurr, 2005). Gourville (2006) indicates that, in the past 25 years, new product failure rate still remains high - between 40% and 90%. As a consequence, the problem may be in the process of diffusion which plays a critical role in NPD activities and lacks systematic investigation (Hultink, Hart, Robben, and Griffin, 2000) rather than in the product development stage.

As described in the previous section, really new products are defined as new products which are unknown to the public, and involve a high degree of technology and consumer behaviour change. Chandy and Tellis (1998) state that really new products tend to focus on future customers. As a consequence, in order to succeed in the market, it is necessary to understand really new products from a customer's perspectives. This study concentrates on consumer factors affecting the adoption of really new products.

2.4   DIFFUSION OF PRODUCT INNOVATION

"Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system"
(Rogers, 2003, p.5)

The adoption of really new products is defined in this thesis as consumers actually purchasing or adopting a really new product (Rogers, 2003). However, not every new product succeeds in the market. There are many aspects that influence the diffusion of really new products. As a consequence, in order to frame this study, it is necessary to understand empirical diffusion of innovation theories to investigate the factors affecting the adoption of really new product.

The diffusion of innovation theory has been studied extensively in the literature. Researchers have proposed various diffusion models to explain the consumer's new product adoption process including Ajzen's (1985) Theory of Planned Behavior, Bass's (1969) the Bass model, Davis's (1989) Technology Acceptance Model, Fishbein and Ajzen's (1975) Theory of Reasoned Action, and Rogers' (2003) Diffusion of Innovation model. Among them, Bass (1969) and Rogers (2003) are two of the major diffusion of innovation studies and will be discussed in the following sections.

2.4.1   The Bass Model

The Bass (1969) diffusion model describes the timing of first adoption of new consumer products by utilizing mathematical methods. He classified potential adopters to two categories, one of which is innovators whose adoption decisions of a product innovation are independent from other members in a social system. The other is imitators who are influenced by the adopters with previous purchase experience of the product innovation. In a later work, Mahajan, Muller, and Bass (1990) state that the concept of the Bass model is that innovators are affected primarily by the mass-media communication (impersonal effect), while imitators, on the other hand, only rely on the word of mouth message (personal effect). In other words, both innovators and imitators will adopt a new product for the very first time. The difference between innovators and imitators is that, in the timing of first adoption, the imitators are influenced by people who have already purchased the new product, but innovators are not influenced by any member of a social system. Bass (1969) also proposes a new product growth model (Figure 2.1) that suggests that the sales of a new product grow to a peak and decline noticeably to the level lower than the peak.

Figure 2.1: Growth of a New Product
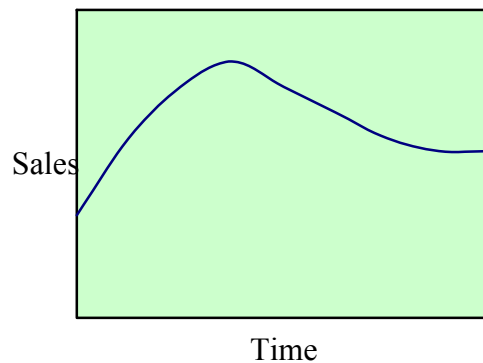
Source: Based on Bass (1969)

The Bass model concludes that the numbers of experienced users of a new product strongly influence the timing of a customer's first adoption of a new product (Bass, Krishnan, and Jain, 1994; Helsen, Jedidi, and DeSarbo, 1993; Mahajan, Muller, and Bass, 1990). This concept explains what influences adopters' initial purchase decision.

However, in the situation of purchasing a really new product, are innovators and early adopter affected only by mass-media communication? How do innovators and early adopters deal with a high level of uncertainty associated with a really new product? Previous studies suggest that innovators and early adopters are influenced by not only impersonal and personal effects but also consumers' personal characteristics such as demographics and consumer innovativeness (Im, Bayus, and Mason, 2003; Mahajan, Muller, and Bass, 1990; Rogers, 2003). Overall, the Bass model provides good predictions of the timing of the adoption of product innovations and offers an appropriate description of the general trend of the sales curve (Bass, 1969; Mahajan, Muller and Bass, 1990). According to the Bass model, after innovators and early adopters adopt a product innovation, they will express their opinion and experiences to later adopters who are called imitators. Many researchers have suggested that

innovators play a prominent role in the diffusion process, and consumer innovativeness is one of the important indicators of innovators (Citrin, Sprott, Silverman, and Stem, 2000; Im, Bayus, and Mason, 2003; Midgley and Dowling, 1993; and Rogers, 2003). As a consequence, the study considers the impersonal and personal effects from the Bass model along with the level of innovators' consumer innovativeness in order to identify the factors driving innovators' decision to adopt a really new product (Russel, 1980).

2.4.2   Rogers' Diffusion of Innovation Theory

Since 1962, many researchers have further studied consumers' adoption of product innovations by considering Rogers' diffusion of innovations theory (Dickerson and Gentry, 1983; Mahajan, Muller, and Srivastava, 1990; Saaksjarvi, 2003; and Verleye and Marez, 2005; Uhl, Andrus, and Poulsen, 1970). Because of the popularity of Rogers' theory, five editions (1962, 1971, 1983, 1995, and 2003) have been released. Rogers (2003) defines an innovation as a perceived new idea, practice or object for an individual. When the diffusion of innovation occurs, an individual starts from gathering basic knowledge of an innovation, to developing a favorable or unfavorable attitude toward the innovation, to deciding an adoption or rejection of the innovation, to implementing the new idea, and finally to confirming his/her decision (Rogers, 2003). These are the five stages of the innovation-decision process defined as follows:

1. **Knowledge**: occurs when a decision maker is exposed to the innovation's existence and gains some understanding of its functions;
2. **Persuasion**: occurs when the decision maker forms an attitude toward the innovation;

3. **Decision**: occurs when the decision maker engages in activities that lead to a choice to adopt or reject the innovation;

4. **Implementation**: occurs when the decision maker puts an innovation to use;

5. **Confirmation**: occurs when a decision maker seeks reinforcement of an individual decision already made, but may reverse the decision if exposed to conflicting message (p. 169).

Rogers (2003) states that the rate of most innovation adoption is an S shape (Figure 2.2). However, not every innovation diffuses at the same speed. The inclination of each S shape is quite different. The diffusion of an innovation relies on individuals' decision to adopt an innovation. What factors would move individuals from one stage of innovation-decision process to another? Rogers (2003) suggests considering four aspects: characteristics of innovation, communication channels, consumer innovativeness, and social system.

Figure 2.2: Innovation Adoption Rate
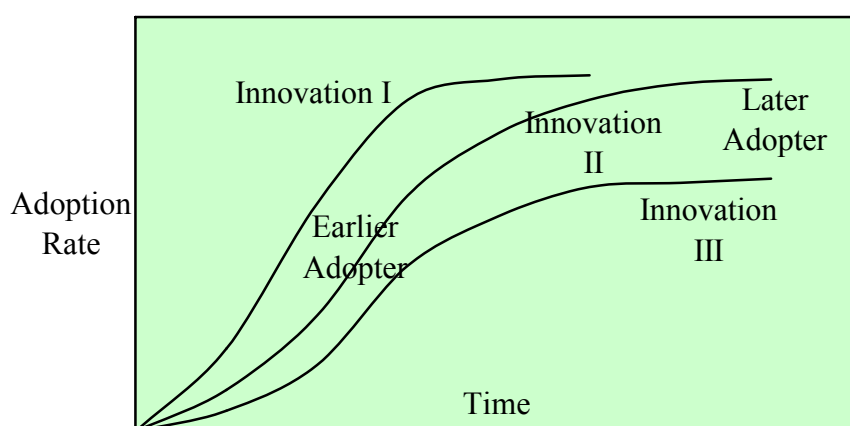
Source: Based on Rogers (2003)

Characteristics of the Innovation

Five perceived characteristics of innovation which are relative advantage, compatibility, complexity, observability and trialability play a major role in an individual's adoption decision. This theory is supported by previous studies (Cooper and Kleinschmidt, 1987; Ernst, 2002). They are discussed as follows:

1. **Relative Advantage**: the degree to which an innovation is perceived as being better than its precursor;

2. **Compatibility**: the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters;

3. **Complexity**: the degree to which an innovation is perceived as being difficult to use;

4. **Observability**: the degree to which the results of an innovation are observable to others;

5. **Trialability**: the degree to which an innovation may be experimented with before adoption. (p.250)

Communication Channels

Rogers (2003) reports that the basic element of diffusion of innovation which is to express the information of an innovation from one individual to another or several others is defined as communication channels. He suggests that mass media channels which include radio, television, newspapers, and so on are the most rapid and efficient way to communicate the existence of an innovation to potential adopters. Interpersonal channels occur when two or more individuals have a face-to-face

communication of the information of an innovation. Furthermore, Rogers (2003)

identifies that besides mass media and interpersonal channels, the internet is also a

powerful communication channel. The role of communication in the diffusion of

innovation has also been confirmed by other empirical researchers (Lee, Lee and

Schumann, 2002; Prins and Verhoef, 2007).

Consumer Innovativeness

Rogers (2003) indicates that the innovation adoption process is a normal distribution,

and he classifies the potential adopters to five segments based on the time of adoption

of an innovation with the percentage of the adopter population: the innovators (2.5%),

the early adopter (13.5%), the early majority (34%), the late majority (34%), and the

laggards (16%) (Figure 2.3). The time of adoption refers to "the degree to which an

individual or other unit of adoption is relatively earlier in adopting new ideas than the

other members of a system" (Rogers, 2003, p.22).

Figure 2.3: Adopter Category
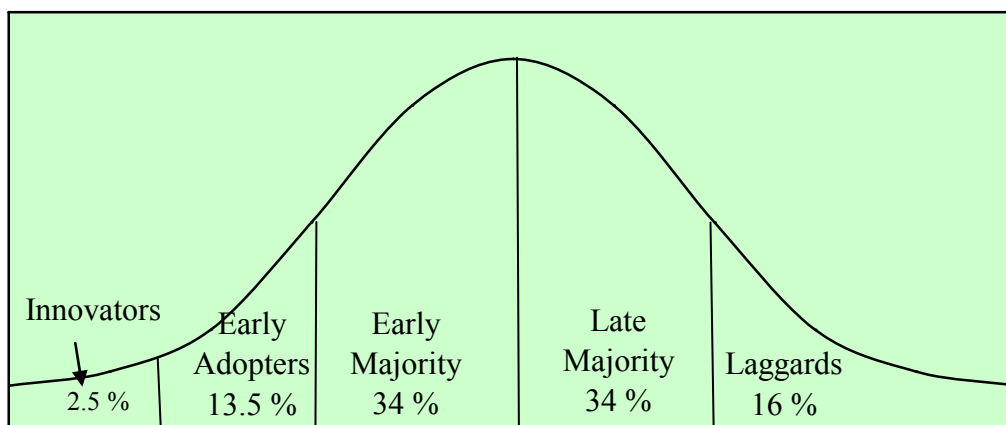
Source: Based on Rogers (2003)

Rogers (2003) suggests that consumer innovativeness which explains consumer adoption is the core concept in the diffusion process. Other researchers have also proved that consumer innovativeness is positively related to the adoption of new products (Goldsmith and Hofacker, 1991; Im, Bayus, Mason, 2003; Midgley and Dowling, 1978). However, the definition of consumer innovativeness lacks consensus and results of previous consumer innovativeness studies are inconsistent (Hauser, Tellis, and Griffin, 2005; Roehrich, 2004). This makes consumer innovativeness an important issue that needs further investigation.

Social System

Rogers (2003) defines a social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (p.23). Individuals are all involved in some kind of social systems such as teachers in a school, doctors in a hospital, or people in a country. As a consequence, a social system plays an important role in affecting an individual's adoption decision. One of the social impacts on diffusion is social structure. Social structure is defined as a social system arranging a pattern for individuals to follow. In this certain social structure, individuals will follow the arranged pattern to behave. Individuals who refuse to obey the structure are considered as deviants. These deviants are suggested to fit to most of the characteristics of innovators. The other impact is social norms which are clarified as "a range of tolerable behaviour and serve as a guide or standard for the behaviour of members of a social system" (p 26). Individuals will perform their behaviour based on the norms of a social system (Rogers, 2003). Prior studies have suggested that different cultures have significant impacts on both consumer innovativeness and the adoption of product innovations (Flynn and Goldsmith, 1993b; Goldsmith, 1983; Raju,

1980; Rogers, 2003; Saaksjarvi, 2003; Schaninger and Sciglimpaglia 1981). The role of national culture will be discussed in detail in a later section.

In sum, Roger's framework which includes four major components - characteristics of innovations, communication channels, characteristics of innovators/innovativeness, and social effects provides a comprehensive overview to the diffusion of innovations, and prior studies prove their importance in diffusion research (Martinez, Polo, and Flavian, 1998; Wee, 2003; Wejnert, 2002).

2.4.3   Section Summary

Roger's (2003) diffusion of innovation theory has been well-known for over 40 years. His suggestion that customer characteristics/innovativeness and culture have great influences on the adoption of product innovations has been supported by a variety of empirical research. For example, consumer innovativeness and consumer characteristics have been proven to have significant relationship with the adoption of product innovation (Cirtrin, Sprott, Siverman, and Stem, 2000; Hansman, Mulder, and Verhoeff, 1999; Im, Bayus, and Mason, 2003; Lassar, Manolis, and Lassar, 2005; Martinez, Polo, and Flavian, 1998; and Midgley and Dowling, 1993). Further, Gourville (2006) suggests that the diffusion of innovation studies need to further consider the psychological characteristics of consumers.

Bass (1969) classifies customers into two categories: Innovators and Imitators. Rogers' (2003) five adopter categories are innovators, early adopters, early majority, late majority, and laggards. Because the innovators are the earliest to adopt a product innovation and express their opinion to other categories of adopters. Bass (1969) and

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Rogers (2003) both suggest that innovators are critical to the adoption of product innovations. Because innovators represent the smallest group in adopter population of a product innovation, marketing researchers and practitioners are considering both innovators and early adopters as the key to successful diffusion (Clark and Goldsmith, 2006; Goldsmith, d'Hauteville, and Flynn, 1998). In order to study what influences the purchase decision of innovators and early adopters, Wijnert (2002) states that it is necessary to integrate all the variables that influence an individual's decision for adopting a product innovation. Rogers (2003) suggests that attributes of new products is one of the important influences on diffusion of innovation. However, the product attributes of controllable and observable factors (Takada and Jain, 1991; Yeniyurt and Townsend, 2003) are not specifically considered in this thesis. For example, new product characteristics can be designed by organizations to satisfy consumers' special needs.

On the other hand, because the importance of innovators and early adopters in the diffusion process and consumer innovativeness plays an important role in predicting innovators and early adopters, what constitutes the relationship between consumer innovativeness and the adoption of really new products is the central focus in the current study. This thesis is interested in unobservable factors - personal characteristics and consumer innovativeness which are considered as the predisposition of individuals and the great influences on new product adoption (Im, Bayus, and Mason, 2003; Im, Mason and Houston, 2007; Midgley and Dowling, 1993). As a consequence, the major objective of this thesis is to evaluate the relationship between personal characteristics, consumer innovativeness, and the adoption of really new products.

2.5   REALLY NEW PRODUCT ADOPTION

New product adoption has become an important issue among academicians and practitioners, and considerable research efforts have been devoted to develop better understanding this issue (Huh and Kim, 2008). Rogers and Shoemaker (1971) define rate of adoption as "the relative speed with which an innovation is adopted by members of a social system. This rate of adoption is usually measured by the length of time required for a certain percentage of the members of a system to adopt an innovation" (p.28). Further, various empirical studies have used new product adoption to measure consumer innovativeness, and suggest that new product adoption does capture the consumer innovativeness elements (Fell, Hansen and Becker, 2003; Im, Bayus, and Mason, 2003; Im, Mason, and Houston, 2007; Rogers, 2003; Tellis, Yin, and Bell, 2005).

However, many studies have empirically mis-clarified the really new products and radical product innovations to which it may cause different results in terms of adoption behaviour. As a consequence, this is a critical aspect of consumer behaviour on innovative products. The current study responds to this call, and defines the adoption of really new product as the final action by which consumers actually purchase or adopt a really new product (Rogers, 2003).

2.5.1   Measuring Really New Product Adoption

There are three major methods for measuring really new product adoption behaviour, namely cross-section method, relative time of adoption, and intention. Im, Bayus, and Mason (2003) suggest that consumers who own more innovative products tend to

have shorter adoption time and a higher level of consumer innovativeness. Prior research implements the "cross-sectional" method which considers the number of new products owned at the time of the survey (Im, Bayus, and Mason, 2003; Im, Mason, and Houston, 2007; Midgley and Dowling, 1978; Rogers, 2003; Tellis, Yin, and Bell, 2005). Although prior research argues that cross-sectional method is not able to capture the constructs of consumer innovativeness (Fell, Hansen and Becker, 2003), there is general agreement that this method measures new product adoption behaviour.

Prior studies also suggest that innovators with a high level of consumer innovativeness adopt a new product relatively earlier than other members in their social system (Mahajan, Muller, and Bass, 1990; Rogers, 2003). In order to measure the adoption behaviour, researchers ask respondents to report number of years or months since their adoption of a new product, which enable cross validation with cross-sectional method (Midgley & Dowling, 1978; Im, Mason, Houston, 2007). This method is called relative time of adoption (Im, Mason, Houston, 2007). In terms of purchase intention, although it is suggested to be unable to appropriately reflect adoption behaviour (Im, Bayus, and Mason, 2003), it is suggested to be an indicator in measuring consumer innovativeness (Lafferty, Goldsmith, and Flynn, 2005). A more detailed utilization of measurement of really new product adoption will be discussed in Chapter Four.

2.6   ROLE OF CONSUMER INNOVATIVENESS

Consumer innovativeness is an important indicator for classifying consumer segments into to five categories: the innovators, the early adopter, the early majority, the late majority, and the laggards (Rogers, 2003). Innovators and early adopters who adopt a new product earlier than other adopters are expected to have a higher degree of consumer innovativeness (Im, Bayus, and Mason, 2003; Im, Mason and Houston, 2007; Rogers, 2003). These two groups of consumers have been proven to play a major role in the success of product innovation adoption because their experiences influence the purchase decisions of late adopters (Bass, 1969; Clark and Goldsmith, 2006; Rogers, 2003; Wood and Swait, 2002). However, the definition and measurement of consumer innovativeness is lack of consensus (Hauser, Tellis, and Griffin, 2005; Roehrich, 2004). In order to specifically understand the concept of consumer innovativeness, the following sections will discuss three different types of consumer innovativeness proposed by empirical studies namely consumer innate innovativeness, domain specific innovativeness, and vicarious innovativeness.

2.6.1   Consumer Innate Innovativeness (CII)

Hauser, Tellis, and Griffin (2006), in their analysis of key directions for innovation research, identify five significant areas of investigation. One of which is the importance of consumer response to product innovation: the role of consumer innovativeness. Some prior studies consider consumer innovativeness as a generalized personality trait which is defined as consumer innate innovativeness (Clark and Goldsmith, 2006; Im, Bayus, and Mason, 2003; Midgley and Dowling, 1993). Midgley and Dowling's (1978) fashion industry study found that consumer

innovativeness is positively related to the adoption of new products, and implied that consumer innovativeness will remain constant across domains or product categories (Hynes and Lo, 2006). In other words, innovators in fashion products will still be innovators in consumer electronic products.

Many empirical researchers consider consumer innate innovativeness as a personality trait which refers to the willingness to change (Clark and Goldsmith, 2006; Dutta-Bergman, 2006; Hurt, Joseph, and Cook, 1977), and because of its importance to the adoption of product innovation, it is necessary to discuss it independently in this study. Table 2.6 presents a summary of empirical studies on consumer characteristics, consumer innovativeness, and the adoption of product innovations. Midgley and Dowling (1978) consider consumer innate innovativeness as an innovative predisposition which is the degree to which the individual adopts an innovation without communicating with others' previous purchasing experience. Manning, Bearden, and Madden (1995) consider consumer innate innovativeness as consumers' desires to seek novelty and creativity.

Steenkamp, Hofstede, and Wedel (1999) describe consumer innate innovativeness as the predisposition (e.g. a personality related factor) to purchase new products rather than to remain with previous choices. From their point of view, it implies that consumer innate innovativeness is unchangeable, and each individual is born with a certain level of consumer innovativeness (Hynes and Lo, 2006).

Table 2.6: Empirical Studies in Consumer Characteristics, Consumer Innovativeness, and Diffusion of Product Innovation

Publications	Concept of Diffusion	Main Findings
Chakrabarti and Baisya (2009)	Role of consumer innovativeness on purchase of organic food	1. Domain specific innovativeness (DSI) is not related to gender but age 2. DSI has positive relationship with organic food adoption
Ching and Ellis (2004)	Factors drive e-commerce adoption	3. Innovators are younger, better educated and more cosmopolitan

Citrin, Sprott, Siverman, and Stem (2000)	Consumer Innovativeness plays an important role in adoption of an innovation	1. Two types of Innovativeness
		    • Open-Processing Innovativeness
		    • Domain-Specific Innovativeness
		4. Open-Processing Innovativeness has no impact on the adoption of the internet shopping
		5. Domain-Specific Innovativeness is positively related to the adoption of the internet shopping

Clark and Goldsmith (2006)	Interpersonal influence and consumer innovativeness	1. Interpersonal influence and attentiveness to social cues have influences on innovativeness 2. Innovativeness is a personality characteristic and relates to conformity 3. Innovators are less influenced by interpersonal influence than late adopters
Cowart, Fox and Wilson (2008)	Consumer innovativeness and self-congruence in new product purchases	1. DSI positively affects purchase intentions for new products 2. The level of DSI is highly correlated with self-image
Dickerson and Gentry (1983)	Characteristics of adopters of home computers	1. Home computer adopters are middle-aged, own their residences, are well-educated, and have higher income
Goldsmith, d'Hauteville, and Flynn (1997)	Measurement of consumer innovativeness	1. Provide DSI scale in two language (German and French) versions 2. Wine innovators are heavy users of wine and are both have more knowledge of wine than later adopters
Handa and Gupta (2009)	Gender influence on consumer innate innovativeness and DSI	1. Gender has no influence on both consumer innate innovativeness and DSI 2. Young online shoppers score higher on domain specific innovativeness
Hansman, Mulder, and Verhoeff (1999)	Consumer characteristics are important factors to adoption of innovation	3. Consumer characteristics such as educational level, income, age, and households have positive affects on adoption
Hoffmann and Soyez	A model to predict DSI	1. DSI is influenced by domain specific opinion leadership, special interest media usage,

(2009)		frequency of use, and the specific need for cognition
Hynes and Lo (2006)	Innovativeness and consumer involvement in the Chinese market	1. Consumer innovativeness has no influence on adoption of co-existing technology products

Im, Bayus, and Mason (2003)	Innate consumer innovativeness and personal characteristics have great impacts on new product adoption behavior	1. Two types of personal characteristics
		    • Demographics
		    • Psychographics
		2. The relationship between innate consumer innovativeness and new product adoption behavior is significant but not prominent
		3. Personal characteristics such as income and age have better influence on new product adoption behavior than innate consumer innovativeness

Kim, Srivastava, and Han (2000)	Individual-level purchase timing and generation choice model	1. The model provides adoptions and substitution patterns for multiple product generations 2. Purchase behavior such as initial purchase, replacement, simple additional buying and leap-frogging needs to be considered in multi-generation adoption processes 3. Individual characteristics have important effects on multiple generation product adoption
Klink and Athaide (2010)	Consumer innovativeness and the extended brand names for new products	1. Innovators evaluate new brands more favorably than brand extensions 2. DSI is a valid measurement of consumer innovativeness
Labay and Kinnear (1981)	The factors influencing consumer adoption of solar energy systems	1. Adopters of solar energy systems are younger, more highly educated, have higher income and occupational status, and are earlier in the family life cycle 2. Adopters of solar energy systems perceived less financial and social risk 3. Innovativeness does not influence the purchase decision of adopters of solar energy systems
Lassar, Manolis, and Lassar (2005)	The important role of consumer characteristics and innovativeness on online banking adoption	1. Combining Diffusion of Innovation (DOI) theory and Technology Acceptance Model (TAM) for evaluating consumer characteristics in adoption of innovation 2. Support TAM perspective in that consumers' attitudes toward on-line banking usage is a significant determents of ultimately using behavior 3. Consumers' characteristics (Demographic) and innovativeness have a significant effect on on-line banking adoption

Martinez, Polo, and Flavian (1998)	Characteristics of individual between first and last adopters	1. Individual characteristics help accelerate the process of diffusion 2. Demographic and socio-economic variables play an important role in determining early and late adopter 3. The influence of the external influences (i.e. mass media) is more important in the first year of introduction stage of diffusion
Midgley and Dowling (1993)	Simplified Contingency Model	1. Individual predispositions and interpersonal communication are central to the diffusion process 2. Innovative communicators have shorter time to adoption than non-innovative communicators 3. Innovative individuals rely on mass media 4. Non-innovative communicators are influenced more by word-of-mouth message

Rogers (1998)	Diffusion of Innovations Model	1. Five stages of diffusion of the population
		  • Innovators 2.5%
		  • Early adopters 13.5%
		  • Early Majority 34%
		  • Late Majority 34%
		  • Laggards 16%
		2. Process of Diffusion
		  Knowledge → Persuasion → Decision → Implementation → Confirmation
		3. The adoption of innovation is effected by characteristics of innovation, characteristics of consumers, and the social system

Saaksjarvi (2003)	Consumer innovation adoption is based on knowledge and product compatibility	1. Consumer adopter categories
		  • Technovators
		  • Supplemental experts
		  • Novices
		  • Core Experts
		2. Consumers' knowledge of a new product will influence their adoption behavior
		3. Compatibility will effect consumers' adoption propensity

Taylor (1974)	The role of risk-taking in consumer behavior	1. Information acquisition, transmission, and processing will help reduce consumers' perceived uncertainty 2. Self-esteem/Self-confidence plays an important role in reduction of perceived uncertainty
Wei (2005)	The role of cognitive age in relation to demographics and innovativeness	1. Chronological age and marital status are positively related to cognitive age 2. Gender, educational level, income level, and employment status are negatively related to cognitive age 3. Cognitive age is negatively related to information-seeking behavior, technology anxiety and adoption of high-tech products 4. Information-seeking behavior is negatively related to adoption of high-tech products

However, other researchers argue that consumer innate innovativeness can also be affected by external influences such as social influences and culture which are suggested to be considered further in diffusion studies (Bearden, Calcich, Netemeyer, and Tell, 1986; Rogers, 2003). In this study, consumer innate innovativeness is defined as an innovative predisposition which is the degree to which the individual adopts an innovation without communicating with others' previous purchasing experience (Midgley and Dowling, 1978).

Empirical research has suggested that consumer innate innovativeness can help identify innovators and early adopters, and has a great impact on the adoption of product innovation (Citrin, Sprott, Silverman, and Stem, 2000; Im, Bayus, and Mason, 2003; Lassar, Manolis, and Lassar, 2005; Midgley and Dowling, 1993; and Rogers, 2003). Further, understanding consumer innate innovativeness is considered to be the basic element to the success of the diffusion of product innovation (Hynes and Lo, 2006). However, the results of various consumer innate innovativeness scales are inconsistent (Roehrich, 2004). Hauser, Tellis, and Griffin (2006) suggest that a consensus of measurement and scales on consumer innovativeness are the key challenge in literature. In order to close gap, further consumer innovativeness studies need to understand what components are involved in consumer innate innovativeness and how to measure consumer innate innovativeness.

2.6.1.1   Components of Consumer Innate Innovativeness

Primary motivating factors such as risk taking, novelty-seeking, and information-seeking are considered as general components of consumer innate innovativeness (Raju, 1980). Pizam (1972) investigates 17 studies dealing with

innovators' psychological factors and indicates 37 psychological characteristics. In addition, Dickerson and Gentry (1983) suggest that the early adopters of home computers are related closely to psychological factors such as opinion leadership, price consciousness, and risk taking. Wood and Swait (2002) and Saaksjarvi (2003) consider variety-seeking, novelty-seeking, information-seeing, knowledge, and the need for cognition as aspects of general consumer innate innovativeness. Further, high self-esteem and opinion leadership are suggested to be positively related to consumer innate innovativeness (Rogers, 2003; Schaninger and Sciglimpaglia, 1981). Moreover, in the works of Goldsmith, d'Hauteville, and Flynn (1997) and Hynes and Lo (2006) price sensitivity and heavy user are also considered as components of consumer innate innovativeness. Tellis, Yin, and Bell's work (2005) includes 12 psychological characteristics for measuring consumer innate innovativeness. Among various psychological characteristics, the current study identifies two major components included in most existing consumer innate innovativeness scales, which are discussed as the following.

Risk Taking

A high degree of uncertainty is associated with the adoption of a new product (Rogers, 2003). Really new products are considered in this thesis as to implement much newer technology, require greater behavior change for customers, and provide greater benefits. As a consequence, a really new product presents customers with a higher degree of uncertainty than other types of new products. Because of the high degree of uncertainty, consumers will perceive a high risk at the time they adopt a really new product. Empirical studies have suggested that innovators and early adopters with a high level of consumer innate innovativeness are able to tolerate a high degree of

uncertainty and are willing to take the risks (Rogers, 2003; Saaksjarvi, 2003). Further, Goldsmith (1983) considers "venturesomeness" as a personality factor to be strongly related to adoption.

Novelty Seeking

Novelty seeking which is an individual's desire to seek for new stimuli (Hirschman, 1980) has been considered as a component of consumer innate innovativeness (Goldsmith, 1983). Wood and Swait (2002) note that innovators view novelty as an important value in their daily lives. In terms of a really new product innovation, which is a new-to-world phenomenon, a high level of novelty is included. As a result, it can be inferred that innovators and early adopters who are comfortable with novelty are willing to accept really new products.

2.6.1.2   Existing Consumer Innate Innovativeness Scales

Consequently, by comprehensively considering different psychological characteristics, empirical research has developed various scales to measure CII (Goldsmith and Hofacker, 1991; Kirton, 1976; Raju, 1980; Roehrich, 2004). Roehrich, Valette-Florence, and Ferrandi (2003) classify these existing consumer innovativeness scales as three categories, namely, life innovativeness scales, consumer innovativeness scales, and domain specific innovativeness scale. As in the earlier discussion, consumer innate innovativeness is considered as a predisposition of individuals. As a consequence, the existing scales in the first category will be appropriate for the study to evaluate consumer innate innovativeness. Among them, Kirton's (1976) Kirton Adaption-Innovation Inventory (KAI) and Hurt-Joseph-Cook's

(1977) scale which are used widely in literature have been proven to correlate with all the psychological characteristics (risk taking, dominance, category width, tolerance of ambiguity, flexibility and venturesomeness, self-esteem, sensation-seeking, lack of dogmatism, fatalism, and impulsiveness) and other innovativeness scales (Foxall and Bhate, 1992; Im, Mason, and Houston, 2007; Vishwanath, 2005). The study considers Hurt-Joseph-Cook's (1977) scale as a useful instrument for measuring consumer innate innovativeness. The details for measurement instruments selection will be discussed in Chapter Four.

2.6.1.3   Shortcoming of CII on New Product Adoption

There are, however, mixed results regarding CII – new product adoption relationship (see Table 2.6). For example, Foxall and Bhate (1992) report that CII is not related to product innovation adoption. Citrin, Sprott, Silverman, and Stem (2000) found that consumer innate innovativeness does not influence the usage of internet shopping which is considered as a really new service to both firms and customers. Goldsmith, Freiden, and Eastman (1995) find that CII is only weakly related to adoption behavior. Moreover, Im, Bayus, and Mason (2003) and Im, Mason and Houston (2007) confirm a significant but weak relationship exists between CII and new product adoption. The relationship between consumer innate innovativeness and adoption of product innovation provided by empirical studies is inconsistent (Im, Mason, and Houston, 2007) and lacks of consensus (Hauser, Tellis, and Griffin, 2006; Roehrich, 2004). This suggests that consumer innate innovativeness may need a further understanding of its influences on really new product adoption. As a consequence, other than consumer innate innovativeness, it is necessary for the current study to investigate other types of consumer innovativeness such as domain specific innovativeness and

vicarious innovativeness (Goldsmith, Freiden, and Eastman, 1995; Im, Mason, and Houston, 2007; Roehrich, Valette-Florence, and Ferrandi, 2003; Vishwanath, 2005).

> Proposition 1: CII is associated with ownership of really new products and relative time of really new product adoption

2.6.2 Domain Specific Innovativeness (DSI) and New Product Adoption

Domain specific innovativeness which is another measurement scale of consumer innovativeness developed by Goldsmith and Hofacker (1991) is defined as "the tendency to learn about and adopt product innovations (new products) within a specific domain of interest" (p.210). Prior research suggests that considering consumer innovativeness to be general across domains can be problematic (Labay and Kinnear, 1981). In other words, innovators in fashion products may be laggards in consumer electronic products (Goldsmith and Hofacker, 1991; Handa and Gupta, 2009; Klink and Athaide, 2010). Gatignon and Robertson (1985) also suggest that consumer innovativeness has to be considered in a certain product category. Further, Im, Bayus, and Mason (2003) conclude that consumer innovativeness and the adoption of new products should be considered as inconsistent across domains.

A number of published studies using domain specific innovativeness are extended to a variety of products and illustrate its usefulness for consumer research (Flynn and Goldsmith, 1993b; Goldsmith, d'Hauteville and Flynn, 1997; Handa and Gupta, 2009; Xie, 2008). Indeed, prior studies have found a relationship between domain specific innovativeness and new product adoption. For example, Citrin, Sprott, Silverman, and

Stem (2000) have employed the DSI scale and found that domain specific innovativeness directly influences the adoption of internet shopping. Klink and Athaide (2010) found that DSI is a better measurement to capture innovators and early adopters who have higher tendency for adopting new brands. Further, Handa and Gupta (2009) report that young online shoppers have higher scores on domain specific innovativeness.

Even though DSI has been used internationally including the U.S.A, Germany and France and found to be the most useful scale to measure consumer innovativeness in a specific product category (Chakrabarti and Baisya, 2009; Handa and Gupta, 2009; Hynes and Lo, 2006; Klink and Athaide, 2010). DSI has rarely been utilized to measure consumer innovativeness in the Asia-Pacific region. The current study extends DSI to an international context including Australia, China and Taiwan.

Proposition 2: DSI is associated with ownership of really new products and relative time of really new product adoption

2.6.3 Vicarious Innovativeness (VI) and New Product Adoption

In previous sections discussing diffusion of innovation, two main diffusion theories have been detailed: Bass (1969) and Rogers (2003). They both suggest that the expression of a new product's information from one individual to another or several others is the basic element of diffusion process. The communication process of new product information through mass media (advertising) and word of mouth is termed vicarious innovativeness by Hirschman (1980). Vicarious innovativeness is defined as

"the acquisition of information regarding a new product. Through vicarious innovativeness the individual can, in essence, adopt the product concept without adopting the product itself" (Hirschman, 1980, p. 285). Other than advertising and word of mouth, Im, Mason, and Houston (2007) consider modeling as the third component of vicarious innovativeness. Based on their work, advertising is defined in the study as "the degree to which a person is exposed to advertising and articles about new products prior to adoption"; modeling is defined as "the degree to which the respondent has observed others in his or her personal network who own these new products"; and word of mouth refers to "the degree to which the person communicates about new products with people who own new products (p. 68). Further, Rogers (2003) suggests besides mass media and interpersonal channels, the internet is also a powerful communication channel. As a consequence, this study considers advertising, modeling, word of mouth, and internet as components of vicarious innovativeness.

Even though not many researchers use vicarious innovativeness specifically, research does exist showing that word of mouth (Mahajan, Muller and Kerin, 1984; Verleye and Marez, 2005) and mass media communication (Lee, Lee and Schumann, 2002; Prins and Verhoef, 2007) do play an important role on new product adoption. Im, Mason, Houston (2007) suggest that vicarious innovativeness has a certain degree of impact on new product adoption and further identify the mediating role of vicarious innovativeness between CII and new product adoption. They also suggest that vicarious innovativeness needs to be cross validated by further research. In order to validate the role of vicarious innovativeness, this study further investigates the role of vicarious innovativeness on the adoption of really new products across countries.

Proposition 3: VI is associated with ownership of really new products and relative time of really new product adoption

2.7 ROLE OF NATIONAL CULTURE

A new product which is introduced successfully in one country may not be accepted by consumers in another country. The adoption rate of product innovations varies among nations. For example, Straub (1994) found that the adoption of E-Mail system in Japan is five years later than with U.S. customers. Before 1995, only a few diffusion studies have considered cross-cultural differences as a factor influencing the adoption of product innovations (Kumar, Ganesh, and Echambadi, 1998; Lynn and Gelb, 1996; Rogers, 2003). Because of market globalization and international competition, the focus of consumer multicultural issues is increasing and needs more attention (Luna and Gupa, 2001). Consumers are involved in a particular culture, and their attitudes toward new products are essential to the success of diffusion of product innovation. Indeed, culture is playing a major role in affecting consumers' attitudes and purchase behavior on new products (Triandis, 1989). Hofstede (1997) defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (p.5). McCracken (1988) simplifies the definition of culture as human activities' blueprint. Empirical studies summarized in Table 2.7 investigate the relationship between culture and product innovation adoption, and illustrates the countries where empirical diffusion research has been conducted.

Table 2.7: Empirical Studies in Culture and Diffusion of Product Innovation

Publications	Purpose of the study	Country Studied	Main Findings
Everdingen and Waarts (2003)	The influence of national culture on the adoption of innovations	10 Eurpoean Countries (Finland, Sweden, Norway, Denmark, The Netherlands, Belgium, France, Spain, Italy and the United Kingdom)	1. National culture has significant influence on Enterprise Resource Planning adoption.
Hofstede (1984)	The relationship between culture and management philosophy	50 countries and 3 multi-country regions	1. Culture has a significant influence in development of management planning
Kumar, Ganesh, and Echambadi (1998)	Replication and extension of three cross-national diffusion studies	Data from Austria, Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK.	1. Country-specific variables such as cosmopolitanism, mobility and women in labor force influence the adoption rates between countries 2. The time-lag theory has positive relationship on the adoption rate among countries
Luna and Gupa (2001)	Integration of cross-cultural consumer behavior framework		1. Cross-cultural factors such as values, symbols, heroes, and rituals shape consumer behavior.
Lynn and Gelb (1996)	Predictors of national innovativeness for technical consumer products	Data from Austria, Belgium, Denmark, Finland, France, Greece, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK.	1. Cultural variables such as individualism, uncertainty avoidance and purchasing power can be used to predict national innovativeness for technical consumer products
Singh, Fassott, Zhao, and Boughton (2006)	A cross-cultural analysis of web site adaptation	German, Chinese, and India in the U.S.	1. Culture have important influences on consumer belief, attitudes, and purchase intention on the web site
Steenkamp, Hofstede, and Wedel (1999)	Examination of the antecedents of cross-national consumer innovativeness	Belgium, Denmark, France, Germany, Great Britain, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain	1. Both individual and national cultural variables such as consumer ethnocentrism, level of countries' individualism, and national cultural uncertainty avoidance have influences on consumer innovativeness 2. National culture also affect individual variables on innovativeness

Straub (1994)	A study of culture effects on IT diffusion	Japan and the U.S.	1.	Cultural effects such as uncertainty avoidance and complex written language symbols play a major role in the IT diffusion process
Takada and Jain (1991)	A cross-national study of consumer durable goods diffusion	Japan, South Korea, Taiwan, and the U.S.	1. 2.	A country's unique social value creates a special cultural environment and communication system which is important to the diffusion processes Lead and lag time effects have positive relationship on the diffusion rate of consumer durable goods
Tan and Farley (1987)	The influences of culture on intention in Singapore	Singapore	1.	Family orientation, a cultural factor, is related strongly to purchase intention
Yeniyurt and Townsend (2003)	Culture and new product acceptance	Secondary data of 56 countries	1.	Culture and socio-economic variables have significant influences on the adoption of new products in countries

Most studies of new product diffusion have been done in the U.S. and Europe. The Asia – Pacific regions has not attracted much attention. Tan and Farley (1987) conducted a study in Singapore and found that family orientation, a cultural value of Confucian philosophy, is related strongly to Asian consumers' purchase intention. Straub (1994) suggests that cultural factors such as national cultural and uncertainty avoidance play a major role in IT diffusion process. Kumar, Ganesh, and Echambadi (1998) consider country-specific characteristics such as cosmopolitanism and mobility as important indicators for explaining different adoption rates among European countries. Singh, Fassott, Zhao, and Boughton (2006) found that cultural factors such as individualism, uncertainty avoidance, and masculinity have significant influences on consumer beliefs, attitudes and purchase intention in online shopping.

More interestingly, many cross-cultural studies have found that cultural factors also influence the degree of consumer innovativeness. For example, Steenkamp, Hofstede, and Wedel (1989) propose that consumer innovativeness is correlated positively with personal values, sociodemographics, and national culture. Lynn and Gelb (1995) suggest that cultural variables such as individualism and uncertainty avoidance can be used to predict national innovativeness for technical consumer products. Culture has been recognized to have a great impact on the consumer acceptance of new products across countries (Gatignon, Eliashberg, and Robertson, 1989; Hofstede, 1984; Lee, 1990; Steenkamp, 2001; Tellis, Yin, Bell, 2005; Van Everdingen and Warrts, 2003; Yeniyurt and Townsend, 2003). Culture plays a major role in shaping individuals' perceptions and behaviors (Yeniyurt and Townsend, 2003; Triandis, 1989).

A new product which has a high adoption rate in a country may not be adopted at the same speed by customers in another country. In particular, in the aspect of really new product, consumers perceive a much higher level of uncertainty, and require much more behavior change than other types of new products (Reid and Brentani, 2004). This makes it even more difficult to predict the performance of really new products in different countries. As a consequence, in order to understand the differences of factors influencing the success of really new products in a global market, the current study conducts a cross-national comparison in three countries.

2.7.1   Cultural Theories

Empirical research has focused on the role of culture in the diffusion of product innovation (Van Everdingen and Warrts, 2003; Gatignon, Eliashberg, and Robertson, 1989; Helsen, Jedidi, and DeSarbo, 1993; Hofstede, 1984; Lee, 1990; Steenkamp, 2001; Tellis, Stremersch, and Yin, 2003; Yeniyurt and Townsend, 2003). Many of these studies look at different culture dimensions in evaluating their influences in the diffusion process. For example, Gatignon, Eliashberg, and Robertson (1989) classify countries by considering the level of "Cosmopolitanism", "Mobility", and "Sex Roles". They suggest that all three clusters are closely related to the diffusion of product innovation. Helsen, Jedidi, and DeSarbo (1993) use "Mobility", "Health", "Trade", "Lifestyle", "Cosmopolitanism", and "Miscellaneous" as criteria to group countries. They found that their constructs have some relationship with the diffusion of product innovations, but are not systematically investigated across product categories. In both studies, these authors also suggest that the Bass diffusion model, which is not constant across countries, needs to give more consideration to cultural effects (Tellis, Stremersch, and Yin, 2003). Further, "Population", "GNP", "Electric

Power Consumption", "Democratic Level", "Protestantism", "Amount of Scientists, Engineers and College Students", and "Literacy Rate" are considered as national determinants of innovation adoption in Lee's (1990) work. Moreover, Schwartz (1994) identifies "Autonomy", "Egalitarianism", and "Mastery" for categorizing different countries which are considered to be similar to Hofstede's framework (Steenkamp, 2001).

Hofstede's (1984) cultural framework is the most well-known national cultural theory (Van Everdingen and Waarts, 2003). Prior studies have proven the validity and efficiency of Hofstede's framework (Van Everdingen and Waarts, 2003; Steenkamp, 2001; Yeniyurt and Townsend, 2003). Sivakumar and Nakata (2001) note that a great amount of marketing research is based on Hofstede's cultural framework. The purpose of the current study is to conduct a cross country comparison of the influence of consumer innovativeness on really new product adoption. As a consequence, it is necessary to consider Hofstede's cultural theory before the research proceeds.

2.7.1.1 Hofstede's Cultural Framework

Hofstede's (1984) study consists of four dimensions: individualism, power distance, uncertainty avoidance, and masculinity. Individualism which is the most employed dimension in cross-cultural research (Yeniyurt and Townsend, 2003) refers to individuals who are expected to consider themselves rather than others in a social system (Hofstede, 1984). In an individualistic culture, people tend to place themselves and their immediate family members in priority, and to see themselves as unique and independent from others. Thus, they make their own decisions (Van Everdingen and Waarts, 2003). In contrast, collectivism is involved deeply in a social system. In this

kind of culture, people consider themselves as living with a group and expect to follow the norms. Empirical studies suggest that individualists are more likely to accept a new product (Van Evergingen and Waarts, 2003; Yeniyurt and Townsend, 2003) and have a higher degree of consumer innovativeness than collectivists (Steenkamp, ter Hofstede, Wedel, 1999).

Power distance is explained by Hofstede (1984) as "the extent to which the members of a society accept that power in institutions and organizations is distributed unequally" (p.83). In a high power distance culture, individuals tend to follow people who are older and/or have higher social status. Therefore, it is suggested that people in high power distance culture are less innovative and have lower rate of new product adoption than people in low power distance culture (Van Evergingen and Waarts, 2003; Yeniyurt and Townsend, 2003).

Uncertainty avoidance refers to the degree to which individuals feel uncomfortable with uncertainty and ambiguity in a society (Hofstede, 1984). In high uncertainty avoidance culture, individuals tend to feel that "what is different is dangerous" (Hofstede, 1991, p. 119). A high level of uncertainty perceived by customers is always associated with the introduction of new products, especially for really new products (Rogers, 2003). Thus, it is suggested that the acceptance of new products in high uncertainty avoidance countries remains low (Frambach, van Herk, and Agarwal, 2003). Further, Steenkamp, Hofstede, and Wedel (1999) note that uncertainty avoidance is negatively related to consumer innovativeness.

Masculinity is defined as the degree of a society's assertiveness versus nurturance (Steenkamp, Hofstede, and Wedel 1999). Hofstede (1984) suggests that a masculine society focus on achievement, heroism, and material success; on the other hand, femininity cares about relationship, modesty, the weak and the quality of life. Rogers (2001) found that the adoption of a new product is positively related to an individual's achievement, motivation, and innovativeness (Van Evergingen and Waarts, 2003). Steenkamp, ter Hofstede, and Wedel's (1999) study identifies the positive relationship between masculinity and consumer innovativeness. However, masculinity is suggested to have no influence on the adoption of a new product (Van Evergingen and Waarts, 2003; Yeniyurt and Townsend, 2003).

In sum, cultural effects which have been considered as an important variable in many diffusion studies are suggested to have strong influences on the adoption of product innovation and consumer innovativeness (Van Everdingen and Warrts, 2003; Frambach, van Herk, and Agarwal, 2003; Gatignon, Eliashberg, and Robertson, 1989; Helsen, Jedidi, and DeSarbo, 1993; Lee, 1990; Steenkamp, 2001; Lynn and Gelb, 1995; Steenkamp, ter Hofstede, and Wedel, 1999; Tellis, Stremersch, and Yin, 2003; Yeniyurt and Townsend, 2003). The structure of a particular culture is suggested to "facilitate or impede" the diffusion of really new products (Rogers, 2003). However, most consumer innovativeness and diffusion research is conducted in the U.S and European nations (Helsen, Jedidi, and DeSarbo, 1993; Gatignon, Eliashberg, and Robertson, 1989; Lee, 1990; Steenkamp, 2001; Lynn and Gelb, 1995). Other regions lack attention from researchers. In order to fill this gap, the current study conducts a cross country comparison in Australia, China and Taiwan.

2.8   OTHER FACTORS AND NEW PRODUCT ADOPTION

The various definitions and measurements of consumer innovativeness are suggested to be a lack of consensus, which needs further research (Hauser, Tellis, and Griffin, 2006). Other than consumer innovativeness, factors such as the desire for unique consumer products (DUC)) and opinion leadership (OL) have been suggested to have an influence on new product adoption behaviour (Lassar, Manolis, and Lassar, 2005; Ruvio, Shoham and Brencic, 2007). They are also included in the current study.

The Desire for Unique Consumer Products (DUCP)

The desire for unique consumer products, considered as another useful scale for examining consumers' responses to unique products, services, and experiences, was introduced by Flynn and Harris in 1996. They define the desire for unique consumer products as "consumers differ in the extent to which they hold as a personal goal the acquisition and possession of consumer goods, services, and experiences that few others possess" (p. 602). Three antecedents are included in the desire for unique consumer products, namely need for uniqueness, status aspiration, and materialism which are different from components of consumer innate innovativeness discussed in the previous section. Among them, need for uniqueness is considered as a potential antecedent of consumer innovativeness (Vandecasteele and Geuens, 2009).

The role of DUCP on new product adoption has been supported cross-culturally (Ruvio, Shoham and Brencic, 2007). In addition, the scale has been used to investigate the relationship between consumer innovativeness and new product adoption among different sexual orientations (Vandecasteele and Geuens, 2009). As a

consequence, besides domain specific innovativeness and vicarious innovativeness, the desire for unique consumer products is added to the conceptual model in the study.

> Proposition 4: DUCP is associated with ownership of really new products and relative time of really new product adoption

Opinion Leadership

Opinion leadership has long been considered as a component of consumer innate innovativeness (Rogers, 2003). Bass (1969) suggests that innovators will transmit their opinions and experiences to late adopters after adopting a new product. Innovators and early adopters who are important sources of new product information have great impact on other consumers (Gatignon andRobertson, 1991). Further, in the work of Lassar, Manolis, and Lassar (2005), opinion leadership has been suggested to be positively related to online banking adoption. As a consequence, innovators and early adopters who play as models in the diffusion process are suggested to be opinion leaders (Goldsmith, Flynn, and Goldsmith, 2003; Hynes and Lo, 2006; Rogers, 2003). Along with consumer innate innovativeness, this study focuses on domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, and the influence of informal opinion leaders. This understanding of opinion leadership is vital since interpersonal communication is also a critical factor for the diffusion of product innovation (Mahajan, Muller, and Bass, 1990).

> Proposition 5: OL is associated with ownership of really new products and relative time of really new product adoption

Demographics

Consumer demographics are used widely to portray innovators and early adopters because of ease data collection (Im, Bayus, Mason, 2003). Lassar, Manolis, and Lassar (2005) suggest that consumer characteristics can be used to distinguish innovators and non-innovators, and income is the only demographic factor that affects the adoption of online banking. Midgley and Dowling (1993) found that innovative consumers tend to be younger, unmarried, and have higher social status. More recently, Im, Bayus and Mason (2003) report that income, education and age have significant impacts on new product adoption. Moreover, Wei (2005) suggests that age, gender, educational level, and income level have significant relationships with consumer adoption behavior.

In the aspect of consumer innovativeness, Tellis, Yin and Bell (2005) suggest that there is no consensus about the relationship between demographics and consumer innovativeness. Steenkamp, Hofstede and Wedel (1999) report that age has a negative impact on consumer innovativeness. Im, Bayus and Mason (2003) and Im, Mason and Houston (2007) found no significant relationship between demographics and consumer innovativeness.

Even though some research argues that the ability of demographics to describe innovative consumers displays lacks of consensus (Tellis, Yin and Bell, 2005), in general, innovators and early adopters are expected to be younger, are well educated, and have higher income (Rogers, 2003; Tellis, Yin and Bell, 2005). As a consequence, identifying demographics remains an important issue to help marketers segment consumers into early adopters and late adopters. Following prior studies, the current

study incorporate five important demographics including age, gender, education, income, and number of children.

> Proposition 6: Demographics is associated with ownership of really new products and relative time of really new product

2.9 RELATIONSHIPS BETWEEN DSI, VI, DUCP and CII

Domain specific innovativeness plays an important role between the relationship of consumer innate innovativeness and new product adoption. For example, Roehrich (2004) considers DSI as "intermediary" between innate innovativeness and the adoption of new products; although this has yet to be tested, Goldsmith, Freiden, and Eastman (1995) indicate that the relationship between CII and new product purchase is mediated by DSI. Further, Roehrich, Valette-Florence, and Ferrandi (2003) suggest that consumer innate innovativeness is an antecedent of DSI. Goldsmith, Hauterville, and Flynn (1997) note that the DSI scale is appropriate to measure the relationship between consumer innovativeness and new product adoption.

In terms of vicarious innovativeness, Im, Mason, and Houston (2007) identify the mediating role of vicarious innovativeness between CII and new product adoption. However, in their study, advertising which plays an important role in the diffusion process is found not to enhance adoption behaviour. Suggestions are made to further investigate the mediating role of communication factors between consumer innate innovativeness and new product adoption behaviour.

Further, in the aspect of the desire for unique consumer products, Harris and Lynn (1996) found a positive relationship between DUCP and the tendency for being a consumer innovator. Vandecasteele and Geuens (2006) suggest that DUCP is a possible antecedent of consumer innovativeness and needs to be cross-validated in further research. Finally, prior research suggests that consumer innovativeness and the adoption of new products should be considered as inconsistent across domains and need further research (Hauser, Tellis, and Griffin, 2006; Im, Bayus, and Mason, 2003; Im, Mason, Houston, 2007). By considering the inconsistent results in consumer innovativeness literature and low correlation among consumer innovativeness scales (Im, Mason, Houdson, 2007; Roehrich, 2004), the current study further investigates the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, and really new product adoption.

> Proposition 7: CII is associated with DSI, VI, DUCP and OL

> Proposition 8: DSI, VI, DUCP and OL mediate the relationship between CII and ownership of really new products and relative time of really new product adoption

> Proposition 9: VI, DUCP and OL moderate the relationship between CII and ownership of really new products and relative time of really new product adoption

2.10 RESEARCH HYPOTHESES AND CONCEPTUAL MODEL

The review of literature has suggested the conceptual model presented in Figure 2.4 which consists of the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and the adoption of really new products to the current study.

Figure 2.4: Conceptual Framework of Consumer Innovativeness and the adoption of Really New Products
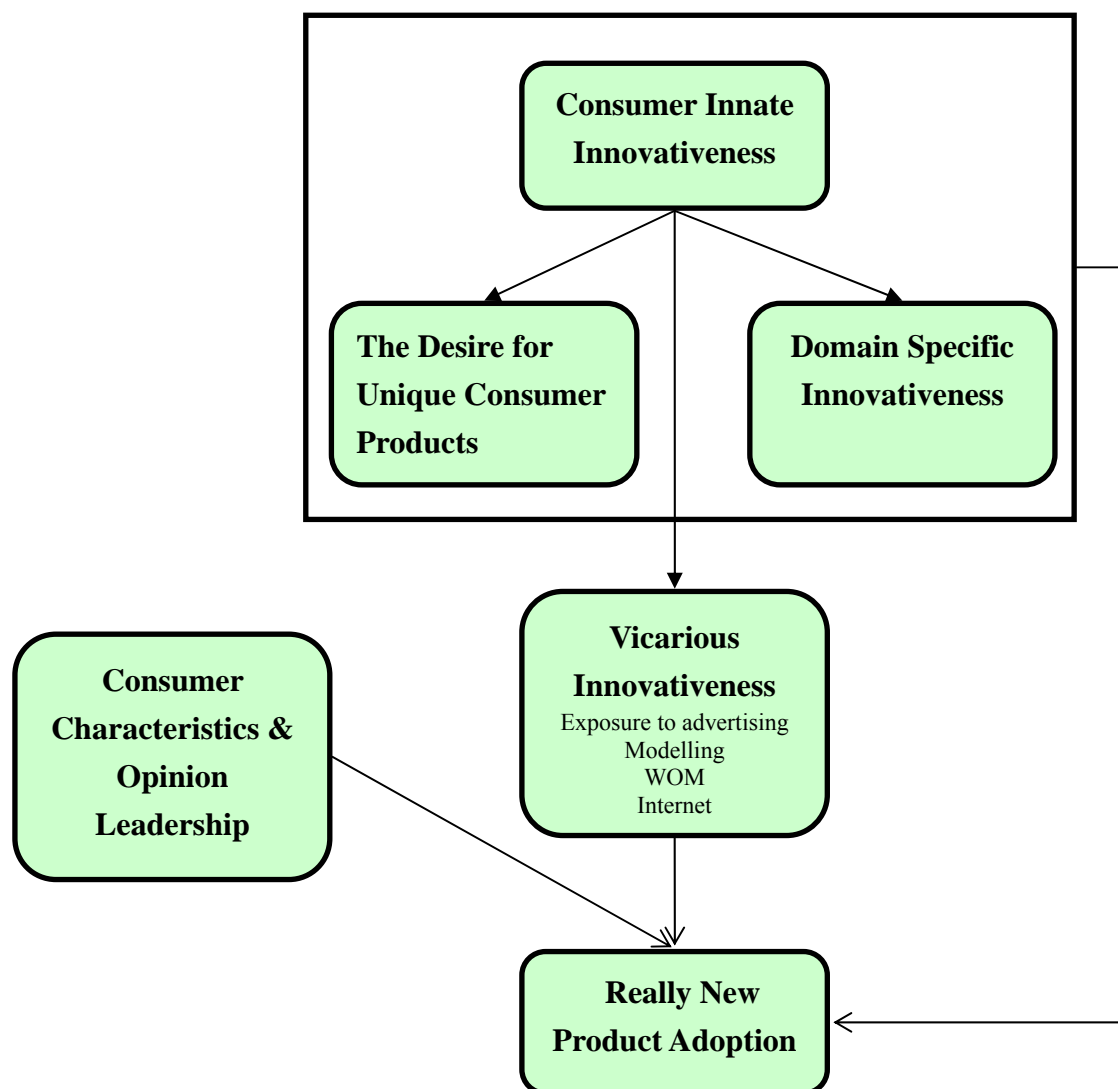
As shown in the conceptual model, consumer innate innovativeness, which is considered as the indicator to distinguish consumers (Rogers, 2003), is suggested by numerous empirical researchers to have a positive relationship with the adoption of product innovations (Citrin, Sprott, Silverman, and Stem, 2000; Im, Bayus, and Mason, 2003; Lassar, Manolis, and Lassar, 2005; Midgley and Dowling, 1993; and Rogers, 2003). Based on these assertions, the hypotheses are as follows:

Proposition 1: CII is associated with ownership of really new products and relative time of really new product adoption

H1a: Consumer Innate Innovativeness is positively associated with ownership of really new product

H1b: Consumer Innate Innovativeness is positively associated with relative time of really new product adoption

Prior studies have suggested that consumer innovativeness varies across product categories (Citrin, Sprott, Silverman, and Stem, 2000; Labay and Kinnear, 1981; Gatignon and Robertson,1985). The domain specific innovativeness scale which is considered to be appropriate to measure the relationship between consumer innovativeness and the adoption of new products is validated by empirical research (Citrin, Sprott, Silverman, and Stem, 2000; Goldsmith, Hauterville, and Flynn, 1997; Hynes and Lo, 2006). The hypotheses are as follows.

Proposition 2: DSI is associated with ownership of really new products and relative time of really new product adoption

H2a: Domain Specific Innovativeness is positively associated with ownership of really new product

H2b: Domain Specific Innovativeness is positively associated with relative time of really new product adoption

Vicarious innovativeness which includes Advertising, Modeling and Word of Mouth is suggested to have a significant relationship with new product adoption (Im, Mason, Houston, 2007). Empirical studies support that these communication factors have great impact on consumers' purchasing decision making (Bass, 1969; Rogers, 2003).

Proposition 3: VI is associated with ownership of really new products and relative time of really new product adoption

H3a: Vicarious Innovativeness - Advertising is positively associated with ownership of really new product

H3b: Vicarious Innovativeness - Advertising is positively associated with relative time of really new product adoption

H3c: Vicarious Innovativeness - Modeling is positively associated with ownership of really new product

H3d: Vicarious Innovativeness - Modeling is positively associated with relative time of really new product adoption

H3e: Vicarious Innovativeness – Word of Mouth is positively associated with ownership of really new product

H3f: Vicarious Innovativeness –Word of Mouth is positively associated with relative

   time of really new product adoption

Flynn and Harris (1996) suggest that the desire for unique consumer products is another useful scale for measuring consumer's adoption behaviour and have a positive relationship with consumer innovativeness. The hypotheses are presented as follows:

Proposition 4: DUCP is associated with ownership of really new products and

   relative time of really new product adoption

   H4a: The desire for unique consumer products is positively associated with

      ownership of really new product

   H4b: The desire for unique consumer products is positively associated with relative

      time of really new product adoption

Opinion leadership has been suggested to be positively related with online banking adoption (Lassar, Manolis, and Lassar, 2005). According to Bass (1969), after adopting a new product, innovators will transmit their opinions and experiences to late adopters. In other words, late adopters look for early adopters' advice about a product innovation and imitate innovators' purchasing behavior (Rogers, 2003). Therefore, innovators and early adopters who play as models in the diffusion process are considered as opinion leaders (Goldsmith, Flynn, and Goldsmith, 2003; Hynes and Lo, 2006; Rogers, 2003). The hypotheses are suggested as follows:

**Proposition 5: OL is associated with ownership of really new products and
relative time of really new product adoption**

*H5a: Opinion leadership is positively associated with ownership of really new
product*

*H5b: Opinion leadership is positively associated with relative time of really new
product adoption.*

Empirical studies have suggested the demographic characteristics of innovators and
early adopters to be younger and to have higher income and higher level of education
than late adopters, and that these variables have strong relationship with the adoption
of product innovations (Im, Bayus, Mason, 2003; Lassar, Manolis, and Lassar, 2005;
Midgley and Dowling, 1993; Rogers, 2003; Wei, 2005). In the aspect of demographics,
the following hypotheses are made:

**Proposition 6: Demographics is associated with ownership of really new products
and relative time of really new product adoption**

*H6a: There is a relationship between consumer characteristics and ownership of
really new product*

*H6b: There is a relationship between consumer characteristics and relative time of
really new product adoption*

Empirical studies suggest that consumer innate innovativeness is positively related to
domain specific innovativeness, the desire for unique consumer products and opinion
leadership (Flynn and Harris, 1996; Goldsmith, Flynn, and Goldsmith, 2003;

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Roehrich, Valette-Florence, and Freeandi, 2003). In contrast, Midgley and Dowling (1978) suggest that consumer innate innovativeness is the degree to which the individual adopts an innovation without communicating with others' previous purchasing experience. In other words, innovative individuals rely less on the communication process prior to new product adoption. Further, Clark and Goldsmith's (2006) findings suggest that consumer innate innovativeness is negatively related to interpersonal influences. Based on these assertions, the hypotheses are as follows:

Proposition 7: CII is associated with DSI, VI, DUCP and OL

H7a: Consumer Innate Innovativeness is positively associated with domain specific innovativeness

H7b: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Advertising

H7c: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Modeling

H7d: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Word of Mouth

H7e: Consumer Innate Innovativeness is positively associated with the desire for unique consumer products

H7f: Consumer Innate Innovativeness is positively associated with opinion leadership

Prior studies suggest that consumer innate innovativeness has a weak or no association with new product adoption (Citrin, Sprott, Silverman, and Stem, 2000; Im, Mason, Houston, 2007). Others suggest that CII only influences new product

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adoption indirectly through DSI and/or vicarious innovativeness (Im, Mason, Houston, 2007; Roehrich, Valette-Florence, and Freeandi, 2003). Further, Roehrich (2004) suggests that DSI is a mediator between innate innovativeness and the adoption of new products. In addition, Vandecasteele and Geuens (2006) also suggest that DUCP, which is a possible antecedent of consumer innovativeness, may play a mediating role between consumer innate innovativeness and new product adoption. The hypotheses are as follows.

Proposition 8: DSI, VI, DUCP and OL mediate the relationship between CII and ownership of really new products and relative time of really new product adoption

H8a: Domain Specific Innovativeness mediates the relationship between Consumer Innate Innovativeness and ownership of really new product

H8b: Domain Specific Innovativeness mediates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H8c: Vicarious innovativeness - Advertising mediates the relationship between consumer innate innovativeness and ownership of really new product

H8d: Vicarious innovativeness - Advertising mediates the relationship between consumer innate innovativeness and relative time of really new product adoption

H8e: Vicarious innovativeness - Modeling mediates the relationship between consumer innate innovativeness and ownership of really new product

H8f: Vicarious innovativeness - Modeling mediates the relationship between consumer innate innovativeness and relative time of really new product adoption

H8g: Vicarious innovativeness – Word of Mouth mediates the relationship between consumer innate innovativeness and ownership of really new product

H8h: Vicarious innovativeness – Word of Mouth mediates the relationship between consumer innate innovativeness and relative time of really new product

H8i: The desire for unique consumer products mediates the relationship between Consumer Innate Innovativeness and ownership of really new product

H8j: The desire for unique consumer products mediates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H8k: Opinion leadership moderates the relationship between consumer innate innovativeness and ownership of really new product

H8l: Opinion leadership moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

The results of the study discussed in the Chapter Five indicate that there is no significant mediating effect existed between the relationship consumer innate innovativeness and really new product adoption, except domain specific innovativeness. The study decides to further investigate whether VI, DUCP, and OL are the moderator variables to the relationship between consumer innate innovativeness and really new product adoption.

Proposition 9: VI, DUCP and OL moderate the relationship between CII and ownership of really new products and relative time of really new product adoption

H9a: Vicarious innovativeness - Advertising moderates the relationship between consumer innate innovativeness and ownership of really new product

H9b: Vicarious innovativeness - Advertising moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

H9c: Vicarious innovativeness - Modeling moderates the relationship between consumer innate innovativeness and ownership of really new product

H9d: Vicarious innovativeness - Modeling moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

H9e: Vicarious innovativeness – Word of Mouth moderates the relationship between consumer innate innovativeness and ownership of really new product

H9f: Vicarious innovativeness – Word of Mouth moderates the relationship between consumer innate innovativeness and relative time of really new product

H9g: The desire for unique consumer products moderates the relationship between Consumer Innate Innovativeness and ownership of really new product

H9h: The desire for unique consumer products moderates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H9i: Opinion leadership moderates the relationship between consumer innate innovativeness and ownership of really new product

H9j: Opinion leadership moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

2.11   CHAPTER SUMMARY & RESEARCH PROBLEM

Rapid development of technology and increased customer demand for variety have pushed organizations to develop a constant stream of new products (Halman, Hofer, and Vuuren, 2003; Markides, 2006). Most firms believe that introducing new products continually helps attract more demand and helps maintain a competitive position in a market (Cooper and Kleinschmidt, 1987; Griffin and Page, 1996; Lundvall and Christensen, 2004). However, not every new product succeeds in the diffusion process. Consumers play a major role in the diffusion of product innovation. A really new product will be successful when it gathers the acceptance of customers. It is critical that most really new products have only one single opportunity at the market (Beard and Easingwood, 1996). As a consequence, the purpose of this study is to understand the relationship between consumer factors and the adoption of really new products.

Consumer innovativeness, which has long been recognized to have a great impact on the adoption of product innovations (Citrin, Sprott, Silverman, and Stem, 2000; Im, Bayus, and Mason, 2003; Lassar, Manolis, and Lassar, 2005; Midgley and Dowling, 1993), is an indicator to distinguish customers as the innovators, the early adopter, the early majority, the late majority, and the laggards (Rogers, 2003). Innovators and early adopters who are considered to have a higher degree of consumer innovativeness are the first to adopt new products within their social system. They also play an important role in influencing the spread of new products by communicating their opinions to later adopters (Bass, 1969). Moreover, prior research suggests that innovators should not be considered as innovators across product categories (Gatignon and Robertson, 1985; Goldsmith and Hofacker, 1991; Labay and Kinnear, 1981).

Furthermore, empirical research on the personal characteristics of innovators suggests that from a demographic perspective they tend to be younger, be well educated, and have higher income and social status. (Im, Bayus, and Mason, 2003; Lassar, Manolis, and Lassar, 2005; Midgley and Dowling, 1993; Rogers, 2003; Wei, 2005). Research from a psychological perspective suggests that they are risk takers and novelty seekers, have a high level of consumer innovativeness, are less price conscious, have higher self-esteem, have needs for cognition and change, and are market mavens (Goldsmith, d'Hauteville, and Flynn, 1997; Hynes and Lo (2006); Rogers, 2003; Raju, 1980; Saaksjarvi, 2003; Schaninger and Sciglimpaglia, 1981; Wood and Swait, 2002).

Finally, Hauser, Tellis, and Griffin (2006) identify five significant areas of investigation for further understanding of innovation in literature, one of which is the importance of consumer response to product innovation: the role of consumer innovativeness. Consumer innovativeness is an important aspect in studying customers. There is still no consensus on the definitions and measurements of consumer innovativeness among researchers; therefore, there is a need for further investigation in order to test and possibly develop appropriate and unified scales for consumer innovativeness (Hauser, Tellis, and Griffin, 2006; Roehrich, 2004). As suggested by Hauser, Tellis, and Griffin (2006), consumer innovativeness varies across product category. The purpose of this research is to examine the relationship between CII, DSI, VI, DUCP, OL, personal characteristics and the adoption of really new products in Australia, China, and Taiwan markets.

This chapter has presented a conceptual model depicting the proposed relationships associated with consumer innovativeness and really new product adoption. A series of hypotheses were then presented which will form the basis for addressing the research

problem. Chapter Three will present a detailed discussion and rationale on the

research methodology to be employed.

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter examined extensively the relevant literature and presented the development of a conceptual model including Consumer Innate Innovativeness, Domain Specific Innovativeness, Vicarious Innovativeness, the Desire for Unique Consumer Products, and really new product adoption. The goal of this study is to develop a theoretically derived, empirically tested model of these relationships.

This chapter outlines the development of the instrument that was used to collect data and test research hypotheses. In the chapter, pre-testing, sample selection, and data collection are discussed. Following this is the questionnaire development, the primary research instrument that provides the rationales of how and why the empirical measurement scales are selected. The discussion of statistical analysis illustrates the analysis techniques used in the current research.

3.2 RESEARCH DESIGN

The initial purpose of a research design is to build a detailed blueprint to guide a study toward its objectives, and to help a researcher decide what research approaches are going to be taken and how the necessary information will be obtained (Aaker, Kumar, and Day, 1998). As a consequence, in this particular study, the appropriate research method was selected based on the nature of the research problem identified in the literature review section.

The fundamental purpose of this research is to examine the influences of CII, DSI, VI, DUCP, OL and personal characteristics on the adoption of really new products among the Australia, China, and Taiwan customers. A review of consumer innovativeness and relevant marketing literature was undertaken to identify key concepts and variables, and subsequently develop hypotheses and a conceptual framework for current study. The research setting exhibits descriptive approach. A quantitative research method was undertaken to test the hypotheses. Details of research process are presented in the next section.

3.3   RESEARCH PROCEDURE

Figure 3.1 provides the outline of the research design which includes five stages.

Stage 1 began with a review of consumer innovativeness and diffusion of product innovations literature helps identify key research questions. This leads to the development of a conceptual framework and propositions for the current research.

Stage 2 presented a descriptive research approach that involved the development of a questionnaire to be implemented as the major research instrument. The measurement scales related to the study were identified and selected from existing scales with necessary modification. All existing scales are developed in English language. In order to measure respondents in two Chinese-speaking countries – China and Taiwan, the questionnaire was translated into two versions – traditional Chinese version and simplified Chinese version. The questionnaire was then pre-tested by a number of university students in Australia and Taiwan. The subsequent refinement and modification was undertaken.

Figure 3.1: Research Design

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                    ┌──────────────────────────────────┐
                    │  Definition of Research Purpose   │
                    └──────────────────────────────────┘
     ┌────────────────────────┐          ┌────────────────────────┐
     │   Review of Diffusion  │◄────────►│   Review of Consumer   │
     │  of Innovation         │          │  Innovativeness        │
     │   Literature           │          │   Literature           │
     └────────────────────────┘          └────────────────────────┘

                    ┌──────────────────────────────────┐
                    │      Identify Research Problem     │
                    └──────────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │  Specification of Research Questions │
                    └──────────────────────────────────┘

     ┌────────────────────────────────┐   ┌────────────────────────────┐
     │ Development of Conceptual       │   │ Development of Propositions │
     │ Framework                       │   │                             │
     └────────────────────────────────┘   └────────────────────────────┘
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Stage 1

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                    ┌──────────────────────────────────┐
                    │    Descriptive Research Approach   │
                    └──────────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │     Questionnaire Development       │
                    └──────────────────────────────────┘

     ┌────────────────────────────────┐   ┌────────────────────────────┐
     │ Selection of Measurement Scales │◄─►│ Translation of Questionnaire│
     └────────────────────────────────┘   └────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │              Pre-Test              │
                    └──────────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │        Refine Questionnaire        │
                    └──────────────────────────────────┘
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Stage 2

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                    ┌──────────────────────────────────┐
                    │          Sample Selection          │
                    └──────────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │          Data Collection           │
                    └──────────────────────────────────┘
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Stage 3

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                    ┌──────────────────────────────────┐
                    │             Data Entry             │
                    └──────────────────────────────────┘

                    ┌──────────────────────────────────┐
                    │         Statistical Analysis       │
                    └──────────────────────────────────┘
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Stage 4

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                    ┌──────────────────────────────────┐
                    │     Conclusion and Implications    │
                    └──────────────────────────────────┘
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Stage 5

Stage 3 involved the sampling plan. The sampling frame was designed in reasonable amounts to identify an appropriate research population for the three countries. The stage also involved descriptive research via the administration of an online survey in Australia and a face-to-face survey in both China and Taiwan as the major primary data collection.

Stage 4 represented data entry and quantitative analysis to determine whether the proposed relationships and hypotheses were supported.

In the final stage, the conclusion and implications from the findings of the study were reported.

3.4 UNIT OF ANALYSIS

The definition of the unit of analysis is the emphasized level of a study. Prior to the commencement of research, it is necessary to specify the unit of analysis which influences the data collection methods, sample size, and variables involved in the conceptual framework (Zikmund, 1994). Given that this research is emphasized on individual customers, the general consumer of consumer electronic products was identified as the unit of analysis to address the research propositions. Individual consumers were considered as the most appropriate respondents due to their personal experiences of owning and/or using really new products. Consequently a wide cross section of consumers from Australia, China, and Taiwan was randomly sampled. This would provide a comprehensive appreciation of the coordinated efforts across countries. Multiple constructs were incorporated into the research design. The outcome would facilitate gaining greater insights from the examination of the various

relationships hypothesized.

3.5 QUANTITATIVE RESEARCH

3.5.1 Questionnaire Development

The questionnaire was developed to obtain information about consumer innate innovativeness and the relationship with really new product adoption. This section will cover the format of the survey instrument and the theoretical foundation for its development.

3.5.1.1 Questionnaire Translation

Since final data were collected in Australia, China and Taiwan for a cross-cultural comparison, an English version of the questionnaire was developed first and translated to two Chinese versions (both traditional and simplified) by the candidate who is a native Chinese speaker. A bilingual translator from the National Accreditation Authority for Translation and Interpreters Ltd. in Australia (NAATI) was hired to validate the translation. Following that, another qualified NAATI translator was asked to back-translate the two Chinese version questionnaires to English in order to solve any discrepancies in the translation (Tellis, Yin, and Bell, 2005). Before the final data collection proceeded, the different versions (both English and Traditional Chinese) of the questionnaires were pre-tested by a convenience student sample of Australians and Taiwanese in their home country to test the wording, reliability and effectiveness of measurement instruments. Modifications were made for the final questionnaire, of which the two Chinese versions questionnaires were

again validated by a professional translator.

3.5.1.2   Scaling

Seven-point Likert-type scales were utilized to measure the key variables. All the items of consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and opinion leadership were anchored at 1, "strongly disagree" and 7, "strongly agree". Even though the major negative concern of this type of scale is that respondents need to spend more time on filling out the questions than other types of scales, Likert-type scales are suggested to be relatively easy to construct and administer, and best suited for personal interview and online methods (Lukas, Hair, Bush, and Ortinau, 2004).

The measurement of really new product adoption involved ownership of really new product and relative time of really new product adoption. An ordinal scale was used to measure ownership of really new products. Respondents were asked to indicate that they either "never seen/unsure", "seen but never bought", "intent to purchase in next 6 months", "bought once", "repurchased same brand", or "repurchased different brand from the suite of selected 20 really new products. For relative time of really new product adoption, a ratio scale was used in the study. Respondents were asked questions such as "how long have you owned this current product", "if repurchased, how long did you own your previous version" and "if repurchased, when did you purchase your very first version." Although these questions relied on respondents' memory which may cause bias, this scale allowed the study to identify the absolute differences and make absolute comparisons between the responses (Lukas, Hair, Bush, and Ortinau, 2004).

3.5.1.3   Structure and Sequencing

Based on the original questionnaire designed by the candidate, an online questionnaire hosted by the contracted market research company was used to collect Australia data; in contrast, traditional and simplified Chinese version questionnaires were used to collect Taiwan and China data. As discussed previously, all respondents were identified above 18 years old before they proceeded to fill out the questionnaire. Both online and paper questionnaires consisted of seven pages. The first page of the questionnaire was to briefly explain the purpose of the research and the importance of respondents answering all the questions.

The questionnaire was divided into four sections: each section was separated by using a prominent heading. In the beginning of each section, clear and relevant instructions were provided to give a precise explanation to respondents. These sections were presented in a logical sequence to assure that respondents could understand clearly and easily complete the questionnaire. Operationalisation of the constructs will be further discussed in Chapter Four.

Section 1   Really New Product Adoption

This section required respondents to indicate whether they know about, own or use certain really new electronic products. Two distinct parts labeled Part One and Two comprised this section. These two sub-sections examined ownership of really new product and relative time of really new product adoption. Only respondents who indicated that they own once or repurchase a certain product were required to answer the questions in Part Two.

Section 2   Influences and Reasons of Purchase Decision

This section sought to capture the general behaviour prior to purchasing really new electronic products and the general reasons for recent purchased really new electronic products. Vicarious innovativeness adapted from Im, Mason, Houston's work (2007) and Flynn, Goldsmith, and Eastman's (1996) opinion leadership scale was utilized in the first sub-section.

In sub-section two, Rogers' (2003) five product characteristics were incorporated to understand the reasons for consumers' acceptance of really new products. Three items selected from literature were included here as additional potential influences to provide a more comprehensive overview.

Section 3   Approach to Purchasing Really New Product

This section is the central component of the questionnaire as it evaluated the extent to which respondents' consumer innovativeness level influences really new product adoption. This was measured by using Hurt, Hoseph, and Cook's (1977) consumer innate innovativeness scale, Goldsmith and Hofacker's (1991) domain specific innovativeness scale and Lynn and Harris' (1997) scale of the desire for unique consumer products. The aim was to capture the degree to which consumers approach thinking about and owning really new products.

Section 4   Respondent Information

This section required the basic information from the respondents. Although personal information is often considered private by respondents, prior studies have found some degree of impact of demographic variables on the measurement of consumer innovativeness and new product adoption. As a consequence, the study included only seven basic questions to try to avoid respondents' discomfort of privacy disclosing. The variables are age, education, number of children, occupation, gender, marriage and income.

3.5.2   Pre-Test

The pre-test was involved in three stages. For the first stage, the survey instrument was assessed by the candidates' supervisors who are experts in marketing research. The purpose of stage one was to identify possible questionnaire design shortcomings, and to confirm that the measurement items were appropriately selected for investigating the proposed relationships. In the second stage, since the candidate is not a native English speaker, in order to avoid the possible questionnaire design shortcomings due to the inexpert English language skill, six native English speakers, excluding the candidates' supervisors, were asked to complete the questionnaire. Each person was given an explanation and rationale for the research, as well as asked to focus specifically on the appropriateness of the wording of questions used by the candidate. They were also encouraged to comment on the questionnaire itself. Additional questions that were added to the last page of questionnaire were presented as follows.

1. Were the questions easy to understand? If not, please indicate which questions were unclear and why.

2. Are there any questions that could be interpreted in a better way? If yes, please indicate which questions and what your final interpretation was.

3. Do you have any comments on the general structure and language of the questionnaire?

4. How long did it take you to complete the questionnaire (minutes)?

Since the candidate is a native Mandarin speaker, a traditional Chinese version questionnaire was translated by the candidate, and validated by two independent professional translators. Six native Mandarin speakers were selected, and the same procedure of second stage discussed above was applied. Based on the feedback of the respondents in the second stage, a number of changes were made to the questionnaire to remove ambiguity within questions and complex statements. On the advice of participants in the pre-test, some sentence structure and language was revised for the final questionnaire. Generally, the respondents were favorable to the questionnaire design which was kept to a considerate length of seven pages. The estimated completion time was 20 minutes which was suggested to be a reasonable respond time to avoid the negative impact of the length of the questionnaire on the response rate.

The third stage then involved sending the English version of final pre-test questionnaire to a convenience sample of 132 Australian university students to ensure the questionnaire's reliability and validity. Similarly, the traditional Chinese version of

the questionnaire was given to 166 Taiwanese university students to ensure the Chinese version questionnaire's reliability and validity.

3.5.3   Sampling

As discussed previously, the primary unit of analysis in the study was in the country unit level. Every member of the population within a country were the key informants to represent the population as a whole. This research investigated how consumer innovativeness influences the adoption of really new products in different countries. Individuals above age of 18 who tend to be considered to have independent financial status for purchasing really new products are the key informants in the study. The final sample was randomly selected from the three countries' citizens with age over 18. This is classified as a simple random sample.

Even though large samples give more reliable results, it is difficult to target the entire target market in the three countries. The study targeted 300 respondents from each country. As suggested by Roscoe (1975), sample sizes between 30 and 500 are appropriate for most behavior research. This is similar to Im, Bayus, and Mason's (2003) study of innate consumer innovativeness, which contain 296 complete and usable responses. Tellis, Yin, and Bell (2005) obtain a sample of 400 respondents for each country in their global consumer innovativeness research in 15 countries. Consequently, a sample size of approximately 200 for each country was expected to facilitate the utilization of structural equation modeling (Boomsma, 1983; Tanaka, 1987). Further, the number of parameters estimated in the SEM model links closely to the appropriateness of sample size. The suggested ratio of sample size and observed variables is 5:1 (Schumacker and Lomax, 2004). The final sample size was 256

useable questionnaires for Australia, 207 useable questionnaires for China, and 209

useable questionnaires for Taiwan which indicated that the developed model should

not have more than 51 observed variables for Australia data, and 42 observed

variables for China and Taiwan data. Under this circumstance, it met the generally

acceptable rule for the proposed conceptual model comprising the dimensions of

consumer innovativeness and the other constructs to which it is posited to have a

relationship.

3.5.4 Data Collection

Data was collected via a quantitative research using a structured questionnaire with

questions. Item order was arranged randomly on each page for all the respondents. In

contrast, construct order was maintained throughout the questionnaire to ensure

appropriate position of the dependent variable. This approach is considered to be

useful to reduce order effects that might occur (Cowart, Fox, and Wilson, 2008).

Primary data can be collected by the following four contact methods: mail, telephone,

personal interview or online (Nickels, 1997). Table 3.1 summarizes the strengths and

weaknesses of each of these methods.

Table 3.1: Strengths and Weaknesses of Contact Methods

Contact Methods	Mail	Telephone	Personal	Online
Flexibility	Poor	Good	Excellent	Good
Quantity of data that can be collected	Good	Fair	Excellent	Good
Control of interviewer effects	Excellent	Fair	Poor	Fair
Control of sample	Fair	Excellent	Fair	Poor
Speed of data collection	Poor	Excellent	Good	Excellent
Response rate	Fair	Good	Good	Good
Cost	Good	Fair	Poor	Excellent

Source: (Nickels, 1997)

This study was conducted in Australia, China, and Taiwan for a cross-national comparison on consumer acceptance of really new products. Face-to-face and online surveys were utilized in the study. For Australia, an online questionnaire was designed to collect data, and respondents were provided with proper instructions. Australian participants in the survey were selected from among individuals who have voluntarily joined a research database of a qualified market research company contracted to host the questionnaire. In this way, web proficiency among respondents could be controlled. Every respondent saw the same website and questionnaire, and had the same information to guide them. A subject was required to answer each question prior to participating with a further question in order to help avoid the possibility of missing data. After filling out and submitting the questionnaire online, respondents were shown a "thank you" page and contact information for a debriefing of the study.

Since market research companies in both China and Taiwan only provide full services which include questionnaire design to data analysis, and they do not offer similar service (only data collection) to the one used in Australia, the cost of data collection in these two countries is extremely high. As a consequence, the face-to-face survey with higher response rate was selected to collect data in China and Taiwan. The questionnaire was administered in person to the identified respondents after seeking permission. University students of both countries were recruited to work on the author's behalf to collect data. Participants were randomly selected from individuals in front of shopping centers in two major cities - Taipei, Taiwan and Shanghai, China. Participants were given enough time to complete the questionnaires. Respondents were assured about the confidentially of data, which was to be used for academic purposes only. This method was conducted to ensure that complete and accurate information was given by the respondents.

3.5.5   Administering the Survey

For China and Taiwan, a total of 300 questionnaires for each country were distributed to Shanghai, China and Taipei, Taiwan in early December, 2008. As discussed in the previous section, 10 university students from each country were hired to conduct face-to-face survey with respondents in front of four selected major shopping centres in the two cities. The only screening question used by students was to ensure that respondents are over 18 years old. Each student was responsible for collecting 30 questionnaires. Students were required not to discuss the contents of the questionnaire with respondents, and to only politely asked respondents to fill out the questionnaire, encourage respondents to answer all the questions, and collect the questionnaire back immediately after it was completed. Following this, an incentive was given to respondents in order to motivate willingness of response and present the authors appreciation. A total of 600 questionnaires from China and Taiwan (300 for each country) were returned. In terms of Australia, the English version questionnaire was sent to the contracted market research company for developing an online questionnaire in early March, 2009. A total of 271 respondents from the company's database completed the questionnaire in mid March, 2009. Due to the requirement of the online questionnaire that Australia respondents had to answer all questions, the chance of missing data had been significantly reduced. After excluding questionnaires with social desirability bias discussed in the later section, the final sample reduced to 256 usable questionnaires for Australia, 207 usable questionnaires for China and 209 usable questionnaires for Taiwan.

3.5.6   Respondent Error

Non-Response Error

Non-response bias is a problem that occurs when a significant amount of the initial expected respondents are not sampled in the study (Lukas, Hair, Bush, and Ortinau, 2004). If the responses obtained from the sample are different from the likely responses of non-respondents, Armstrong and Overton (1977) suggest that the results should not be generalized to the entire population. The study utilized online survey and face-to-face interview for data collection. Both methods are suggested to have good strength on response rate (Nickels, 1997). The sample was drawn from general consumers in the three countries. Individuals who are over age of 18 are the key informants of this research. In Australia, the computer system of the contracted market research company automatically screened out the respondents from its database who did not meet the age requirement. The respondents in China and Taiwan were asked their age before the questionnaire was given. As a consequence, with only one limitation of age, non-response bias was not a critical issue for the current study.

Response Error

Response bias is a problem that occurs when a sufficient number of respondents either misinterpret unconsciously or intend to mislead their responses. The main response errors include hostility, social desirability, prestige, auspices error, yea– and nay-saying, mental set error and acquiescence error (Aaker, Kumar, Day, 1998). Among them, social desirability is the major concern in the study. In an attempt for enhancing data quality and controlling for social desirability bias, a digital camera

was included in the suite of really new products selected in the study. The item: "please answer by checking either "never seen/unsure", "seen it but never bought it", "intend to purchase in next six months", "bought once", "repurchased same brand", or "repurchase different brand". The reason for using digital camera was that it has appeared in the market for a long time. A digital camera is considered as an incremental product rather than a really new product. It is expected that all individuals have seen and/or at least know a digital camera. As a consequence, the questionnaires in which respondents answered with "never seen/unsure" to this question were removed from the data set as "unusable" respondents.

3.5.7   Ethics and Information Confidentiality

Monash University provides guidelines for conducting research. All researchers must obtain approvals from the Standing Committee on Ethics in Research (SCERH) prior to commencing their research. The SCERH required detailed information to be included in the cover letter. The SCERH requests an explicit statement that participant have the right to withdraw from the survey at any time and participate voluntarily. The following statement was included in the cover letter along with each questionnaire: *"If you have a complaint concerning the manner in which this research (project number:2008000851) is being conducted, please contact the executive officer in Standing Committee on Ethics in Research Involving Humans at the following address: Building 3E, Room 111, Research Office, Monash University VIC 3800, Tel: +61 3 9905 2502 Fax: +61 3 9905 1420 Email: scerh@adm.monash.edu.au"*.

For addressing confidentiality, the following sentence was stated in the cover letter: *"The questionnaire is anonymous, and your individual opinions can never be traced back to you. The result of this study may be published, but your name will not be know as all results are presented in aggregated statistical form"*.

In addition, Monash University required that the researchers are responsible for retaining and storing the questionnaires for a minimum for five years in a secure place. If any queries regarding the manner in which the research was conducted arise, the questionnaires can be accessed.

3.5.8   Data Coding and Edition

Numerical codes were assigned to each question during the development of the questionnaire in the study. In terms of demographic variables, they were coded after the questionnaire was administered. Non-responses were considered as missing data and coded as "999". All coding and recoding variables were using SPSS 12.0 before data analysis commenced.

3.5.9   Data Analysis Procedures

The research investigated the relationships between consumer innovativeness and adoption behaviours. As a consequence, the analysis followed previous works by using structural equation modeling, regression analysis and ANOVA (Im, Bayus, and Mason, 2003; Tellis, Yin, and Bell, 2005). The analysis of measurement equivalence adopted the guidelines set down by Mavondo, Gabbott, and Tsarenko (2003). Chapter Four will present the detailed operationalisation of constructs including the three

analysis methods mentioned earlier along with reliability, validity, Cronbach's alpha and correlation analysis.

3.6 CHAPTER SUMMARY

This chapter presented the development of the instrument used to collect the data in this research that aims to test the theoretical hypotheses. The aim of this study is to investigate the impact of consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and personal characteristics on really new product adoption among Australia, China, and Taiwan consumers. Based on the nature of the research problem identified in the literature review, the research setting exhibits a descriptive approach. Quantitative research was undertaken to test the hypotheses. An online survey and face-to-face interview were identified as being the appropriate methods for data collection. The strengths and weaknesses of the two approaches were acknowledged, and efforts were made to avoid possible response bias. A pre-test was conducted, and then the questionnaire was refined and modified based on the outcomes of the pre-test. A profile of the participating individuals was provided and detailed administration of the survey was discussed. Further, data entry techniques were addressed.

The next chapter will address the operationalisation of constructs.

CHAPTER 4 – CONSTRUCT MEASUREMENT

4.1   INTRODUCTION

There are two sections discussed in Chapter Four – pilot study/pre test and final study operationalisation. The purpose of these sections is to explain the operationalisation of the constructs introduced in Chapter Two. This study adopted and modified existing scales to investigate the relationships among really new product adoption, CII, DSI, DUCP, OL and VI. Prior to final determination of items, a pilot study was undertaken. The sample was a convenience sample of Australian and Taiwanese university students. The reason for not including China in the pre test was that China and Taiwan use the same language; the only difference is simplified characteristics for China and traditional characteristics for Taiwan. The final questionnaire targeted general consumers who are citizens over age in Australia, China, and Taiwan.

Consumer innovativeness is the major focus in the study, however as indicated in Chapter Two, there is a lack of consensus in the definition of consumer innovativeness and the results of various consumer innovativeness measurements remain inconsistent. The most appropriate measurement scales for the study were identified, and are then justified in Section I, followed in Section II, by detailed discussion of measurement invariance and the measures of reliability and validity for all the scales selected. As mentioned above, the measurement scales of this study were selected from existing scales. By maintaining the original meaning of each measurement item, minor modifications were necessarily and carefully made to coordinate the current study. This was validated in the pre-test with academics and through the responses of university students in both Australia and Taiwan.

Most existing measurement scales related to the study have been developed in English language, and are tested in Western countries. In order to measure respondents in two Chinese speaking countries – China and Taiwan, it was anticipated that many of Chinese speaking respondents may experience difficulty in understanding the English version of questionnaire. It is necessary to make Chinese speaking respondents comfortably respond to the questionnaire. As a consequence, a traditional Chinese character version and a simplified Chinese character version were developed, and minor modifications were made to adapt to the language. This was tested by six native Chinese speakers in the pre-test stage and validated by two independent professional translators.

The final version of the questionnaire was adjusted according to the essential findings drawn from the quantitative pre-test phase. In the aspect of reducing non-response, the measurement instrument was kept to an acceptable length without jeopardizing the original purpose of the instrument. Although, it was considered important to completely capture the underlying elements of each construct, the total number of items was minimized. The questionnaire was kept to seven pages and the completion time to 15~20 minutes. The following sections summarize the operationalisation process of each construct.

SECTION I: OPERATIONALISATION OF PILOT STUDY

The pre-test was conducted on a convenience sample of Australian students (n=132) and Taiwanese students (n=166) in their home countries. The selected constructs, modifications for final questionnaire, and the results of pre-test are further discussed in the following.

4.2 REALLY NEW PRODUCT ADOPTION

"the degree to which an individual adopts innovations relatively earlier than other members of his system." (Rogers and Shoemaker, 1971, p.27)

Base on the above perspective, empirical studies measure new product adoption behavior in three major ways: ownership, adoption time and intention.

4.2.1 Ownership of Really New Product/Cross Session Method

Generally, really new products are new to the markets. At the time of the study, secondary data of adoption rates was not available for all the really new consumer electronic products employed in the study. Im, Bayus, and Mason (2003) suggest that consumers who own more innovative products tend to have shorter adoption time and higher level of consumer innovativeness. Following prior research, (e.g., Im, Bayus, and Mason, 2003; Im, Mason, and Houston, 2007; Midgley and Dowling, 1978; Rogers, 2003; Tellis, Yin, and Bell, 2005) this study implemented the "cross-sectional" method which considers the number of really new electronic products owned/adopted at the time of the survey to investigate the adoption behaviour of really new electronic products. This method is suggested to be a practical measure of new product adoption behavior and has less recall bias (Midgley and Dowling, 1978). The reason for choosing consumer electronic products was that consumer electronics have frequently changed product life cycles and more really new products are introduced to the market than other product categories.

Really new product ownership is defined in the study as the number of products owned from selected consumer electronics products which is considered really new at the time of the study. In the pre-test stage, 25 electronic products were selected. They are compact digital camera, digital SLR camera, 3G mobile phone, multimedia smartphone, PDA, digital media player, Mp3 or Mp4 sound system, portable DVD player, HDD video recorder, blu-ray video player, home media centre, LCD or Plasma TV, Apple TV, Super compact subnotebook, Laptop computer, digital photo frame, console video game player, hand held video game, vehicle satellite navigator, digital radio, internet phone, digital photo printer, web camera, digital pen, and Bluetooth headphones. For each of these items, a seven-point scale was used: never seen, unsure, seen but never bought, intend to purchase, bought once, repurchased same brand, and repurchased different brand.

4.2.2   Relative Time of Really New Product Adoption

Innovators who have high level of consumer innovativeness are defined as individuals who adopt a new product relatively earlier than other members of a social system (Mahajan, Muller, and Bass, 1990; Rogers, 2003). Even though relative time of adoption has been criticized as susceptible to recall biases (Midgley and Dowling, 1978), prior studies suggest that it helps assess the convergent validity with cross-sectional method discussed in earlier section (Midgley & Dowling, 1978; Im, Mason, Houston, 2007). As a consequence, in order to measure the adoption time, the study implemented self-reports of the relative time of adoption (i.e., number of years or months since adoption).

In the pre-test stage, two questions were asked to measure the relative time of really new product adoption. One was "how long have you owned your most current version" which was answered by the respondents who indicated their ownership of selected products on "bought once, repurchased same brand, or repurchased different brand". The other was "how long did you own your previous version before you updated it" for respondents whose ownership of selected products was on "repurchased same brand or repurchased different brand". This question was to measure how quickly the respondents are likely to have upgraded their products.

4.2.3 Intention of Purchasing Really New Product

Purchase intention is also suggested to be an indicator in measuring consumer innovativeness (Lafferty, Goldsmith, and Flynn 2005). Although intention is suggested to be unable to appropriately reflect adoption behaviour (Im, Bayus, and Mason, 2003), however, in order to have a more comprehensive understanding of consumer electronic product adoption, this study included purchase intention as a third indicator of consumer adoption behaviour.

4.3 MEASUREMENT OF CONSUMER INNATE INNOVATIVENESS

Consumer innate innovativeness (CII) is defined in this study as an innovative predisposition which is the degree to which the individual adopts an innovation without communicating with others' previous purchasing experience (Midgley and Dowling, 1978). From this definition, it is assumed that consumers who have higher level of CII tend to own higher number of new products from different product categories (Roehrich, Valette-Florence, and Ferrandi, 2003). This research

investigates how CII influences the adoption of really new products. This study evaluated consumers who are more or less innovative by adopting one of the existing consumer innate innovativeness scales from prior research, and compared it with their adoption behavior of really new electronic products.

As mentioned in Chapter Two, various innovativeness scales have been developed since the mid 70's, however, the results of these scales lack consensus (Hauser, Tellis, and Griffin 2006; Roehrich 2004). In Roehrich, Valette-Florence, and Ferrandi's (2003) study, they classify empirical scales of measuring consumer innovativeness into to three categories. Leavitt and Walton (1975), Kirton's (1976) Kirton Adaption-Innovation Inventory (KAI) scale, and Hurt-Joseph-Cook (1977) are considered as life innovativeness scales for the first category. The second category is consumer innovativeness scales, which include Raju (1980), Roehrich (1995); Steenkamp and Baumgarten (1996). Roehrich, Valette-Florence, and Ferrandi (2003) report that consumer innovativeness scales have fewer dimensions, and are superior predictive validity than life innovativeness scales. However, in this study CII is considered as a predisposition of individuals, therefore, the scales in second category mentioned above which measure consumer innovativeness at the consumption level are not considered. The last category is domain specific innovativeness which will be discussed in the next section.

Hurt, Joseph, and Cook (1977) define consumer innate innovativeness as "a normally distributed, underlying personality construct, which may be interpreted as a willingness to change" (p59). The scale illustrated in Table 4.1 is chosen for the following reasons. First, according to Roehrich (2003), in the category of life innovativeness scales, Leavitt and Walton's scale has seldom been employed by

Table 4.1: Hurt-Joseph-Cook's (1997) Scale

Consumer Innate Innovativeness
1. I am generally cautious about accepting new ideas
2. I rarely trust new ideas until I can see whether the vast majority of people around me accept them
3. I am aware that I am usually one of the last people in my group to accept something new
4. I am reluctant about adopting new ways of doing things until I see them working for people around me
5. I find it stimulating to be original in my thinking and behaviour
6. I tend to feel that the old way of living and doing things is the best way
7. I am challenged by ambiguities and unsolved problems
8. I must see other people using new innovations before I will consider them
9. I am challenged by unanswered questions
10. I often find myself skeptical of new ideas
11. I am suspicious of new inventions and new ways of thinking

Source: Based on Hurt, Joseph, and Cook (1977)

researchers. Second, although the KAI scale has been proved to be reliable, content valid, and generalized in various contexts by prior research (Im, Mason, and Houston, 2007; Vishwanath, 2005), authorization is needed for implementing it. Third, the Hurt-Joseph-Cook (1997) scale has been adopted by a number of other researchers (Clark and Goldsmith, 2006; Goldsmith and Freiden, 1995; Pallister and Foxall, 1998).

Originally, Hurt, Joseph, and Cook (1997) reported a 20-item scale with a reliability of .94. However, Hurt, Joseph, and Cook (1997) and Pallister and Foxall (1998) both proposed a shortened version of the scale. Hurt, Joseph, and Cook (1997) report the 10-item scale's internal reliability is .89 and its correlation is .92 with the 20-item scale. In the shortened version scale proposed by Pallister and Foxall (1998), the reliability is .83. Further, Clark and Goldsmith (2006) report a reliability .72 of the

scale. Overall, the ten-item Hurt-Joseph-Cook (1997) scale exhibits high and acceptable levels of reliability and discriminant validity for measuring consumer innate innovativeness (Goldsmith and Freiden, 1995; Pallister and Foxall, 1998). 9 items from the original 20-item scale are included by Hurt, Joseph, and Cook's (1997) and Pallister and Foxall's (1998) shortened versions. The only difference is that Hurt, Joseph, and Cook (1997) included "I am challenged by unanswered questions" and Pallister and Foxall (1998) use "I am suspicious of new inventions and new ways of thinking" as the tenth item in their scales. Therefore, this study adopted these two items as tenth and eleventh items in the Hurt-Joseph-Cook (1997) scale. All 11 items were measured on a seven-point Likert-type scale (1=strongly disagree, 7=strongly agree) in pre-test stage.

4.4 MEASUREMENT OF DOMAIN SPECIFIC INNOVATIVENESS

As discussed in Chapter two, prior research suggests that consumer innovativeness varies across product categories (Goldsmith and Hofacker, 1991; Roehrich, Valette-Florence, and Ferrandi, 2003). The current study looked specifically to high-tech consumer electronic products. In order to measure domain specific innovativeness, an adapted 6-item domain specific innovativeness scale presented in Table 4.2 developed originally by Goldsmith and Hofacker (1991) was used in this study. The scale has been proved to be unidimensional, highly reliable, and valid in measuring domain specific innovativeness in a specific product category (Chakrabarti and Baisya, 2009; Hoffmann and Soyez, 2009; Klink and Athaide, 2010).

Table 4.2: DSI Scale

Domain Specific Innovativeness
1. In general, I am among the last in my circle of friends to purchase a new electronic product.
2. If I heard that a new electronic product was available through a local store, I would be interested enough to buy it.
3. Compared to my friends, I do little shopping.
4. I will consider buying a new product, even if I haven't heard of it yet.
5. In general, I am the last in my circle of friends to know the names of the latest electronics products on the market.
6. I know more about new electronic products before other people do.

Source: Based on Goldsmith and Hofacker (1991)

Table 4.3 illustrates the particular product used and reliability in prior research of domain specific innovativeness. The study replaced "new product" with "new electronic product" for each item. Each item used a 7-point Likert-type scale with 1 representing strongly disagree and 7 representing strongly agree.

Table 4.3: Reliability of Empirical DSI Studies

Empirical Studies	Product Category	Reliability
Citrin, Sprott, Silverman, and Stem (2000)	Internet Shopping	.85
Goldsmith, d'Hauteville, and Flynn (1997)	Wine	.90 & .84
Goldsmith, Flynn, and Goldsmith (2003)	General Products	.71
Goldsmith, Freiden, and Eastman (1995)	Fashion & Electronics	.79 & .81
Hynes and Lo (2006)	Digital Camera	.75
Lafferty, Goldsmith, and Flynn (2005)	Cell Phone	.82
Roehrich, Valette-Florence, and Ferrandi (2003)	Snack Food	.73 & .80

4.5   MEASUREMENT OF VICARIOUS INNOVATIVENESS

Vicarious innovativeness is defined as "the acquisition of information regarding a new product. Through vicarious innovativeness the individual can, in essence, adopt the product concept without adopting the product itself" (Hirschman, 1980, p. 285). Im, Mason, Houston (2007) identify the mediating role of vicarious innovativeness between CII and new product adoption. Vicarious innovativeness has not yet been fully considered by researchers. In measuring vicarious innovativeness, the current study adopted Im, Mason, and Houston's (2007) approach which includes three factors – exposure to advertising, modeling, and word of mouth.

Exposure to advertising is measured by the respondents who report to have seen the selected really new products in the mass media. In pre-test stage, respondents were asked two questions relating to exposure to advertising. They were "I saw advertising for the product prior to purchasing it" and "I read a number of news articles about the product before purchasing it". Modeling is measured by the respondents who report having seen their social network owning the selected really new products prior to their adoption. Three questions "I watched my friends using the product before purchasing it", "I saw my work/university colleagues using the product prior purchasing it", and "I saw my family members using the product prior purchasing it" were asked in the pre-test questionnaire.

Word of mouth is measured by the respondents who report that they had personal conversations about the selected really new products with another individual prior to their adoption. Respondents in the pre-test were asked to choose among the responses: "I talked with my friends about the product prior to purchasing it", "I talked with my

work colleagues about the product prior purchasing it", and "I talked with my family members about the product prior purchasing it". Furthermore, the use of the internet is suggested to be another channel for acquiring information about new products (Rogers, 2003). Thus, this study included the use of the internet as the fourth factor of vicarious innovativeness. The question "I searched for information about the product via the Internet" was asked in pre-test stage, and was modified to "I usually search for information about electronic products via the internet before I purchase them" in the final questionnaire.

4.6   MEASUREMENT OF THE DESIRE FOR UNIQUE CONSUMER PRODUCTS

Prior research indicates that consumer innate innovativeness indirectly influences consumer adoption behavior in a specific product category (Goldsmith, Freiden, and Eastman, 1995; Im, Mason, and Houston, 2007). Hauser, Tellis, and Griffin (2005) note that the results of different consumer innate innovativeness scales lack consensus and the strength of the relationship between scales measuring innate innovativeness and adoption behaviour have been mixed. As a consequence, Harris and Lynn (1996) developed a new scale, namely the desire of unique consumer products (DUCP), to measure individual differences and to explain the importance of consumer disposition. They found a positive relationship between DUCP and the tendency for being a consumer innovator. Vandecasteele and Geuens (2006) also suggest that DUCP is a possible antecedent of consumer innovativeness. Further, Franke and Schreier (2008) indicate that the desire for unique consumer products is a reliable and valid scale. As a result, as well as DSI scale, the current study implemented DUCP as another indicator for measuring the relationship between consumer innate innovativeness and really

new product adoption.

Previous studies have proved that DUCP is a reliable scale for measure consumers' desire of uniqueness. Table 4.4 illustrates the reliability of DUCP in empirical research.

Table 4.4: Reliability of Empirical DUCP Studies

Empirical Studies	Reliability
Bloch, Brunel, and Arnold (2003)	.74
Franke and Schreier (2008)	.75
Lynn and Harris (1997)	.78 & .85
Vandecasteele and Geuens (2009)	.74

The scale of DUCP measures how "consumers differ in the extent to which they hold as a personal goal the acquisition and possession of consumer goods, services, and experiences that few others possess" (Lynn and Harris, 1997, p. 602). There are 33 items in the original DUCP scale. In order to keep the scale short, the current study only used items with factor loadings above 0.20, of which are identical with the Lynn and Harris' (1997) result. That reduced the DUCP scale to 21 items (Table 4.5). Each item used a 7-point Likert-type scale with 1 representing strongly disagree and 7 representing strongly agree.

Table 4.5: DUCP Scale

The Desire for Unique Consumer Product
1.   I am very attracted to rare objects
2.   I tend to be a fashion leader rather than a fashion follower
3.   I am more likely to buy a product if it is scarce
4.   I would prefer to have things custom-made than to have them ready-made
5.   I enjoy having things that others do not
6.   I rarely pass up the opportunity to order custom features on the products I buy
7.   I like to try new products and services before others do
8.   I enjoy shopping at stores that carry merchandise which is different and unusual
9.   I dislike owning products that everyone else has
10. I have always wanted to design my own house
11. When on vacation, I would rather explore new places on my own than take a guided tour with others
12. I feel no need to personalize the products I buy
13. Often, I choose less popular brands of products in order to be different
14. I often put patches and/or stickers on my possessions to make them reflect who I am
15. I prefer shopping at antique shops and flea markets to shopping at department stores and malls
16. I often see new products and innovations that I wish I could have
17. The idea of having my initials monogrammed on some of my clothes appeals to me
18. New products hold little appeal for me until they have been tested in the market place
19. I enjoy using old, out-of-date products that few others still use
20. Some of my favorite entertainers (i.e., musicians, actors, etc.) are people who have not yet made it to the big time
21. Limited editions hold no special appeal for me

Source: Based on Lynn and Harris (1997)

4.7   MEASUREMENT OF DEMOGRAPHICS

Demographics used widely in research were included in the current study for investigating the differences between Australian, Chinese, and Taiwanese consumers' consumer innovativeness and the adoption of really new products. In pre-test, age, gender, number of children, marriage status, income and occupation were included for both versions of questionnaires (English and Traditional Chinese). Due to the differences of education system and monthly income level between Australia and Taiwan, the items related to education and the interval of net income were represented differently in the two versions of the pre-test questionnaire. These demographic measures have been generally used in other marketing research (Im, Bayus, and Mason, 2002; Midgley and Dowling, 1993; Rogers, 2003).

4.8   OTHER FACTORS THAT INFLUENCE CONSUMER INNOVATIVENESS AND NEW PRODUCT ADOPTION

Product Characteristics

Rogers (2003) suggests a wider issue that product characteristics (relative advantage, compatibility, complexity, observability, trialability) have great influence on new product adoption. Whilst these factors are not specifically included in the conceptual model, items related to product characteristics were included in the questionnaire (both pre-test and Final) in order to understand the reasons of consumers' acceptance/rejection of really new products, and may indeed provide direction for further research. In addition to product characteristics, general interest in electronic products, price, and impulsiveness were considered to have potential influences in

really new product adoption. Further, by considering the feedback from the pre-test, "brand name" was added into the final questionnaire. The questions are presented in Table 4.6.

Table 4.6: General Reasons for Purchasing Really New Products

	Pre-Test Questionnaire	**Final Questionnaire**
Relative Advantage	The new product was consistent with my existing values, needs, and past experiences	The new electronic products are consistent with my existing values, needs, and past experiences
Compatibility	The new product was better than its predecessors	The new electronic products are better than their predecessors
Complexity	The new product was easy to use	The new electronic products are easier to use
Observability	It was easy to observe the benefits and risks of buying the new product	It is easier to observe the benefits and risks of the new electronic products
Trialability	I was able to trial the product before I purchased it	I is able to trial the new electronic products before I purchased them
General Interest	I am generally interested in this type of product	I am generally interested in electronic products
Price	The price was low	The prices are low or on sale/special
Impulsiveness	It was an impulse purchase	The new electronic products are often an impulse purchase
Brand Name		The brand name of the new electronic products

Opinion Leadership

In the work of Lassar, Manolis, and Lassar (2004), opinion leadership has been suggested to be positively related with new product adoption behaviour. According to Bass (1969), after adopting a new product, innovators will transmit their opinions and experiences to late adopters. In other words, late adopters look for early adopters' advice about a product innovation, and imitate innovators' purchasing behavior (Rogers, 2003). As a result, innovators who play as models in the diffusion process are considered as opinion leaders (Goldsmith, Flynn, and Goldsmith, 2003; Hynes and Lo, 2006; Rogers, 2003). Opinion leadership, which is suggested as a component to consumer innovativeness, is important for the current study in understanding consumer innovativeness. (Roger, 2003; Tellis, Yin, and Bell, 2005). The current study intended to investigate whether innovators of really new products are truly opinion leaders in the specific product category.

The opinion leadership scale (Table 4.7) was used in the study to measure consumers' propensity of opinion leadership (Flynn, Goldsmith, and Eastman, 1996). The scale has been implemented and validated by empirical studies (Chakrabarti and Baisya, 2009; Gldsmith, Flynn, and Goldsmith, 2003; Hoffmann and Soyez, 2009).

Table 4.7: Opinion Leadership Scale

Opinion Leadership
1.   I often persuade other people to buy products that I like
2.   Other people rarely come to me for advice about choosing what to buy
3.   People that I know often pick their purchases based on what I have told them
4.   My opinion on what to buy seems not to count with other people
5.   I often influence people's opinions about buying things
6.   When they choose products to buy, other people do not turn to me for advice

Source: Based on Flynn, Goldsmith, ad Eastman (1996)

4.9   RELIABILITY AND FACTOR ANALYSIS OF CONSTRUCTS IN PILOT STUDY

This section reports the reliability analysis and exploratory factor analysis undertaken for the measurement instrument in the pilot study. The results of both analyses are explored for the assessment of final version questionnaire.

4.9.1   Reliability

Reliability, which refers to the degree of error that measurement instrument generates in the measuring, is a necessary condition for validity measures (Peter, 1979). It is essential to access the consistency or stability of the instruments prior testing the hypotheses. Among the techniques of testing reliability, Parameswaran, Greenberg, Bellenger, and Robertson (1979) suggest that attention should be devoted to internal consistency, particularly in the area of consumer research. Cronbach's alpha is one of the most common methods used in marketing research. Peter (1979) indicates that Cronbach's alpha "is the most commonly accepted formula for assessing the reliability of a measurement scale with multi-point items" (p.8). A low score of

Cronbach's alpha indicates that the combination of scale items do not truly measure the constructs and are not able to yield consistent results. Gilford (1954) suggests that reliabilities between 0.35 and 0.7 are acceptable for basic research. Many published studies implement the range between the 0.5-0.7 suggested by Kline (1998). In the current study, Table 4.8 illustrates that all measures utilized in the pre-test exhibited good reliability for both countries' student samples. The exception is the six item Domain Specific Innovativeness scale, which scored an unacceptable .25 in Taiwanese samples, however, given that this scale has been tested well in western cultures and the alpha was .72 for Australian samples in the pre test, the DSI scale was retained in the final study to try to identify the possible problem that caused such a low score of reliability in Chinese culture aspect, and no further action was taken to improve the reliability.

Table 4.8: Reliabilities for All Measures in Pre-test

	Australia	**Taiwan**
CII	.77	.81
DSI	.72	.25
VI	.78	.85
DUCP	.75	.85

4.9.1.1 Multi-Item Measures

Peter (1979) indicates that researchers need to develop multi-item scales for measuring constructs in marketing research because complex constructs are not able to be measured effectively with a single item. Empirical research also suggests that

the reliability can be enhanced by implementing multi-item tests (Parameswaran, Greenberg, Bellenger, and Robertson, 1979). The use of multi-item scales provides the opportunity for assessing the reliability appropriately.

4.9.1.2   Exploratory Factor Analysis

The major purpose of exploratory factor analysis is to identify the minimum number of possible factors needed to reproduce the original constructs (Gorsuch, 1997). The major processes in undertaking exploratory factor analysis include pre-analysis checks, extraction, and rotation (Ferguson and Cox, 1993). In the aspect of pre-analysis checks, Gorsuch (1997) recommends the sample to variable ratio should be 10 cases for every item and a minimum of 300 sample size is preferred, whilst others suggest the range between 2:1 and 10:1 and minimum numbers of subjects between 100 to 200 are recommended (Ferguson and Cox, 1993). As a result, the attained sample size of 132 Australian and 166 Taiwanese students in the pre-test is acceptable. For factor extraction, this study applied principal component analysis, and two criteria were utilized for retaining factors. The first is the Kaiser criterion, which suggests retaining factors with eigenvalues greater than 1.0 (Kim and Mueller, 1978b). Further, Robbins (1980) suggests that when the sample to variable ratio is large (10:1) as is the case with this study, the Kaiser criterion is the most appropriate criterion. The other is the scree test, which is to examine the plot of the eigenvalues to identify where a break is apparent, and extract the number of factors before that break point (Ford, MacCallum, and Tait, 1986).

The study applied the varimax rotation method, which is most commonly found on the SPSS computer package (Ferguson and Cox, 1993). According to Ferguson and Cox (1993), "varimax produces a solution based on a number of smaller factors and aims to maximize the variance of the squared loadings across a factor…" (p.90). In order to determine the factorability of the data, Bartlett's test of Sphericity and the Kaiser-Meyer-Olkin measure of sampling (KMO) adequacy were applied in the study (Coakes and Steed, 2001). The sample is factorable when the KMO measure is greater than .60, and Bartlett's test of sphericity is large and significant ($p<.05$). In the theoretical model, the existing scales implemented, namely Consumer Innate Innovativeness (Hurt, Joseph, and Cook, 1997), Domain Specific Innovativeness (Goldsmith and Hofacker, 1991) and Domain Specific Opinion Leadership (Flynn, Goldsmith, and Eastman, 1996), were assessed via exploratory factor analysis to examine the dimensionality, and then confirmatory factor analysis for discriminant validity in final study discussed in following section (Gorsuch, 1997). The remaining two scales, namely Vicarious Innovativeness and the Desire for Unique Consumer Products (Lynn and Harris, 1997) were firstly assessed via exploratory factor analysis in the pre-test study, because the Vicarious Innovativeness scale was adopted from Im, Mason, and Houston's (2007) approach which had not previously been rigorously validated in the literature, and to identify the fewest possible constructs in DUCP scale. Tables 4.9 to 4.12 indicate that the DUCP and Vicarious Innovativeness Scales are factorable for both Australian and Taiwanese samples with KMO scores ranging from .696 to .819. The Bartlett's Test of Sphericity tests are significant, scoring p=.000.

The results for the DUCP scale indicated a 6-factor for Australia and a 4-factor solution for Taiwan. Item 1 to item 9 fell under the dimension of Unique Products with eigenvalues of 5.740 and 6.104 for Australia and Taiwan. The purpose of factor analysis is to reduce a large number of variables. As a result, only the 9 items loaded most highly on the first unrotated factor were retained. These items had factor loadings of .60 or better. The Cronbach's alpha values of Unique Products for both Australia and Taiwan were .89 and .90, whilst the alpha values of the rest factors for both countries were all below .70. The result is consistent with the original scale (Lynn and Harris, 1997), except that item 9 was not included in the original scale.

The Vicarious Innovativeness scale was expected to be a 3- factor solution scale which included Advertising, Modeling and Word of Mouth. The result of exploratory factor analysis of the Australian sample fit the expectation, whilst Modeling and Word of Mouth were combined as a single factor in Taiwanese sample. The VI scale was supported with over 60% of variance explained for both countries. The Cronbach's Alpha values ranged from .61 to .86. The result recommended that all items could be retained, but rewording was needed to improve the reliability for the final study. This is briefly discussed in the next section. The final 9 item DUCP and VI scales were then assessed via exploratory factor analysis again and followed by confirmatory factor analysis. The results were illustrated in section II.

Table 4.9: Factor Analysis and Reliability for DUCP (Australia)

CONSTRUCT	ITEMS	FACTORS						TESTS
		1	2	3	4	5	6	
DUCP								KMO=.801 Bartlett=924.139 Significance=.000 Total variance explained=62.24% Cronbach alpha .754
Unique Products	DUCP 5	.785						Eigenvalue=5.740 Cronbach alpha .894
	DUCP 4	.769						
	DUCP 8	.763						
	DUCP 3	.739						
	DUCP 1	.729						
	DUCP 7	.700						
	DUCP 6	.667						
	DUCP 2	.620						
	DUCP 9	.570						
Antique Products	DUCP 21		.829					Eigenvalue=2.158 Cronbach alpha .647
	DUCP 20		.775					
Personalization	DUCP 12			.750				Eigenvalue=1.468 Cronbach alpha .611
	DUCP 13			.686				
Reflection of Products	DUCP 15				.500			Eigenvalue=1.345 Cronbach alpha .475
	DUCP 18				.831			
Popularity	DUCP 11					.698		Eigenvalue=1.232 Cronbach alpha .478
	DUCP 14					.587		
	DUCP 16					.526		
Appeal of New Products	DUCP 17						.651	Eigenvalue=1.151 Cronbach alpha .346
	DUCP 19						.641	
	DUCP 10						.515	

NB Loading less than .3 were suppressed

Table 4.10: Factor Analysis and Reliability for DUCP Scale (Taiwan)

CONSTRUCT	ITEMS	FACTORS				TESTS
		1	2	3	4	
DUCP						KMO=.815 Bartlett=1323.353 Significance=.000 Total variance explained=59.39% Cronbach alpha .853
Unique Products	DUCP 3	.852				Eigenvalue=6.104 Cronbach alpha .904
	DUCP 5	.835				
	DUCP 1	.745				
	DUCP 6	.713				
	DUCP 4	.713				
	DUCP 8	.701				
	DUCP 2	.700				
	DUCP 7	.676				
	DUCP 9	.664				
Popularity	DUCP 21		.781			Eigenvalue=2.324 Cronbach alpha .664
	DUCP 20		.696			
	DUCP 15		.631			
	DUCP 14		.549			
Reflection of Products	DUCP 18			.740		Eigenvalue=1.668 Cronbach alpha .580
	DUCP 17			.676		
	DUCP 16			.629		
Personalization	DUCP 10				.391	Eigenvalue=1.335 Cronbach alpha .559
	DUCP 12				.766	
	DUCP 13				.634	
	DUCP 11				.634	
	DUCP 19				.213	

NB Loading less than .3 were suppressed

Table 4.11: Factor Analysis and Reliability for Vicarious Innovativeness (Australia)

CONSTRUCT	ITEMS	FACTORS			TESTS
		1	2	3	
Vicarious Innovativeness					KMO = .696 Bartlett = 268.871 Significance = .000 Total variance explained = 66.73% Cronbach alpha .777
Modeling	VI 4	.819			Eigenvalue = 2.916
	VI 3	.811			Cronbach alpha .740
	VI 5	.739			
Word of Mouth	VI 8		.803		Eigenvalue = 1.329
	VI 6		.726		Cronbach alpha .620
	VI 7		.631		
Advertising	VI 1			.830	Eigenvalue = 1.094
	VI 2			.713	Cronbach alpha .613

NB Loading less than .3 were suppressed

Table 4.12: Factor Analysis and Reliability for Vicarious Innovativeness (Taiwan)

CONSTRUCT	ITEMS	FACTORS		TESTS
		1	2	
Vicarious Innovativeness				KMO = .819 Bartlett = 617.195 Significance = .000 Total variance explained = 68.57% Cronbach alpha .849
Modeling & Word of Mouth	VI 4	.861		Eigenvalue = 4.300
	VI 5	.813		Cronbach alpha .857
	VI 3	.745		
	VI 7	.736		
	VI 8	.628		
	VI 6	.548		
Advertising	VI 2		.876	Eigenvalue = 1.185
	VI 1		.858	Cronbach alpha .777

NB Loading less than .3 were suppressed

4.9.1.3   Item Modification

Ownership of Really New Product

After considering the feedback from the pre-test, 5 electronic products (Mp3 or Mp4 sound system, portable DVD player, HDD video recorder, Laptop computer, hand held video game) were removed from the original product list. Some of these products had caused confusion to respondents, while some of them were not considered as really new products by respondents. For example, many respondents consider Mp3 or Mp4 sound system and Mp3 or Mp4 players as the same product. Laptop computers and hand held video games are simply considered as incremental products by respondents. The seven-point scale of ownership of really new product was reported to make the questionnaire more complicated to answer. As a consequence, it was replaced by a six-point scale (never seen/unsure, seen but never bought, intend to purchase in next 6 months, bought once, repurchased same brand, repurchased different brand) for the final version of the questionnaire.

Relative Time of Really New Product Adoption

By considering the feedback from the pre-test, minor rewordings were made to the questions of investigating relative time of really new product adoption, and an additional question (if repurchased, when did you purchase your very first version) was added into the final questionnaire in order to capture the upgrading time of changing from an old version of product to a current really new product.

Vicarious Innovativeness

In order to improve the reliability of the Vicarious Innovativeness scale, questions of "modeling" were modified to "I usually watch my friends using electronic products before I purchase them", "I usually see my work colleagues using electronic products before I purchase them", and "I usually see my family members using electronic products before I purchase them", and an additional question "To make sure I buy the right brand of electronic products, I often observe what others are buying and using" was added.

The questions of "word of mouth" were modified to "I usually talk with my friends about electronic products before I purchase them", "I usually talk with my work colleagues about electronic products before I purchase them", and "I usually talk with my family members about electronic products before I purchase them", and an additional question "I usually discuss electronic products with others on a social networking site prior to purchasing them e.g. facebook, blog" was added.

The wording of two questions of "exposure to advertising" were modified to "I usually see advertising for electronic products prior before I purchase them" and "I usually read a number of news articles about electronic products before I purchase them". Two additional questions "I usually read a number of promotion information about electronic products before I purchase them" and "I usually see demonstration for electronic products in an exhibition before I purchase them" were added to the final questionnaire.

Demographics

All demographics used in the pre-test questionnaire were all retained consistent in the final questionnaire. In addition, Australia is expected to be more internationalized than Taiwan. International students are common in Australia's universities, but not in Taiwan. As a result, a question of nationality was asked in the pre-test questionnaire for students who study in Australia. This particular question was changed to "what is your ethnic group?" in the final questionnaire for Australian consumers.

4.10   SECTION SUMMARY

The preceding section discussed the operationalisation of the pre test in the study. Literature was used carefully to explain the measurement utilized and the development of VI scale. After the assessments of exploratory factor analysis and reliability, the reasons of reducing and rewording of scale items for final study were presented and discussed. The next section will discuss the use of exploratory factor analysis for testing the dimensions of final scales and the use of confirmatory factor analysis for examining the validity of each of the measures.

SECTION II: OPERATIONALISATION OF FINAL STUDY

4.11   INTRODUCTION

Based on the findings and analysis of the pre test, changes and modifications discussed in previous section had made to the final questionnaire. The final study targeted on citizens who are age over 18 in three countries of Australia (n=271), China (n=207), and Taiwan (n=209). Section II of this chapter discusses the analysis of final study undertaken to assess reliability and validity of the measurement instruments. First, reliability is explored via Cronbach's Alpha as reported in pre test section, and then exploratory and confirmatory factor analysis is conducted for the measures of validity.

4.11.1   Reliability

Cronbach's Alpha discussed in the previous section was used for reliability test of final study. Table 4.13 illustrates that all scales exhibited good reliability among three countries with alpha from .69 to .88, except Domain Specific Innovativeness scale. The DSI scale yields a good reliability (.78) for Australia but low scores for both China (.31) and Taiwan (.61). The results of reliability tests in both pre test and final study indicate that the DSI scale works well for Australia but not for countries with Chinese culture in the study. Exploratory and confirmatory factor analyses were undertaken for further investigation, and the outcomes are discussed in the followings.

Table 4.13: Reliabilities for All Measures in Final Study

	Australia	**China**	**Taiwan**
Consumer Innate Innovativeness	.78	.74	.74
Domain Specific Innovativeness	.77	.31	.61
Vicarious Innovativeness	.88	.83	.85
The Desire for Unique Consumer Products	.84	.85	.78
Opinion Leadership	.79	.69	.70

4.11.2   Exploratory Factor Analysis

Most scales are designed to be homogeneous (Gorsuch, 1997), and Cronbach alphas assume scales to be unidimensional (Cronbach, 1951). In order to test for unidimensionality, the score for scales utilized in the study were factor analyzed using varimax rotation discussed in previous section. Table 4.14 to 4.18 illustrate the results of factor analysis of scales namely, Consumer Innate Innovativeness (CII), Domain Specific Innovativeness (DSI), Vicarious Innovativeness (VI), The Desire for Unique Consumer Product (DUCP), and Opinion Leadership (OL). All the scales were then assessed the validity via confirmatory factor analysis discussed in next section.

The shortened version of CII (Hurt, Joseph, and Cook, 1977) is suggested to be a two-factor solution scale (Hurt, Joseph, and Cook, 1977; Kissock, 1996; Pallister and Foxal, 1998; Udoeleong, 1995). The result of the CII scale in the study indicated a 3-factor solution for both Australia and China, and a 4-factor solution for Taiwan. The items loaded on to factors that were exactly the same for Australia and China, and item 1 and 8 were the fourth factor in Taiwanese data. All reliability coefficients for

these multi-item constructs exceeded .70. Results showed that three factors best capture three dimensions of consumer innate innovativeness, namely **Accepting** new ideas, **Suspiciousness** of new ideas, and **Challenging** of new ideas. The three factors accounted the total variance of 63.85% for Australia, 58.07% for China, and 56.30% for Taiwan.

Table 4.14: Factor Analysis and Reliability for CII among Three Countries

CONSTRUCT	ITEMS	FACTOR LOADINGS		
		AUS	CN	TW
Accepting of New Ideas	HURT 1	.737	.639	.721
	HURT2	.747	.743	.670
	HURT3	.690	.726	.744
	HURT4	.651	.681	.692
	HURT6	.609	.527	.648
	HURT8	.701	.580	.721
	Cronbach's Alpha	**.81**	**.77**	**.73**
Suspiciousness of New Ideas	HURT5	DNL	DNL	DNL
	HURT7	.829	.875	.782
	HURT9	.875	.852	.835
	Cronbach's Alpha	**.82**	**.74**	**.67**
Challenging of New Ideas	HURT10	.860	.852	.902
	HURT11	.866	.830	.853
	Cronbach's Alpha	**.81**	**.77**	**.83**

DNL refers to the fact that the item did not load because it failed to meet specified criteria

The Original DSI scale is modeled as unidimensional (Goldsmith and Hofacker, 1991). In the study, the DSI items split into two factors which explained the total variance of 72.08% for Australia, 54.60% for China, and 61.72% for Taiwan. The result is consistent with Goldsmith, Flynn, and Goldsmith's (2003) study which indicates the two factors were formed by the positive and negative items. They assume the DSI is a single scale. However, Cronbach alpha scores of the factor with positive items were at an unacceptable level for both China and Taiwan, which was

also problematic for Taiwanese student samples in the pre test. Therefore, the study should not assume the DSI is a single scale with combined positive and negative items.

Table 4.15: Factor Analysis and Reliability for DSI among Three Countries

CONSTRUCT	ITEMS	FACTOR LOADINGS		
		AUS	CN	TW
Speed of Purchase	DSI1	.858	.754	.758
	DSI3	.839	.704	.802
	DSI5	.889	.772	.789
	Cronbach's Alpha	**.85**	**.63**	**.73**
New Product Information	DSI2	.841	.684	.802
	DSI4	.848	.616	.618
	DSI6	.625	.771	.701
	Cronbach's Alpha	**.71**	**.47**	**.50**

For the VI scale, the result reported a three-factor solution for Australia and China and a four-factor solution for Taiwan. By considering the results and Im, Mason, and Houston's (2007) study, three best captured constructs were **Advertising, Modeling, and Word of Mouth** explained the total variance of 66.69% for Australia, 58.29% for China, and 62.06% for Taiwan. All the Cronbach alpha scores of these three constructs across three countries exceeded .70.

Table 4.16: Factor Analysis and Reliability for VI among Three Countries

CONSTRUCT	ITEMS	FACTOR LOADINGS		
		AUS	CN	TW
Modeling	VIM1	.870	.730	.904
	VIM2	.759	.858	.886
	VIM3	.873	.711	.575
	VIM4	.779	.509	.627
	Cronbach's Alpha	**.89**	**.73**	**.83**
Advertising	VIA1	.713	.797	.817
	VIA2	.870	.812	.830
	VIA3	.837	.770	.794
	VIA4	.447	.580	.424
	Cronbach's Alpha	**.78**	**.78**	**.76**
Word of Mouth	VIW1	.667	.840	.811
	VIW2	.570	.747	.780
	VIW3	.646	.671	.735
	VIW4	.849	.460	.618
	Cronbach's Alpha	**.74**	**.71**	**.72**

The results of principle-components factor analysis of the 9-item DUCP scale produced a two-factor solution for Australia, a three-factor solution for China, and a one-factor solution for Taiwan. In Australian samples, the second factor included item 4 and 9 with Cronbach alpha score of .58. For China, items 4 and 9 with unacceptable scores were also excluded from the largest factor, while other factors also had unacceptable low alpha. A maximum-likelihood confirmatory factor analysis indicated that item 4 and 9 should be removed from the subsequent analysis. The increased Cronbach alpha scores across three countries supported the decision of removing item 4 and 9. The one-factor solution accounted for the variance of 49.91% for Australia, 43.49% for China, and 49.91% for Taiwan with alpha scores of .85, .78, and .83.

Table 4.17: Factor Analysis and Reliability for DUCP among Three Countries

CONSTRUCT	ITEMS	FACTOR LOADINGS		
		AUS	CN	TW
DUCP	DUCP1	.712	.613	.843
	DUCP2	.776	.838	.507
	DUCP3	.739	.694	.856
	DUCP5	.707	.533	.767
	DUCP6	.695	.659	.664
	DUCP7	.792	.669	.624
	DUCP8	.653	.847	.613
	Cronbach's Alpha	**.85**	**.78**	**.83**

The two-factor solution for the OL scale was supported and it explained the variance of 73.41% for Australia, 62.57% for China, and 67.84% for Taiwan. The result was consistent with Goldsmith, Flynn, and Goldsmith's (2003) study which indicates that the two factors were composed of positive and negative worded items. Coefficient alpha scores were .79 for Australia, .69 for China, and .70 for Taiwan. In Goldsmith, Flynn, and Goldsmith's (2003) work, all six items were considered as a single scale. However, confirmatory factor analysis suggested that 2-factor was the best solution for OL among three countries. As a result, the OL scale was remained as two-factor solution in the current study.

Table 4.18: Factor Analysis and Reliability for OL among Three Countries

CONSTRUCT	ITEMS	FACTOR LOADINGS		
		AUS	CN	TW
Opinion	OL1	.834	.636	.792
	OL3	.865	.823	.792
	OL5	.856	.779	.813
	Cronbach's Alpha	**.83**	**.61**	**.72**
Persuasion	OL2	.779	.818	.849
	OL4	.804	.821	.825
	OL6	.881	.779	.840
	Cronbach's Alpha	**.78**	**.75**	**.79**

4.12 MEASUREMENT INVARIANCE

Measurement invariance refers to "whether or not, under different conditions of observing and studying phenomena, measurement operations yield measures of the same attribute" (Horn and McArdle, 1992, p.117). Prior research indicates that measurement invariance has to receive significant attention in cross-cultural comparability of consumer behaviour and marketing, and the conclusions of a study are erroneous if the evidence of supporting measurement invariance is lacking (Mavondo, Gabbott, and Tsarenko, 2003; Steenkamp and Baumgartner,1998; Wang and Waller, 2006).

4.12.1 Forms of Invariance

Mavondo, Gabbott, and Tsarenko (2003) refers to a general agreement that factor analytic models commonly appeal when investigating measurement invariance. Various forms of factorial invariance have been distinguished as configural, weak, strong, and strict factorial invariance (Meredith, 1993). Configural invariance, the

basic and the weakest form of factorial invariance, evaluates the similarity in the pattern of factor loading for each group. Weak invariance, also referred to as "metric invariance" (Steenkamp and Baumgartner, 1998), assesses invariance by constraining factor loadings to be equal across countries. Strong invariance is also called "scalar invariance" (Cole, Bedeian, and Field, 2006), which involves additional constraints on the intercepts across groups. Finally, strict invariance, also called "measurement-error equivalence (Cole, Bedeian, and Field, 2006), is the most rigid model for assessing invariance by extending the additional constraints on measurement error.

The purpose of the present research is to understand the predicting role of CII, DSI, and VI to really new product adoption across three countries. As a consequence, without evidence of measurement invariance, it is meaningless to cross-culturally compare constructs. The current study followed the sequence of test procedures recommended by Mavondo, Gabbott, and Tsarenko (2003) for assessing measurement invariance via multigroup confirmatory factor analysis (MCFA). Nested models were presented to test the fit of additionally restrictive models against the baseline model. The significant Chi-square differences between nested models indicate that a null hypothesis of equivalence should be rejected. Overall model fit in MCFA is commonly evaluated like standard confirmatory factor analysis discussed in next section.

4.12.2 Assessing Measurement Invariance

Consumer Innate Innovativeness

As shown in Table 4.19, Model 1, the baseline model, representing configural invariance had a $x^2(114) = 226.626$; p = .000; x^2:df ratio = 1.988; a RMSEA = .038, the NFI = .898; CFI = .945 and TLI = .921, thus indicating a very good fit and suggesting adequate configural invariance across three countries. After the baseline model was established, the test of weak factorial invariance was preceded in which the factor loadings were constrained to be equal across countries. It can been seen that the increase of chi-square was not significant between Model 1 and Model 2 ($\triangle$ $x^2(16) = 13.825$, p>.60). The results support weak factorial invariance across the three countries. Following prior discussion, model 3 represents strong factorial invariance in which intercepts were constrained to be invariant across groups. By comparing Model 3 and Model 2, the formal test gives $\triangle x^2(12) = 20.934$; p>.05. This indicates that strong factorial invariance is established across the three countries. The results of measurement invariance suggest that CII was mapped the same way across the three countries.

Domain Specific Innovativeness

It can been seen from Table 4.20 that configural invariance was supported with adequate model fit of $x^2(24) = 75.139$; p = .000; x^2:df ratio = 3.133; a RMSEA = .056, the NFI = .918; CFI = .942 and TLI = .809. In the test of weak factorial invariance, there was a significant increase in chi-square between Model 1 and Model 2 ($\triangle x^2(8) = 36.705$, p<.001) of which indicated that DSI is different across the three

countries.

Vicarious Innovativeness

Table 4.21 illustrates that configural invariance was supported with adequate model fit of $x^2(144) = 409.858$; p = .000; x^2:df ratio = 2.847; a RMSEA = .053, the NFI = .892; CFI = .926 and TLI = .898. However, weak factorial invariance was not supported because there was a significant increase in chi-square between Model 1 and Model 2 ($\triangle x^2(18) = 38.598$, p<.004). The results indicate that VI does not significantly generalize across countries.

The Desire for Unique Consumer Products

As shown in Table 4.22, Model 1 had a $x^2(69) = 173.447$; p = .000; x^2:df ratio = 2.514; a RMSEA = .048, the NFI = .910; CFI = .943 and TLI = .911. Model 1 was fit the data adequately. There was evidence that the configural invariance is supported. The comparison of Model 1 and Model 2 revealed that there was a significant increase in chi-square ($\triangle x^2(16) = 69.292$, p<.001). This clearly shows that DUCP is being mapped differently across the three countries.

Opinion Leadership

It can be seen from Table 4.23 that configural invariance was supported with good model fit of $x^2(24) = 40.281$; p = .020; x^2:df ratio = 1.678; a RMSEA = .032, the NFI = .966; CFI = .986 and TLI = .973. The nonsignificant increase of chi-square between Model and Model 2 indicated that weak factorial invariance was supported

$(\triangle x^2 (8) = 9.407, \text{p}>.30)$. It can be suggested that the regression weights are invariant across groups. However, By comparing Model 3 and Model 2, the test gave $\triangle x^2 (6) = 54.571; \text{p}<.001$. This indicated that strong factorial invariance was not supported across the three countries. The results suggest that OL is different across the three countries.

4.12.3 Section Summary

The results of measurement invariance analysis indicate that only the scale of consumer innate innovativeness can be considered as invariance across the three countries. The scales were calibrated differently across the three countries. There is no evidence to support that the data of three countries can be combined as a whole. As a result, all data was kept separately for the subsequent analysis in the present research.

Table 4.19: Measure Equivalence of Consumer Innate Innovativeness across Aus, CN and TW

Model Comparison	x^2 (df)	p	$\dfrac{x^2}{df}$	RMSEA	NFI	TLI	CFI	$\triangle x^2$ ($\triangle$df)	P	$\dfrac{\triangle x^2}{\triangle df}$	$\triangle$NFI	$\triangle$TLI	$\triangle$CFI
MODEL 1 Configural invariance	226.626(114)	P=.000	1.988	.038	.898	.921	.945	-		-			
Model 2 Weak factorial invariance	240.452(130)	P=.000	1.850	.036	.892	.932	.946						
Model 2 vs. Model 1								13.825 (16)	P=.612	.864	.006	-.011	-.001
Model 3 Strong factorial invariance	261.385(142)	P=.000	1.841	.035	.883	.933	.942						
Model 3 vs. Model 2								20.934 (12)	P=.051	1.745	.009	-.001	.004

Table 4.20: Measure Equivalence of Domain Specific Innovativeness across Aus, CN and TW

Model Comparison	x^2 (df)	p	$\dfrac{x^2}{df}$	RMSEA	NFI	TLI	CFI	$\triangle x^2$ ($\triangle$df)	P	$\dfrac{\triangle x^2}{\triangle df}$	$\triangle$NFI	$\triangle$TLI	$\triangle$CFI
MODEL 1 Configural invariance	75.139(24)	P=.000	3.133	.056	.918	.890	.942	-		-			
Model 2 Weak factorial invariance	111.897(32)	P=.000	3.497	.061	.878	.872	.909						
Model 2 vs. Model 1								36.705 (8)	P=.000	4.588	.004	.018	.033
Model 3 Strong factorial invariance	143.481(38)	P=.000	3.776	.064	.844	.857	.880						
Model 3 vs. Model 2								31.584 (6)	P=.000	5.264	.034	.015	.029

2

Table 4.21: Measure Equivalence of Vicarious Innovativeness across Aus, CN and TW

Model Comparison	x^2 (df)	p	x^2 df	RMSEA	NFI	TLI	CFI	$\triangle x^2$ ($\triangle$df)	P	$\triangle x^2$ $\triangle$df	$\triangle$NFI	$\triangle$TLI	$\triangle$CFI
MODEL 1 Configural invariance	409.898(144)	P=.000	2.847	.053	.892	.898	.926	-		-			
Model 2 Weak factorial invariance	448.487(162)	P=.000	2.768	.051	.881	.902	.920						
Model 2 vs. Model 1								38.589 (18)	P=.003	2.144	.010	-.004	.006
Model 3 Strong factorial invariance	482.720(174)	P=.000	2.774	.051	.872	.902	.914						
Model 3 vs. Model 2								34.232 (12)	P=.001	2.853	.009	.000	.006

3

Table 4.22: Measure Equivalence of The Desire for Unique Consumer Products across Aus, CN and TW

Model Comparison	x^2 (df)	p	$\frac{x^2}{df}$	RMSEA	NFI	TLI	CFI	$\triangle x^2$ ($\triangle$df)	P	$\frac{\triangle x^2}{\triangle df}$	$\triangle$NFI	$\triangle$TLI	$\triangle$CFI
MODEL 1 Configural invariance	173.447(69)	P=.000	2.514	.048	.910	.911	.943	-		-			
Model 2 Weak factorial invariance	242.739(85)	P=.000	2.856	.053	.875	.890	.914						
Model 2 vs. Model 1								69.292 (16)	P=.000	4.331	.035	.021	.029
Model 3 Strong factorial invariance	245.787(87)	P=.000	2.826	.052	.873	.892	.913						
Model 3 vs. Model 2								3.14 (2)	P=.208	1.570	.002	-.002	.001

Table 4.23: Measure Equivalence of Opinion Leadership among Aus, CN and TW

Model Comparison	x^2 (df)	p	$\frac{x^2}{df}$	RMSEA	NFI	TLI	CFI	$\triangle x^2$ ($\triangle$df)	P	$\frac{\triangle x^2}{\triangle df}$	$\triangle$NFI	$\triangle$TLI	$\triangle$CFI
MODEL 1 Configural invariance	40.281(24)	P=.020	1.678	.032	.966	.973	.986	-		-			
Model 2 Weak factorial invariance	49.688(32)	P=.024	1.553	.029	.958	.978	.985						
Model 2 vs. Model 1								9.407 (8)	P=.309	1.176	.008	-.005	.001
Model 3 Strong factorial invariance	104.259(38)	P=.000	2.744	.051	.912	.932	.942						
Model 3 vs. Model 2								54.571 (6)	P=.000	9.095	.046	.047	.043

4.13   VALIDITY

In data analysis, reliability is the necessary measure to assess the quality of the measurement but not sufficient for validity (Nunnally, 1967). Validity which includes three types of validity, namely content, construct, and criterion validity is very important to be assessed to determine the accuracy of the measurement scales and the intended constructs that has been captured (Jung, 2006).

4.13.1   Content Validity

The measure is said to have content or face validity when the sample is appropriate and the items "look right" (Churchill, 1979). The items utilized in the study to measure the constructs were considered to have content validity for the following reasons. Firstly, all items were the same or very similar to original scales. Secondly, all items were tested in the pre-test process. Thirdly, a number of academics familiar with this area of study and two independent qualified translators were asked to evaluate the measurement instrument. However, item 4 of DSI scale "I will consider buying a new electronic product, even if I haven't heard of it yet" was reported to be problematic by numbers of Chinese and Taiwanese respondents and one of the two qualified translators. The DSI scale has been validated by empirical research (Citrin, Sprott, Silverman, and Stem, 2000; Hynes and Lo, 2006; Lafferty, Goldsmith, and Flynn, 2005) in western culture. As a result, item 4 was retained in the study for further investigation in the aspect of Chinese culture. Finally, modifications of the instrument were made accordingly.

4.13.2 Construct Validity

Construct validity, which refers to the extent that concept is measured accurately by the instrument, has been described as a major concern in research process (Bagozzi, Yi, and Phillips, 1991; Churchill, 1979). Further exploration of construct validity suggests that it is composed from convergent, discriminant, and nomological validity (Ruekert and Churchill, 1984).

4.13.3 Convergent Validity

Convergent validity can be achieved by assessing the estimates among measures of the same underlying construct (Bagozzi, Yi, and Phillips, 1991). As a result, all factor loadings of the observable items under the particular construct indicate the degree of convergent validity. This is the evidence of which items correlated positively and significantly with other measures under the same construct, and the high factor loadings indicate good convergent validity.

4.13.4 Discriminant Validity

Discriminant validity is suggested to be "predictably low correlations between the measure of interest and other measures that are supposedly not measuring the same variable or concept" (Heeler and Ray, 1969, p.362). That is, high correlations among the measures of different constructs would indicate that the measures are not considered to be discriminative. To achieve discriminant validity, the average variance extracted for each of the constructs was required to be greater than correlations of other constructs (Campbell and Fiske, 1959).

The study followed three criteria proposed by Bagozzi and Yi (1988) for evaluating the construct validity. First, the individual item reliability needs to be greater than .50. Any item with poor loading with less than .50 was suppressed from the subsequent analysis. Second, internal consistency, assessed via composite reliability, is recommended to be greater than .60. Third, the scores for average variance extracted should be .50 or greater, which indicates that the latent variables have good reliability and validity.

4.13.4.1   Confirmatory Factor Analysis (CFA)

In early discussion, the study had completed the exploratory factor analysis which is considered as a preliminary study for the confirmatory factor analysis (Gorsuch, 1997). Bagozzi, Yi, and Phillips (1991) indicate that confirmatory factory analysis (CFA) is a useful method to assess construct validity. The purpose of confirmatory factor analysis is to test specific hypotheses associated with the proposed theoretical model. Crowley and Fan (1997) suggest that confirmatory factor analysis is "generally considered to have some advantages over its exploratory counterpart in substantive theory building and theory testing" (p.513).

Confirmatory factor analysis is a measurement model under structural equation modeling (SEM) suggested to be a useful method in social and behavioral sciences for testing hypothesized relationships among either directly observed variables or latent variables (Crowley and Fan, 1997). In the current study, confirmatory factor analysis, the primary use of SEM, was conducted for construct validation of measurement instruments. To evaluate the measurement models for each construct, all the analyses in the study were conducted with AMOS (Analysis of Moment Structures). The measurement models are presented as Figures 4.1 to 4.15**.** Latent variables are represented as ellipses, and

rectangles represent the observed variables. A one-way straight arrow is used to connect the observed variables to latent variables. The values attached to the arrows are factor loadings to observed variables which indicate the convergent validity to the measures. The curved lines connecting latent variables and the values indicate correlations among latent variables. Circles represent variance in the measures due to random error. Schumacker and Lomax (1996) suggest that there is no single criterion to explicitly decide the overall model fit, researchers need to consider various criteria. AMOS provides criteria that help to determine the model fit which are presented in Table 4.24. The results for each scale utilized in the study are presented in the following sections.

Table 4.24: CRITERION FOR GOODNESS OF FIT

GOODNESS-OF-FIT CRITERION	LEVEL OF ACCEPTANCE	INTERPRETATION
Model Fit		
x^2 value	Low x^2 value (relative to df) with sig.level>.05	>.05 significance reflects acceptable fit
Cmin/df	< 3	Values < 3 reflect acceptable fit
Goodness-of-fit (GFI)	> .90	Values close to .90 reflect a good model fit
Adjusted GFI (AGFI)	> .90	Values close to .90 reflect a good model fit
RMSEA	<.05	Values <0.05 reflect a good model fit
	<.08	Values <.08 reflect a reasonable fit
Model Comparison		
Tucker-Lewis Index (TLI)	> .90	Values > .90 reflects a good model fit
Normed Fit Index (NFI)	> .90	Values > .90 reflects a good model fit
Comparative Fit Index (CFI)	> .90	Values > .90 reflects a good model fit

Source: Based on Wu (2007)

4.13.4.2   Consumer Innate Innovativeness

The result of exploratory factor analysis discussed in previous section suggested three constructs for CII, namely accepting new ideas, suspiciousness of new ideas, and challenging of new ideas. Table 4.25 and 4.26 present internal consistency, square roots of average variance extracted and correlation matrix and model fit of consumer innate innovativeness in the three countries.

Table 4.25: Internal Consistency, Square Roots of Average Variance Extracted and Correlation Matrix and Model Fit - CII

Construct		Internal Consistency			AUS Validity			CN Validity			TW Validity		
		AUS	CN	TW	1	2	3	1	2	3	1	2	3
1	Accepting of New Ideas	.81	.77	.73	**.65**			**.60**			**.55**		
2	Suspiciousness of New Ideas	.81	.77	.85	.62	**.83**		.58	**.79**		.53	**.85**	
3	Challenging of New Ideas	.82	.67	.77	.10	.10	**.84**	.03	.02	**.71**	.03	.26	**.79**

Table 4.26: Goodness of Fit Analysis - CII

Goodness of Fit Measure	AUS	CN	TW
Model Fit			
Chi-squared	74.431	51.800	59.227
Degrees of Freedom	31	32	32
P-value	.000	.015	.002
Cmin/df	2.369	1.619	1.851
Goodness of Fit Index	.95	.95	.95
Adjusted Goodness of Fit	.91	.92	.91
RMSEA	.07	.06	.06
Model Comparison			
Tucker-Lewis Index (TLI)	.93	.94	.92
Normed Fit Index (NFI)	.92	.90	.89
Comparative Fit Index (CFI)	.95	.96	.95

Australia Data

The average variance extracted for each of the 3 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by accepting new ideas (.65) was greater than the correlation between accepting new ideas and suspiciousness of new ideas (.62), and was greater then the correlation between accepting new ideas and challenging of new ideas (.10). The average variance accounted for by suspiciousness of new ideas (.83) was greater than the correlation between suspicious of new ideas and challenging of new ideas (.10). The average variance accounted for by challenging of new ideas (.84) was greater than the correlation between challenging of new ideas and accepting new ideas (.10), and challenging of new ideas and suspiciousness of new ideas (.10).

The results indicate that accepting new ideas, suspiciousness of new ideas and challenging of new ideas are distinct measures of consumer innate innovativeness in Australian data. In addition, the goodness of fit requirements indicates an acceptable fit and therefore demonstrates convergent validity (Table 4.26).

China Data

The average variance extracted for each of the 3 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by accepting new ideas (.60) was greater than the correlation between accepting new ideas and suspiciousness of new ideas (.58), and was greater then the correlation between accepting new ideas and challenging of new ideas (.03). The average variance accounted for by suspiciousness of new ideas (.79) was greater than the correlation between suspiciousness

of new ideas and challenging of new ideas (.02). The average variance accounted for by challenging of new ideas (.71) was greater than the correlation between challenging of new ideas and accepting new ideas (.03), and challenging of new ideas and suspiciousness of new ideas (.02).

The results indicate that accepting new ideas, suspiciousness of new ideas and challenging of new ideas are distinct measures of consumer innate innovativeness in China data. Further, the goodness of fit requirements indicates an acceptable fit and therefore demonstrate convergent validity.

Taiwan Data

The average variance extracted for each of the 3 constructs was well above .50 except items 1,6,8 of accepting new ideas were only .02 lower than .50, which indicates good convergent validity. The average variance accounted for by accepting new ideas (.55) was greater than the correlation between accepting new ideas and suspiciousness of new ideas (.53), and was greater then the correlation between accepting new ideas and challenging of new ideas (.03). The average variance accounted for by suspiciousness of new ideas (.85) was greater than the correlation between suspiciousness of new ideas and challenging of new ideas (.26). The average variance accounted for by challenging of new ideas (.79) was greater than the correlation between challenging of new ideas and accepting new ideas (.03), and challenging of new ideas and suspiciousness of new ideas (.26).

The results indicate that accepting new ideas, suspiciousness of new ideas and challenging of new ideas are distinct measures of consumer innate innovativeness in Taiwanese data. Further, the goodness of fit requirements indicates an acceptable fit and therefore demonstrates convergent validity.

Figure 4.1: AUS - Measurement Model - CII
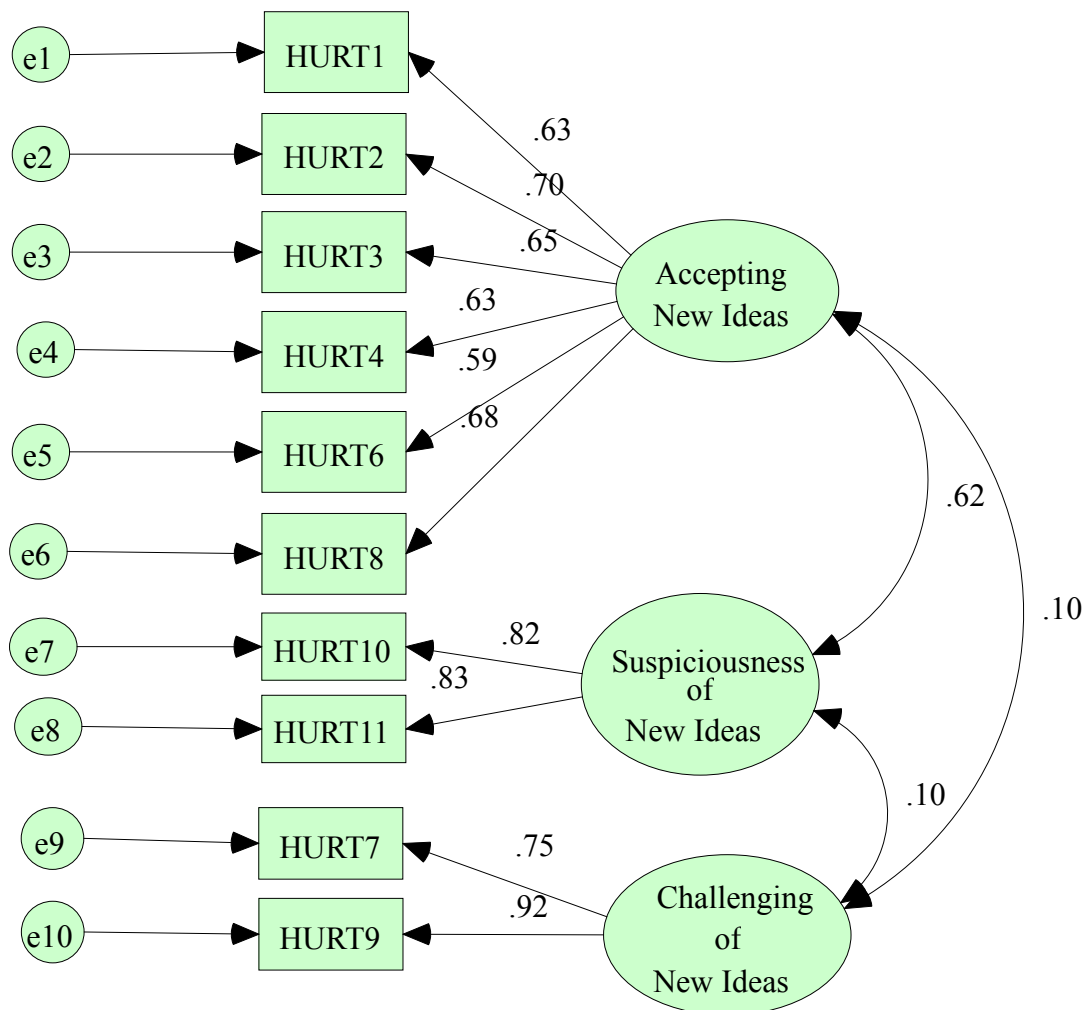
Figure 4.2: CN - Measurement Model - CII
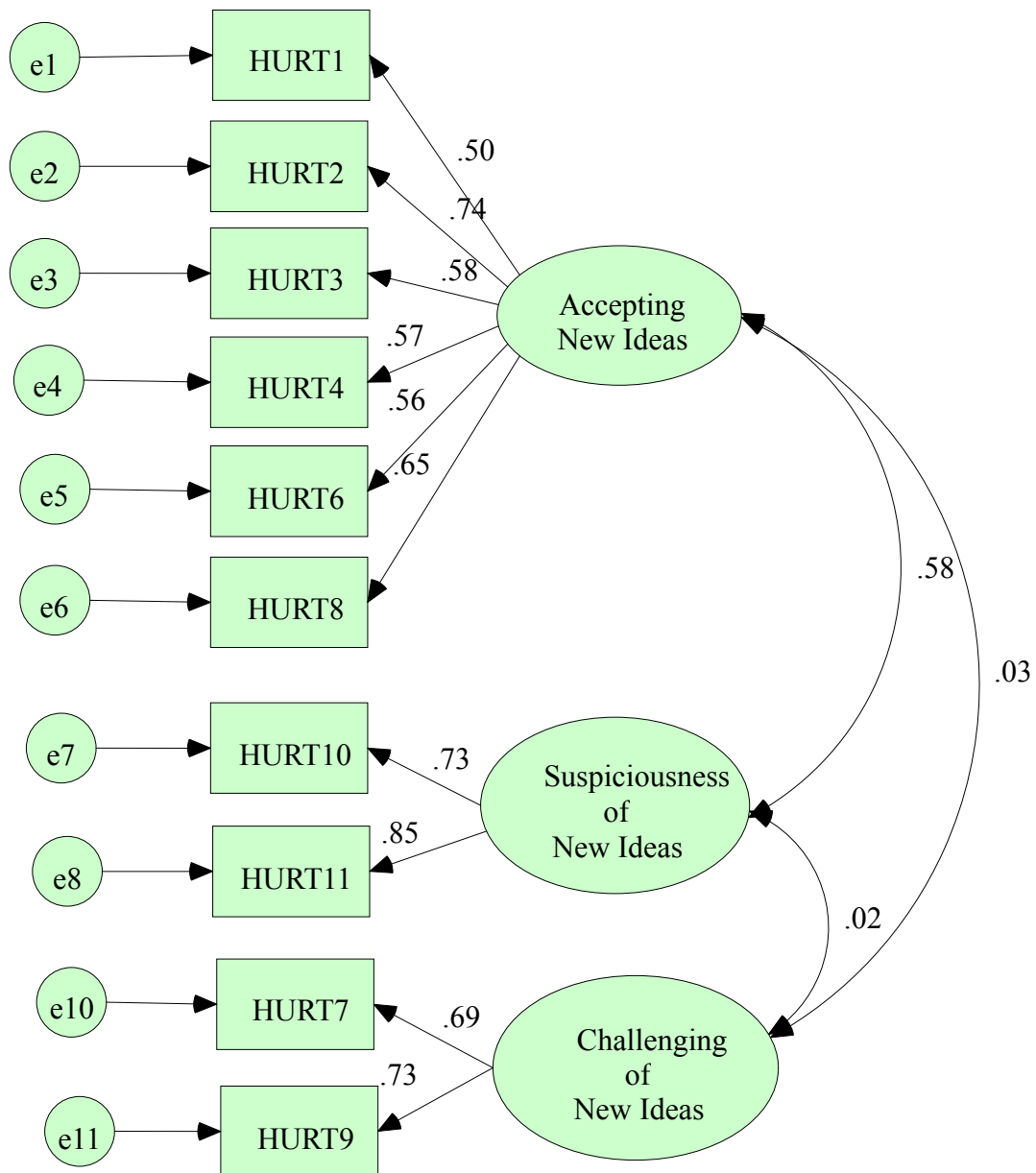
Figure 4.3: TW – Measurement Model - CII
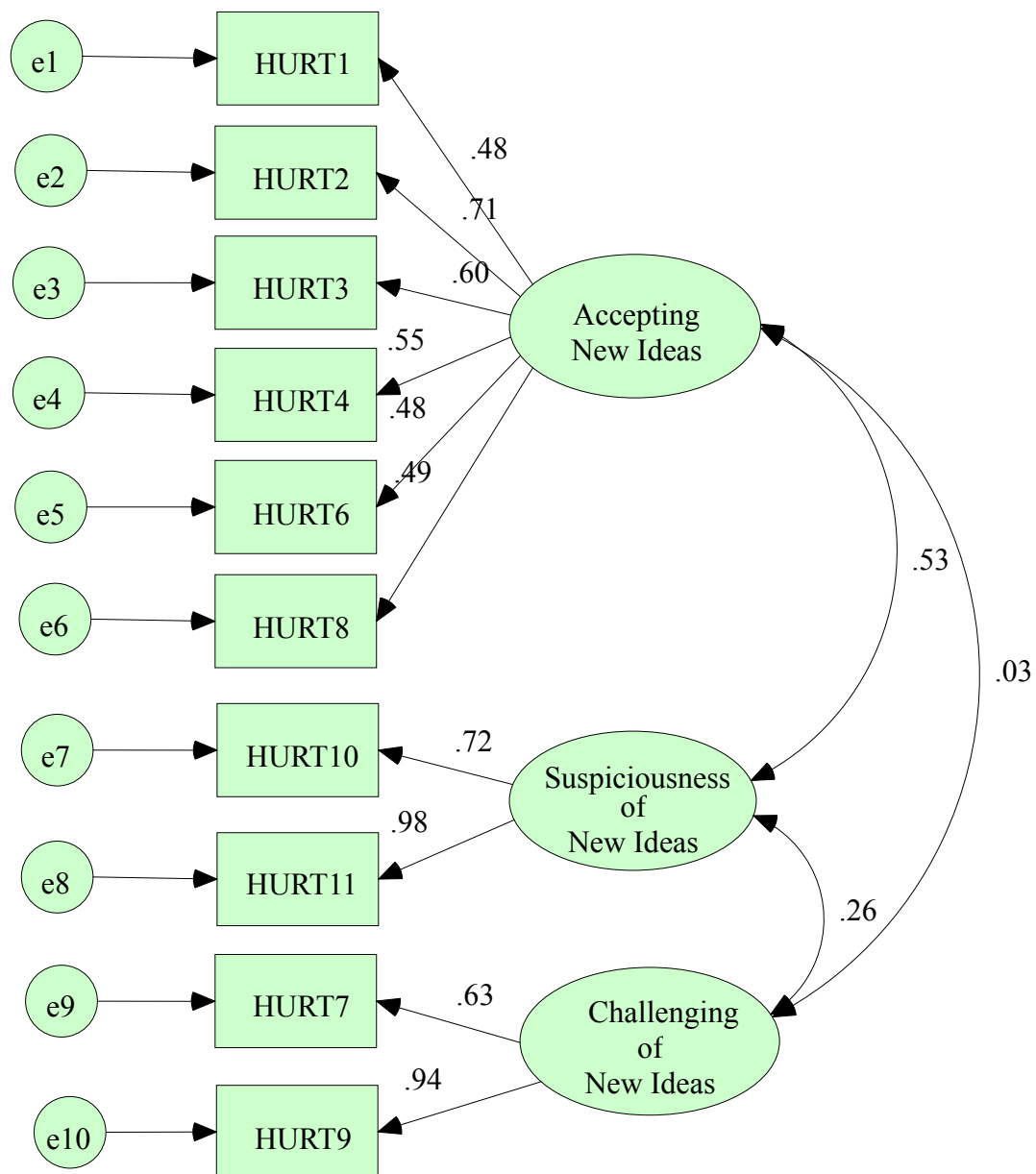
4.13.4.3   Domain Specific Innovativeness

The result of exploratory factor analysis discussed in previous section suggested two constructs for DSI, namely speed and new product information. The construct, new product information, with poor loadings of less than .50 was removed from the subsequent analysis for all three countries. Table 4.27 and 4.28 present internal

consistency, square roots of average variance extracted and correlation matrix and model fit of domain specific innovativeness in the three countries.

Table 4.27: Internal Consistency, Square Roots of Average Variance Extracted and Correlation Matrix and Model Fit - DSI

Construct	Internal Consistency			AUS		CN		TW	
	Aus	CN	TW	1	2	1	2	1	2
1 Speed of Purchase	.85	.64	.73	**.81**		**.61**		**.69**	
2 New Product Information	.71	-	-	.25	**.74**	-	-	-	-

Table 4.28: Goodness of Fit Analysis - DSI

Goodness of Fit Measure	AUS	CN	TW
Model Fit			
Chi-squared	2.577	2.519	.161
Degrees of Freedom	4	1	1
P-value	.631	.112	.688
Cmin/df	.644	2.519	.161
Goodness of Fit Index	.99	.99	1
Adjusted Goodness of Fit	.99	.95	1
RMSEA	.000	.09	.00
Model Comparison			
Tucker-Lewis Index (TLI)	1	.94	1
Normed Fit Index (NFI)	.99	.97	1
Comparative Fit Index (CFI)	1	.98	1

Australia Data

For Australian data, examination of the modification indices (MIs) revealed that the item - DSI 6 of new product information had high correlation with the construct of speed of purchase. After DSI 6 was removed, the average variance extracted for each of the 2 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by speed of purchase (.81) and new product information (.74) were greater than the correlation between speed of purchase and new product information

(.25)

The results indicate that speed of purchase and new product information are distinct measures of domain specific innovativeness in Australian data. In addition, the goodness of fit requirements indicates an acceptable fit and therefore demonstrate convergent validity.

China Data

As discussed in previous section, the reliability of the construct of new product information was not acceptable for both China and Taiwan. CFA also suggested that the construct – new product information needed to be suppressed from the subsequent analysis for the two countries. The average variance extracted for the constructs – speed of purchase was well above .50, which indicates good convergent validity. The composite reliability was .64, which suggests adequate level of internal consistency. Further, the goodness of fit requirements indicates an acceptable fit and therefore demonstrate convergent validity.

Taiwan Data

Consistent with prior discussion, the average variance extracted for speed of purchase was well above .50, which indicates good convergent validity. The composite reliability was .71, which suggests adequate level of internal consistency. Further, the goodness of fit requirements indicates an acceptable fit and therefore demonstrates convergent validity.

Figure 4.4: AUS – Measurement Model - DSI
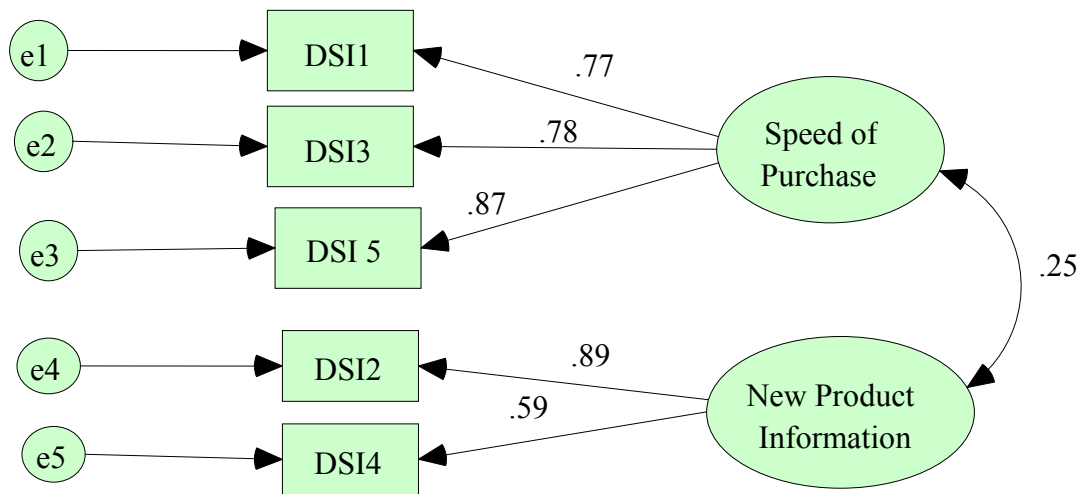
Figure 4.5: CN – Measurement Model - DSI
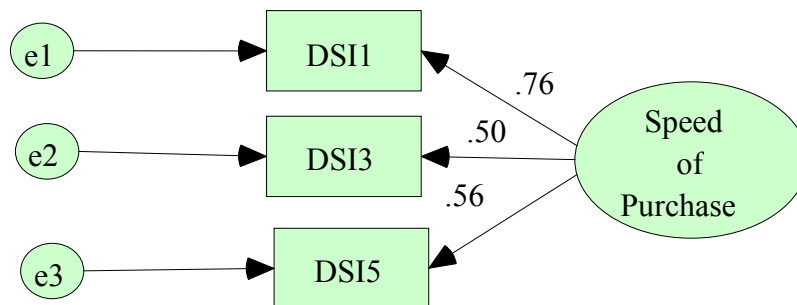
Figure 4.6: TW – Measurement Model - DSI
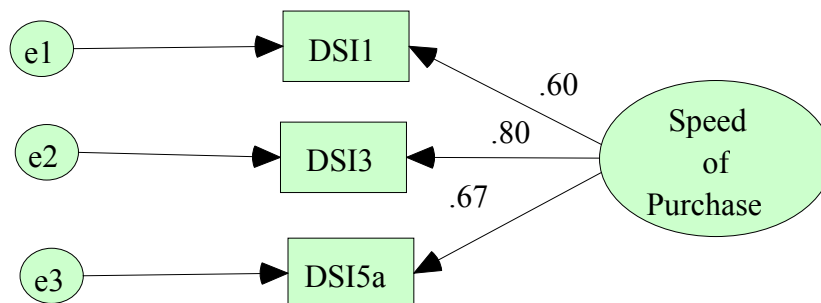
4.13.4.4   Vicarious Innovativeness

The result of exploratory factor analysis discussed in previous section suggested 3 constructs for VI namely Advertising, Modeling, and Word of Mouth (WOM). Table 4.29 and 4.30 present internal consistency, square roots of average variance extracted and correlation matrix and model fit of vicarious innovativeness in the three countries.

Table 4.29: Internal Consistency, Square Roots of Average Variance Extracted and Correlation Matrix and Model Fit - VI

Construct		Internal Consistency			AUS			CN			TW		
		Aus	CN	TW	1	2	3	1	2	3	1	2	3
1	Modeling	.89	.76	.87	**.82**			**.66**			**.79**		
2	Advertising	.81	.80	.79	.48	**.76**		.43	**.70**		.20	**.69**	
3	Word of Mouth	.76	.78	.81	.74	.45	**.73**	.46	.44	**.74**	.58	.35	**.75**

Table 4.30: Goodness of Fit Analysis - VI

Goodness of Fit Measure	AUS	CN	TW
Model Fit			
Chi-squared	95.077	96.665	91.489
Degrees of Freedom	35	41	39
P-value	.000	.000	.000
Cmin/df	2.716	2.358	2.346
Goodness of Fit Index	.94	.92	.93
Adjusted Goodness of Fit	.88	.88	.88
RMSEA	.08	.08	.08
Model Comparison			
Tucker-Lewis Index (TLI)	.94	.90	.93
Normed Fit Index (NFI)	.94	.88	.92
Comparative Fit Index (CFI)	.96	.93	.95

Australia Data

The average variance extracted for each of the 3 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by Modeling (.82) was greater than the correlation between Modeling and Advertising (.48), and was greater then the correlation between modeling and WOM (.74). The average variance accounted for by Advertising (.76) was greater than the correlation between Advertising and WOM (.45). The average variance accounted for by WOM (.73) was greater than the correlation between WOM and Advertising (.45), and only .01 lower than the correlation between WOM and Modeling (.74).

The results indicate that modeling, Advertising, and WOM are distinct measures of vicarious innovativeness in Australian data. Further, the goodness of fit requirements indicate an acceptable fit and therefore demonstrate convergent validity.

China Data

The average variance extracted for each of the 3 constructs was well above .50 except item 4 of Modeling was only .05 lower than .50, which indicates acceptable convergent validity. The average variance accounted for by Modeling (.66) was greater than the correlation between Modeling and Advertising (.43), and was greater then the correlation between Modeling and WOM (.46). The average variance accounted for by Advertising (.70) was greater than the correlation between Advertising and WOM (.44) and the correlation between Modeling and Advertising (.43). The average variance accounted for by WOM (.74) was greater than the correlation between WOM and Advertising (.44), and WOM and Modeling (.46).

The results indicate that modeling, Advertising, and WOM are distinct measures of vicarious innovativeness in Chinese data. Further, the goodness of fit requirements indicates an acceptable fit and therefore demonstrate convergent validity.

Taiwan Data

The average variance extracted for each of the 3 constructs was well above .50 except item 4 of Advertising was only .04 lower than .50 and item 3 of WOM was only .03 lower than .50, which indicates adequate convergent validity. The average variance accounted for by Modeling (.79) was greater than the correlation between Modeling and Advertising (.20), and was greater then the correlation between Modeling and WOM (.58). The average variance accounted for by advertising (.69) was greater than the correlation between Advertising and WOM (.35), and Modeling and Advertising (.20). The average variance accounted for by WOM (.75) was greater than the correlation between WOM and Advertising (.35), and WOM and Modeling (.58).

The results indicate that modeling, advertising, and WOM are distinct measures of vicarious innovativeness in Taiwanese data. Further, the goodness of fit requirements indicates an acceptable fit. Therefore, there is support for the assumption of convergent validity, and the dimensions will be kept distinct for the development of the structural equation model.

Figure 4.7: AUS – Measurement Model - VI
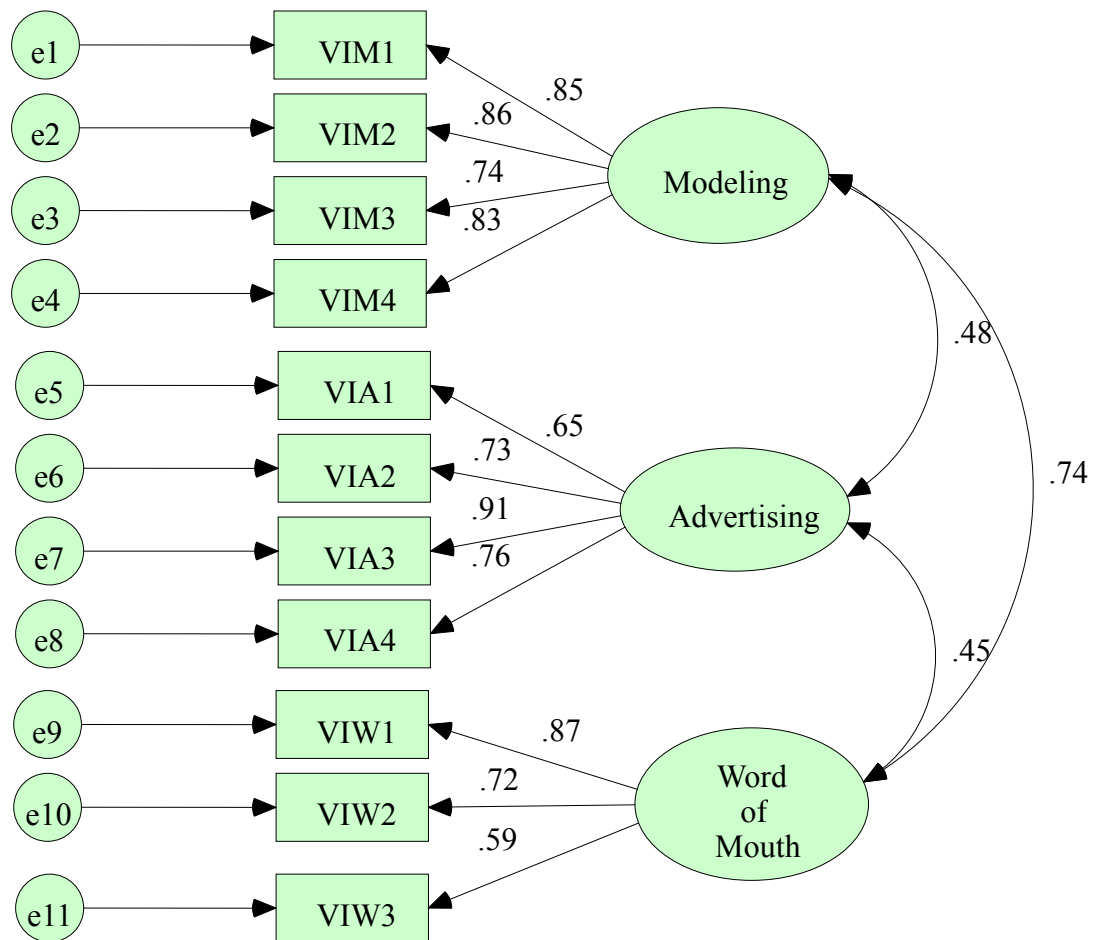
Figure 4.8: CN - Measurement Model – VI
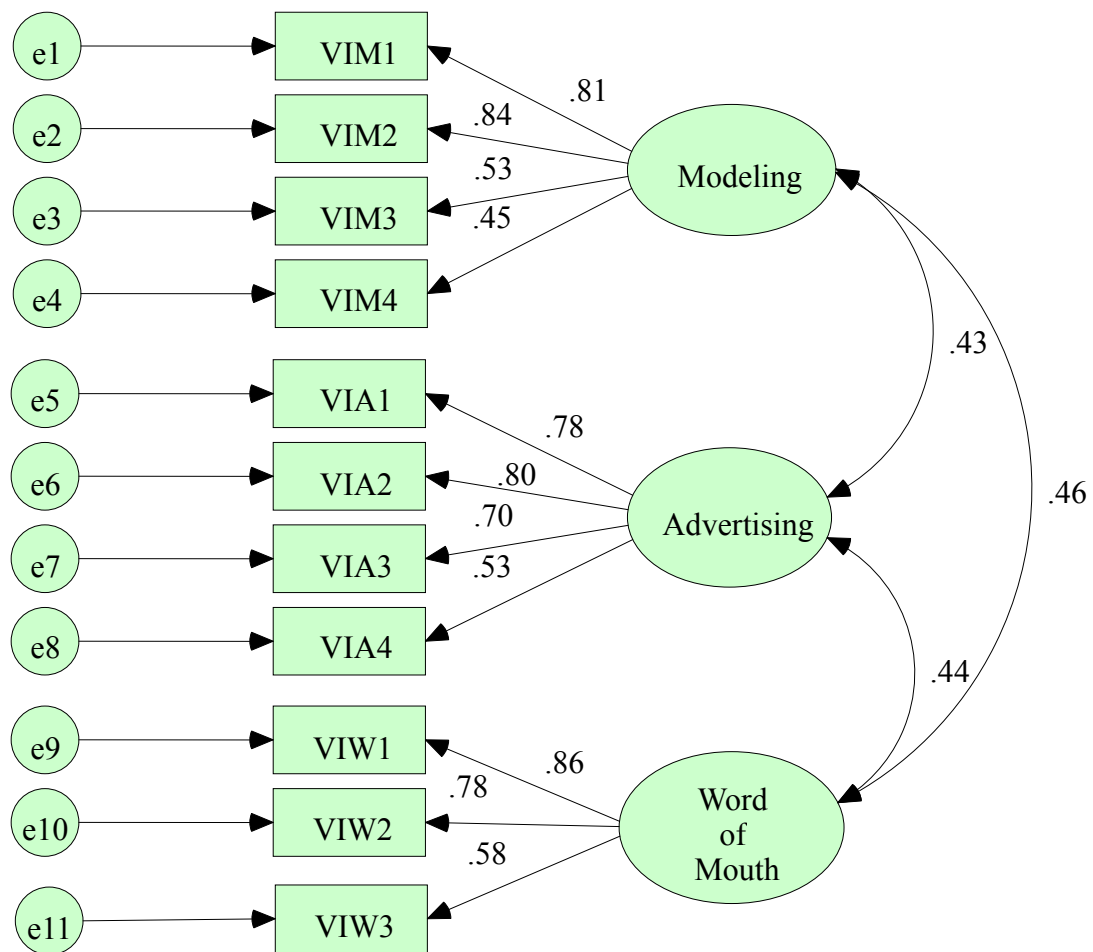
Figure 4.9: TW - Measurement Model - VI
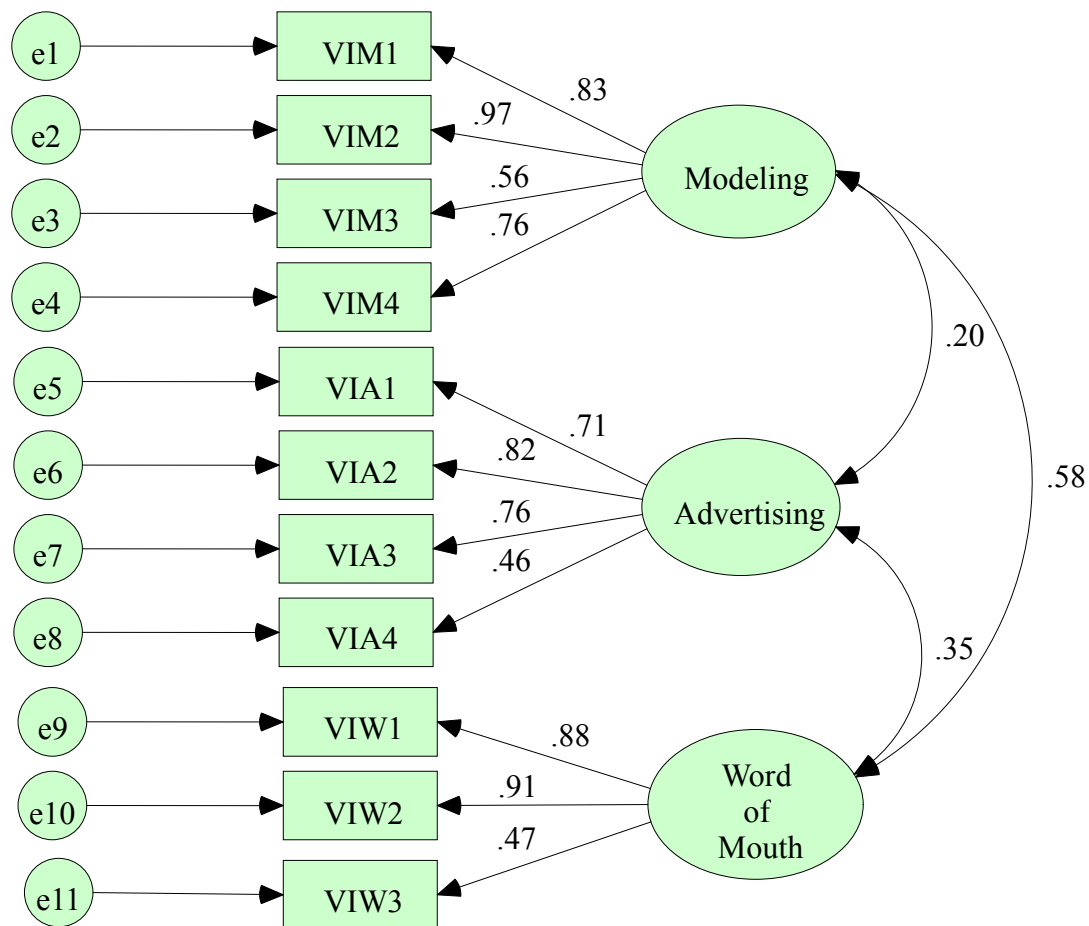
4.13.4.5   The Desire for Unique Consumer Products

Table 4.31 presents model fit of the desire for unique consumer products in the three countries.

Australia Data

The average variance extracted for the single construct of DUCP was well above .50, which indicates good convergent validity. The internal consistency was .84, which indicates good construct reliability. The goodness of fit requirements represents an

acceptable fit and therefore demonstrates convergent validity.

China Data

The average variance extracted for the single construct of DUCP was well above .50 except item 7 was only .07 lower than .50, which indicates good convergent validity. The internal consistency was .79, which indicates good construct reliability. The goodness of fit requirements represent an acceptable fit and therefore demonstrate convergent validity.

Taiwan Data

The average variance extracted for the single construct of DUCP was well above .50, which indicates good convergent validity. The internal consistency was .83, which indicates good construct reliability. The goodness of fit requirements represent an acceptable fit and therefore demonstrate convergent validity.

Table 4.31: Goodness of Fit Analysis - DUCP

Goodness of Fit Measure	AUS	CN	TW
Model Fit			
Chi-squared	24.768	23.617	22.194
Degrees of Freedom	12	13	9
P-value	.016	.035	.008
Cmin/df	2.064	1.817	2.466
Goodness of Fit Index	.97	.97	.97
Adjusted Goodness of Fit	.94	.93	.93
RMSEA	.07	.06	.08
Model Comparison			
Tucker-Lewis Index (TLI)	.97	.95	.95
Normed Fit Index (NFI)	.96	.94	.96
Comparative Fit Index (CFI)	.98	.97	.97

Figure 4.10: AUS - Measurement Model – DUCP
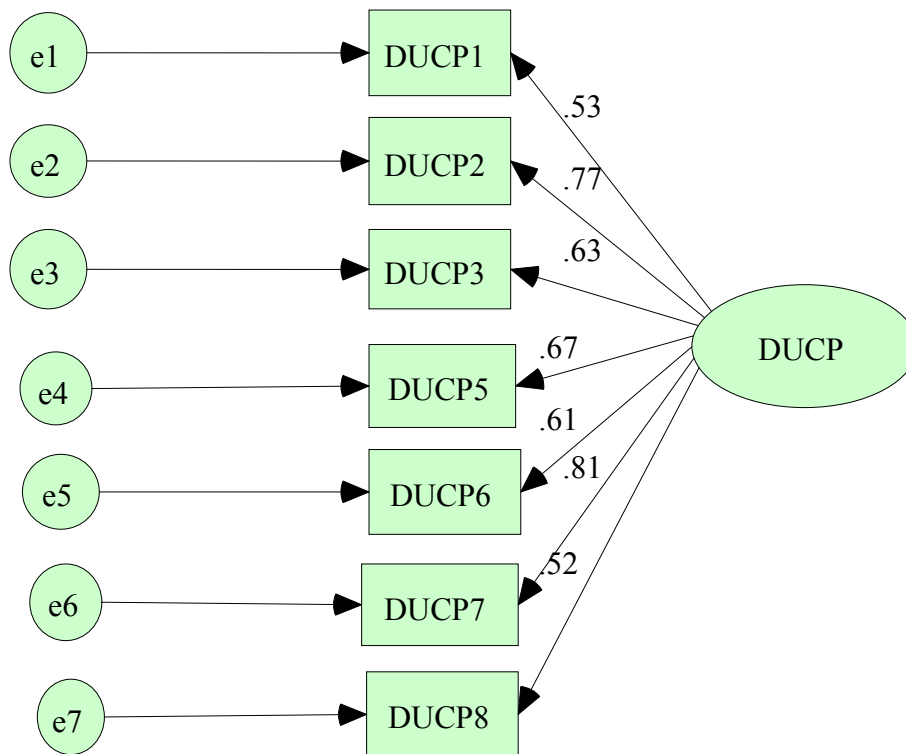
Figure 4.11: CN - Measurement Model – DUCP
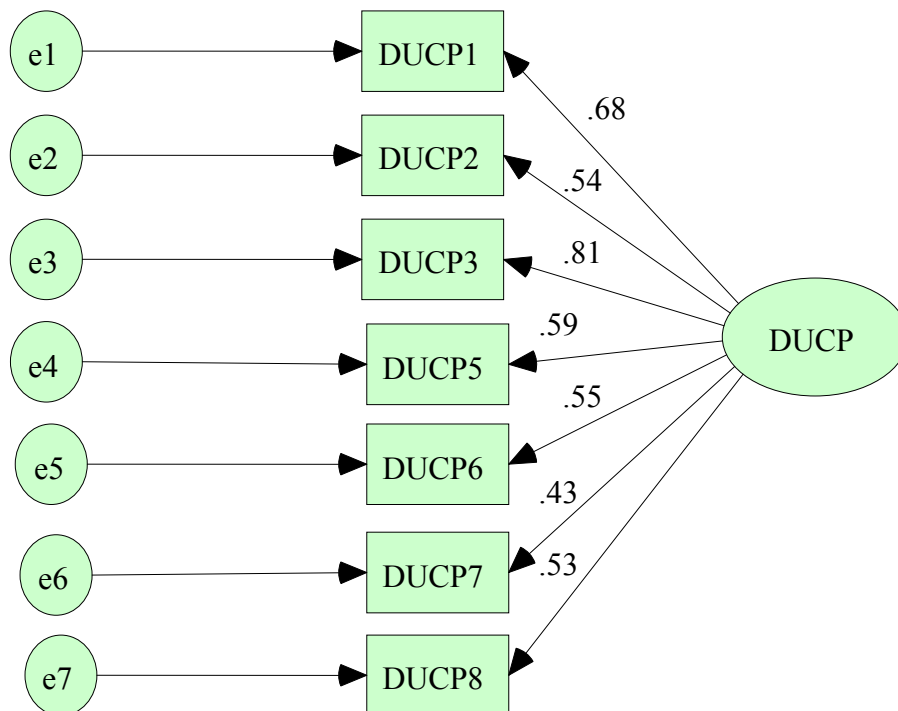
Figure 4.12: TW - Measurement Model – DUCP
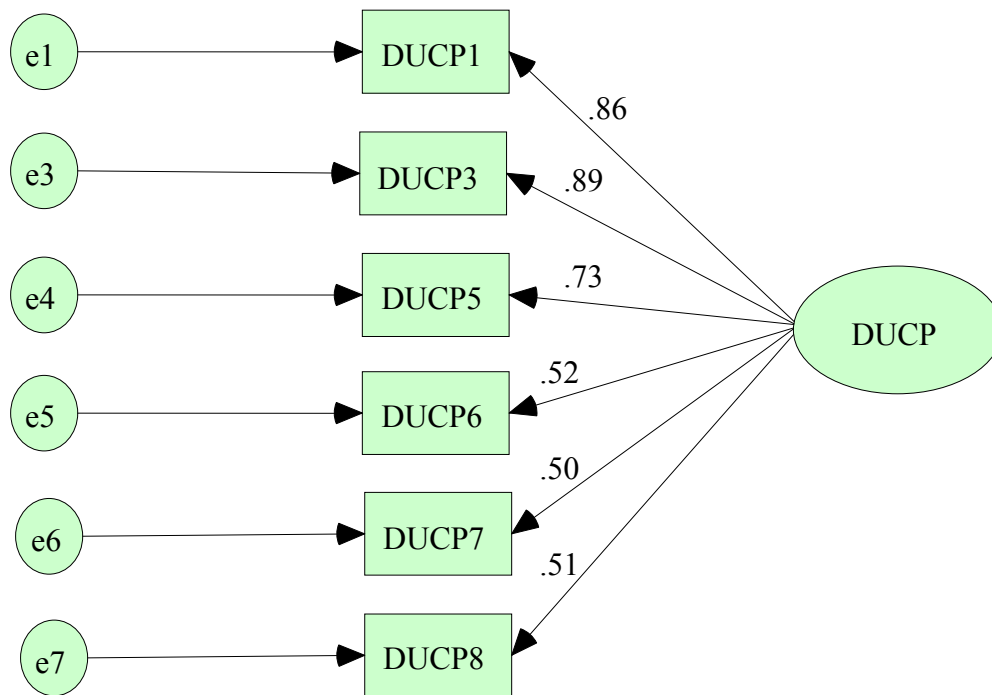
4.13.4.6   Opinion Leadership

Table 4.32 and 4.33 present internal consistency, square roots of average variance extracted and correlation matrix and model fit of opinion leadership in the three countries.

Australia Data

The average variance extracted for each of the 2 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by opinion (.75) was greater than the correlation between opinion and persuasion (.44). The average variance accounted for by persuasion (.79) was greater than the correlation between opinion and persuasion (.44).

The results indicate that opinion and persuasion are distinct measures of opinion leadership in Australian data. Further, the goodness of fit requirements indicate an acceptable fit and therefore demonstrate convergent validity.

Table 4.32: Internal Consistency, Square Roots of Average Variance Extracted and Correlation Matrix and Model Fit - OL

Construct	Internal Consistency			AUS		CN		TW	
	Aus	CN	TW	1	2	1	2	1	2
1 Opinion	.79	.75	.79	**.75**		**.71**		**.75**	
2 Persuasion	.84	.64	.73	.44	**.79**	.36	**.61**	.26	**.68**

Table 4.33: Goodness of Fit Analysis - OL

Goodness of Fit Measure	AUS	CN	TW
Model Fit			
Chi-squared	20.878	8.531	10.877
Degrees of Freedom	8	8	8
P-value	.007	.383	.209
Cmin/df	2.610	1.066	1.360
Goodness of Fit Index	.97	.99	.98
Adjusted Goodness of Fit	.93	.96	.96
RMSEA	.08	.02	.04
Model Comparison			
Tucker-Lewis Index (TLI)	.96	.99	.98
Normed Fit Index (NFI)	.97	.96	.97
Comparative Fit Index (CFI)	.98	.99	.99

China Data

The average variance extracted for each of the 2 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by opinion (.71) was greater than the correlation between opinion and persuasion (.36). The average variance accounted for by persuasion (.61) was greater than the correlation between

opinion and persuasion (.36).

The results indicate that opinion and persuasion are distinct measures of opinion leadership in Australian data. Further, the goodness of fit requirements indicate an acceptable fit and therefore demonstrate convergent validity, the constructs will be kept distinct for the development of the structural equation model.

Taiwan Data

The average variance extracted for each of the 2 constructs was well above .50, which indicates good convergent validity. The average variance accounted for by opinion (.75) was greater than the correlation between opinion and persuasion (.26). The average variance accounted for persuasion (.68) was greater than the correlation between opinion and persuasion (.26).

The results indicate that opinion and persuasion are distinct measures of opinion leadership in Australian data. Further, the goodness of fit requirements indicates an acceptable fit. Thus, there is support for the assumption of convergent validity, and the dimensions will be kept distinct for the development of the structural equation model.

Figure 4.13: AUS - Measurement Model – OL
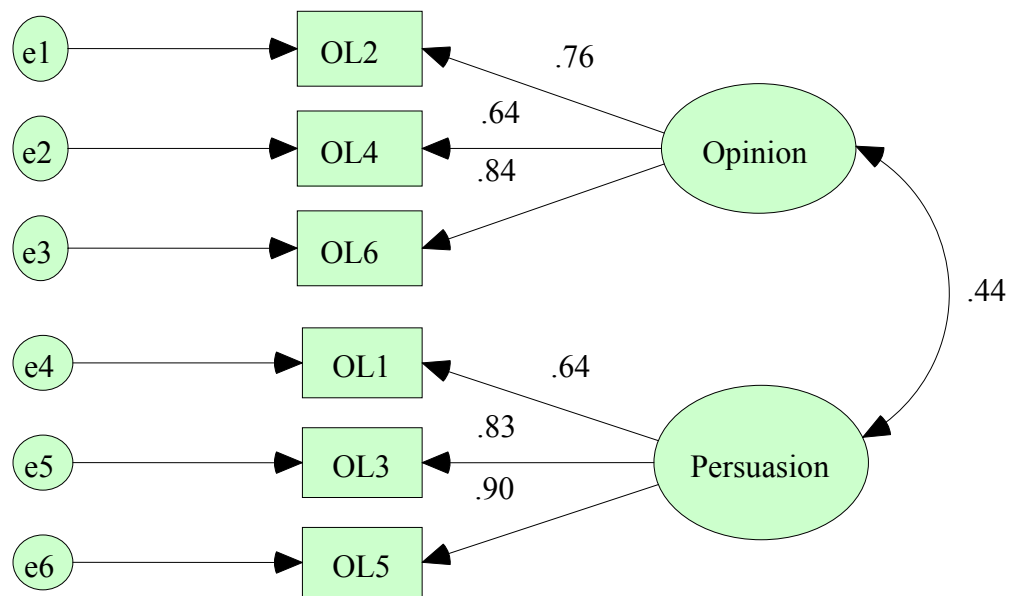
Figure 4.14: CN - Measurement Model – OL
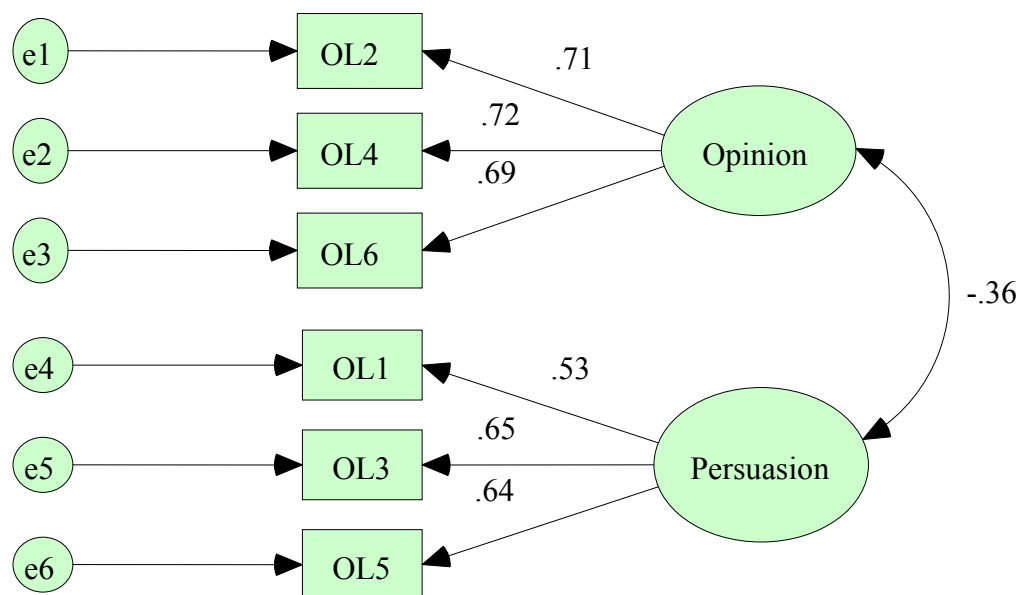
Figure 4.15: TW - Measurement Model – OL
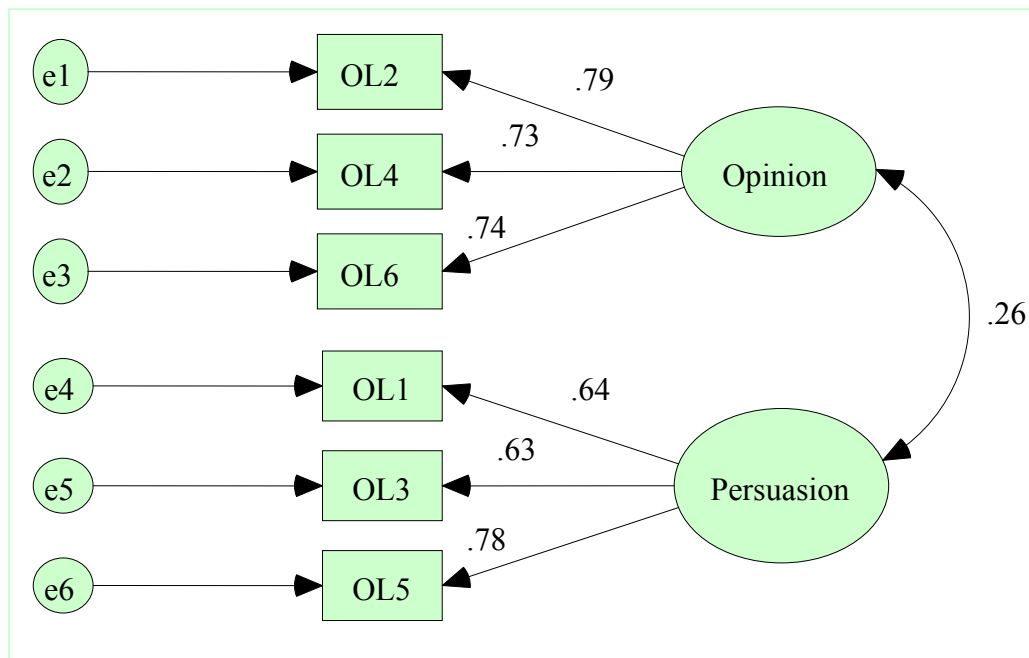
4.13.5   Nomological Validity

The purpose of nomological validity is to determine the relationship between the theoretical constructs. The correlation matrix presented as Table 4.34 was used to assess the scales which are correlated theoretically measure different, but related constructs (Malhotra, Kim, and Patil, 2006a). The result supports the nomological validity of the key constructs. The direction and weights of the correlation values were comparable with the anticipated relationships among three countries. Almost, all factors were correlated at a significance level of $p=<0.01$. The only variable that did not correlate consistently with other variable was the measure of vicarious innovativeness which is suggested only by Im, Mason, Houston (2007) to have significant relationship with CII and new product adoption, but has not yet been wildly cross-validated.

4.13.6   Multicollinearity

Independent variables should be examined for collinearity which indicates the degree of correlation between independent variables (Malhotra, Kim, and Patil, 2006a). High degree of collinearity arises the problem of collinearity in multiple regression analyses. When two independent variables are highly correlated ($r > .70$), it indicates that one of them is unnecessary in the analysis (Tabachnick and Fidell, 2001). Table 4.34~4.36 found no strong correlations which support for the assumption of collinearity between variables was not an issue. There is one variable need to be mentioned which is number of children. Because of one-child policy in China, people are not allowed to have more than one child. As a consequence, this variable should not be an issue in China. This variable was evaluated in both Australia and Taiwan, not China.

Table 4.34: Means, Standard Deviations, and Correlation - AUSTRALIA

	1	2	3	4	5	6	7	8	9	10	11	12
1. CII	1.00											
2. DSI	.63**	1.00										
3. DUCP	-.16**	.26**	1.00									
4. OL	.19**	.52**	.48**	1.00								
5. VI	-.26**	-.04	.37**	.19**	1.00							
6. Age	-.01	-.06	-.34**	-.21**	-.18**	1.00						
7. Gender	-.001	-.14*	-.08	-.10	.01	-.23**	1.00					
8. EDU	.02	.14*	.18**	.23**	.32**	-.19**	-.02	1.00				
9. Income	.15*	.21**	.12	.17**	.11	.003	-.34**	.32**	1.00			
10. NC	-.05	-.11	.29**	-.20**	-.02	.42**	.02	-.14*	.03	1.00		
11. OWN	.10	.17**	.14*	.14*	.12	-.25**	.01	.16*	.19**	.02	1.00	
12. RTA	.15*	.15*	.05	.16*	.07	-.20**	-.03	.19*	.20**	-.02	.82**	1.00
Mean	4.42	4.75	3.72	4.20	4.30	3.34	1.48	3.02	2.61	2.64	5.25	19.53
Std dev	.81	1.32	1.08	1.00	1.01	1.33	.50	1.13	1.44	1.32	2.49	9.63

Note. **$p<0.01$, *$p<0.05$, two-tailed; CII (consumer innate innovativeness), DSI (domain specific innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership), VI (vicarious innovativeness), OWN (ownership), RTA (relative time of adoption), EDU (education), NC (number of children).

Table 4.35: Means, Standard Deviations, and Correlation - China

	1	2	3	4	5	6	7	8	9	10	11
1. CII	1.00										
2. DSI	.57**	1.00									
3. DUCP	-.23**	-.11	1.00								
4. OL	.20**	.25**	.18*	1.00							
5. VI	-.13	-.11	.30**	.15*	1.00						
6. Age	-.22**	-.22**	.02	-.08	.03	1.00					
7. Gender	.06	.04	-.17*	.04	-.03	-.16*	1.00				
8. EDU	.17*	.12	.06	.14*	.04	.03	-.004	1.00			
9. Income	.08	-.02	.15*	.07	-.07	.29**	-.11	.34*	1.00		
10. OWN	.19**	.28**	.07	.18**	.06	-.18**	.02	.39**	.06	1.00	
11. RTA	.24**	.35**	.03	.24**	.10	-.13	.03	.33**	.06	.81**	1.00
Mean	4.01	4.36	4.36	4.18	4.96	1.83	1.51	3.68	2.24	3.17	9.30
Std dev	.85	1.20	1.00	.68	.87	.87	.50	.78	1.30	3.19	10.61

Note. **p<0.01, *p<0.05, two-tailed; CII (consumer innate innovativeness), DSI (domain specific innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership), VI (vicarious innovativeness), OWN (ownership), RTA (relative time of adoption), EDU (education), NC (number of children).

Table 4.36: Means, Standard Deviations, and Correlation - Taiwan

	1	2	3	4	5	6	7	8	9	10	11	12
1. CII	1.00											
2. DSI	.50**	1.00										
3. DUCP	-.29**	.09	1.00									
4. OL	.06	.40**	.32**	1.00								
5. VI	-.33**	-.19**	.28**	.07	1.00							
6. Age	.24**	.11	-.29**	-.06	-.12	1.00						
7. Gender	.12	-.05	-.06	-.01	.08	-.12	1.00					
8. EDU	.02	-.01	.04	.10	-.03	-.28**	.09	1.00				
9. Income	.19**	.19**	-.15*	.07	-.18*	.34**	-.10	-.02	1.00			
10. NC	.15*	.14*	-.18*	.04	-.04	.63**	-.02	-.22**	.29**	1.00		
11. OWN	.11	..33**	.20**	.25**	-.003	.12	-.17*	.04	.24**	.23**	1.00	
12. RTA	.20**	.35**	.09	.23**	-.04	.21*	-.17*	.003	.27**	.25**	.77**	1.00
Mean	3.96	4.32	4.18	4.27	5.18	2.16	1.52	3.96	1.60	1.45	3.94	13.62
Std dev	.74	1.29	1.08	.89	.88	1.03	.50	.52	.63	.80	2.52	10.34

Note. **$p<0.01$, *$p<0.05$, two-tailed; CII (consumer innate innovativeness), DSI (domain specific innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership), VI (vicarious innovativeness), OWN (ownership), RTA (relative time of adoption), EDU (education), NC (number of children)

4.14   CHAPTER SUMMARY

Section I of Chapter Four provided an explanation of the operationalisation of the constructs associated with the conceptual model. Existing scales were utilized and tested in the pilot study, and necessary modifications were made for final study. Section II evaluated each constructs in terms of reliability and validity by examining coefficient alphas, exploratory and confirmatory factor analysis and correlation analysis. The constructs were found to achieve acceptable reliability and demonstrate content and convergent validity. The results of the research and discussion of research hypothesis are presented in Chapter Five.

CHAPTER 5 – RESULTS AND DISCUSSION

5.1   INTRODUCTION

Chapter Five presents the results of the analysis undertaken to examine the hypotheses associated with the study. The purpose of this research is to examine the influence of consumer innovativeness and other factors while consumers are purchasing really new products in Australia, China, and Taiwan markets. The purpose is further divided into four objectives. The first object is to examine whether Australian, Chinese and Taiwanese consumers exhibit any difference in the measuring constructs and really new product adoption. The second objective is to investigate the relationships between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, opinion leadership, the desire for unique consumer products and the adoption of really new products. The specific hypotheses are:

Proposition 1: **Consumer Innate Innovativeness** (CII) is associated with ownership of really new products and relative time of really new product adoption

  H1a: Consumer Innate Innovativeness is positively associated with ownership of really new product
  H1b: Consumer Innate Innovativeness is positively associated with relative time of really new product adoption

Proposition 2: **Domain Specific Innovativeness** (DSI) is associated with ownership of really new products and relative time of really new product adoption

    H2a: Domain Specific Innovativeness is positively associated with ownership of really new product

    H2b: Domain Specific Innovativeness is positively associated with relative time of really new product adoption

Proposition 3: **Vicarious Innovativeness** (VI) is associated with ownership of really new products and relative time of really new product adoption

    H3a: Vicarious Innovativeness - Advertising is positively associated with ownership of really new product

    H3b: Vicarious Innovativeness - Advertising is positively associated with relative time of really new product adoption

    H3c: Vicarious Innovativeness - Modeling is positively associated with ownership of really new product

    H3d: Vicarious Innovativeness - Modeling is positively associated with relative time of really new product adoption

    H3e: Vicarious Innovativeness – Word of Mouth is positively associated with ownership of really new product

    H3f: Vicarious Innovativeness –Word of Mouth is positively associated with relative time of really new product adoption

Proposition 4: **The Desire for Unique Consumer Products** (DUCP) is associated with ownership of really new products and relative time of really new product adoption

> H4a: The desire for unique consumer products is positively associated with ownership of really new product
>
> H4b: The desire for unique consumer products is positively associated with relative time of really new product adoption

Proposition 5: **Opinion Leadership** (OL) is associated with ownership of really new products and relative time of really new product adoption

> H5a: Opinion leadership is positively associated with ownership of really new product
>
> H5b: Opinion leadership is positively associated with relative time of really new product adoption.

The third objective is to examine the relationship between consumer innate innovativeness and other measurement constructs and the mediating effect of domain specific innovativeness, vicarious innovativeness, opinion leadership and the desire for unique consumer products between consumer innate innovativeness on really new product adoption. Further, the moderating effects of vicarious innovativeness, the desire for unique consumer products and opinion leadership on the relationship between consumer innate innovativeness and really new product adoption are also examined. The specific hypotheses are:

Proposition 7: **Consumer Innate Innovativeness** (CII) is associated with DSI, VI, DUCP and OL

H7a: Consumer Innate Innovativeness is positively associated with domain specific innovativeness

H7b: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Advertising

H7c: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Modeling

H7d: Consumer Innate Innovativeness is negatively associated with vicarious innovativeness – Word of Mouth

H7e: Consumer Innate Innovativeness is positively associated with the desire for unique consumer products

H7f: Consumer Innate Innovativeness is positively associated with opinion leadership

Proposition 8: DSI, VI, DUCP and OL mediate the relationship between CII and ownership of really new products and relative time of really new product adoption

H8a: Domain Specific Innovativeness mediates the relationship between Consumer Innate Innovativeness and ownership of really new product

H8b: Domain Specific Innovativeness mediates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H8c: Vicarious innovativeness - Advertising mediates the relationship between consumer innate innovativeness and ownership of really new product

H8d: Vicarious innovativeness - Advertising mediates the relationship between consumer innate innovativeness and relative time of really new product adoption

H8e: Vicarious innovativeness - Modeling mediates the relationship between consumer innate innovativeness and ownership of really new product

H8f: Vicarious innovativeness - Modeling mediates the relationship between consumer innate innovativeness and relative time of really new product adoption

H8g: Vicarious innovativeness – Word of Mouth mediates the relationship between consumer innate innovativeness and ownership of really new product

H8h: Vicarious innovativeness – Word of Mouth mediates the relationship between consumer innate innovativeness and relative time of really new product

H8i: The desire for unique consumer products mediates the relationship between Consumer Innate Innovativeness and ownership of really new product

H8j: The desire for unique consumer products mediates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H8k: Opinion leadership moderates the relationship between consumer innate innovativeness and ownership of really new product

H8l: Opinion leadership moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

Proposition 9: VI, DUCP and OL moderate the relationship between CII and ownership of really new products and relative time of really new product adoption

H9a: Vicarious innovativeness - Advertising moderates the relationship between consumer innate innovativeness and ownership of really new product

H9b: Vicarious innovativeness - Advertising moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

H9c: Vicarious innovativeness - Modeling moderates the relationship between consumer innate innovativeness and ownership of really new product

H9d: Vicarious innovativeness - Modeling moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

H9e: Vicarious innovativeness – Word of Mouth moderates the relationship between consumer innate innovativeness and ownership of really new product

H9f: Vicarious innovativeness – Word of Mouth moderates the relationship between consumer innate innovativeness and relative time of really new product

H9g: The desire for unique consumer products moderates the relationship between Consumer Innate Innovativeness and ownership of really new product

H9h: The desire for unique consumer products moderates the relationship between Consumer Innate Innovativeness and relative time of really new product adoption

H9i: Opinion leadership moderates the relationship between consumer innate innovativeness and ownership of really new product

H9j: Opinion leadership moderates the relationship between consumer innate innovativeness and relative time of really new product adoption

The fourth objective is to examine the effects of demographic factors of age, gender, education level, income and number of children on really new product adoption. The specific hypotheses are:

Proposition 6: Demographics is associated with ownership of really new products and relative time of really new product adoption

H6a: There is a relationship between consumer characteristics and ownership of really new product

H6b: There is a relationship between consumer characteristics and relative time of really new product adoption

5.2   DATA ANALYSIS

In this research, for objective one, ANOVA is utilized to examine the cross country difference in all research variables. Multiple regression is conducted to examine the direct relationships between variables for hypotheses 1a~1b, 2a~2b, 3a~3f, 4a~4b, and 5a~5b of objective two and hypotheses 6a~6b for objective four. Structural equation modeling is then applied for a more comprehensive analysis on examining the direct, indirect and total effects of the independent variables on the dependant variables for hypotheses7a~7f and 8a~8l of objective three.

5.2.1   ANOVA

Analysis of Variance is used to examine the mean difference among Australian, Chinese and Taiwanese consumers in the research's variables of consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and really new product adoption. Only one independent variable is involved at a time. Therefore, one-way ANOVA is appropriate. The F-ratio with an F-probability value less than .05 is used to suggest that the independent variable significantly influence the dependent variable. In order to avoid making the assumption of equal variances, Tamhane's T2 test is utilized because it does not make the assumption of equal variances across the countries.

5.2.2   Multiple Regression

Multiple regression is suggested to provide the best prediction of a dependant variable from a set of independent variables (Coakes, Steed, and Price, 2008). In the research,

SPSS 12 is utilized to examine the relationships between CII, DSI, VI, DUCP, OL, and demographics. Regression is also used to assess the predictive effects of all constructs on Ownership of really new product and Relative Time of Adoption.

The purpose of multiple regression analysis is to examine the association between the entire set of independent variables and the dependant variables. R^2 values, the indicator of the percentage of variance of the dependent variable explained and F-ratio, the significance indicate the efficacy of the regression model fit. The beta and t-values represent the importance and significance of the prediction of a dependent from the independent variables. A standard or simultaneous regression method is used rather than a hierarchical or stepwise method since the interest is in finding the effects of these independent variables controlling for their joint effects. All variables are entered to the regression model.

5.2.2.1   Assumptions of Multiple Regression

Prior to the regression analysis, a number of assumptions need to be identified and examined to ensure there is no violation of the assumptions. These assumptions relate to sample size, collinearity, outlier, normality, linearity, homoscedasticity, and independence of error (Coakes, Stee, and Price, 2008). These are discussed briefly in the next section.

Sample size

In the aspect of sample size requirement, the recommend minimum is five times more cases than predictors (Jung, 2006). Coakes, Stee, and Price (2008) suggested 20 times more cases than independent variables is the ideally sample size. In the current study, the

samples of 256 Australian, 207 Chinese, and 209 Taiwanese are well above the recommend sample size. The largest number of independent variables used in the regression analysis is five in the demographic regression model.

Collinearity

Collinearity refers to independent variables that are highly correlated. A high degree of correlation creates problems in separating the effects of independent variables on the dependent variables (Malhotra, Kim and Patil, 2006a). As indicated in Chapter Four, the correlation matrix between independent variables presented initially that no correlation is greater than 0.70 which indicates that collinearity is not a concern (Tabachnick and Fidell, 2001). Two collinearity diagnostics; Tolerance and Variation Inflation Factor (VIF) are further used as measures of collinearity. A tolerance value of less than .10 indicates high correlation between independent variables, and a VIF of above 10 represents multicollinearity (Tabachnick and Fidell, 2001). In the study, all observed results fell within the range of acceptability. As a result, the assumption of collinearity between the variables is not violated.

Outliers

Case-wise plots are used to identify outlying cases. Three cases in Australia data, four cases in China data, and one case in Taiwan data have a standardized residual value of above 3.00 or below -3.00. These outlying observations are further investigated examining the Cook's Distance value in the Residuals Statistics table which suggests that the value below 1.00 indicates that there is no excessive effect on the regression results (Tabachnick and Fidell, 2001). All the Cook's distance values are well below 1.00.

Normality, Linearity, and Homoscedasticity

The residual scatter plots for each regression equation are examined to access the assumptions of normality, linearity, and homoscedasticity. For normality, all plots in the normal plot of regression standardized residuals for the dependent variable are normally distributed along the diagonal drawn from the O axis point. The assumption of normality is therefore not violated in the three countries. From the three countries' scatterplots of residuals, all plots are randomly distributed by which indicates that there is no clear relationship between the residuals and the predicted values and hence the assumption of linearity is not violated.

Independence of Error

The Durbin-Watson statistic is utilized to examine independence of error. The statistic checks the correlation between the residuals, and a score close to 2 is considered acceptable (Norusis, 1993). Durbin-Watson statistics ranged from 1.885 to 2.210 for Australia data, from 1.566 to 1.964 for China data, and from 1.635 to 2.174 for Taiwan data are produced. That is supported that the assumption of independence of error is not violated.

5.2.3   Structural Equation Modeling (SEM)

Structural equation modeling, also named latent variable analysis or covariance structure analysis is a multivariate statistic method. It includes many widely used statistical methods such as regression analysis, confirmatory factor analysis and path analysis, and assesses hypothesized interrelationships among a set of theoretical independent variables,

dependent variables, and error variables. (Crowley and Fan, 1997).

SEM is considered as a confirmatory rather than an exploratory approach to data analysis. Confirmatory factor analysis was discussed in Chapter Four. For path analysis, SEM is used in this analysis because it examines relations among observed and unobserved variables while multiple regression analysis assesses only one dependent variable at a time. It also calculates direct, indirect and total effects between variables (Wu, 2007). AMOS version 7 is used to test the hypotheses developed for the study.

The hypothesized relationships between the independent variables and the dependent variable are calculated by a path coefficient to indicate direct effects which are presented as standardized regression weights, the $\beta 1$ value in Figure 5.1. These values indicate a one unit change in an independent variable directly result the change in a dependent variable.

A dependent variable may be influenced indirectly by an independent variable. The indirect effects are the effects of independents variables on the dependent variables through one or more mediators. The β value represents one unit change in an independent variable directly causes the change in a dependent variable. The indirect effects are measured by multiplying the $\beta 2$ value between an independent variable and a mediator, and the $\beta 3$ value between a mediator and the dependent variable in Figure 5.1. The sum of the indirect and direct effects indicates the total effects between the independent and dependent variables (Wu, 2007).

Figure 5.1: Direct and Indirect Effects
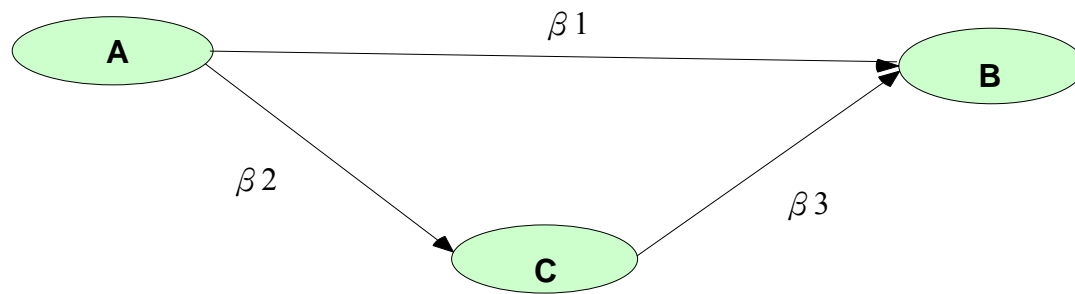
Direct Effect $= \beta 1$

Indirect Effect $= \beta 2 * \beta 3$

Total Effects $= \beta 1 + \beta 2 * \beta 3$

Source: (Schumacker and Lomax, 2004)

With respect to sample size, the larger the sample size, the more confidence can be expressed for the SEM model. The appropriate sample size is suggested to be above 200 (Boomsma, 1983; Tanaka, 1987). Further, the number of parameters estimated in the SEM model links closely to the appropriateness of sample size. The suggested ratio of sample size and distinct parameters to be estimated is 5:1 (Schumacker and Lomax, 2004). In the study, the final sample size is 256 for Australia, 207 for China, and 209 for Taiwan which indicates that the developed model should not have more than 51 observed variables for Australia data, and 42 observed variables for China and Taiwan data. It met the generally accepted rule. Therefore, appropriate parameter estimates could be expected with a full structural equation model.

5.3   SAMPLE CHARACTERISTICS OF THE STUDY

Table 5.1 presents the descriptive analysis for Australian, Chinese and Taiwanese sample characteristics.

The demographics for the current study reveal that gender is distributed equally for the three countries (Male: n = 132, 51.5% Australia; n = 106, 48.8% China; n = 109, 47.8% Taiwan). Respondents between 26-35 and 36-45 years old are the predominated groups in Australia (n = 130, 50.8%). Half of the respondents are between 26-35 years old in China (n = 104, 50.2%) and Taiwan (n = 104, 49.8%). In Australia, 44.9% (n = 115) of respondents has secondary school degree. More than half of respondents have undergraduate degree in China (n = 116, 56%) and Taiwan (n = 161, 77%). The average household income for Australia samples is in the range of less than $2,000 AUS dollars per month (n = 77, 30.1%), the average household income in China samples is in the range of less than $150 AUS dollars per month (n = 74, 37.4%), and the average household income in Taiwan samples is in the range of $1,000 to $2,600 AUS dollars per month (n = 104, 49.8%). The average number of children in the Australia samples is three (n = 82, 32%) and the average number of children in the Taiwan samples is one (n = 149, 71.3%). Because of the one-child policy, Chinese are expected to have no more than one child per family. As a consequence, number of children is not involved in the analysis of China data.

Table 5.1: Description of Respondents (N = 256, Aus; 207, China; 209, Taiwan)

	Australia		China		Taiwan	
	Response	**Total**	**Response**	**Total**	**Response**	**Total**
Age: 18-25	5.9%	15	36.7%	76	23.4%	49
26-35	25.4%	65	50.2%	104	49.8%	104
36-45	25.4%	65	9.7%	20	19.6%	41
45-55	21.1%	54	1.9%	4	3.8%	8
56-65	16.4%	42	0.5%	1	1.9%	4
66+	5.9%	15	1%	2	1.5%	3
Total	100%	256	100%	207	100%	209
Gender: Male	51.6%	132	48.8%	101	47.8%	100
Female	48.4%	124	51.2%	106	52.2%	109
Total	100%	256	100%	207	100%	209
Education: Primary	0.4%	1	1.0%	2	0%	0
Secondary (junior high for CN, TW)	44.9%	115	5.8%	12	1.4%	3
Diploma (senior high for CN, TW)	23.0%	59	27.5%	57	11.5%	24
UnderGrad	16.8%	43	56.0%	116	77%	161
Graduate	14.1%	36	9.2%	19	10%	21
PhD	0.8%	2	0.5%	1	0%	0
Total	100%	256	100%	207	100	209
Income: <$2000	30.1%	77				
(AUS) $2,000-$4,000	22.7%	58				
$4,001-$6,000	20.3%	52				
$6,001-$8000	10.2%	26				
>$8,000	16.8%	43				
Total	100%	256				
Income: <$1000			35.7%	74		
(CN) $1,001-$2,000			27.5%	57		
$2,001-$3,000			15.9%	33		
$3,001-$4000			6.8%	14		
>$4,000			9.7%	20		
Missing			4.3%	9		
Total			100%	207		
Income: <$30,000					45.9%	96
(TW) $30,000-$80,000					49.8%	104
$80,000-$130,000					3.3%	7
$130,000-$180,000					0.5%	1
>$180,000					0.5%	1
Total					100%	209
# of Children: 0	30.1%	77			71.3%	149
1	11.3%	29			15.8%	33
2	32.0%	82			11.0%	23
3	17.6%	45			1%	2
4+	9.0%	23			1%	2
Missing	0	0			0%	0
Total	100%	256			100%	209

Note. Income levels relate to each country's currency

5.4   ANOVA – CROSS COUNTRY DIFFERENCE

The first object of this research is to examine whether Australian, Chinese and Taiwanese consumers exhibit any difference in the measuring constructs and really new product adoption. One-way ANOVA is employed to examine the mean difference in the three countries for all research variables. The results are presented in Table 5.2.

The post hoc test via Tamhane's T2 scores indicates that only the constructs of opinion leadership had no and weak significant mean differences between Australia, China and Taiwan consumers. For consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and really new product adoption, significant differences are evident. The F ratios are all at p<0.001 for each construct except Challenging of New Ideas of consumer innate innovativeness with p<0.05.

Table 5.2: Cross Country Difference

| | Group Means | | | | |
	AUS n=256	CN n=207	TW n=209	F-Ratio	Differences and Significance Level
Consumer Innate Innovativeness (CII)					
Accepting New Ideas	4.51	4.11	4.03	16.17***	AUS>CN/TW
Suspiciousness of New Ideas	4.88	4.29	3.94	33.79***	AUS>CN/TW CN>TW
Challenging of New Ideas	3.71	3.42	3.76	3.85*	AUS>CN CN>TW
Domain Specific Innovativeness (DSI)					
Speed of Purchase	4.75	4.36	4.32	8.08***	AUS>CN/TW
Vicarious Innovativeness (VI)					
Advertising	4.84	4.97	5.30	9.91***	TW>AUS/CN
Modeling	3.82	4.87	4.95	66.25***	AUS<CN AUS<TW
WOM	4.23	5.03	5.28	48.79***	AUS<CN TW>AUS/CN
The Desire for Unique Consumer Products (DUCP)					
DUCP	3.72	4.36	4.18	24.42***	AUS<CN AUS<TW
Opinion Leadership (OL)					
Opinion	4.41	4.29	4.27	1.03	
Persuasion	3.98	4.08	4.26	3.29*	AUS<TW
Really New Product Adoption					
Ownership	5.25	3.17	3.94	34.60***	AUS>CN/TW CN<TW
RTA	19.53	13.62	9.30	59.27***	AUS>CN/TW CN>TW

∗ =p<0.1, *=p<0.05, **=p<0.01, ***=p<0.001

5.4.1　　　Discussion of Results for Cross Countries Differences

The only non significant result was found in opinion leadership across three countries. The three countries' consumers exhibit the strongest mean differences in really new product adoption behaviour. These findings suggest that consumers with different cultural backgrounds generally exhibit a different level of consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, and really new product adoption. Australians are suggested to have a higher level of consumer innate innovativeness and domain specific innovativeness. In terms of vicarious innovativeness, Chinese and Taiwanese generally present a higher level than Australians. Further, the results indicate that Australians have the lowest level of the desire for unique consumer products.

Among the three countries, Australia represents western culture, while China and Taiwan represent eastern culture. It is not surprising that Australia exhibits different results from both China and Taiwan. In contrast, surprisingly, China and Taiwan, the two Asian countries that share similar cultural background and language also differ from each other. The reason could be that China and Taiwan have been politically separated for over sixty years. People in China and Taiwan are living in different conditions for all the aspects. Even though Shanghai, the major city of China, has been opened to western culture for years, Taiwanese, on the other hand, are more influenced by the culture of the U.S. and Japan for decades. This may explain why differences exist between China and Taiwan.

Wang and Waller (2006) suggest that the use of univariate ANOVA approach would lead to the erroneous conclusion that there are no differences between countries. In this study, the results of ANOVA and measurement invariance supported the essentiality of

investigating measurement invariance in a cross-national study (Mavondo, Gabbott, and Tsarenko, 2003; Steenkamp and Baumgartner, 1998, Vandeburg and Lance, 2000).

5.5 MULTIPLE REGRESSION – REALLY NEW PRODUCT ADOPTION

This section examines the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and really new product adoption in Australia, China and Taiwan.

The hypothesized relationships are represented in Table 5.3, 5.4 and 5.5.

Table 5.3: Really New Product Adoption Regressions - AUS

	Hypothesized Direction of Relationship	Ownership						Relative Time of Adoption					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
H6: Demographics	+/-												
Age		-.302***					-.244**	-.225**					-.187**
Gender		-.011					.029	-.024					-.003
Education		.072					.033	.107					.082
Income		.162**					.140*	.159*					.135∗
Number of Children		.154*					.168*	.088					.105
H1: CII	+												
Accepting New Ideas			.029				-.081		.009				-.075
Suspicious of New Ideas			.067				.067		.136				.143∗
Challenging of New Ideas			.054				.107		.105				.138*
H2: DSI	+												
Speed of Purchase				.139*			.105			.138*			.022
New Product Information				.144*			.238*			.075			.235*
H3: VI	+												
Advertising					.012		.022				-.038		-.026
Modeling					-.025		-.012				-.054		.030
Word of Mouth					.151∗		.063				.162∗		-.179
H4, H5: Other Factors	+												
DUCP						.094	-.070					-.053	-.179
Opinion						.051	.015					.065	.008
Persuasion						.061	-.048					.158*	.103
R^2		**.121**	**.011**	**.048**	**.019**	**.026**	**.170**	**.097**	**.034**	**.029**	**.015**	**.028**	**.164**
Adj R^2		**.103**	**.011**	**.040**	**.008**	**.014**	**.115**	**.079**	**.034**	**.021**	**.003**	**.016**	**.109**
F-ratio		**6.870*****	**.972**	**6.378****	**1.660**	**2.227∗**	**3.063*****	**5.374*****	**2.996***	**3.750***	**1.274**	**2.416∗**	**2.940*****
DF		**5**	**3**	**2**	**3**	**3**	**16**	**5**	**3**	**2**	**3**	**3**	**16**

∗ =p<0.1, *=p<0.05, **=p<0.01, ***=p<0.001 (the figures in the tables are standardized regression weights) CII (consumer innate innovativeness), DSI (domain specific innovativeness), VI (vicarious innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership)

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Table 5.4: Really New Product Adoption Regressions - CN

		Ownership						Relative Time of Adoption					
Hypothesized Direction of Relationship		**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
H6: Demographics	**+/-**												
Age		-.189**					-.144*	-.151*					-.082
Gender		-.005					.005	-.006					-.008
Education		.399***					.360***	.338***					.269***
Income		-.021					-.043	-.178					-.031
H1: CII	**+**												
Accepting New Ideas			.236**				-.030		.265**				-.046
Suspicious of New Ideas			-.065				-.056		-.048				-.029
Challenging of New Ideas			.038				.077		.073				.145∗
H2: DSI	**+**												
Speed of Purchase				.284***			.150			.352***			.226*
H3: VI	**+**												
Advertising					.270***		.222**				.218**		.162*
Modeling					-.179*		-.059				-.209**		-.072
Word of Mouth					-.018		-.068				.118		.070
H4, H5: Other Factors	**+**												
DUCP						.079	.070					.044	.043
Opinion						.216**	.085					.302***	.157∗
Persuasion						.052	.024					.079	.067
R²		**.186**	**.049**	**.080**	**.068**	**.048**	**.267**	**.131**	**.069**	**.124**	**.071**	**.085**	**.258**
Adj R²		**.169**	**.035**	**.076**	**.054**	**.034**	**.211**	**.113**	**.055**	**.119**	**.057**	**.072**	**.201**
F-ratio		**11.014*****	**3.481****	**17.925*****	**4.994****	**3.406***	**4.768*****	**7.265*****	**5.017****	**28.943*****	**5.144****	**6.288*****	**4.537*****
DF		**4**	**3**	**1**	**3**	**3**	**14**	**4**	**3**	**1**	**3**	**3**	**14**

∗ =p<0.1, *=p<0.05, **=p<0.01, ***=p<0.001 (the figures in the tables are standardized regression weights) CII (consumer innate innovativeness), DSI (domain specific

innovativeness), VI (vicarious innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership)

Table 5.5: Really New Product Adoption Regressions - TW

	Hypothesized Direction of Relationship	Ownership						Relative Time of Adoption					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
H6: Demographics	+/-												
Age		-.113					-.095	.024					.014
Gender		-.169*					-.123∗	-.150*					-.124∗
Education		.088					.074	.068					.047
Income		.189**					.172*	.194**					.162*
Number of Children		.267**					.243**	.188**					.162*
H1: CII	+												
Accepting New Ideas			.183**				-.004		.213**				.022
Suspicious of New Ideas			.022				.058		.106				.114
Challenging of New Ideas			-.124∗				-.067		-.118∗				-.085
H2: DSI	+												
Speed of Purchase				.328***			.194*			.347***			.206*
H3: VI	+												
Advertising					.287***		.207**				.218**		.157*
Modeling					-.089		.002				-.076		.053
Word of Mouth					-.147		-.098				-.149		-.101
H4, H5: Other Factors	+												
DUCP						.161*	.151∗					.041	.056
Opinion						.199**	.088					.217**	.091
Persuasion						.057	-.037					.065	-.002
R^2		**.127**	**.050**	**.108**	**.083**	**.086**	**.284**	**.129**	**.080**	**.120**	**.057**	**.062**	**.265**
Adj R^2		**.106**	**.036**	**.103**	**.070**	**.073**	**.228**	**.108**	**.067**	**.116**	**.043**	**.048**	**.208**
F-ratio		**5.929*****	**3.588****	**24.989*****	**6.207*****	**6.466*****	**5.093*****	**6.032*****	**5.973****	**28.264*****	**4.110****	**4.521****	**4.639*****
DF		**5**	**3**	**1**	**3**	**3**	**15**	**5**	**3**	**1**	**3**	**3**	**15**

∗ =p<0.1, *=p<0.05, **=p<0.01, ***=p<0.001 (the figures in the tables are standardized regression weights) CII (consumer innate innovativeness), DSI (domain specific innovativeness), VI (vicarious innovativeness), DUCP (the desire for unique consumer products), OL (opinion leadership)

5.5.1 Consumer Characteristics and Really New Product Adoption

Model 1

Model 1 is developed to test the demographics as independent variables and really new product adoption as the dependent variable. Ownership represents the numbers of really new products owned by the respondents at the time of study. Relative Time of Adoption represents the number of years or months since the adoption of really new products.

Australia Data

The demographic factors in model one explain 12.1% of the variance in Ownership and 9.7% of the variance in Relative Time of Adoption in Australia data. Age was found to be associated with both Ownership (β = -.302, t = -4.396, p<0.001) and Relative Time of Adoption (β = -.225, t = -3.233, p<0.01). Income was also found to be the important predictor of Ownership of really new products (β = .162, t = 2.405, p<0.01) and Relative Time of Adoption (β = .159, t = 2.327, p<0.05), while Gender and Education were found to have no association with really new product adoption. Number of Children was found to have a association with Ownership of really new products (β = .154, t = 2.310 p<0.05).

China Data

The results of the multiple regression analysis indicate that consumer characteristics do explain a significant proportion of the variance in really new product adoption in China data. This is evidenced by the R^2 values indicate that consumer characteristics explain

18.6% of the variance of Ownership of really new products and 13.1% of the variance of Relative Time of Adoption. Education was found to be the most important predictor of both Ownership of really new products (β = .399, t = 5.770, p<0.001) and Relative Time of Adoption (β = .338, t = 4.728, p<0.001). Age was also found to be associated with Ownership of really new products (β = -.189, t = -2.751, p<0.01) and Relative Time of Adoption (β = -.151, t = -2.123, p<0.05), while Gender and Income were found to have no association with really new production adoption.

Taiwan Data

The R^2 values indicate that consumer characteristics explain 12.7% of the variance of Ownership of really new products and 12.9% of the variance of Relative Time of Adoption in Taiwan data. Age and Education were found to have no association with really new product adoption. Number of Children was found to be the most important predictor of Ownership of really new products (β = .267, t = 3.138, p<0.01) and Relative Time of Adoption (β = .188, t = 2.217, p<0.01). Income was also found to be associated with Ownership of really new products (β = .189, t = 2.668, p<0.01) and Relative Time of Adoption (β = .194, t = 2.748, p<0.01). Further, Gender was found to have significant associations with Ownership of really new products (β = -.169, t = -2.544, p<0.05) and Relative Time of really Adoption (β = -.150, t = -2.253, p<0.05).

Summary

The fourth objective of the study is to examine the effects of demographic factors of age, gender, education level, income, and number of children on really new product adoption (Ownership and Relative Time of Adoption). The results of regression analyses provide

partial supports of Hypotheses 6a and 6b across the three countries. For Australian consumers, age and income were found to be the most important predictors of really new product adoption. Australian with younger age, higher income, and have more children tend to own more really new products. Further, Australians who are younger and have higher income tend to adopt really new products earlier than others. In the China data, age and education were found to have significant relationships with really new product adoption. Chinese with younger age and a higher level of education tend to own more and adopt really new products earlier than others. In Taiwan, consumers' gender, income, and number of children are significantly related to really new product adoption. Taiwanese who have high income and more children tend to adopt earlier and own more really new products. Further, female Taiwanese tend to own more and adopt really new products earlier than males. The results confirm other findings of significant relationships between consumer characteristics and really new product adoption (Im, Mason, and Houston, 2007; Tellis, Yin, and Bell, 2005). It is worth to note that these demographics effects on really new product adoption do vary by countries.

5.5.2   CII and Really New Product Adoption

In the study, Ownership and Relative Time of Adoption are both used to identify really new product adoption behaviour.

Model 2

To further evaluate the relationship between consumer innate innovativeness and really new product adoption, the individual dimensions of consumer innate innovativeness are entered in to a multiple regression analysis as Model 2.

Australia Data

The R^2 values indicate that the dimensions of consumer innate innovativeness explain 1.1% of the variance of Ownership and 3.4% of the variance of Relative Time of Adoption in Australia data. The three dimensions of consumer innate innovativeness are found to have no relationship with both Ownership and Relative Time of Adoption.

China Data

The R^2 values indicate that the dimensions of consumer innate innovativeness explain approximately 5% of the variance of Ownership and 7% of the variance of Relative Time of Adoption in China data. Accepting of New Ideas was found to be the most important predictor of Ownership (β = .236, t = 3.080, p<0.01) and Relative Time of Adoption (β = .265, t = 3.492 p<0.01).

Taiwan Data

The R^2 values indicate that the dimensions of consumer innate innovativeness explain approximately 5% of the variance of Ownership and 8% of the variance of Relative Time of Adoption in Taiwan data. Accepting of New Ideas was found to be the most important predictor of Ownership (β = .183, t = 2.466, p<0.05) and Relative Time of Adoption (β = .213, t = 2.911, p<0.01).

Summary

The results of regression analyses provide weak partial supports of Hypothesis 1a and 1b that the degree of consumer innate innovativeness is found to have a significant but weak relationship with really new product adoption. Consumer innate innovativeness is found to have no significant relationship with really new product adoption in Australia. It suggests that the use of consumer innate innovativeness for predicting really new product adoption in Australia is problematic. For China and Taiwan, consumer innate innovativeness is partially related to really new production adoption. Chinese and Taiwanese who are likely to accept new ideas tend to own more and adopt really new products earlier than others. These results are consist with the literature review of no relationship between consumer innate innovativeness and really new product adoption (Foxall and Bhate, 1992; Goldsmith, Freiden, and Eastman, 1995) or only a weak relationship between them (Im, Bayus, and Mason, 2003; Im, Mason and Houston, 2007).

5.5.3 DSI and Really New Product Adoption

Model 3

Model 3 tests the relationship between domain specific innovativeness and really new product adoption. The two dimensions of domain specific innovativeness (Speed of Purchase and New Product Information) are simultaneously entered into a multiple regression analysis to evaluate their predictive ability in Australia data. In contrast, because of the low reliability of the dimension – New Product Information in China and Taiwan data, it is not utilized in the regression analysis.

Australia Data

The R^2 values indicate that domain specific innovativeness explain 4.8% of the variance of Ownership of really new products and 2.9% of the variance of Relative Time of Adoption in Australia data. Speed of Purchase was found to be directly associated with Ownership ($\beta = .139$, t = 2.229, p<0.05) and Relative Time of Adoption ($\beta = .138$, t = 2.186, p<0.05). New Product Information was found to significantly associated with Ownership only ($\beta = .144$, t = 2.297, p<0.05).

China Data

The R^2 values indicate that domain specific innovativeness explain approximately 8% of the variance of Ownership of really new product and 12.4% of the variance of Relative time of Adoption in China data. Speed of Purchase was found to be the most important predictor of Ownership of really new product ($\beta = .284$, t = 4.234, p<0.001) and Relative Time of Adoption ($\beta = .352$, t = 5.380, p<0.001).

Taiwan Data

The R^2 values indicate that domain specific innovativeness explain 10.8% of the variance of Ownership of really new product and 12% of the variance of Relative Time of Adoption in China data. Speed of Purchase was found to be the most important predictor of Ownership of really new products ($\beta = .328$, t = 4.999, p<0.001) and Relative Time of Adoption ($\beta = .347$, t = 5.316, p<0.001).

Summary

The results of regression analyses provide supports for Hypothesis 2a and 2b that the degree of domain specific innovativeness is found to have a positive and significant relationship with really new product adoption in Australia. Australians who have a high level of domain specific innovativeness tend to own more and adopt really new products earlier than others. The similar results were also found in China and Taiwan which suggest that Chinese and Taiwanese who purchase new products faster than others seem to own more and adopt earlier really new products. The results are in an agreement with Hynes and Lo (2006) who suggest that domain specific innovativeness directly influences the adoption of new product innovation. It is worth noting that only one dimension of DSI was analyzed in China and Taiwan data. Further studies need to cross-validate DSI in different cultural settings other than western culture. The structural equation modeling analysis is used to further evaluate the indirect effects of domain specific innovativeness on the relationship between consumer innate innovativeness and really new product adoption.

5.5.4 VI and Really New Product Adoption

Model 4

Model 4 is developed to investigate the relationship between vicarious innovativeness and really new product adoption and their predictive ability, the dimensions of vicarious innovativeness (Advertising, Modeling, and Word of Mouth) are simultaneously entered into a multiple regression analysis.

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Australia Data

The non-significant F-ratio demonstrates that vicarious innovativeness explains no significant proportion of Ownership and Relative Time of Adoption in Australia data.

China Data

The results of the multiple regression analysis reported in Table 5.4 indicate that the vicarious innovativeness dimensions do explain a significant but small proportion of the variance in really new product adoption in China data. This is evidenced by R^2 values showed that vicarious innovativeness explain 6.8% of the variance of Ownership of really new products and 7.1% of the variance of Relative Time of Adoption. Advertising was found to be the most important predictor of Ownership of really new product ($\beta = .270$, t = 3.561, p<0.001) and Relative Time of Adoption ($\beta = .218$, t = 2.872, p<0.01). Modeling was found to be negatively associated with Ownership of really new products ($\beta = -.179$, t = -2.331, p<0.05) and Relative Time of Adoption ($\beta = -.209$, t = -2.727, p<0.01).

Taiwan Data

The R^2 values indicated that the dimensions of vicarious innovativeness explain 8.3% of the variance of Ownership of really new products and 5.7% of the variance of Relative Time of Adoption in Taiwan data. The results report that Advertising is the most closely associated with Ownership ($\beta = .287$, t = 4.000, p<0.001) and Relative Time of Adoption ($\beta = .218$, t = 3.004, p<0.01).

Summary

The results of regression analyses provide partial supports for Hypothesis 3a to 3f only in China and Taiwan. Vicarious innovativeness was found to have no relationship with really new adoption in Australia data, while only Advertising was found to be significantly and positively related to really new adoption in China and Taiwan data. It seems that the adoption of really new products is considered as a private decision to Australians. Their adoption decisions are not influenced by either mass media or personal communication. In contrast, the findings indicate that Chinese and Taiwanese consumers who, exposure more to advertisings, tend to adopt more really new products. This was not consistent with Im, Mason, Houston's (2007) finding which they suggest that exposure to advertising has no relationship with new product adoption. However, the results support the notion that early adopters' adoption behaviour is influenced primarily by impersonal communication (Bass, 1969). Structural equation modeling analysis is utilized to further evaluate the indirect impact of vicarious innovativeness on the relationship between consumer innate innovativeness and really new product adoption.

5.5.5   DUCP, OL and Really New Product Adoption

Model 5

Model 5 tests the relationships between the desire for unique consumer products, opinion leadership and really new product adoption and their predictive ability. The R^2 values of Model 5 explain 2.6% of the variance of Ownership of really new products and 2.8% of the variance of Relative Time of Adoption in Australia data. In China data, the R^2 values of Model 5 explain 4.8% of the variance of Ownership of really new product and 8.5% of

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the variance of Relative Time of Adoption. Further, the R^2 values of Model 5 explain 8.6% of the variance of Ownership of really new product and 6.2% of the variance of Relative Time of Adoption in Taiwan data.

The Desire for Unique Consumer Products

Australia Data

The reports indicate that the desire for unique consumer products has no association with really new product adoption in Australia data.

China Data

The results of Model 5 indicate that the desire for unique consumer product is not associated with really new product adoption in China data.

Taiwan Data

The results of Model 5 report that, in Taiwan data, the desire for unique consumer products has a significant but weak association with Ownership ($\beta = .161$, t = 2.223, p<0.05), while no association with Relative Time of Adoption.

Summary

The results of regression analyses do not support Hypothesis 4a and 4b across three three countries, the desire for unique consumer products has no significant relationship with

really new product adoption. Surprisingly, it seems that consumers' adoption decisions of really new products are not influenced by the level of their desire for unique consumer products. The results are inconsistent with the findings of Franke and Schreier (2008) who suggest that the desire for unique consumer products directly influences new product adoption. In order to further investigate the difference, structural equation modeling analysis which, gives a macro level of analysis, is utilized to evaluate the relationship between the desire for unique consumer products and really new product adoption.

Opinion Leadership

Australia Data

In Model 5, persuasion was determined to have a small but significant association with Relative Time of Adoption (β = .158, t = 2.024, p<0.05) in Australia data.

China Data

The results of Model 5 report that Opinion, in China data, is closely associated with Ownership of really new products (β = .216, t = 3.033, p<0.01) and Relative Time of Adoption (β = .302, t = 4.317, p<0.001), whilst persuade is not.

Taiwan Data

In Model 5, Opinion was determined to have a significant association with Ownership of really new products (β = .199, t = 2.930, p<0.01) and Relative Time of Adoption (β =.217, t = 3.154, p<0.01).

Summary

The results of regression analyses provide partial supports for Hypothesis 5a and 5b that the degree of opinion leadership was found to have a positive and significant relationship with really new product adoption in China and Taiwan. It seems that Australians make their adoption decision independent from others. In contrast, Chinese and Taiwanese who are opinion leaders tend to adopter earlier and own more really new products. The results of the study are generally consistent with results reported by Lassar, Manolis, and Lassar (2004) that opinion leadership has a positive relationship with new product adoption. Structural equation modeling analysis is used to further evaluate the indirect impacts of opinion leadership between the relationship of consumer innate innovativeness and really new product adoption in this chapter.

Summary for the Five Models

Australia Data

By far the largest explanatory factor in Ownership and Relative Time of Adoption is demographics, followed by domain specific innovativeness, other factors (DUCP and OL). Consumer innate innovativeness and vicarious innovativeness are suggested to be not related to really new product adoption.

China Data

In China data, the largest explained factor in Ownership is demographics, followed by domain specific innovativeness, vicarious innovativeness, consumer innate

innovativeness, and then other factors (DUCP and OL). On the other hand, in Relative Time of Adoption, the largest explained factor is demographics, followed by domain specific innovativeness, vicarious innovativeness, other factors (DUCP and OL), and then consumer innate innovativeness.

Taiwan Data

In Taiwan data, the largest explained factor in Ownership is demographics, followed by domain specific innovativeness, other factors (DUCP and OL), vicarious innovativeness, and then consumer innate innovativeness. In terms of Relative Time of Adoption, the largest explained factor is demographics, followed by domain specific innovativeness, consumer innate innovativeness, other factors (DUCP and OL), and then vicarious innovativeness.

Overall, the results are similar across three countries. Demographics and domain specific innovativeness are suggested to be the most important predictors across the three countries. The only difference is that the Model 4 – only Advertising is closely associated with really new product adoption in China and Taiwan, while no association between vicarious innovativeness and really new product adoption is found in Australia.

Model 6

Model 6 tests the impact of all independent variables on really new product adoption and derives from the recognition that the five groups of predictors are occurring simultaneously. Model 6 also helps identify that the dynamics of such complex relationships mean that the same variables that are significant in single models may

become non-significant in a complex wholistic model.

Australia Data

The R^2 values of Model 6 explain 17% of the variance of Ownership and 16.4% of the variance of Relative Time of Adoption in Australia data.

Demographics

When all predictors are combined, Age, Income and Number of Children, which were significant in Mode 1 (Ownership and Relative Time of Adoption), remain to be significant in Model 6.

Consumer Innate Innovativeness

With the combination of predictors in Model 6, in Ownership, Model 2 and Model 6 have the same results. In terms of Relative Time of Adoption, Suspicious of New Ideas and Challenging of New Ideas, which were not significant in Model 1, become significant in the combined Model 6.

Domain Specific Innovativeness

In the combined Model 6 (Ownership), Speed of Purchase, which was significant in Model 3, cease to be significant in Model 6. Results for Relative Time of Adoption, Speed of Purchase, which was significant in Model 3, cease to be significant in Model 6, New Product Information, which was not significant in Model 3, becomes significant in the combined Model 6.

Vicarious Innovativeness

The combination of predictors in Model 6 has the same results with Model 4 for both Ownership and Relative Time of Adoption.

DUCP and OL

The combination of predictors in Model 6 has the same results with Model 5 for both Ownership and Relative Time of Adoption.

China Data

The R^2 values of Model 6 explain 26.7% of the variance of Ownership and 25.8% of the variance of Relative Time of Adoption in China data.

Demographics

When all predictors are combined Age and Education, which were significant in Mode 1 (Ownership and Relative Time of Adoption), remain to be significant and same direction in Model 6.

Consumer Innate Innovativeness

With the combination of predictors in Model 6, Accepting New Ideas, which was significant in Model 2 (Ownership and Relative Time of Adoption), cease to be significant. Results for Relative Time of Adoption show that Challenging of New Ideas, which was not significant in Model 2, becomes significant in the combined Model 6.

Domain Specific Innovativeness

In the combined Model 6, (Ownership), Speed of Purchase, which was significant in Model 3, ceases to be significant. Results for Relative Time of Adoption show that Speed of Purchase, which was significant in Model 3, becomes less significant in Model 6.

Vicarious Innovativeness

The combination of predictors in Model 6 indicates that Modeling, which was significant in Model 4, becomes non-significant in both Ownership and Relative Time of Adoption.

DUCP and OL

With the combination of predictors in Model 6, Opinion which was significant in Model 5, cease to be significant in Ownership and less significant in Relative Time of Adoption.

Taiwan Data

The R^2 values of Model 6 explain 28.4% of the variance of Ownership and 26.5% of the variance of Relative Time of Adoption in Taiwan data.

Demographics

When all predictors are combined Gender, Income, and Number of Children, which were significant in Model 1 (Ownership and Relative Time of Adoption) become to be less significant in Model 6.

Consumer Innate Innovativeness

With the combination of predictors in Model 6, Accepting New Ideas and Challenging of New Ideas, which were significant in Model 2 (Ownership and Relative Time of

Adoption), cease to be significant.

Domain Specific Innovativeness

In the combined Model 6, (Ownership), Speed of Purchase, which was significant in Model 3, becomes to be less significant.

Vicarious Innovativeness

The combination of predictors in Model 6 indicates that Advertising, which was significant in Model 4, becomes less significant in both Ownership and Relative Time of Adoption.

DUCP and OL

With the combination of predictors in Model 6, the Desire for Unique Consumer Products, which was significant in Model 5, becomes less significant in Ownership and non-significant in Relative Time of Adoption. Results for Ownership and Relative Time of Adoption show that Opinion, which were significant in Model 5, become non-significant in the combined Model 6.

5.6   SUMMARY OF REALLY NEW PRODUCT ADOPTION REGRESSION ANALYSIS

The regression analyses support that demographics are the best predictors of really new product adoption across the three countries. It is worthy to note that the demographics effects on really new product adoption do vary by countries. Partial supports were found for the proposed relationships between consumer innate innovativeness and really new product adoption in China and Taiwan, but not Australia. Significant results were found

for the relationship between domain specific innovativeness and really new product adoption across the three countries, whilst the relationship between vicarious innovativeness and really new product adoption is partially supported in China and Taiwan, but not Australia. The proposed relationship between the desire for unique consumer products and really new product adoption was found to be statistically significant but weak in Taiwan only. There are also partial supports for the proposed relationships between opinion leadership and really new product adoption in China and Taiwan.

Overall, the regression analyses suggest support for the proposed model. However, there are a number of low beta and unexpected direction of relationships recorded. In order to assess these relationships, structural equation modeling analysis is undertaken which is also utilized to evaluate the proposed relationships, firstly, the direct effects of consumer innate innovativeness on domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and opinion leadership, and secondly, the indirect effects of domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and opinion leadership on the relationship between consumer innate innovativeness and really new product adoption.

5.7 STRUCTUAL EQUATION MODELING – REALLY NEW PRODUCT ADOPTION

Structural equation modeling is used in the current analysis because it is capable of examining the interrelationships among observed and unobserved variables at the same time, it also has the ability to calculate direct, indirect and total effects between predictors, mediators and dependent variables.

The study tests four structural models, namely Basic, Extended, Integrated, and Overall which are discussed separately in following sections. These models are based on theoretical reasoning and incorporated the direct and mediating relationships hypothesized in Chapter Two. Latent constructs have been included in all models. It should be noted that the study should emphasize more on the theoretical relationships between key constructs rather than the measurement model per se.

The total effects are calculated using AMOS version 7. The hypothesized relationships between the independent variables and the dependent variable are calculated by a path coefficient to indicate direct effects. Indirect effects are the effects of independent variables on the dependent variables through one or more mediators. In the study, there are multiple mediators proposed in the final model – the Overall Model. In order to test the mediating effects, the SEM analysis is run for each mediator one at a time within the Overall Model. The indirect effects are measured by using the product of coefficients test which is to test the significance of the mediating effect by dividing the estimate of the indirect effect by its standard error. The standard error for the indirect effects is estimated by setting the bootstrap at 200 and a confidence level of 95%.

5.7.1 Structure of the Basic Model

The relationship between consumer innate innovativeness and new product adoption has been the basis for a number of studied. However, there is no consensus on the definition and measurement of consumer innate innovativeness. The foundation of this research is drawn from Hauser, Tellis, and Griffin (2005) and Im, Mason, and Houston (2007) who suggest that further research needs to be done to clarify the role of consumer innovativeness across product categories and countries, and to cross-validate the

mediating role of vicarious innovativeness. In the Basic Model (Figure 5.2), consumer

innate innovativeness and vicarious innovativeness are entered as independent variables

and really new product adoption as a dependent variable. It should be noted that the

emphasis of the study is on the relationships between key constructs rather than the

measurement model per se.

Figure 5.2: The Basic Model
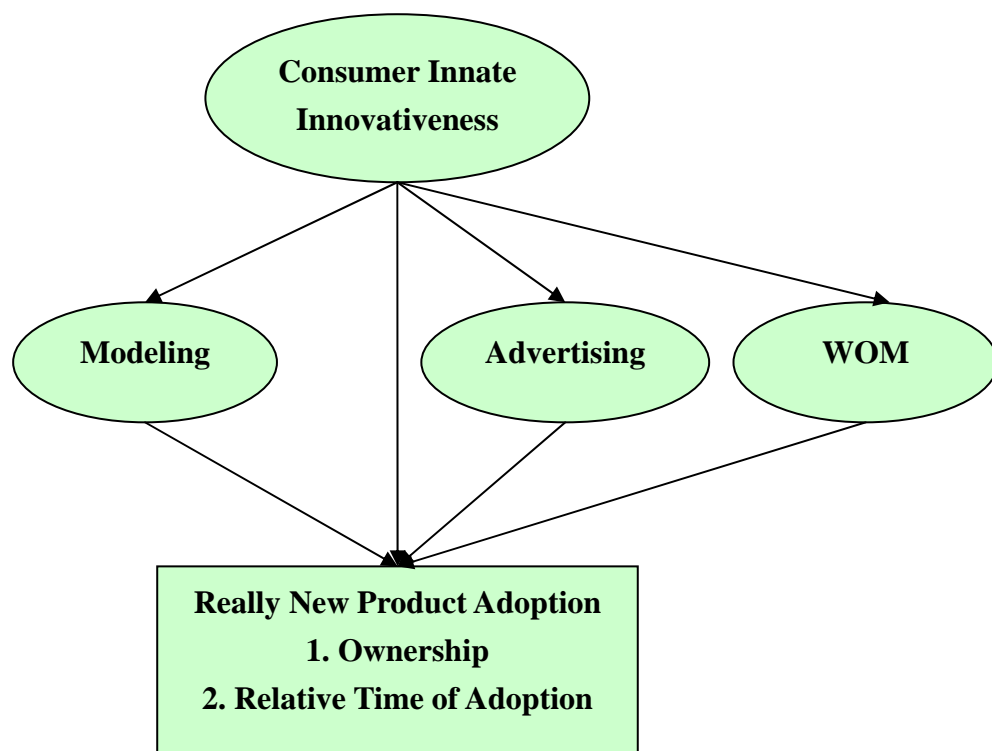
5.7.1.1   Results of the Basic Model

Australia Data

Table 5.6 presents the standardized path coefficients from the relationships between the

antecedent variables and really new product adoption, along with the t-value and

respective levels of significance for Australia data. Similar results were found for both Ownership and Relative Time of Adoption. H7b~H7d are supported. All paths from consumer innate innovativeness to the three communication factors of vicarious innovativeness are significant and in negative direction. This suggests that the level of Australians' vicarious innovativeness declines when they already have a high level of consumer innate innovativeness. In other words, Australians with high CII do not depend on vicarious innovativeness for their ownership of really new products nor for speed with which they adopt really new products.

Table 5.6: Direct Effect on Really New Product Adoption for the Basic Model – AUS, CN and TW

Hypothesis	Ownership and RTA		
	Regression Coefficient (t-value)		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7b: CII→Advertising	-.652***(-3.288)	-.648***(-3.159)	-.474***(-3.209)
H7c: CII→Modeling	-.706***(-3.565)	-.864***(-3.318)	-.824***(-4.173)
H7d: CII→WOM	-.726***(-3.521)	-.642***(-3.215)	-.780***(-4.347)
H1a: CII→Ownership	1.224(1.608)	2.314(1.610)	1.897(1.580)
H1b: CII→RTA	1.629*(1.831)	1.714**(3.173)	2.906*(1.815)
Vicarious Innovativeness			
H3a: Advertising→Ownership	.382*(1.727)	.820***(3.250)	.528***(3.454)
H3c: Modeling→Ownership	.443*(1.835)	1.239(1.260)	.866(1.360)
H3e: WOM→Ownership	.624**(2.345)	.466**(2.065)	.632(1.382)
H3b: Advertising→RTA	.455*(1.865)	1.089***(3.938)	.577***(3.192)
H3d: Modeling→RTA	.571*(2.233)	.151(1.308)	1.384*(1.696)
H3f: WOM→RTA	.782**(2.768)	.658***(3.772)	1.042*(1.725)

*=p<0.05, **=p<0.01, ***=p<0.001
t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

From the results, H1b is supported (β = 1.629, t = 1.831, p<0.05). Consumer innate innovativeness has only a weak direct effect on Relative Time of Adoption, but not Ownership. Further, H3a~H3f are supported. Advertising (β = .382, t = 1.727, p<0.05,

Ownership; β = .455, t = 1.865, p<0.05, RTA), Modeling (β = .443, t = 1.835, p<0.05,

Ownership; β = .571, t = 2.233, p<0.05, RTA) and WOM (β = .624, t = 2.345, p<0.01,

Ownership; β = .782, t = 2.768, p<0.01, RTA) are found to have a direct effect on really

new product adoption. This suggests that Australians with high VI tend to own more and

adopt really new products earlier than others.

China Data

Table 5.6 presents the standardized path coefficients from the relationships between the

antecedent variables and really new product adoption, along with the t-value and

respective levels of significance for China data. Similar results were found for both

Ownership and Relative Time of Adoption. Similar to Australia data, H7b~H7d are

supported. All paths from consumer innate innovativeness to the three communication

factors of vicarious innovativeness are significant and in negative direction. This suggests

that Chinese with high CII do not depend on vicarious innovativeness for their ownership

of really new products nor for speed with which they adopt really new products.

The results suggest that H1b is supported. Consumer innate innovativeness is related to

Relative Time of Adoption (β = 1.714, t = 3.173, p<0.01), but not Ownership. This

suggests that Chinese with high CII tend to adopter really new products earlier than

others. In terms of vicarious innovativeness, H3a (β = .820, t = 3.250, p<0.001) , H3b

(β = 1.089, t = 3.938, p<0.001), H3e (β = .466, t = 2.065, p<0.01) and H3f (β = .658, t =

3.772, p<0.001) are supported. This suggests that Chinese rely more on the information

from advertisings and word of mouth prior to really new product adoption.

Taiwan Data

Table 5.6 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Taiwan data. Similar results were found for both Ownership and Relative Time of Adoption. Similar to Australia and China data, H7b~H7d are supported. Significant and negative relationships were observed between consumer innate innovativeness and the three communication factors of vicarious innovativeness. This suggests that Taiwanese with high CII do not depend on vicarious innovativeness for their ownership of really new products nor for speed with which they adopt really new products.

In Taiwan data, H1b is supported (β = 2.906, t = 1.815, p<0.05). Consumer innate innovativeness was found to have a significant but weak effect on Ownership only. In term of vicarious innovativeness, H3a (β = .528, t = 3.454, p<0.001) and H3b (β = .577, t = 3.192, p<0.001). This suggests that Taiwanese who exposures more to Advertising tend to own more and adopt really new products earlier than others. H3d (β = 1.384, t = 1.696, p<0.05) and H3f (β = 1.042, t = 1.725, p<0.05) are also supported. This suggests that Taiwanese depends on Modeling and Word of Mouth for speed with which they adopt really new products.

5.7.2 Discussion of Results for the Basic Model

The summarized results of the Basic Model across the three countries are presented in Table 5.7. Hypothesis 1a, 1b, 3a~3f, and 7b~7d were tested in the basic model.

Table 5.7: Summary of the Basic Model across the three countries

Hypothesis	Ownership and RTA		
	Supported		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7b: CII→Advertising	Yes	Yes	Yes
H7c: CII→Modeling	Yes	Yes	Yes
H7d: CII→WOM	Yes	Yes	Yes
H1a: CII→Ownership	No	No	No
H1b: CII→RTA	Yes	Yes	Yes
Vicarious Innovativeness			
H3a: Advertising→Ownership	Yes	Yes	Yes
H3c: Modeling→Ownership	Yes	No	No
H3e: WOM→Ownership	Yes	Yes	No
H3b: Advertising→RTA	Yes	Yes	Yes
H3d: Modeling→RTA	Yes	No	Yes
H3f: WOM→RTA	Yes	Yes	Yes

For H7b~7d, support was found across the three countries. Consumer innate innovativeness has significant and negative relationships with the three communication factors of vicarious innovativeness. This suggests that the level of vicarious innovativeness declines when customers already have a high level of consumer innate innovativeness. The results are not consistent with Im, Mason, and Houston's (2007) study which suggests that consumer innate innovativeness has positive and significant relationships with all the three constructs of vicarious innovativeness. Since there is no consensus on the measurement of consumer innate innovativeness, these different results could be caused by the scale of consumer innate innovativeness used in the study is

different from the one used by Im, Mason, and Houston (2007). The other explanation may be that consumers with a high level of consumer innate innovativeness making their adoption decisions independently from other's personal influence in the social system (Midgley and Dowling, 1978).

For H1a and H1b, consumer innate innovativeness was found to have a significant but weak association with Relative Time of Adoption in China and Taiwan, while no significant relationship in Australia. The results were consistent with prior studies which suggest that consumer innate innovativeness has no or only weak relationship with new product adoption (Foxall and Bhate, 1992; Goldsmith, Freiden, and Eastman, 1995; Im, Mason and Houston, 2007).

For H3a to 3f, the three communication factors of vicarious innovativeness were reported to have significant associations with really new product adoption across the three countries except only Modeling is not associated with really new product adoption in China and Taiwan. The findings are partially consistent with Im, Mason and Houston's (2007) work which only Advertising has no effect on new product adoption. The results of the Basic model suggest that vicarious innovativeness is a better predictor of really new product adoption than consumer innate innovativeness. The mediating role of vicarious innovativeness on the relationship between consumer innate innovativeness and really new product adoption will be investigated in the Overall Model.

5.7.3   Structure of the Extended Model

The relationship between consumer innate innovativeness and adoption of product innovation provided by empirical studies is inconsistent and lacks consensus. Prior studies have suggested that consumer innovativeness varies across product categories (Citrin, Sprott, Silverman, and Stem, 2000; Labay and Kinnear, 1981; Gatignon and Robertson, 1985). Further, Roehrich (2004) also suggests that DSI is a mediator between consumer innate innovativeness and the adoption of new products. In the Extended Model (Figure 5.3), consumer innate innovativeness and domain specific innovativeness are entered as independent variables and really new product adoption as a dependent variable.

Figure 5.3: The Extended Model
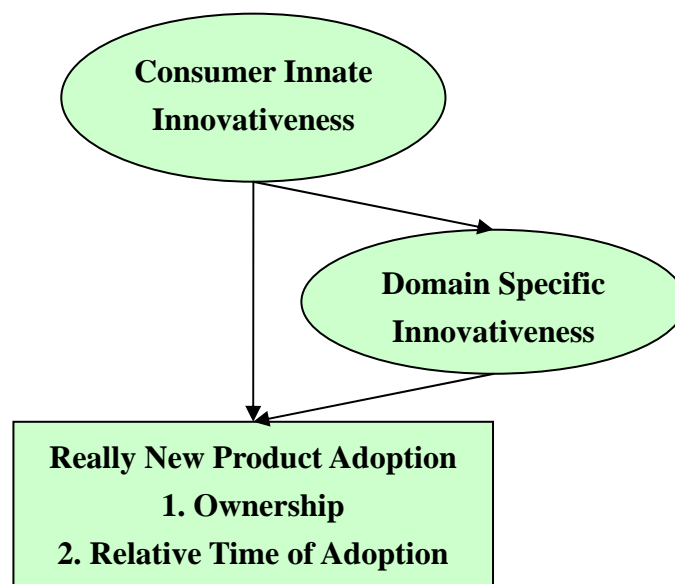
5.7.3.1 Results of the Extended Model

Australia Data

Table 5.8 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Australia data. H7a is supported ($\beta = .766$, t = 7.632, p<0.001). Consumer innate innovativeness was found to have a strong association with domain specific innovativeness. This suggests that Australians with a high level of consumer innate innovativeness tend to have a high level of domain specific innovativeness.

Table 5.8: Direct Effect on Really New Product Adoption for the Extended Model – AUS, CN and TW

Hypothesis	Ownership and RTA		
	Regression Coefficient (t-value)		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7a: CII→DSI	.766***(7.632)	.601**(2.668)	.672***(3.950)
H1a: CII→Ownership	-.118(-.984)	-.092(-1.097)	-.113(-.986)
H1b: CII→RTA	-.044(-.044)	-.140(-1.347)	-.049(-.446)
Domain Specific Innovativeness			
H2a: DSI→Ownership	.251*(2.063)	.407***(3.259)	.449***(3.630)
H2b: DSI→RTA	.186(1.547)	.524***(3.844)	.449***(3.582)

*=p<0.05, **=p<0.01, ***=p<0.001
t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Similar to the Basic Model, H1a and H1b are not supported. Consumer innate innovativeness was found to have no significant effect on really new product adoption in Australia. H2a is supported ($\beta = .251$, t = 2.063, p<0.05). Domain specific innovativeness was observed to have a significant association with Ownership only. The

results suggest that Australians with high DSI tend to own more really new products than others.

China Data

Table 5.8 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for China data. Similar results were found for both Ownership and Relative Time of Adoption. H7a is supported (β = .601, t = 2.668, p<0.01). Consumer innate innovativeness was observed to be associated with domain specific innovativeness.

H1a and H1b are not supported. The results suggest that consumer innate innovativeness has no association with really new product adoption in China data. In contrast, H2a (β = .407, t = 3.259, p<0.001) and H2b (β = .524, t = 3.844, p<0.001) are supported. Domain specific innovativeness was found to have a strong association with really new product adoption in China data. This suggests that Chinese with high DSI tend to own more and adopt really new products earlier than others.

Taiwan Data

Table 5.8 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Taiwan data. Similar results were found for both Ownership and Relative Time of Adoption. Similar to Australia and China data, H7a is supported (β = .672, t = 3.950, p<0.001). This suggests that consumer innate

innovativeness is strongly associated with domain specific innovativeness.

H1a and H1b are not supported. The results indicate that consumer innate innovativeness has no effect on really new product adoption. In terms of domain specific innovativeness, H2a (β = .449, t = 3.630, p<0.001) and H2b (β = .449, t = 3.582, p<0.001) are supported. This suggests that Taiwanese with a high level of DSI tend to own more and adopt really new products earlier than others.

5.7.4 Discussion of Results for the Extended Model

The summarized results of the Extended Model across the three countries are presented in Table 5.9. Hypothesis 1a, 1b, 2a, 2b and 7a were tested in the Extended Model. For H7a, supports were found across the three countries. Consumer innate innovativeness has a significant and positive relationship with domain specific innovativeness across the three countries. The results of the Extended Model suggested that the consumers with a high level of consumer innate innovativeness tend to also have a high level of domain specific innovativeness across the three countries. This is consistent with Roehrich, Valette-Florence, and Ferrandi's (2003) finding.

Table 5.9: Summary of the Extended Model across the three countries

Hypothesis	Ownership and RTA		
	Supported		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7a: CII→DSI	Yes	Yes	Yes
H1a: CII→Ownership	No	No	No
H1b: CII→RTA	No	No	No
Domain Specific Innovativeness			
H2a: DSI→Ownership	Yes	Yes	Yes
H2b: DSI→RTA	No	Yes	Yes

For H1a and H1b, similar to the Basic Model, consumer innate innovativeness was found to have no significant relationship with really new product adoption across the three countries. This is consistent with many prior studies (Foxall and Bhate, 1992; Goldsmith, Freiden, and Eastman, 1995; Im, Mason and Houston, 2007). This supports that considering consumer innate innovativeness as a predictor of really new product adoption could be problematic.

For H2a and H2b, support was found across the three countries. Domain specific innovativeness directly influences really new product adoption. This is in the agreement with previous studies (Citrin, Sprott, Silverman, and Stem, 2000; Goldsmith and Hofacker, 1991). The results of the Extended Model suggest that domain specific innovativeness is a better predictor of really new product adoption than consumer innate innovativeness. The mediating role of domain specific innovativeness on the relationship between consumer innate innovativeness and really new product adoption will be evaluated in the Overall Model.

5.7.5   Structure of the Integrated Model

The results of the Basic Model and the Extended Model show that vicarious innovativeness and domain specific innovativeness are both better predictors of really new product adoption than consumer innate innovativeness. Im, Mason, and Houston (2007) suggest that the relationship between consumer innate innovativeness and vicarious innovativeness needs to be investigated as either a domain-specific or generalized communication process. Further, no study in previous literature considers vicarious innovativeness and domain specific innovativeness at the same time. As a consequence, for further investigation of the influences of vicarious innovativeness and

domain specific innovativeness, they are both included in the Integrated Model. Similar
to the first two models, consumer innate innovativeness, domain specific innovativeness
and vicarious innovativeness are entered as independent variables and really new product
adoption as a dependent variable. The Integrated Model is presented in Figure 5.4.

Figure 5.4: The Integrated Model
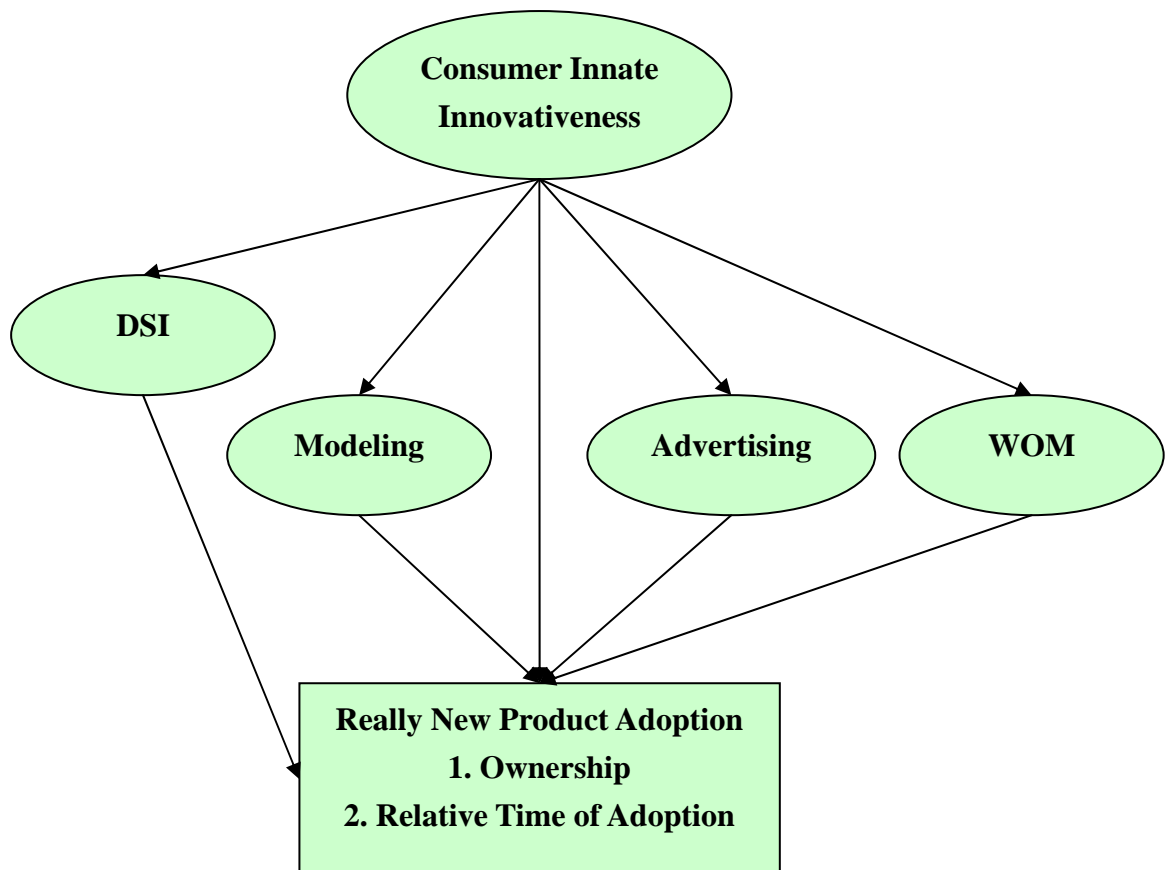
5.7.5.1 Results of the Integrated Model

Australia Data

Table 5.10 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Australia data. H7a is supported ($\beta = .744$, t = 8.273, p<0.001). Similar to the Extended Model, consumer innate innovativeness was found to have a significant association with domain specific innovativeness. This suggests that Australians with a high level of consumer innate innovativeness tent to have a high level of domain specific innovativeness. H7c and H7d are supported, while H7b is not. All paths from consumer innate innovativeness to Modeling and Word of Mouth of vicarious innovativeness are significant except Advertising. All these relationships are in negative direction. The results, which are similar to the Basic Model, suggest that the level of Australians' vicarious innovativeness declines when they already have a high level of consumer innate innovativeness.

From the results of the Integrated Model, H1a and H1b are not supported. No significant relationship was observed between consumer innate innovativeness and really new product adoption. In contrast, H2 ($\beta = .219$, t = 1.980, p<0.05) and H2b ($\beta = .199$, t = 1.821, p<0.05) are supported. Domain specific innovativeness was found to have a significant association with really new product adoption. In terms of vicarious innovativeness, H3a~H3f are not supported. No direct effect was found on really new product adoption. The results suggest that domain specific innovativeness is a better predictor of really new product than consumer innate innovativeness and vicarious innovativeness.

Table 5.10: Direct Effect on Really New Product Adoption for the Integrated Model – AUS, CN and TW

Hypothesis	Ownership and RTA		
	Regression Coefficient (t-value)		
	AUS	**CN**	**TW**
Consumer Innate Innovativeness			
H7a: CII→DSI	.744***(8.273)	.379**(2.865)	.719***(6.177)
H7b: CII→Advertising	-.063(-.678)	-.582***(-3.460)	-.302*(-2.546)
H7c: CII→Modeling	-.349***(-4.943)	-.929***(-3.730)	-.569***(-5.851)
H7d: CII→WOM	-.154*(-2.090)	-.577***(-3.619)	-.451***(-4.925)
H1a: CII→Ownership	-075(-.655)	1.384(.876)	-.130(-.644)
H1b: CII→RTA	-.049(-.433)	1.347(.875)	.023(.124)
Domain Specific Innovativeness			
H2a: DSI→Ownership	.219*(1.980)	.206*(1.948)	.459**(2.981)
H2b: DSI→RTA	.199*(1.821)	.317**(3.029)	.418**(2.644)
Vicarious Innovativeness			
H3a: Advertising→Ownership	-.001(-.006)	.430**(2.857)	.219***(3.245)
H3c: Modeling→Ownership	-.018(-.094)	.961(.688)	-.011(-.111)
H3e: WOM→Ownership	.156(.823)	.157(1.122)	-.117(-1.419)
H3b: Advertising→RTA	-.113(-1.555)	.324**(2.243)	.144*(2.330)
H3d: Modeling→RTA	-.034(-.178)	.945(.695)	.084(.969)
H3f: WOM→RTA	.176(.931)	.323**(2.308)	-.120(-1.560)

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

China Data

Table 5.10 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for China data. Similar results were found for both Ownership and Relative Time of Adoption. Similar to the Extended Model, H7a is supported (β = .379, t = 2.865, p<0.01). Consumer innate innovativeness was found to have a strong and significant association with domain specific innovativeness. H7b~H7d was supported. Consumer innate innovativeness was found to have a significant and

negative association with the three communication factors of vicarious innovativeness. The results are the same with the Basic Model.

From the results, H1a and H1b are not supported. No significant relationship was observed between consumer innate innovativeness and really new product adoption. Domain specific innovativeness was found to have a significant association with really new product adoption. For vicarious innovativeness, H3a (β = .430, t = 2.857, p<0.01) and H3b (β = .324, t = 2.243, p<0.01) are supported. Only Advertising was found to have a direct effect on really new product adoption. This suggests that Chinese who are more exposure to advertising tend to own more and adopt really new products earlier than others. Further, H3f is supported (β = .323, t = 2.308, p<0.01). Word of Mouth was observed to have a significant association with Relative Time of Adoption. This suggests that the speed with which Chinese adopts really new products depends on word of mouth. The results of the Integrated Model suggest that domain specific innovativeness and Advertising are better predictors of really new product adoption than consumer innate innovativeness in China.

Taiwan Data

Table 5.10 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Taiwan data.

Similar results were found for both Ownership and Relative Time of Adoption. Similar to the Extended Model, H7a is supported (β = .719, t = 6.177, p<0.001). Consumer innate innovativeness was found to have a strong and significant association with domain

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specific innovativeness. This suggests that Taiwanese with a high level of consumer innate innovativeness tent to have a high level of domain specific innovativeness. H7b~H7d are supported. All paths from consumer innate innovativeness to the three communication factors of vicarious innovativeness are significant and in negative direction. The results, which are similar to the Basic Model, suggest that the level of Taiwanese vicarious innovativeness declines when they already have a high level of consumer innate innovativeness.

From the results of the Integrated Model, like Australia and China data, H1a and H1b are not supported. No significant relationship was observed between consumer innate innovativeness and really new product adoption. H2a (β = .459, t = 2.981, p<0.01)and H2b (β = .418, t = 2.644, p<0.01) are supported. Domain specific innovativeness was found to be strongly associated with really new product adoption. This suggests that Taiwanese with high DSI tend to own more and adopt really new products earlier than others. In terms of vicarious innovativeness, only H3a (β = .219, t = 3.245, p<0.001)and H3b (β = .144, t = 2.330, p<0.05) are supported. This suggests that Taiwanese depend on advertising for their ownership of really new products and for speed with which they adopt really new products.

5.7.6   Discussion of Results for the Integrated Model

The Integrated Model is a combination of the Basic and the Extend models for investigating the relationships between consumer innate innovativeness and domain specific innovativeness and vicarious innovativeness, and their impacts on really new product adoption. The hypotheses in the first two models are all tested in the Integrated Model. The summarized results of the Integrated Model across the three countries are

presented in Table 5.11.

Table 5.11: Summary of the Integrated Model across the three countries

Hypothesis	Ownership and RTA		
	Supported		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7a: CII→DSI	Yes	Yes	Yes
H7b: CII→Advertising	No	Yes	Yes
H7c: CII→Modeling	Yes	Yes	Yes
H7d: CII→WOM	Yes	Yes	Yes
H1a: CII→Ownership	No	No	No
H1b: CII→RTA	No	No	No
Domain Specific Innovativeness			
H2a: DSI→Ownership	Yes	Yes	Yes
H2b: DSI→RTA	Yes	Yes	Yes
Vicarious Innovativeness			
H3a: Advertising→Ownership	No	Yes	Yes
H3c: Modeling→Ownership	No	No	No
H3e: WOM→Ownership	No	No	No
H3b: Advertising→RTA	No	Yes	Yes
H3d: Modeling→RTA	No	No	No
H3f: WOM→RTA	No	Yes	No

In terms of H7a, consumer innate innovativeness has a significant relationship to domain specific innovativeness across the three countries. This is consistent with the results of the Extend Model. For H7b~7d, consumer innate innovativeness was found to have a significant and negative relationship with the three communication factors of vicarious innovativeness except only Advertising is not significant in Australia data. The results are also consistent with the Basic Model. For H1a and 1b, similar to the first two models, consumer innate innovativeness is reported to have no significant association with really new product across the three countries. This again confirmed the findings in previous literature (Foxall and Bhate, 1992; Goldsmith, Freiden, and Eastman, 1995; Im, Mason

and Houston, 2007).

For H2a and 2b, domain specific innovativeness has a significant relationship with really new product adoption across the three countries. This is also consistent with the results of the Extend Model.

For H3a, 3b, 3c, 3d, 3d and 3f, in Australia data, no support was found for the relationship between vicarious innovativeness and really new product. In China and Taiwan, only Advertising was reported to have a significant relationship with really new product adoption. Interestingly, when domain specific innovativeness and vicarious innovativeness are included at the same time, the relationships between really new product adoption and Word of Mouth and Modeling, which were significant in the Basic Model, cease to be significant in the Integrated Model. This will be further investigated in the Overall Model.

In general, the first three models have similar results across the three countries. However, these models derive from the theoretical reasoning and the findings still lack of consensus in the literature. This leads to the consideration of the Overall Model in terms of predicting really new product adoption that alternative constructs need to be considered rather than just the roles of consumer innate innovativeness, domain specific innovativeness and vicarious innovativeness.

5.7.7   Structure of the Overall Model

As discussed in Chapter 3, other than domain specific innovativeness and vicarious innovativeness, the desire of unique consumer products and opinion leadership are also included in the Overall Model for the current study. Consumer innate innovativeness and really new product are entered as independent and dependent variable. In exploring the intervening role of domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and opinion leadership, the mediating effect model was postulated in the Overall Model presented in Figure 5.5.

Figure 5.5: The Overall Model
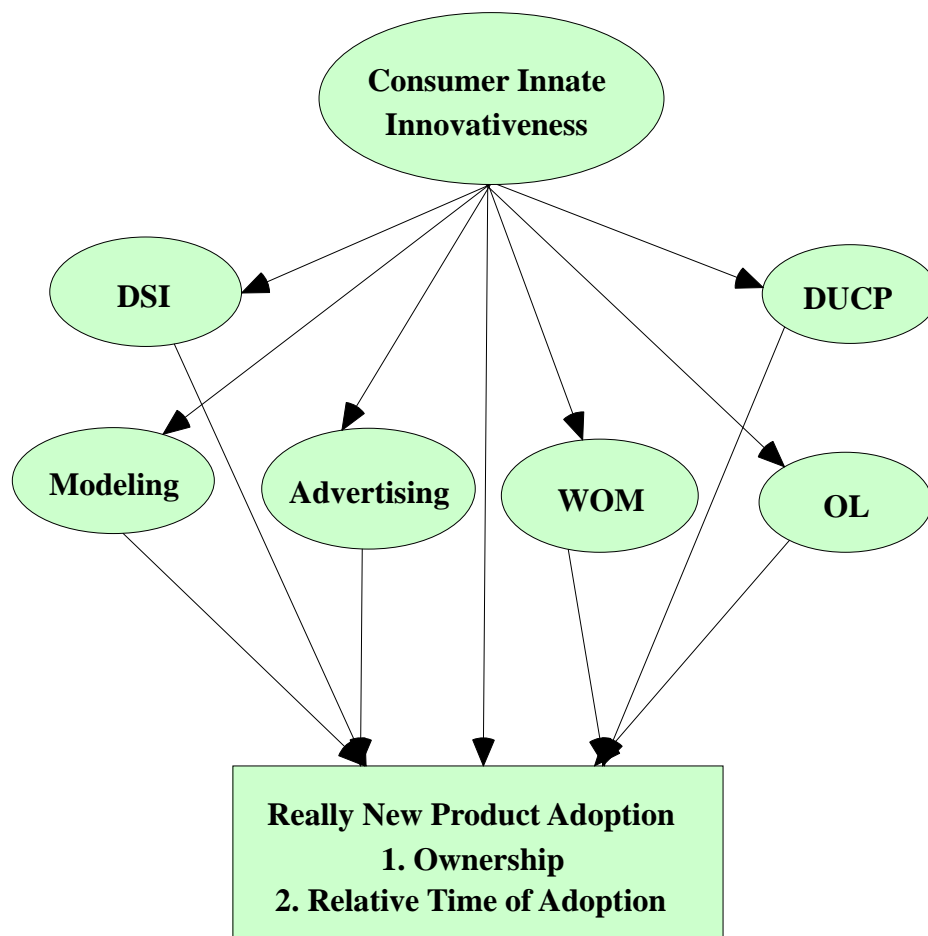
5.7.7.1   Results of the Overall Model

Australia Data

Table 5.12 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Australia data. H7a is supported (β = .744, t = 8.383, p<0.001). Consumer innate innovativeness was found to be strongly associated with domain specific innovativeness. This is consistent with the results in the Extend and Integrated Models. From the results, for the relationship between consumer innate innovativeness and vicarious innovativeness, H7b~7d are supported.

Consumer innate innovativeness was reported to have significant and negative relationships with the three communication factors of vicarious innovativeness. This is consistent with the results of the Basic and Integrated models.

H7e is not supported. Consumer innate innovativeness has no significant effect on the desire for consumer products. Further, H7f is supported (β = .176, t = 2.412, p<0.05). Consumer innate innovativeness was found to have a significant and positive association with opinion leadership. This suggests that Australians with high CII tend to be opinion leaders.

Table 5.12: Direct Effect on Really New Product Adoption for the Overall Model – AUS, CN and TW

Hypothesis	Ownership and RTA		
	Regression Coefficient (t-value)		
	AUS	**CN**	**TW**
Consumer Innate Innovativeness			
H7a: CII→DSI	.744***(8.383)	.948***(7.908)	.830***(7.439)
H7b: CII→Advertising	-.077*(-1.706)	-.001(-.017)	-.259*(-1.885)
H7c: CII→Modeling	-.349***(-4.614)	-.365***(-4.721)	-.501***(-6.102)
H7d: CII→WOM	-.160*(-2.169)	-.048(-.584)	-.321***(-3.802)
H7e: CII→DUCP	.034(.953)	-.008(-.186)	-.114**(-2.548)
H7f: CII→OL	.176*(2.412)	.628***(6.564)	.614***(6.363)
H1a: CII→Ownership	-.086(-.766)	-.855(-1.332)	-.321(-1.114)
H1b: CII→RTA	-.037(.374)	-.491(-1.351)	-.055(-.274)
Domain Specific Innovativeness			
H2a: DSI→Ownership	.248*(2.274)	1.058*(1.702)	.531*(2.241)
H2b: DSI→RTA	.185(1.279)	.719*(1.912)	.410**(2.636)
Vicarious Innovativeness			
H3a: Advertising→Ownership	.038(.738)	.266**(2.868)	.191**(2.700)
H3c: Modeling→Ownership	.060(.883)	-.120(-1.461)	.045(.542)
H3e: WOM→Ownership	.074(1.069)	-.065(-.765)	-.133(-1.495)
H3b: Advertising→RTA	.009(.175)	.198*(2.449)	.106*(1.916)
H3d: Modeling→RTA	.014(.085)	-.144*(-1.754)	.105(1.235)
H3f: WOM→RTA	.083(.479)	.119*(1.702)	-.159*(-2.107)
The Desire for Unique Consumer Products			
H4a: DUCP→Ownership	.092*(2.537)	.078*(1.963)	.095**(2.557)
H4b: DUCP→RTA	.071*(1.724)	.027(.719)	.079**(2.389)
Opinion Leadership			
H5a: OL→Ownership	.053(.800)	.087(.809)	.157(1.458)
H5b: OL→RTA	.113(1.332)	.145(1.491)	.116(1.239)

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

For the direct relationships between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and really new product adoption, only H4a (β = .092, t = 2.537, p<0.05), H4b (β = .071, t = 1.724, p<0.05) and H2a (β = .248, t = 2.274, p<0.01) are

supported. The desire for unique consumer products is directly and positively associated with really new product adoption. This suggests that when Australians consider really new products as unique, they tend to own more and adopt really new products earlier than others. In addition, domain specific innovativeness was found to have a significant relationship with Ownership. This suggests that Australian with high DSI tend to own more really new products than others. No support was found for H1a~1b, H2b, H3a~3f, and H5a~5b.

China Data

Table 5.12 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for China data. Similar results were found for both Ownership and Relative Time of Adoption. H7a is supported (β = .948, t = 7.908, p<0.001). Consumer innate innovativeness was found to be strongly associated with domain specific innovativeness. This is consistent with the results in the Extend and Integrated Models.

For the relationship between consumer innate innovativeness and vicarious innovativeness, H7b~7d are supported. Consumer innate innovativeness has a significant and negative association only with Modeling (β = -.365, t = -4.721, p<0.001). This is partially consistent with the results of the Basic and Integrated models.

Similar to the results of Australia data, H7e is not supported. Consumer innate innovativeness has no significant effect on the desire for unique consumer products. H7f is supported (β = .628, t = 6.564, p<0.001). This suggests that Chinese with a high level of CII are also opinion leaders.

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For the direct relationships between all antecedent variables, H2a (β = 1.058, t = 1.702, p<0.05) and H2b (β = .719, t = 1.912, p<0.05) are supported. This suggests that Chinese consumers with high DSI tend to own more and adopt really new products earlier than others. For Hypotheses H3a~H3f, only H3a (β = .266, t = 2.868, p<0.01) and H3b (β = .198, t = 2.449, p<0.01) are supported. This suggests that Chinese depend on Advertising for their ownership of really new products and for speed with which they adopt really new products.

Further, H4a is supported (β = .078, t = 1.963, p<0.05). The desire for unique consumer products was reported to have a significant effect on Ownership only. This suggests that when Chinese considers really new products as unique, they tend to own more really new products earlier than others. No support was found for H1a~1b, H3c~3e, H4b and H5a~5b.

Taiwan Data

Table 5.12 presents the standardized path coefficients from the relationships between the antecedent variables and really new product adoption, along with the t-value and respective levels of significance for Taiwan data. Similar results were found for both Ownership and Relative Time of Adoption. Similar to the results of Australia and China data, H7a is supported (β = .830, t = 7.439, p<0.001). Consumer innate innovativeness was found to be strongly associated with domain specific innovativeness.

For the relationship between consumer innate innovativeness and vicarious innovativeness, H7b~7d are supported. Consumer innate innovativeness is negatively and significantly associated with the three communication factors of vicarious innovativeness.

This is consistent with the results of the Basic and Integrated models. Similar to the results of Australia and China data, H7e is not supported. Consumer innate innovativeness has no significant effect on the desire for consumer products. Further, H7f is supported ($\beta = .614$, t = 6.363, p<0.001). This suggests that Taiwanese with high CII tend to be opinion leaders.

For the direct relationships between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products, opinion leadership and really new product adoption in Taiwan data, H2a ($\beta = .531$, t = 2.241, p<0.05) and H2b ($\beta = 410$, t = 2.636, p<0.01) are supported. This suggests that Taiwanese with high DSI tend to own more and adopt really new products earlier than others. In addition, H3a ($\beta = .191$, t = 2.700, p<0.01) and H3b ($\beta = .106$, t = 1.916, p<0.05) are supported. This suggests that, similar to Chinese, Taiwanese depends on advertising for their ownership of really new products and the speed with which they adopt really new products. Further, H4a ($\beta = .095$, t = 2.557, p<0.01) and H4b ($\beta = .079$, t = 2.389, p<0.01) are supported. This suggests that when Taiwanese consider really new products as unique, they tend to own more and adopt really new products earlier than others. No support was found for H1a~1b, H3c~3f, and H5a~5b.

5.7.7.2 Mediating Role of DSI, VI, DUCP and OL

Australia Data

Table 5.13 presents the standardized path coefficients from the mediating effects of antecedent variables on the relationship between consumer innate innovativeness and really new product adoption, along with the t-value and respective levels of significance

for Australia data.

Table 5.13: Mediating Effects on Really New Product Adoption for the Overall Model across the three countries

Hypothesis	Mediating Effect		
	Regression Coefficient (t-value)		
	AUS	CN	TW
Ownership			
H8a: CII→DSI→Ownership	.201*(1.762)	.245**(2.227)	.346*(1.966)
H8c:CII→Advertising→Ownership	-.002(-.095)	.033(.892)	-.078*(-1.200)
H8e: CII→Modeling→Ownership	-.044(-1.571)	.000(.000)	.012(.255)
H8g: CII→WOM→Ownership	-.023(-1.095)	.002(.153)	.008(.267)
H8i: CII→DUCP→Ownership	-.017(-.362)	.000(.000)	-.111(-.383)
H8k: CII→OL→Ownership	-.007(.189)	.072(1.412)	.096(1.548)
Relative Time of Adoption			
H8b: CII→DSI→RTA	.159(1.459)	.318*(2.224)	.333*(2.220)
H8d:CII→Advertising→RTA	-.002(-.071)	-.002(-.143)	-.064(-1.561)
H8f: CII→Modeling→RTA	-.036(-1.000)	.000(.000)	-.012(-.218)
H8h: CII→WOM→RTA	-.010(-.526)	-.008(-.571)	.008(.308)
H8j: CII→DUCP→RTA	-.008(-.211)	.000(.000)	-.080(.297)
H8l: CII→OL→RTA	-.011(-.268)	.118*(2.000)	.081(1.373)

*=p<0.05, **=p<0.01, ***=p<0.001
t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

H8a (β = .201; t = 1.762, p<0.05) is supported. The mediating effect calculation suggested that domain specific innovativeness mediates the relationship between consumer innate innovativeness and really new product adoption. H8b~8l are not supported. The calculation of mediating effects indicated that there was no significant mediating effect of vicarious innovativeness, the desire for unique consumer products and opinion leadership was found between consumer innate innovativeness and really new product adoption in Australia data.

China Data

Table 5.13 presents the standardized path coefficients from the mediating effects of antecedent variables on the relationship between consumer innate innovativeness and really new product adoption, along with the t-value and respective levels of significance for China data.

Only H8a (β = .245; t = 2.227, p<0.01) and H8b (β = .318; t = 2.224, p<0.05) are supported. The mediating effect calculation suggested that domain specific innovativeness mediates the relationship between consumer innate innovativeness and really new product adoption. Further, H8l is supported (β = .118; t = 2.000, p<0.05). This suggests that opinion leadership mediates the relationship between consumer innate innovativeness and relative time of really new product adoption.

Taiwan Data

Table 5.13 presents the standardized path coefficients from the mediating effects of antecedent variables on the relationship between consumer innate innovativeness and really new product adoption, along with the t-value and respective levels of significance for Taiwan data.

Similar to China data, only H8a (β = .346; t = 1.966, p<0.05) and H8b (β = .333; t = 2.220, p<0.05) are supported. The results of mediating effect analysis suggested that the relationship between consumer innate innovativeness and really new product adoption is mediated only by domain specific innovativeness in Taiwan data.

5.7.8 Discussion of Results for the Overall Model

All the proposed hypotheses in the study are tested in the Overall Model. Table 5.14 summarizes the results of the Overall Model across the three countries.

Table 5.14: Summary of the Overall Model across the three countries

Hypothesis	Ownership and RTA		
	Supported		
	AUS	CN	TW
Consumer Innate Innovativeness			
H7a: CII→DSI	Yes	Yes	Yes
H7b: CII→Advertising	Yes	No	Yes
H7c: CII→Modeling	Yes	Yes	Yes
H7d: CII→WOM	Yes	No	Yes
H7e: CII→DUCP	No	No	No
H7f: CII→OL	Yes	Yes	Yes
H1a: CII→Ownership	No	No	No
H1b: CII→RTA	No	No	No
Domain Specific Innovativeness			
H2a: DSI→Ownership	Yes	Yes	Yes
H2b: DSI→RTA	No	Yes	Yes
Vicarious Innovativeness			
H3a: Advertising→Ownership	No	Yes	Yes
H3c: Modeling→Ownership	No	No	No
H3e: WOM→Ownership	No	No	No
H3b: Advertising→RTA	No	Yes	Yes
H3d: Modeling→RTA	No	No	No
H3f: WOM→RTA	No	Yes	No
The Desire for Unique Consumer Products			
H4a: DUCP→Ownership	Yes	Yes	Yes
H4b: DUCP→RTA	Yes	No	Yes
Opinion Leadership			
H5a: OL→Ownership	No	No	No
H5b: OL→Ownership	No	No	No

5.7.8.1 CII and Domain Specific Innovativeness

Hypothesis 7a states that consumer innate innovativeness is positively and directly associated with domain specific innovativeness. The results suggest that consumer innate innovativeness is the best predictor of domain specific innovativeness across the three countries. This has also been proved by the Extended and Integrated models. Roehrich, Valette-Florence, and Ferrandi (2003) report that consumer innate innovativeness is highly related to domain specific innovativeness, that is, consumers who have a high level of consumer innate innovativeness tend to have a high level of domain specific innovativeness as well, and the results of the study support this suggestion.

5.7.8.2 CII and Vicarious Innovativeness

Hypotheses 7b, 7c and 7d state that consumer innate innovativeness is negatively and directly associated with vicarious innovativeness. Even though the results slightly vary across the three countries, generally, consumer innate innovativeness was found to have a significant and negative relationship with vicarious innovativeness across the three countries. The negative and significant relationships suggested that consumers who have a high level of consumer innate innovativeness tend to rely less on communication factors. The results were not consistent with Im, Mason, and Houston's (2007) work in which consumer innate innovativeness is positively related to all the three constructs of vicarious innovativeness. The possible explanation is that the study adopts Hurt's (1977) scale for measuring consumer innate innovativeness, while Im, Mason, and Houston (2007) use Kirton's (1976) Kirton Adaption-Innovation Inventory (KAI) scale. The use of different indicators to measure consumer innate innovativeness in previous literature is suggested to have inconsistent results (Hauser, Tellis, and Griffin, 2005). As a

consequence, there may be a possibility to obtain different results from various measurements of consumer innate innovativeness.

A second possible explanation is that, according to Midgley and Dowling (1978), consumer innate innovativeness is the degree to which the individual adopts an innovation without communicating with others' previous purchasing experience. In other words, consumers with a high level of consumer innate innovativeness seem to rely less on the communication process for obtaining new product information. Clark and Goldsmith's (2006) findings suggest that consumer innate innovativeness is negatively related to interpersonal influences. This is consistent with the finding of the study.

5.7.8.3 CII and the Desire for Unique Consumer Products

Hypothesis 7e states that consumer Innate Innovativeness is positively and directly associated with the desire for unique consumer products. The results of the Overall Model provide no support across the three countries. This is not consistent with Vandecasteele and Geuens's (2006) findings. The possible explanation is that the measurement of consumer innate innovativeness used in the study differs from other studies. The use of different indicators of consumer innate innovativeness may have different results (Hauser, Tellis, and Griffin (2005).

An alternative explanation is that the antecedents included in the desire for unique consumer products, namely need for uniqueness, status aspiration, and materialism which are different from the components of consumer innate innovativeness discussed in previous section. Among them, only need for uniqueness is considered as a potential antecedent of consumer innovativeness (Vandecasteele and Geuens, 2009). As a

consequence, consumer innate innovativeness and the desire for unique consumer products may be considered as two distinct scales and hence measure different things.

5.7.8.4   CII and Opinion Leadership

Hypothesis 7f states that consumer innate innovativeness is positively and directly associated with opinion leadership. In the study, consumer innate innovativeness was found to be positively and significantly associated with opinion leadership across the three countries. Thus, H1f is supported. This is consistent with previous studies which suggest that opinion leadership has been long considered as an important factor to identify early adopters who have a high level of consumer innate innovativeness (Goldsmith, Flynn, and Goldsmith, 2003; Rogers, 2003).

5.7.8.5   Really New Product Adoption and CII

Hypotheses 1a and 1b state that consumer innate innovativeness is positively and directly associated with really new product adoption (Ownership and Relative Time of Adoption). Similar to the first three models, there is no significant relationship between consumer innate innovativeness and really new product adoption found across the three countries. The non-significant relationship is consistent with the findings of the multiple regression analysis in section 5.5.2. The overall results from the four models provide the evidence of the lack of strong link between consumer innate innovativeness, a generalized predisposition, and really new product adoption. The results confirmed previous findings that consumer innate innovativeness does not directly or only weakly related to innovation adoption behaviour (Citrin, Sprott, Silverman, and Stem, 2000; Goldsmith, Freiden, and Eastman, 1995; Im, Mason and Houston, 2007). This suggests that

consumer innate innovativeness is not an appropriate predictor of really new product adoption.

5.7.8.6   Really New Product Adoption and DSI

Hypotheses 2a and 2b state that domain specific innovativeness is positively and directly associated with really new product adoption. A positive and significant relationship between domain specific innovativeness and really new product adoption was found in China and Taiwan data, while a significant association was found only with Relative Time of Adoption in Australia data. This suggests that consumers who have a high level of domain specific innovativeness tend to own more really new products or adopt earlier than others. These results are consistent with the findings of the multiple regression analysis in section 5.5.3, where the relationship between domain specific innovativeness and Relative Time of Adoption is partially supported (e.g. Speed of Purchase and Relative Time of Adoption) in Australia data. As suggested in the reliability test presented in Table 4.15, one of the dimensions of domain specific innovativeness – New Product Information was found not to be reliable in China and Taiwan data. This result suggests that although domain specific innovativeness may still be a reliable and accurate predictor of really new product adoption, it may also need to be cross validated in different culture settings.

5.7.8.7   Really New Product Adoption and VI

Hypotheses 3a to 3f state that vicarious innovativeness is positively and directly associated with really new product adoption. In the study, vicarious innovativeness was found to have no relationship with really new product in Australia, while only advertising

was observed to be significantly and positively related to really new product adoption in China and Taiwan data. The results confirmed the findings of Model 4 in the multiple regression analysis discussed in previous section. This suggests that Australians are not influenced by communication factors for their new product adoption behaviour, and Advertising does enhance really new product adoption for Chinese and Taiwanese consumers.

The difference between Australia and the two Chinese speaking countries – China and Taiwan could possibly be the difference of national cultural background. According to Hofstede's (1984) study, Australia is classified to individualism, while China and Taiwan which, share similar cultural background, are both classified as collectivism. In an individualistic culture, people tend to place themselves and their immediate family members in priority, and to see themselves as unique and independent from others. As consequence, Australians may consider ownership of really new products as a private thing, and thus make their own decisions independently from others. Further, Australian customers might tend to believe the new products they actually see rather than rely on personal and impersonal communication.

In contrast, Chinese and Taiwanese consumers who are early adopters or own more really new products tend to rely on the information from mass media communication prior making their purchase decisions. The results confirm the traditional diffusion research which suggests that early versus late adopters are affected by impersonal communication – Advertising rather than personal communication such as Modeling and Word of Mouth (Bass, 1969).

Moreover, the use of internet is suggested as another type of communication factor that customers tend to rely on their own online investigations of new product information to form their buying decision (Rogers, 2003). The frequent use of internet may reduce the chance of the interaction between individuals, thus consumers may rely less on modeling and word of mouth regarding new product purchasing decisions. This may explain the non-significant relationship between interpersonal factors and really new product adoption in the study. This may become more evident with further vicarious innovativeness research.

5.7.8.8   Really New Product Adoption and DUCP

Hypotheses 4a and 4b state that the desire for unique consumer products is positively and directly associated with really new product adoption. These hypotheses are supported across the three countries. The desire for unique consumer products was found to have a positive relationship with really new product adoption. The results in the study are in the agreement with those by Vandecasteele and Geuens (2006) who, in studying consumer innovativeness in gays, lesbians and bisexuals, found that these groups of people express a higher level of DUCP and adopt more innovative products than heterosexuals. The results of the study suggest that the desire for unique consumer products is an accurate and appropriate predictor of really new product adoption.

5.7.8.9   Really New Product Adoption and OL

Hypotheses 5a and 5b state that opinion leadership is positively and directly associated with really new product adoption. No support was found across the three countries. Even though this study confirms that opinion leadership is directly and positively associated

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with consumer innate innovativeness, apparently opinion leadership has no influence on really new product adoption behaviour. The results are in direct contrast to the findings of Lassar, Manolis, and Lassar (2005), which posit that opinion leaders are more likely to adopt really new service. One possible explanation is that opinion leadership is a personality trait which allows opinion leaders to collect market or product information and shares it with others just for social exchange rather than actual adoption.

An alternative explanation is that it might be due to the product category utilized in the study, i.e., consumer electronic products. In contrast, online banking classified in e-service involves a much higher level of technological discontinuity and requires greater behaviour change for consumers than consumer electronic products. Further, online safety is a great concern to consumers, especially in banking services. Consequently, the early users of online banking may be asked frequently about their opinions and personal experiences of the specific service, and thus are considered to have a high level of opinion leadership. There would seem to be grounds for further research into the nature of opinion leadership between really new products and really new services adoption.

5.7.8.10   Mediating Role of DSI, VI, DUCP and OL

For H2c, H2d, H3g to H3l, H4c, H4d, H5c and H5d, only domain specific innovativeness was found to have a significant mediating effect on the relationship between consumer innate innovativeness and really new product adoption across the three countries. The results confirmed Roehrich's (2004) finding to which domain specific innovativeness is a mediator between consumer innate innovativeness and the adoption of new products. However, in fact, there is no mediating effect of vicarious innovativeness, the desire for unique consumer products and opinion leadership found in the study. As a consequence,

the study decides to further investigate whether these three constructs are the moderator

variables to the relationship between consumer innate innovativeness and really new

product adoption. The results of moderation analysis are discussed in the next section.

5.8 MODERATION

As discussed in the previous section, only domain specific innovativeness was found to

have a mediating effect on the relationship between consumer innate innovativeness and

really new product adoption, while other proposed constructs were not. The predictive

efficacy of consumer innate innovativeness could be affected by exogenous or situational

variables known as "moderator" variables (Prescott, 1986). This section examines

whether the moderating effects of vicarious innovativeness, the desire for unique

consumer products and opinion leadership exist on the relationship between consumer

innate innovativeness and really new product adoption in Australia, China and Taiwan.

5.8.1 The Nature of Moderators

A moderator is a variable that influences the direction and/or strength of the relation

between an independent variable and a dependent variable (Baron and Kenny, 1986). In

other words, "a moderated effect of some focal variable F on outcome variable Y is one

in which is size or direction depends on the value of a third, moderator variable M"

(Hayes and Matthes, 2009 p. 924). Figure 5.6 illustrates a moderator model.

The model has three causal paths that feed into the outcome variable: the impact of focal

predictor (Path a); the impact of a moderator (Path b), and the interaction (Path c). The

moderating effect is supported if the interaction (Path c) is significant. Although the main

effects of focal predictor and moderator (Paths a and b) could be significant, they are not

directly relevant conceptually to examine the moderating effects (Baron and Kenny,

1986).

Figure 5.6: Moderator Model
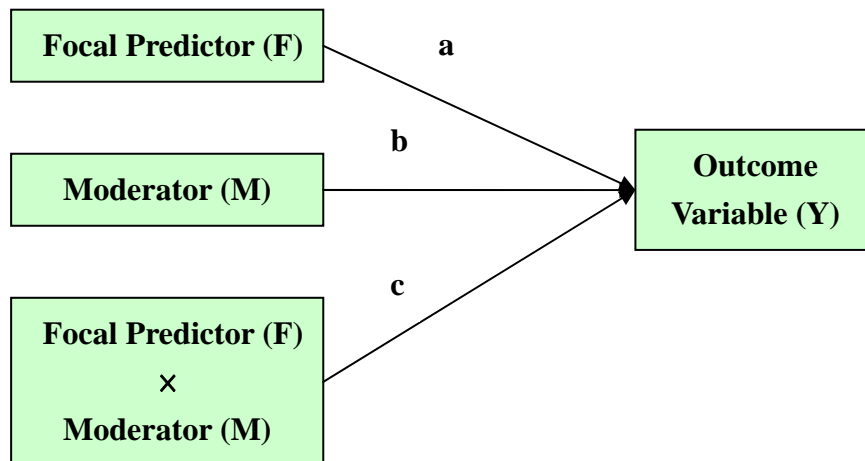
Sources: based on Baron and Kenny (1986)

5.8.2   Classification of Moderators

Although empirical studies are in the agreement with the importance of moderators, some

confusion such as what a moderator variable really is and how it affects the relationship

between two variables may produce misleading findings (Sharma et al., 1981). Sharma et

al. (1981) use two dimensions to classify moderator variables to one of four types,

namely Predictor, Homologizer, Quasi Moderator and Pure Moderator (Figure 5.7)

Predictors which refer to as an intervening, exogenous, antecedent, suppressor variables

are not considered as moderator variables. These variables are related to the criterion

and/or predictor variable but does not interact with the predictor. A homologiser is

suggested to have an impact on the strength of the relationship between the predictor and criterion variables. There is no interaction between homologiser and predictor variables, and a homologiser is not significantly related to either the predictor or the criterion variable. Ghiselli (1963) suggests that the homologizer is considered as a moderator variable when its subgroups generate different predictive validity coefficients for the predictor variables.

Figure 5.7: Classification of Moderator Variables

	Related to Criterion and/or Predictor	Not related to Criterion and Predictor
No Interaction with Predictor	**PREDICTOR** **Intervening, Exogenous,** **Antecedent, Suppressor**	**MODERATOR** **Homologizer**
Interaction with Predictor	**MODERATOR** **Quasi Moderator**	**MODERATOR** **Pure Moderator**

Source: Sharma et al., (1981, p.292)

In terms of Pure and Quasi moderators, they modify the form of the relationship between the predictor and criterion variables. A Pure moderator does not have a significant relationship with either the predictor or the criterion variable, but interacts with the predictor variable. In contrast, a Quasi moderator not only has an interaction with the predictor variable but is also a predictor variable itself (Sharma et al., 1981). Consequently, Pure and Quasi moderators are the major concern of moderating effects in the thesis.

5.8.3   Moderation Analysis Procedures

Moderation effects can be tested by statistical models such as ordinary least squares or logistic regression (Hayes and Matthes, 2009). Hay and Matthes (2009) suggest that "when an interaction is found, it should be probed in order to better understand the condition (i.e., the values of the moderator) under which the relationship between the focal predictor and the outcome is strong versus weak, positive versus negative, and so forth" (p. 924). They develop a macro for SPSS and SAS, named MODPROBE which is a computational aide for probing interactions in logistic regression. The macro produces the regular regression output, and also calculates the effect of the focal predictor variable at values of the moderator variable.

In the study, MODPROBE and SPSS Version 18.0 was used to examine the moderating effects of vicarious innovativeness, the desire for unique consumer products and opinion leadership on the relationship between consumer innate innovativeness and really new product adoption. The effect of each moderator variable was examined independently for each country. Consumer innate innovativeness was entered as the focal predictor variable (F), and Advertising, Modeling, Word of Mouth, DUCP and OL were entered as the moderator variables (M). These moderator variables and the focal predictor variable were split into three subgroups representing "One s.e below", "Mean" and "One s.e above" values. These are continuous variables (Aiken and West, 1991) thus the computer uses mean and plus/minus one standard deviation to create the three condition to calculate the effect of the focal predictor variable at a specific value of the moderators. If an interaction is found, a table of conditional effect of focal predictor at values of a moderator is provided to indicate the significance of these subgroups. Finally, the results were then to be input into the graphing program to produce a visual plot of the

interaction.

5.8.4   Results of Moderation Analysis

Australia Data

Table 5.15 and 5.16 present the standardized path coefficients from the moderating

effects on the relationship between consumer innate innovativeness and really new

product adoption, along with the t-value and respective levels of significance for

Australia data. From the results, Modeling, Word of Mouth and Opinion Leadership were

found not to have a moderating effect. In contrast, the desire for unique consumer

products was found to moderate the relationship between consumer innate innovativeness

and Ownership of really new products (β = -.305, t = -2.215, p<0.05). The significant

interactions were further examined to determine whether the various subgroups would

produce different predictive efficacy for consumer innate innovativeness.

Table 5.15: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Ownership - Australia (n=256)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	5.229***	,156	33.561	
CII (F)	.388*	.199	1.951	
Advertising (M)	.199	.140	1.419	Potential Homologizer
Interact (FxM)	-.196	.144	-1.359	
R^2	.022			
F-ratio	1.912			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	5.199***	.161	32.356	
CII (F)	.499*	.210	2.380	
Modeling (M)	.266*	.125	2.128	Predictor
Interact (FxM)	-.155	.130	-1.195	
R^2	.031			
F-ratio	2.686*			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	5.256***	.156	33.787	
CII (F)	.369*	.201	1.843	
WOM (M)	.315*	.126	2.500	Predictor
Interact (FxM)	.014	.150	.095	
R^2	.033			
F-ratio	2.902*			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	5.211***	.154	33.942	
CII (F)	.447*	.195	2.300	
DUCP (M)	.362*	.143	2.535	Quasi Moderator
Interact (FxM)	-.305*	.138	-2.215	
R^2	.053**			
F-ratio	4.661			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	5.260***	.158	33.323	
CII (F)	.231	.197	1.169	
OL (M)	.312*	.160	1.945	Predictor
Interact (FxM)	-.038	.213	-.180	
R^2	.024			
F-ratio	2.077			

$*=p<0.05$, $**=p<0.01$, $***=p<0.001$

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 252.000

Table 5.16: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Relative Time of Adoption - Australia (n=256)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.811***	.040	69.883	Potential Homologizer
CII (F)	.140**	.051	2.726	
Advertising (M)	.016	.036	.427	
Interact (FxM)	-.040	.037	-1.074	
R²	.030			
F-ratio	2.573*			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.806***	.042	67.589	Potential Homologizer
CII (F)	.165**	.054	3.050	
Modeling (M)	.052	.032	1.608	
Interact (FxM)	-.029	.034	-.850	
R²	.037			
F-ratio	3.227*			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.812***	.040	70.111	Predictor
CII (F)	.152**	.052	2.936	
WOM (M)	.069*	.033	2.120	
Interact (FxM)	-.025	.039	-.647	
R²	.043			
F-ratio	3.810*			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.809***	.041	69.299	Potential Homologizer
CII (F)	-.145**	.055	-2.639	
DUCP (M)	-.001	.038	-.023	
Interact (FxM)	.037	.039	.969	
R²	.030			
F-ratio	2.622*			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.809***	.041	68.923	Potential Homologizer
CII (F)	.112*	.051	2.193	
OL (M)	.032	.041	.766	
Interact (FxM)	.049	.055	.900	
R²	.032			
F-ratio	2.747*			

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 252.000

The Desire for Unique Consumer Products

Table 5.17 illustrates the conditional effect of consumer innate innovativeness at low, moderate and high level of the desire for unique consumer products to supplement the conditional estimates already calculated. In addition, Figure 5.8 plots this interaction graphically using the coefficients from the model, setting the covariates to their sample mean. In Ownership, among those with relatively low level of the desire for unique consumer products (One s.e below or Mean on the scale), the coefficient for consumer innate innovativeness is positive and statistically different from zero. This suggests that Australian respondents with a One s.e below (β = .771, t = 2.955, p<0.01) or Mean (β = .447, t = 2.300, p<0.05) level of the desire for unique consumer products report to own more really new products when they have a higher level of consumer innate innovativeness. In other words, when Australian innovative consumers consider really new products to have a lower level of uniqueness, they tend to purchase more than others who has a low level of consumer innate innovativeness. Among those with a "One s.e above" level in the desire for unique consumer products, there is no relationship between consumer innate innovativeness and really new product adoption.

Table 5.17: Conditional Effect of CII at values of DUCP - Australia

Ownership			
DUCP	**Co-eff**	**SE**	**t-Value**
One s.e below	.771**	.263	2.955
Mean	.447*	.195	2.300
One s.e above	.118	.225	.521

*=p<0.05, **=p<0.01, ***=p<0.001

Figure 5.8: Moderating Effect of DUCP on the Relationship between CII and Ownership
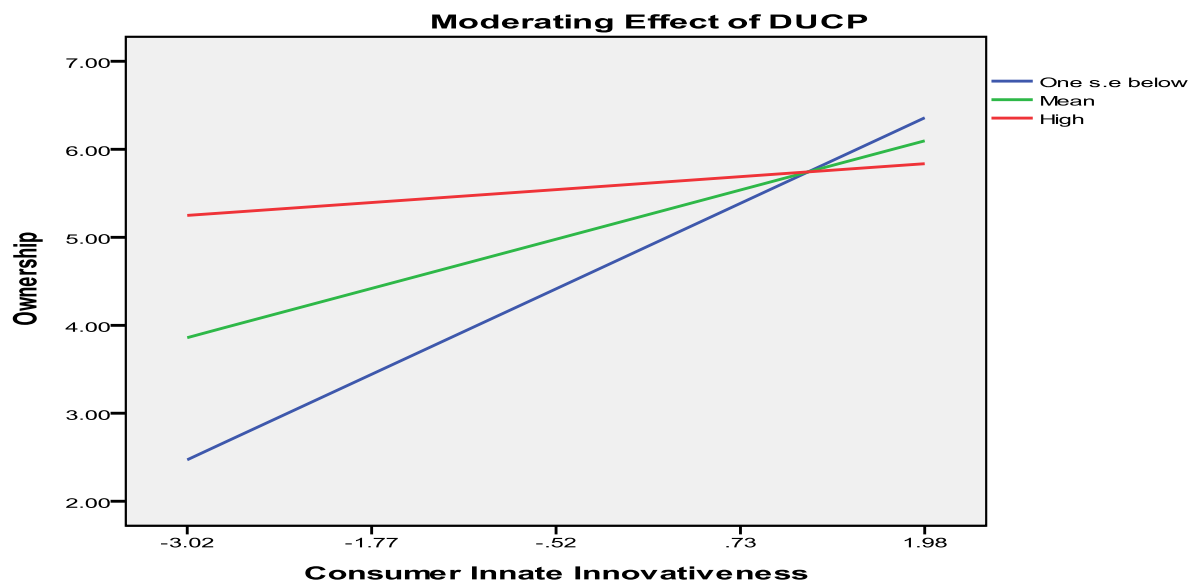
China Data

Table 5.18 and 5.19 present the standardized path coefficients from the moderating effects on the relationship between consumer innate innovativeness and really new product adoption, along with the t-value and respective levels of significance for China data. From the results, DUCP, Word of Mouth and Opinion Leadership were found not to have a moderating effect. In contrast, Advertising (β = -.728, t = -3.253, p<0.01, Ownership; β = -.232, t = -2.701, p<0.01, Relative Time of Adoption) was found to moderate the relationship between consumer innate innovativeness and really new product adoption. In addition, Modeling (β = -.208, t = -2.042, p<0.05) was found to moderate the relationship between consumer innate innovativeness and Relative Time of Adoption only. The significant interactions were further examined to determine whether the various subgroups would produce different predictive efficacy for consumer innate innovativeness.

Table 5.18: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Ownership - China (n=207)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.159***	.029	15.087	
CII (F)	.871***	.252	3.464	
Advertising (M)	.518**	.177	2.923	Quasi Moderator
Interact (FxM)	-.728**	.224	-3.253	
R²	.120			
F-ratio	9.250***			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.089***	.226	13.674	
CII (F)	.722**	.269	2.684	
Modeling (M)	-.031	.226	-.138	Potential Homologizer
Interact (FxM)	-.389	.269	-1.448	
R²	.046*			
F-ratio	3.240			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.180***	.220	14.486	
CII (F)	.696**	.258	2.693	
WOM (M)	.057	.191	.297	Potential Homologizer
Interact (FxM)	.109	.224	.488	
R²	.036			
F-ratio	2.521*			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.150***	.222	14.177	
CII (F)	.843**	.278	3.031	
DUCP (M)	.415*	.235	1.762	Predictor
Interact (FxM)	-.125	.228	-.550	
R²	.049			
F-ratio	3.469*			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.162***	.222	14.276	
CII (F)	.571*	.262	2.178	
OL (M)	.675*	.344	1.962	Predictor
Interact (FxM)	.102	.384	.265	
R²	.056			
F-ratio	3.994**			

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 203.000

Table 5.19: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Relative Time of Adoption - China (n=207)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	1.585***	.080	19.759	
CII (F)	.455***	.096	4.722	
Advertising (M)	.206**	.068	3.032	Quasi
Interact (FxM)	-.232**	.086	-2.701	Moderator
R²	.146			
F-ratio	11.604***			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	1.545***	.086	18.037	
CII (F)	.425***	.102	4.160	
Modeling (M)	.020	.086	.238	Pure
Interact (FxM)	-.208*	.102	-2.042	Moderator
R²	.094			
F-ratio	6.991***			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	1.588***	.083	19.194	
CII (F)	.410***	.097	4.209	
WOM (M)	.156*	.072	2.163	Predictor
Interact (FxM)	-.054	.084	-.641	
R²	.096			
F-ratio	7.190***			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	1.579***	.085	18.649	
CII (F)	.457***	.106	4.315	
DUCP (M)	.153*	.090	1.703	Predictor
Interact (FxM)	-.061	.087	-.699	
R²	.088			
F-ratio	6.497***			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	1.600***	.084	19.126	
CII (F)	.346***	.099	3.496	
OL (M)	.372**	.130	2.862	Predictor
Interact (FxM)	-.077	.145	-.532	
R²	.111			
F-ratio	8.425***			

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 203.000

VI - Advertising

Table 5.20 presents the conditional effect of consumer innate innovativeness at low, moderate and high level of VI – Advertising. Further, Figure 5.9 and 5.10 plots this interaction graphically. Consumer innate innovativeness is positively related to really new product adoption if Advertising is One s.e below (β = 1.734, t = 4.330, p<0.001, Ownership; β = .730, t = 4.755, p<0.001, Relative time of Adoption) or Mean (β = .871, t = 3.464, p<0.001, Ownership; β = .455, t = 4.722, p<0.001, Relative Time of Adoption). This suggests that when really new products are recently released to the market and there is no much information about them in the mass media, Chinese respondents with a high level of consumer innate innovativeness tend to purchase more and adopt earlier than others. Among those with a higher contact with Advertising, there is no relationship between consumer innate innovativeness and really new product adoption.

Table 5.20: Conditional Effect of CII at values of Advertising - China

Ownership			
Advertising	**Co-eff**	**SE**	**t-Value**
One s.e below	1.734***	.400	4.330
Mean	.871***	.252	3.464
One s.e above	.009	.327	.027

RTA			
Advertising	**Co-eff**	**SE**	**t-Value**
One s.e below	.730***	.154	4.755
Mean	.455***	.096	4.722
One s.e above	.181	.125	1.443

*=p<0.05, **=p<0.01, ***=p<0.001

Figure 5.9: Moderating Effect of VI - Advertising on the Relationship between CII and Ownership
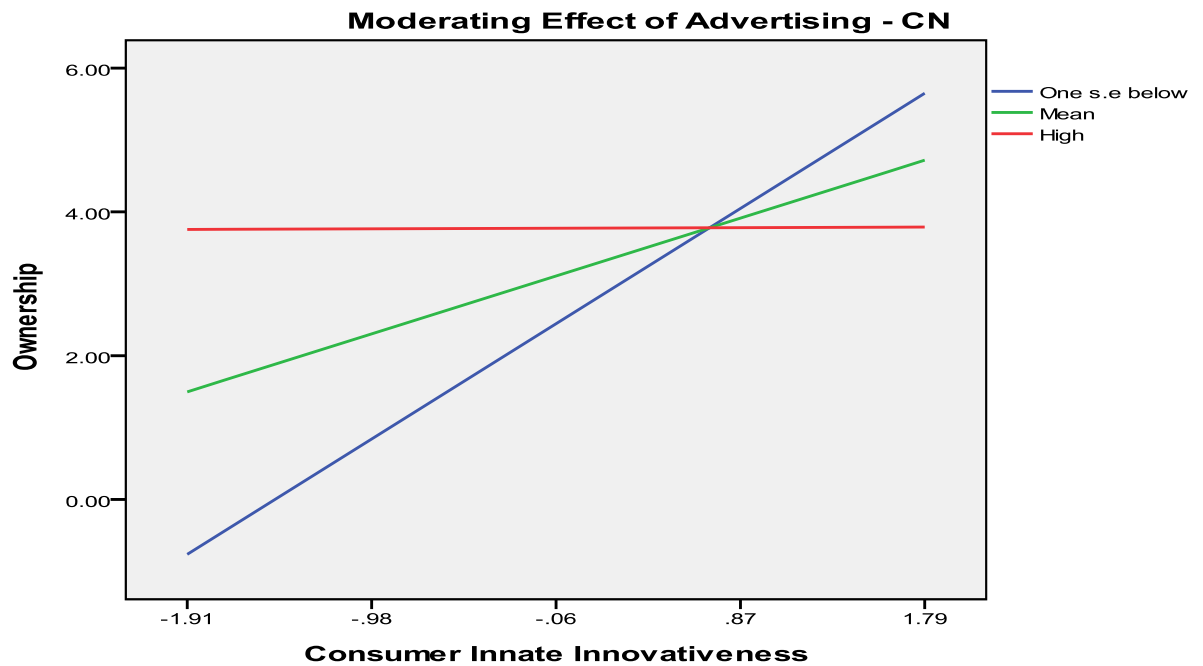
Figure 5.10: Moderating Effect of VI - Advertising on the Relationship between CII and Relative Time of Adoption
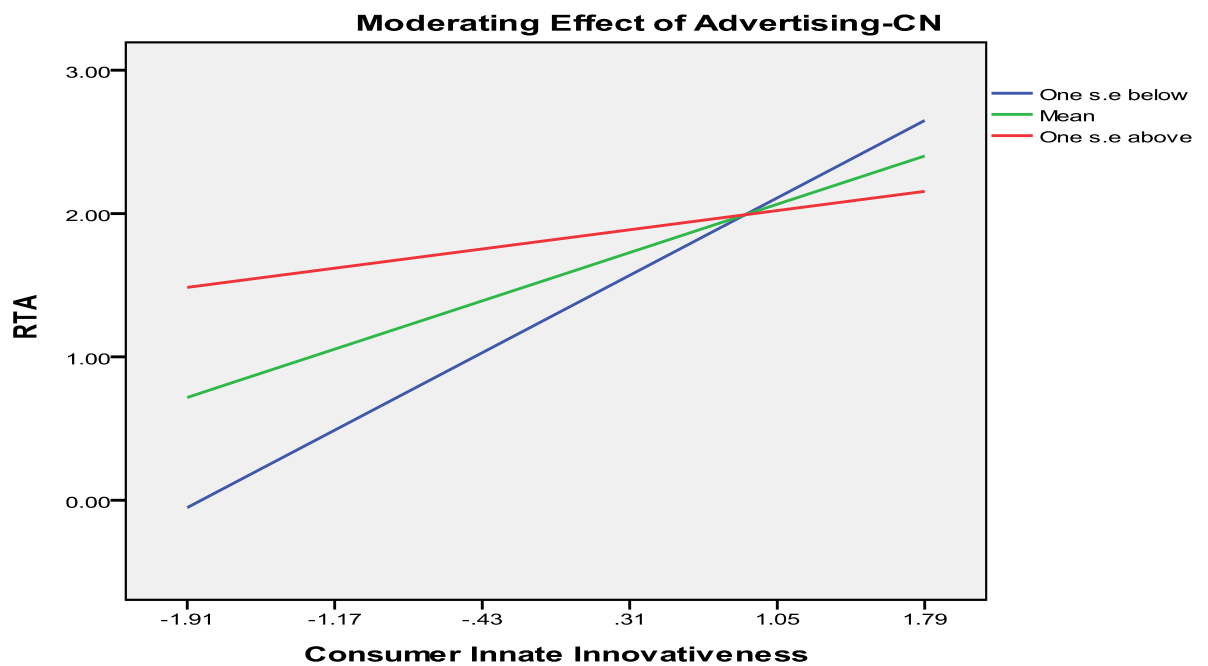
VI - Modeling

Table 5.21 presents the conditional effect of consumer innate innovativeness at low, moderate and high level of VI – Modeling. Modeling is defined as the degree to which the respondent has observed others in his or her personal network who own these new products. Figure 5.11 plots this interaction graphically. In Relative Time of Adoption, among those with relatively One s.e below (β = .642, t = 4.016, p<0.001) or Mean (β = 425, t = 4.160, p<0.001) level of Modeling, the coefficient for consumer innate innovativeness is positive and statistically different from zero. This suggests that when really new products are new to the market, Chinese innovative respondents, who have less opportunity to observe others' ownership of these products, report to adopt really new products earlier than others. In contrast, among those with a higher degree of Modeling, there is no relationship between consumer innate innovativeness and the speed of really new product adoption.

Table 5.21: Conditional Effect of CII at values of Modeling - China

RTA			
Modeling	**Co-eff**	**SE**	**t-Value**
One s.e below	.642***	.160	4.016
Mean	.425***	.102	4.160
One s.e above	.208	.134	1.552

*=p<0.05, **=p<0.01, ***=p<0.001

Figure 5.11: Moderating effect of VI - Modeling on the relationship between CII and Relative Time of Adoption
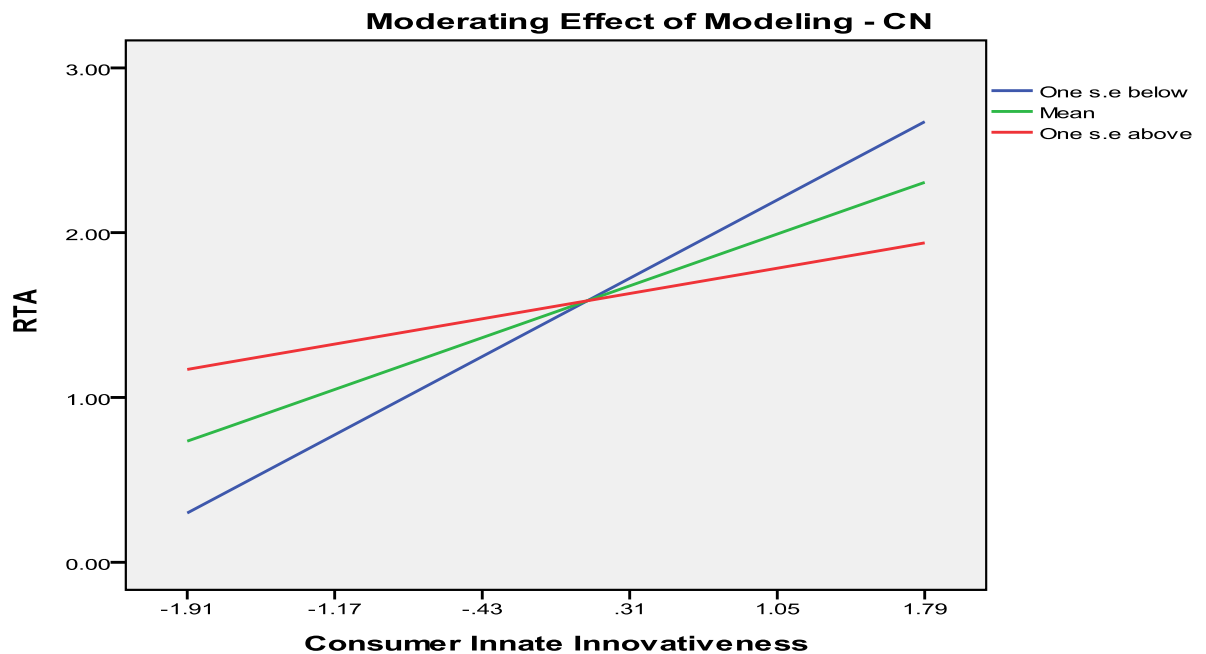
Taiwan Data

Table 5.22 and 5.23 present the standardized path coefficients from the moderating effects on the relationship between consumer innate innovativeness and really new product adoption, along with the t-value and respective levels of significance for China data. The results provide no evidence to suggest that VI, DUCP and OL have a moderating effect on the relationship between consumer innate innovativeness and really new product adoption in Taiwan data.

Table 5.22: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Ownership - Taiwan (n=209)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.969***	.173	22.969	
CII (F)	.529*	.237	2.233	
Advertising (M)	.591***	.167	3.541	Predictor
Interact (FxM)	.170	.237	.716	
R²	.073			
F-ratio	5.352**			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.939***	.181	21.812	
CII (F)	.325	.258	1.261	
Modeling (M)	-.140	.154	-.913	Potential Homologizer
Interact (FxM)	-.013	.187	-.071	
R²	.017			
F-ratio	1.181			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.926***	.179	21.936	
CII (F)	.332	.246	1.350	
WOM (M)	-.142	.154	-.920	Potential Homologizer
Interact (FxM)	-.069	.184	-.377	
R²	.018			
F-ratio	1.274			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.958	.174	22.733	
CII (F)	.619*	.248	2.494	
DUCP (M)	.589***	.167	3.531	Predictor
Interact (FxM)	.067	.186	.360	
R²	.074			
F-ratio	5.489**			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	3.931***	.169	23.290	
CII (F)	.330	.229	1.439	
OL (M)	.646***	.192	3.360	Predictor
Interact (FxM)	.266	.241	1.102	
R²	.077			
F-ratio	5.670***			

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 205.000

Table 5.23: Moderating Effects on the Relationship between Consumer Innate Innovativeness and Relative Time of Adoption - Taiwan (n=209)

Advertising as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.283***	.064	35.550	
CII (F)	.219*	.088	2.485	
Advertising (M)	.150*	.062	2.425	Predictor
Interact (FxM)	.019	.088	.218	
R²	.048			
F-ratio	3.461*			
Modeling as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.271***	.066	34.414	
CII (F)	.171*	.094	1.815	
Modeling (M)	-.045	.056	-.806	Potential Homologizer
Interact (FxM)	-.037	.068	-.534	
R²	.025			
F-ratio	1.764			
Word of Mouth as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.276***	.065	34.799	
CII (F)	.156*	.090	1.736	
WOM (M)	-.057	.056	-1.017	Potential Homologizer
Interact (FxM)	-.019	.067	-.281	
R²	.026			
F-ratio	1.851			
The Desire for Unique Consumer Products as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.286***	.065	35.071	
CII (F)	.217*	.093	2.333	
DUCP (M)	.105*	.062	1.686	Predictor
Interact (FxM)	.025	.070	.357	
R²	.036			
F-ratio	2.566*			
Opinion Leadership as Moderator				
	Co-eff	**SE**	**t-Value**	**Interpretation**
Constant	2.277***	.062	36.761	
CII (F)	.159*	.084	1.895	
OL (M)	.229**	.071	3.252	Predictor
Interact (FxM)	.067	.088	.752	
R²	.076			
F-ratio	5.621***			

*=p<0.05, **=p<0.01, ***=p<0.001

t-tests are one tail tests because the hypotheses were directional so cut off point t=1.65

Note: DF1 = 3.000, DF2 = 205.000

5.9   CHAPTER SUMMARY

Chapter Five has identified the outcome of ANOVA, regression analyses and structural equation modeling in examining the relationships between CII, DSI, VI, DUCP and OL, and their impact on really new product adoption (Ownership and Relative Time of Adoption).

Consumer innate innovativeness was found to have strong positive and direct associations with domain specific innovativeness and opinion leadership across the three countries. CII was found to have a direct and negative association with the three communication factors of vicarious innovativeness. Consumer innate innovativeness was not found to have a similar direct association with the desire for unique consumer products.

The structural equation models were presented which support the various analyses conducted and confirm a good fit between the data and the conceptual model derived form the literature review. Among the constructs in the study, only domain specific innovativeness and the desire for unique consumer products were found to have direct and positive associations with really new product adoption across the three countries. Advertising was found to have a strong positive association with really new product adoption in China and Taiwan data. Further, only domain specific innovativeness was found to mediate the relationship between consumer innate innovativeness and really new product adoption.

The further investigation of moderating effects of VI, DUCP and OL suggests that the desire for unique consumer products moderates the relationship between consumer innate innovativeness and really new product adoption in Australia. In China, Advertising was found to moderate the relationship between consumer innate innovativeness and really new product adoption, while Modeling has a moderating effect on the relationship between consumer innate innovativeness and Relative Time of Adoption. No evidence of a moderating effect was found in Taiwan data.

The final chapter will discuss in detail the implications of the findings presented in Chapter Five.

CHAPTER 6 – CONCLUSIONS AND IMPLICATION

6.1   INTRODUCTION

The main purpose of this dissertation is to better understand the drivers of adoption and the consumer characteristics that are associated with it – theyby improving the ability to develop communication and marketing campaigns to speed up the sale of really new products. The following research question is addressed:

What is the relationship between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, opinion leadership, the desire for unique consumer products and the adoption of really new products?

A conceptual model which was derived from the literature was tested empirically and found to partially support the proposed hypotheses. The results and discussion of the research hypotheses were presented in the previous chapters. Chapter Four confirmed all the measurement constructs are reliable and valid, but not invariant across three countries. The preceding Chapter Five addressed all the hypotheses and the proposed relationships were culminated via structural equation model. The conceptual model was found to be an acceptable fit with the data.

This chapter identifies and summarizes the main conclusions of each of these hypotheses. The academic and managerial contributions from this study will be highlighted. Finally, the limitations of the study and future research directions for extending the knowledge of consumer innovativeness research will be discussed.

6.2   SUMMARY OF RESEARCH HYPOTHESES

The tables of multiple regressions (Tables 5.3 – 5.5) summarize the relationships that were found to be significant. The study developed SEM to present a holistic picture of the relationships. This summary is depicted in Table 6.1. Further, Table 6.2 summarizes the results of moderation analysis.

Table 6.1: Summary of Hypotheses Results for Australia, China and Taiwan

Hypothesis	Supported/Not Supported		
	AUS	**CN**	**TW**
H1a: CII→Ownership	**Not Supported**	**Not Supported**	**Not Supported**
H1b: CII→RTA	**Not Supported**	**Not Supported**	**Not Supported**
H2a: DSI→Ownership	Supported	Supported	Supported
H2b: DSI→RTA	Supported	Supported	Supported
H3a: VI-Advertising→Ownership	Not Supported	Supported	Supported
H3b: VI-Advertising→RTA	Not Supported	Supported	Supported
H3c: VI-Modeling→Ownership	Not Supported	Not Supported	Not Supported
H3d: VI-Modeling→RTA	Not Supported	Not Supported	Not Supported
H3e: VI-WOM→Ownership	Not Supported	Not Supported	Not Supported
H3f: VI-WOM→RTA	Not Supported	Not Supported	Not Supported
H4a: DUCP→Ownership	Supported	Supported	Supported
H4b: DUCP→RTA	Supported	Not Supported	Supported
H5a: OL→Ownership	Not Supported	Not Supported	Not Supported
H5b: OL→RTA	Not Supported	Not Supported	Not Supported
H6a: Demographics→Ownership	Supported**	Supported**	Supported**
H6b: Demographics→RTA	Supported**	Supported**	Supported**
H7a: CII→DSI	Supported	Supported	Supported
H7b: CII→VI-Advertising	Supported	Not Supported	Supported
H7c: CII→VI-Modeling	Supported	Supported	Supported
H7d: CII→VI-Word of Mouth	Supported	Not Supported	Supported
H7e: CII→DUCP	Not Supported	Not Supported	Not Supported
H7f: CII→OL	Supported	Supported	Supported
H8a: CII→DSI→Ownership	Supported	Supported	Supported
H8b: CII→DSI→RTA	Not Supported	Supported	Supported
H8c: CII→Advertising→Ownership	Not Supported	Not Supported	Not Supported
H8d: CII→Advertising→RTA	Not Supported	Not Supported	Not Supported
H8e CII→Modeling→Ownership	Not Supported	Not Supported	Not Supported
H8f: CII→Modeling→RTA	Not Supported	Not Supported	Not Supported
H8g: CII→WOM→Ownership	Not Supported	Not Supported	Not Supported
H8h CII→WOM→RTA	Not Supported	Not Supported	Not Supported
H8i: CII→DUCP→Ownership	Not Supported	Not Supported	Not Supported
H8j: CII→DUCP→RTA	Not Supported	Not Supported	Not Supported
H8k: CII→OL→Ownership	Not Supported	Not Supported	Not Supported
H8l: CII→OL→RTA	Not Supported	Not Supported	Not Supported

**Partially significant findings

Table 6.2: Summary of Moderation Analysis for Australia, China and Taiwan

Results	Ownership		
	AUS	CN	TW
H9a: Advertising as Moderator	Not Supported	**Quasi Moderator (Supported)**	Not Supported
H9c: Modeling as Moderator	Not Supported	Not Supported	Not Supported
H9e: Word of Mouth as Moderator	Not Supported	Not Supported	Not Supported
H9g: DUCP as Moderator	**Quasi Moderator (Supported)**	Not Supported	Not Supported
H9i: Opinion Leadership as Moderator	Not Supported	Not Supported	Not Supported
Results	Relative Time of Adoption		
	AUS	CN	TW
H9b: Advertising as Moderator	Not Supported	**Quasi Moderator (Supported)**	Not Supported
H9d: Modeling as Moderator	Not Supported	**Pure Moderator (Supported)**	Not Supported
H9f: Word of Mouth as Moderator	Not Supported	Not Supported	Not Supported
H9h: DUCP as Moderator	Not Supported	Not Supported	Not Supported
H9j: Opinion Leadership as Moderator	Not Supported	Not Supported	Not Supported

6.2.1   CII and Other Measurement Constructs

Chapter Four examined the measurement models of all the constructs utilized in the study. The confirmatory factor analysis provides evidence to suggest that consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, and opinion leadership are multidimensional constructs, while the desire for unique consumer products is a unidimensional model. The results are similar across the three countries, and are generally found to be consistent with previous studies (Flynn, Goldsmith, and

Eastman, 1996; Goldsmith, Flynn, and Goldsmith, 2003; Harris and Lynn, 1996; Im, Mason, and Houston, 2007; Pallister and Foxall, 1998). For consumer innate innovativeness, three constructs were suggested, namely Accepting New Ideas, Suspiciousness of New Ideas, and Challenging of New Ideas.

Domain specific innovativeness was found to be a two-factor solution which included DSI Speed and DSI Information. However, DSI Information, which is a measure of gathering product information prior adoption, was found to be not reliable in China and Taiwan data. As a result, only DSI Speed, which is a measure of speed of adoption, was kept for further analysis in China and Taiwan data.

Vicarious innovativeness is a three-factor solution scale which included Advertising, Modeling, and Word of Mouth. This is consistent with Im, Mason, and Houston's (2007) study. For opinion leadership, confirmatory factor analysis suggested it as a two-dimension scale which included Opinion, measuring giving opinions to other late adopters and Persuasion, measuring persuading late adopters to purchase.

6.3   ACADEMIC CONTRIBUTION

As discussed in Chapter One, the definition and measurement of consumer innovativeness indicate a lack of consensus in previous studies. The results of different consumer innovativeness scales and the strength of the relationship between consumer innovativeness and adoption behaviour have been mixed. This thesis adopted an approach similar to earlier consumer innovativeness research as outlined in Chapter Two. The major contribution of this study is the establishment of an empirical link between consumer innovativeness and really new product adoption behaviour. This research adds

to the body of knowledge on the theoretical clarification in defining consumer innovativeness. Further, empirical studies indicate that early adopters play an important role in the diffusion of product innovations. The study demonstrates that consumer innate innovativeness is not the best predictor of consumer adoption behaviour for really new electronic products. That is, innovators are not always innovators across product categories. In addition, the relationships between consumer innate innovativeness, domain specific innovativeness, vicarious innovativeness, the desire for unique consumer products and opinion leadership were found to be only partially supported. Consequently, the antecedents of consumer innovativeness should be further investigated in order to gain complete understanding of this specific personality trait and develop a better measurement of consumer innovativeness.

The second contribution is that the study adds support for scales drawn from previous research, and responds to the need for empirical international validation of the growing body of theoretical work. This study undertook a rigorous statistical validation for the four measurement scales across three countries. Support was found for the reliability, convergent and discriminant validity, and nomological validity of Hurt's (1977) consumer innate innovativeness scale, the desire for unique consumer products scale, vicarious innovativeness scale, and opinion leadership scale across the three countries. In the study, these four scales were suggested to generalize sufficiently across countries. However, only the desire for unique consumer products was found to be a unidimensional scale. Further, for a two-solution scale (positive and negative items) of domain specific innovativeness, only one construct (positive items) was supported to be reliable and valid in China and Taiwan. This may be due to respondents with Chinese cultural background are not comfortable in responding negative wording items. Thus, previous studies which assume these scales to be unidimensional could be problematic. Further methodological

studies would make a positive contribution by investigating the influence of negative items involved in a scale on consumers with Chinese cultural background.

One of the major strengths of this study is that CII, DSI, VI and DUCP have not been considered together, and the mediating roles of DSI, VI and DUCP have not been fully tested in the literature. As mediating variables, DSI has been suggested to have impact on really new product adoption. The study found that DUCP and Advertising of VI have moderating effects rather than mediating effects on the relationship between consumer innate innovativeness and really new product adoption. It is worth noting that the results of mediation and moderation analyses vary across the three countries. Further cross-country comparison studies should give great attention to the differences when they combine data from different countries.

A further contribution involves the concept of measurement invariance which needs to be investigated previously when conducting cross-group comparison research. It is proposed that the findings of a cross cultural research are incapable manifesting their comparable effects without testing measurement equivalence. This study adopted a rigorous examination of the measurement invariance by following Mavondo, Gabbott, and Tsarenko (2003) and Vandenberg and Lance's (2000) sequence of test procedures namely, configural, weak, strong, and strict factorial invariance. In the study, only Hurt's (1977) consumer innate innovativeness was found to map the same construct across the three countries, while other measurement constructs did not. The findings are important methodologically because the results of the study are not comparable without evidence of measurement invariance. Further research should give greater attention when conducting cross-groups comparison studies.

6.4   MANAGERIAL IMPLICATIONS

As the participants of this study were drawn from Australia, China, and Taiwan, the results are likely to be most useful for mangers in similar settings. Because of the pressure of increasing globalization, marketers need be aware that countries differ systematically in both consumer innovativeness and specific product categories. Even though innovators have been confirmed to play an important role in the diffusion of new products, innovators are not always innovators across countries and product categories. Firms should try to identify innovators one country at a time when introducing new products in different countries and product categories. This study found that even though China and Taiwan share similar cultural background and the same language, consumers in these two countries have different responses to consumer innovativeness and really new product adoption. For this purpose, it is recommended that firms should consider introducing really new products for each country separately with different strategies. Despite increasing marketing research expenses, it would reduce risks and increase quick adoption.

The results of measuring the relationships between consumer innovativeness and really new product adoption indicate a lack of consensus. There is not yet a single scale found to measure new product adoption behaviour efficiently and effectively. Mixed results were found for scales utilized across the three countries. Marketers should keep the following in mind when they intend to measure new product behaviour in these countries. First, consumer innate innovativeness is confirmed to have a weak relationship, even if significant, relationship with really new product adoption. Using only consumer innate innovativeness to predict new product adoption behaviour will be problematic. DUCP and Advertising influence the predicting efficacy of consumer innate innovativeness on

really new product adoption.

Second, domain specific innovativeness is found to have a direct effect on really new product across the three countries. For introducing new products, marketers should use domain specific innovativeness to best predict consumers' adoption behaviour in a specific product category in Western culture.

Third, among all the scales used in the study, the desire for unique consumer products is the other scale to be proved to have direct relationship with really new product adoption across the three counties. It is worthy to note that the scale is for measuring consumers' adoption on unique products. It does shed light on aspects of the psychology of new buying. Consumers high on DUCP might buy new products when they are novel or original in the sense of being unique. Marketers need to keep in mind that all new products may not be considered as unique by consumers. The scale of the desire for unique consumer products should be used in predicting adoption behaviour of a specific product category which is considered as unique by customers.

Fourth, the study found that impersonal communication plays an important role in predicting adoption behaviour. Chinese and Taiwanese consumers are more influenced by advertising, while Australians are not. Marketers should understand that when introducing new products, advertising is the most important tool to generate product awareness and enhance adoption behaviour in China and Taiwan. In contrast, Australians make their own adoption decisions independently from others. Marketers should use demographic factors such age, income and numbers of children to best predict really new product adoption in Australia.

Finally, firms need to be aware of the fact that demographic effects also differ across countries. For age, consumers who are younger tend to purchase more really new product in Australia and China. For Gender, females are found to own more really new consumer electronic products in Taiwan. For Chinese consumers, marketers should focus more on consumers with higher level of education. As object characteristics, income and number of children serve as powerful and straightforward means by which marketers can target potential really new product users in Australia and Taiwan. New product diffusion is risky, especially for really new products. Various factors which differ systematically across countries have great impact on adoption behaviour. Marketer should consider seriously developing a different strategy for each country at a time, rather than implementing one strategy simultaneously in all countries.

6.5   LIMITATIONS

Several limitations of the study should be noted. First, data was collected from the major cities of Melbourne, Australia, Shanghai, China, and Taipei, Taiwan. Respondents who live in these big cities might have more chances to obtain really new product information, and thus have different perspectives from people who live in other small cities.

Second, the use of different data collection methods would have produced different advantages and disadvantages. In the study, Australian data were collected via online questionnaires given to individuals who have voluntarily joined a research database of a qualified market research company contracted to conduct the survey. In contrast, for China and Taiwan, participants were randomly selected from individuals in front of shopping centers and asked to complete the questionnaires. The online questionnaire can reduce human mistakes at the data entry stage. However, respondents may fill out the

questionnaire arbitrarily because of the lack of human presence for clarification purposes. Generally, the results found from the study should be interpreted carefully with consideration to limitations.

Third, the findings reported in the study may be limited to the categories of really new products investigated in the research. Consumer electronic products, for example, are only one of the various product categories. In addition, there are also various products in the specific product category. Even in relation to the same product category, respondents' perspectives may differ from one particular product to another. Thus, the relationships found in this particular product category may just provide a generalized overview in the adoption of consumer electronic products. Researchers using other product categories should use the results of this study with this in mind.

Finally, there are some constructs that may have an influence on the adoption of really new products that are not included in the research. For instance, other scales of consumer innate innovativeness, market maven, novelty seeking, and product attributes may also have influence on really new product adoption behaviour. The scales that are selected for the study may not cover all the factors influencing new product adoption behaviour.

6.6   FUTURE RESEARCH

Identifying early adopters is an important issue in new product diffusion. The study did not exhibit a consistent result for the measurements of consumer innovativeness (consumer innate innovativeness, domain specific innovativeness and vicarious innovativeness) across the three countries. Overall, the results of the study and previous research are still lack of consensus. There is room for improvement concerning the measurement of the consumer innovativeness.

The research studied only on a single product category, consumer electronic products. Future research should examine other product categories and/or really new services to expand the scope of this research field. In addition, even though, this study has done a cross country comparisons, the results differ systematically across countries. Beyond a focus on countries other than Australia, China and Taiwan, replication or extension studies could be undertaken in other Asia regions such as Japan, South Korea.

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