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# 以創新擴散模型結合社會影響力和認知風險探索消費者採用創新產品之因子

# Why people play Wii? An extended IDT model with social influence and perceived risk

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# 中文摘要

近幾年來，遊戲產業的蓬勃發展，尤其是次世代遊戲主機的來臨造成了一股旋風。2006 年初由微軟率先發表 Xbox360 在遊戲市場掀起了一股熱潮，而 Sony 也不甘示弱的相繼推出 PS3(Play Station 3)加入了這場大戰，在 2006 年底任天堂推出的 Wii 將這場戰爭達到最高潮，並在這場次世代遊戲主機大戰獨占鰲頭。為什麼這個後起之秀 Wii 能夠廣受好評而創下如此佳績呢？而又為什麼消費者想要去採用這樣創新的體感式遊戲主機呢？我們利用了創新擴散理論 IDT(Innovation Diffusion Theory)當做我們的基礎模型(Base model)，再結合了認知風險(Perceived Risk)及社會影響力(Social Influence) 來探討是什麼樣的因子會去影響消費者採用創新產品，又是什麼樣的因子會去幫助消費者將這種創新產品在一個社會體系中擴散開來。我們將認知風險(Perceived Risk)當作模型內的中介變數(Mediator)，和不同的採用者(adopter categories)當作模型內的調節變數(Moderator)去探討創新認知屬性和社會影響力對於採用意願的關係。我們利用問卷收集的方式以及相關的統計方法-結構方程模組(Structural equation modeling SEM)來幫助我們找到研究問題的答案。最後我們根據我們研究的結果去提供行銷管理人員一些行銷策略的建議

*關鍵字*: 創新擴散理論 IDT (Innovation Diffusion Theory), 認知風險 Perceived Risk, 社會影響力 Social Influences

# ABSTRACT

In recent years, the game industry has been growing rapidly. In particular, innovative video games like motion-sensitive game consoles have recently received increasing popularity. The primary research question to be addressed in this research is “Why do people adopt the innovative game console?” We want to apply IDT (Innovation Diffusion Theory, Rogers, 1983, 2004) as our base model with perceived risk (Jocoby & Kaplan, 1972) and social influence (Moore and Benbasat, 1990). In our extend IDT, perceived risk mediate the effects of technological factors (perceived attributes of innovation) and social factors (social influence) onto use intention. Moreover, adopter categories moderate the relationships in our conceptual model. A preliminary version of a 49-item online questionnaire was developed. We asked 701 respondents on a gamers’ website and BBS to complete the online questionnaire. To achieve the purposes of our research and test the hypotheses, we employed the SPSS 14.0 (Statistical Package for the Social Sciences) and structural equation modeling (SEM) with LISREL to help us analyze the collected data. Our contribution to this research area is twofold. We explain 1) how the factors affect the people to adopt an innovation and 2) the factors that help people diffuse an innovation and reduce uncertainty about it. Finally, our research provides marketing managers with some suggestions about marketing strategies, such as audience segmentation (Rogers, 2005).

*Keywords*: IDT (Innovation Diffusion Theory), Perceived Risk, Social Influences, Audience Segmentation

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# 1. Introduction

## *1.1. Research Background*

In recent years, the game industry has been growing rapidly. In particular, innovative video games like motion-sensitive game consoles have recently received increasing popularity.

For instance, Wii, which is one of the motion-sensitive game consoles, is the fifth home video game console developed by Nintendo. An innovative feature of this console is its wireless controller, Wii Remote, which can be used as a handheld control device that can detect acceleration in 3D. This feature has revolutionized traditional hand-contolled video games. The DFC forecasts that Wii will become the best-selling hardware unit in Japan and possibly worldwide (Datamonitor, 2007). According to a recent AOL survey (Sina, 2007), Wii ranked the third in the 2007 Top 15 Hot and Popular Products in American. Moreover, according to The Annual Video Game Industry Report in 2007, Wii was in second place in terms of total sales in Japan (NS-shop, 2007). Because the motion-sensitive game console has revolutionized video games, it has become known as a “killer application” in the entertainment community and among gamers worldwide.

This motivates us to ask: Why do people adopt innovative game console like Wii?

Understanding the game's phenomenal success would enable designers to develop other popular games and help marketing managers adjust their marketing strategies.

## *1.2. Research Motivations*

The primary research question to be addressed in this research is "Why do people adopt the innovative game console?" In our research, we apply IDT (Innovation Diffusion Theory) (Rogers, 1983, 2005) to explain the adoption behavior and use intentions.

In order to reach our research context and explain our research question completely, we extend IDT in three ways. First, as people are presented with an innovation, they invariably experience some uncertainty (perceived risks) (Jacoby & Kaplan, 1972) about it. Thus, the use intention will decrease. In addition to our primary research questions, we try to determine the factors that affect perceived risks. Specifically, by perceived risks as a mediator, we explore 1) the relationship between technological factors (perceived attributes of innovation) and the adoption attitude toward the innovation (use intention); and 2) the relationship between social factors (social influences) and the adoption attitude toward the innovation (use intention).Second, IDT is a social process (Rogers, 2005), but the theory does not consider that social factors affecting an innovation in different stages of the diffusion process; hence we incorporate the construct of social influences (Deutsch & Gerard,

1955) into our conceptual model. Finally, according to IDT, there are different adopters in the different stages of the adoption processes. Facing uncertainty about innovations, they have different levels of perceived risks because they have different personality, socioeconomic and knowledge about innovations. Therefore, they would be influenced by different factors that help reduce their perceived risks. Thus, we argued adopter categories could moderate our conceptual model. Hence, in this thesis, we propose a synthesized conceptual model to determine why people adopt an innovation.

### *1.3. Research Purpose*

The purpose of this research is to use IDT as the base model and integrate social influences and perceived risks in order to develop a new theoretical model that can explain adoption behavior and use intention. In our extend IDT, perceived risk mediate the effects of technological factors and social factors onto use intention. In addition, adopter categories moderate the relationships in our conceptual model. Our contribution to this research area is twofold. We explain 1) how the factors affect the people to adopt an innovation and 2) the factors that help people diffuse an innovation and reduce uncertainty about it. Specifically, we apply the proposed model to the game console phenomenon.

The remainder of this thesis is structured as follows. In Chapter 2, we provide a

literature review, present our hypotheses, and explain our conceptual model. Chapter 3 describes our methodology, including the sampling method, measurement development, and analysis method. In Chapter 4, we test our hypotheses using statistical tools, namely Lisrel and SPSS and we summarized our findings. In chapter 5, we provide some marketing strategies to marketing managers.

# 2. Literature Review

## *2.1. Innovation*

In 1962, Rogers proposed the Innovation Diffusion Theory (IDT) to explain why people adopt a new product or a new idea, and how diffusion of a new product or idea occurs. He defined innovation as an idea, practice, or object that is perceived as new by an individual or group (Rogers, 2005).

## *2.2. Perceived Risk*

Innovation is not a sufficient reason for a technology to be adopted because it is widely recognized that consumers often perceive an element of risk when they adopt an innovation (Rogers, 2005). Therefore, we propose perceived risk is an interim period before deciding to adopt an innovation.

Rogers (2005) noted that a technological innovation leads to uncertainty in the mind of potential adopters. This uncertainty can be represented in terms of as perceived risk. Conchar et al. (2004) found that perceived risk may negatively affect the decision to adopt and use new products. Perceived Risk is commonly thought of as the uncertainty felt about the possible negative consequences of using a product or service (Featherman & Pavlou, 2003). In their study, Featherman and Pavlou found

that perceived risk reduces adoption intention. Teo and Pok (2003) also found that perceived risk is negatively associated with the attitude of adopting and using a WAP-enabled mobile phone. Based on the above findings, we put forward the following hypothesis:

*H1*: *Perceived Risk* is negatively associated with *Use Intention.*

Jacoby and Kaplan (1972) also proposed five facets of perceived risk, namely, performance risk, financial risk, psychological risk, social risk, and physical risk. The five dimensions are defined in Table 1.

Table 1. *Definitions of Jacoby and Kaplan's five perceived risks*

| Construct | Definition |
|---|---|
| Performance Risk | The risk that there will be something wrong with products or services, or that it will not meet expectations. |
| Financial Risk | The risk that maintaining the product or service will cost more than expected. |
| Physical Risk | The risk that products or services may be harmful or injurious to health |
| Psychological Risk | The risk that products or services will not fit well with the user's self-image or self-concept, and will cause a loss of self-esteem. |
| Social Risk | The risk that products or services will cause the user to lose status in his/her social group. |

*Source: Jacoby and Kaplan (1972), Featherman and Pavlou (2003)*

We argued perceived risks mediate the effects of technological factors (perceived attributes of innovation) and social factors (social influence) and use intention. Kuhlthau (1993) has also proposed uncertainty as a basic principle for information seeking. Information seeking activities can reduce uncertainty about the innovations

(Rogers, 2005). Due to uncertainty, people would seek information to reduce the anxiety in their mind. According to an earlier study (Geoffrey & Roger, 1981), the source of information seeking can divided into non-interpersonal search and interpersonal search. In our research, we proposed the following two factors to help people reduce perceived risk: technological factors (perceived attributes of innovation) and social factors (social influences). When these risks are reduced, use intention will increase. Therefore, technological factors and social factors are the antecedents of perceived risk.

## *2.3. Innovation Diffusion Theory*

### 2.3.1. Perceived attributes of innovation

The perceived attributes of innovation represent one of important technological factors that affect adoption behavior (Roger, 2005); hence, they represent a key factor in the adoption of innovations. If people perceive or rate the attributes of an innovation highly, they will adopt it.

Moore and Benbasat (1990) developed scales to measure the perceived attributes of an innovation that may affect its diffusion. The perceived attributes of innovation, which were based on the *Innovation Diffusion Theory* (Rogers, 1983*)* include relative advantage, ease of use, compatibility, observability, and trialability.

However, Moore and Benbasat proposed some new constructs, namely, voluntariness and they replaced Roger's attribute of observability with image, visibility, and result demonstrability. Their perceived attributes of innovation are defined in Table 2.

Table 2. *Definitions of Moore and Benbasat's perceived attributes of innovation*

| Construct | Definition |
|---|---|
| Relative advantage | The degree to which an innovation is perceived as better than the idea it supersedes. |
| Ease of use | The degree to which an individual believes that using a particular system would be free of physical and mental effort. |
| Compatibility | The degree to which an innovation is perceived as being consistent with the current values, needs, and past experiences of potential adopters. |
| Trialability | The degree to which an innovation may be experimented with before adoption. |
| Image | The degree to which use of an innovation is perceived as enhancing one's image or status in one's social system. |
| Visibility | The degree to which adopters see the innovation as being visible in the adoption context. |
| Result demonstrability | The degree to which the results of using an innovation are perceived to be tangible. |
| Voluntariness | The degree to which the use of the innovation is perceived as being based on free will. |

*Source: Moore and Benbasat (1990)*

Our research investigates innovation adoption behavior in the context of motion-sensitive game consoles. It is assumed that use intentions depend on the following six attributes proposed by Rogers (1983) and Moore and Benbasat (1990): relative advantage, ease of use, compatibility, trailability, image, and visibility. Result demonstrability and voluntariness do not fit the motion-sensitive game consoles' context well, so we omit them.

In addition, usability (relative advantage) has become a term among Human-Computer Interaction (HCI) researchers in recent years (John & Ding, 2002). Game designers have their own term, *playability*, which was coined by game designers and experts in the game industry almost 10 years (John & Ding, 2002). Moreover, previous studies have found that the use of entertainment-oriented technologies, such as online games, is influenced by *perceived enjoyment* (Davis, Bagozzi, & Warshaw, 1992; Van der Heijden, 2003; Hsu & Lu, 2004; Hsu & Lu, 2005; Ha, Yoon, & Choi, 2007). Therefore, in our research, we replace relative advantage with playability and perceived enjoyment to fit the context of motion-sensitive game consoles.

The success of innovation technology products depends on people's perception of technological factors, i.e., the perceived attributes of innovation. Holak and Lehmann (1990) focused on customer acceptance by exploring how the perceived attributes of innovation and perceived risk combine to affect the use intention of an innovation. They found that relative advantage, compatibility, and ease of use were negatively correlated to perceived risk. Featherman and Pavlou (2003) used perceived risk to predict the adoption of e-services. The results indicate that relative advantage and ease of use significantly reduce perceived risk. According to Rogers (2005), technological factors can reduce the uncertainty and risks associated with an

innovation. In this thesis, we propose the following hypothesis:

*H2*: *Perceived Attributes of Innovation* are negatively associated with *Perceived Risk*.

## *2.4. Social Influences*

Social factors (Social influences) also help reduce consumer's perceived risks and diffuse an innovation. A social process, involving interpersonal relationships, is a central tenet of IDT (Rogers, 1976, 2005). In addition, social influences have a very strong impact on most people's perceptions, beliefs, and actions (Asch, 1955). Hence, social influences are another issue that we consider in our research.

Deutsch and Gerard (1955) defined two types of social influences: informational influence and normative social influence, which are defined in Table 3.

Table 3. *Definitions of Deutsch and Gerard's social influences*

| Construct | Definition |
|---|---|
| Normative Social Influence | An influence that pressures an individual to conform with the positive expectations of another. |
| Information Social Influence | An influence that pressures an individual to accept information obtained from another as evidence about reality. |

*Source: Deutsch and Gerard (1955)*

The two types of social influences, "normative" and "informational" social influence, are related to two psychological needs that lead people to conform. One relates to people who need to be liked, so they conform to normative influence. The other relates to people who need to be right, so they conform to informational

influence.

These two social influences manifest through three processes: internalization, identification, and compliance (Kelman, 1958, 1961). Based on the work of Deutsch and Gerard (1955) and Kelman (1958, 1961), Park & Lessig (1977) identified three motivational influences that derive from reference groups, namely value-expressive influence, utilitarian influence, and informational influence. Each of Kelman's processes relates to one of Deutsch and Gerard's social influences types and one of Park and Lessig's reference group influences. Their relationships are summarized in Table 4.

Table 4. *The relationships among the three concepts of social influences*

| Influence | Process | Reference Group Influence |
|---|---|---|
| Normative Social Influence | Identification | Value-expressive Reference Group Influence |
| | Compliance | Utilitarian Reference Group Influence |
| Informational Social Influence | Internalization | Informational Reference Group Influence |

*Sources: Kelman (1958, 1961), Burnkrant and Cousineau (1975), Park and Lessig (1977), Bearden and Etzel (1982), and Bearden, Netemeyer, and Teel (1989)*

Normative pressure from reference groups reduces an individual's perceived risk in adopting an innovation (Thompson, Higgins & Howell, 1994). Perry and Hamm (1969) proposed that the higher the risk involved in a buying decision, the greater the importance of personal influence will be. Lutz and Reilly (1974) found that consumers tend to use more sources of information when faced with increased

levels of perceived risk. These social factors can reduce uncertainty about the innovations. This leads to the following hypotheses:

*H3a*: Normative *Social Influence* is negatively associated with *Perceived Risk*.

*H3b*: Informational *Social Influence* is negatively associated with *Perceived Risk*.

## *2.5. Innovativeness of Adopters*

According to IDT (Rogers, 2005), people react differently to an innovation because of their different characteristics and levels of innovativeness; that is the degree to which an individual or group adopts new ideas relatively earlier than other members of a social system. Previous studies have found that that innovativeness results from different personal traits (Bruce & Witt, 1970; Jacoby, 1971; Im, Bayus, & Mason., 2003) and developed some scales to measure levels of innovativeness (Hurt & Joseph, 1977; Midgley & Dowling, 1978; Hirschman, 1980; Flynn & Glodsmith, 1993; Hirunyawipada & Paswan, 2006).

Based on the above scales, Rogers (1983) classified adopters into five categories called Adopter Categories (AC). They are: innovators, early adopters, early majority, late majority, and laggards. The approximate percentage of people in each group is 2.5%, 13.5%, 34%, 34%, and 16%.

These categories provide meaningful distinctions between adopters in terms of

their perceptions of an innovation's characteristics and the adoption innovation factors they are concerned about (Yi, Fiedler & Park, 2006). Based on the *Cross the Chasm* (Moore, 1999), there is a chasm between early adopters and early majority in stages of adoption processes. The chasm means that the two groups of people have different personalities, socioeconomic backgrounds, and psychological characteristics. In our research, we focus on innovators, early adopters, the early majority, and the late majority. Early adopters and innovators are combined into one category, called earlier adopters. The early majority and late majority are also combined into one category, called later adopters. Laggards are omitted because of their resistance to innovation, so they are not a key part of our research. Thus, hereafter, we focus on two groups: earlier adopters and later adopters.

The two groups of adopters differ in terms of socioeconomic characteristics, personality variables, and communication behavior patterns. Earlier adopters are better able to cope with uncertainty and risk than later adopters because they have sufficient knowledge to estimate risks (Rogers, 2005). In their empirical study, Labay and Kinnear (1981) also found earlier adopters are less concerned about financial risks and social risks than later adopters or non-adopters. Therefore, we propose the following hypothesis:

*H4*: The relationship between *Perceived Risk* and *Use Intention* is stronger

for *Later Adopters* than for *Earlier Adopters.*

With regard to communication behavior, earlier adopters seek information about innovations more actively than later adopters. They also have more knowledge about innovations (Rogers, 2005). Rogers (1983) argued that individuals develop an attitude about adopting an innovation by collecting information from a variety of channels, including mass media and interpersonal channels. Mass media are usually fast and efficient communication channels that can provide information to individuals, especially for earlier adopters (Rogers, 2005). In addition, Rogers suggested that an interpersonal channel that involves face-to-face interaction between two or more individuals during the exchange of information is also an efficient means of communication, especially for later adopters. The Bass Forecasting Model (Bass, 1969) showed that potential adopters of an innovation are influenced by two types of communication channels: mass media and interpersonal channels. Bass suggested that earlier adopters are usually influenced by mass media, while later adopters are usually influenced by interpersonal messages. In an earlier empirical study, James et al. (1969) found that innovators is influenced by formal media, such as popular technical magazines. Manning, Bearden, and Madden (1995) used two concepts of innovation to analyze the new product adoption process. Their results show that consumers in the early stages of the adoption process often seek novel information about a new product.

Meanwhile, consumers in the later stages of the adoption process often ask their friends or relatives about a new product. Therefore, earlier adopters have knowledge about innovations than later adopters do. Clark and Goldsmith (2006) found that the higher the level of global innovativeness, the lower the level of normative interpersonal influence, and the higher the level of informational interpersonal influence. Karahanna, Straub, and Chervany (1999) found that potential adopters are more influenced by subject norm than existing users. Therefore, we propose the following hypotheses:

*H5*: The relationship between *Perceived Attributes of Innovation* and *Perceived Risk* is stronger for *Earlier Adopters* than for *Later Adopters.*

*H6*: The relationship between *Informational Social Influence* and *Perceived Risk* is stronger for *Earlier Adopters* than for *Later Adopters.*

*H7:* The relationship between Normative Social Influence and Perceived Risk is stronger for *Later Adopters than* for *Earlier Adopters*.

## *2.6. Conceptual Model*

Based on the literature review, we suggest that 1) perceived risk will reduce use intention and 2) perceived attributes of innovation and social influences can reduce Perceived Risk Then, adopter categories moderate all the relationships. For the

purpose of our research, we have developed the conceptual model shown in Figure1.

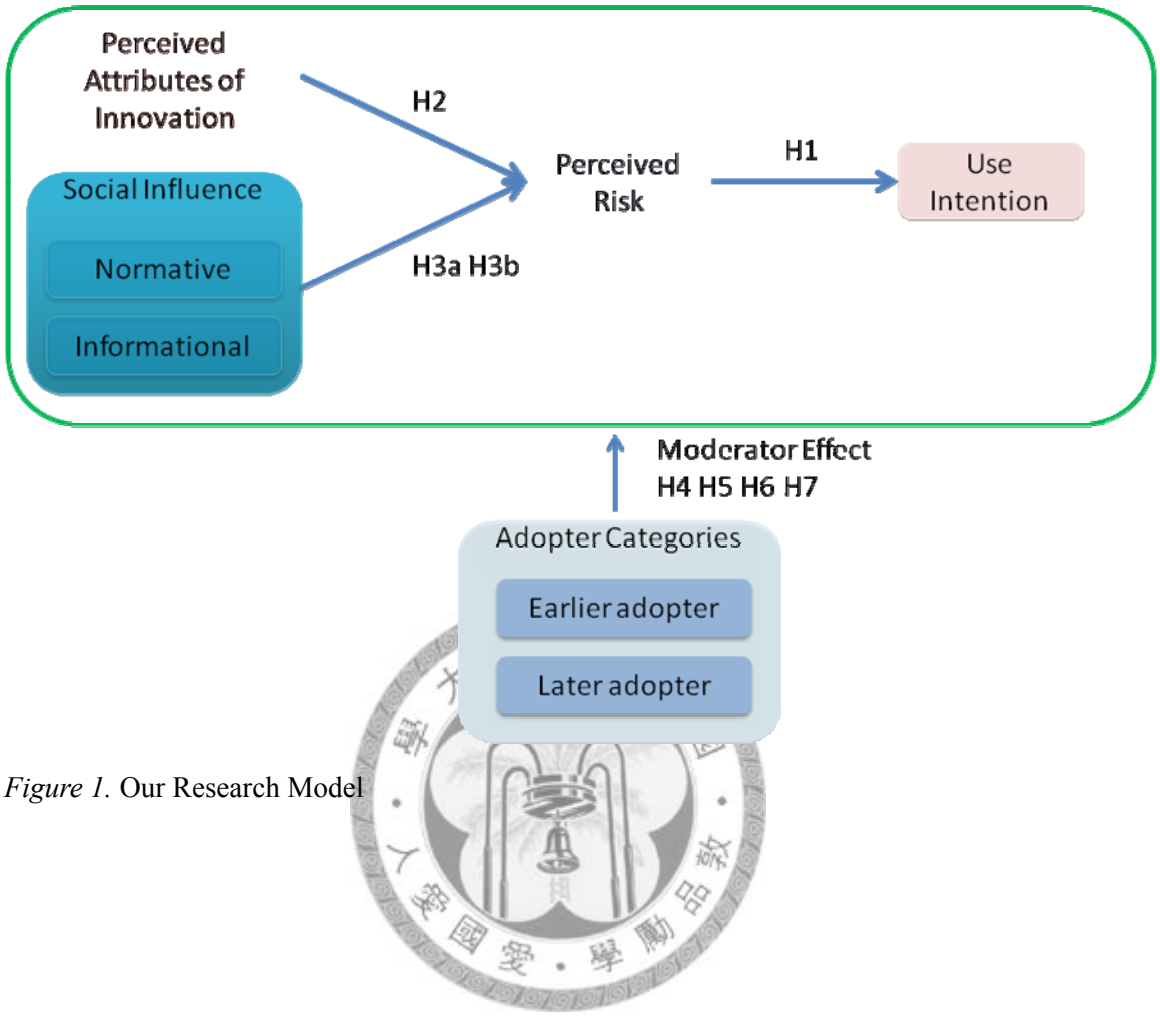



*Figure 1.* Our Research Model

# 3. Research Methodology

A preliminary version of a 49-item questionnaire was developed and adapted based on the related literature. The questionnaire used in this research is comprised of five parts: perceived attributes of innovation (23 items), social influences (12 items), perceived risk (5 items), use intention (3 items), and innovativeness of adopters (6 items). We measure the items on 7-point Likert scale with anchors of 1=Strongly Disagree to 7=Strongly Agree.

## *3.1. Sampling*

In the sampling process, people who have experiences in playing game were essential to collect. The questionnaire was designed to be placed on homepages on a web site. Asp.net programming was developed to handle the data collection process. We will post our questionnaire website on the famous game forum "Bahamut" (www.gamer.com.tw) and BBS (Bulletin Board System). In total, 743 surveys were collected in four weeks. After weeding entries of incomplete answers, and having the same answer for a lot of questions, 701 respondents were valid (94.35%). The incentive for respondent in the online survey is NT 150 gift card lottery. Table 5 shows the descriptive statistics of the sample. Our research was also compared to

market intelligence center (MIC) in November, 2007.

Table 5. *Demographic Profile*

| | *Sample in Our Research* | | | *MIC 2007* |
|---|---|---|---|---|
| Variable | Description | Frequency | (%) | (%) |
| Gender | Male | 398 | (56.8%) | (65.8%) |
| | Female | 303 | (43.2%) | (34.2%) |
| Age | Under 14 | 0 | (0.00%) | The average |
| | 15-19 | 55 | (7.85%) | is 22.8 years |
| | 20-24 | 421 | (60.06%) | old. |
| | 25-29 | 185 | (26.39%) | The major |
| | 30-34 | 30 | (4.28%) | group is |
| | 35-39 | 8 | (1.14%) | 20-24. |
| | More than 40 | 2 | (0.28%) | |
| Education | Junior high school or less | 10 | (1.43%) | N/A |
| | High school | 11 | (1.57%) | |
| | College | 18 | (2.57%) | |
| | Bachelor's degree | 463 | (66.05%) | |
| | Graduate degree or above | 199 | (28.38%) | |
| Occupation | Student | 487 | (69.47%) | (56.1%) |
| | Not student | 214 | (30.53%) | (43.9%) |
| Experience in Game | 1 year | 56 | (7.99%) | N/A |
| | 2 years | 61 | (8.70%) | |
| | 3 years | 72 | (10.27%) | |
| | 4 years | 30 | (4.28%) | |
| | 5 years | 43 | (6.13%) | |
| | 6 years | 20 | (2.85%) | |
| | More than 6 years | 419 | (59.78%) | (48.7%) |

## *3.2. Measures*

The purpose of this research is to investigate adoption behavior and use of

motion-sensitive game consoles, and determine the different ways of eliminating perceived risk of adopters when they are presented with an innovation. All measures were adapted from pre-existing scales in the literature. The operational definitions are detailed in Table 6.

To ensure that the English version of the instrument was conceptually equivalent to the Chinese culture, the translation processes were implemented in the following steps. 1) Forward translation: the English version was translated into Chinese by a bilingual translator knowledgeable about English-speaking and Chinese-speaking cultures. 2) Two graduate students and the original translator were invited to assess the adequacy of the translation and identify any discrepancies between the forward translation and the previous versions of the questionnaire. Then, the back-translation was adopted as the first step. The Chinese version questionnaire was translated back to the English version by another independent bilingual translator. The back-translation focused on the conceptual and cultural equivalence of the original version. Discrepancies were discussed by all the experts mentioned in Steps 1 and 2. The accurate rate is about 94.11%. The discussion continued until an adequate version was obtained. Details of the content of the questionnaire are given in the Appendix.

### *3.2.1. Perceived Attributes of Innovation*

Based on Moore and Benbasat's work (1990), the items for Perceived Attributes

of Innovation were evaluated along eight dimensions: relative advantage, ease of use, compatibility, trailability, image, visibility, result demonstrability and voluntariness. Result demonstrability and voluntariness were omitted for the reasons mentioned in Chapter 2. We also modified the scales from previous studies (Yi, Fiedler, & Park, 2006; Lewis, Agarwal, & Sambamurthy, 2003; Teo & Pok, 2003; Taylor & Todd, 1995; Davis, 1989). In addition, we replaced the scales for measuring the relative advantage dimension with playability (Desurvire, Caplan, & Jozesef, 2004) and perceived enjoyment (Davis, Bagozzi, & Warshaw, 1992) to suit motion-sensitive game consoles' context.

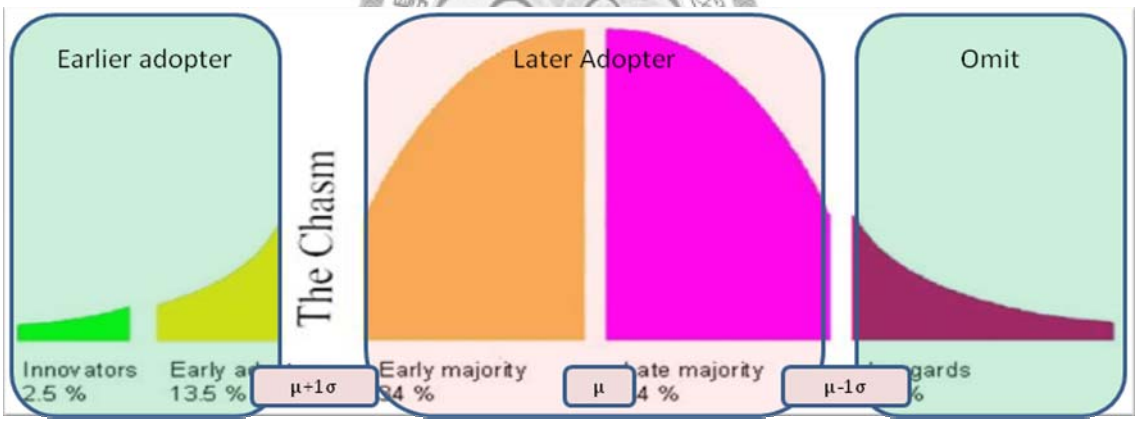
### *3.2.2. Social Influences*

The scales for measuring social influences, including normative and informational factors, were modified from Bearden et al (1989). The construct for social influences evaluated respondents' susceptibility to interpersonal influence.

### *3.2.3. Innovativeness of Adopters*

The respondents were classified into three categories on the basis of their self-reported behavior patterns. The criterion for adopter categorization is innovativeness (Roger, 2005). For the purposes of the analysis, we split the distribution of innovativeness scores to form three groups of respondents, namely,

earlier adopter, later adopter, and laggard. One standard deviation above the mean value and one standard deviation below the mean value for the innovativeness score were taken as a splitting point of three groups of respondents (See Figure 2). The First group is early adopters the second group is later adopters, and the third group is laggards. Laggards are omitted because of their resistance to innovation, so they are not a key part of our research. This procedure is proposed by Flynn and Goldsmith (1992). The innovativeness scales were adapted from Hirschman (1980), Goldsmith and Hofacker (1991), Flynn and Goldsmith (1993), and Hirrunyawipada and Paswan (2006), with modifications to suit the motion-sensitive game consoles' context.




*Source: Source: Rogers, E. M. (1983). Diffusion of Innovations, Moore, G. A. (1999). Crossing the Chasm*

*Figure 2.* Adopter Category

### *3.2.4. Perceived Risk*

The scales for measuring perceived risk, including performance risk, financial risk, physical risk, psychological risk, and social risk, were modified from Peter and

Tarpey (1975) and Jacoby and Kaplan (1972). The construct for perceived risk evaluated respondents' perception of the probability of risk and perception of the importance of risk.

Although the literature contains a wide variety of measures of perceived risk (Bettman, 1973; Peter & Tarpey, 1975; and Dowling & Stealin, 1994), the proposed model shows not only a multiplicative function of the probability and importance of risk, but also the various facets of risk (Peter & Tarpey, 1975). Peter and Tarpey developed the perceived risk model to measure them. The following model was formulated:

$$OPR_j = \sum_{i=1}^{n} PL_{ij} \times IL_{ij}$$

where $OPR_j$ = over perceived risk for brand j

$PL_{ij}$ = probability of risk i form purchase of brand j

$IL_{ij}$ = importance of risk i form purchase of brand j

$n$ = risk facets

Hence, we use the model to measure and calculate perceived risk in this research.

### *3.2.5. Use Intention*

The scales for the use intention were modified from Hsu, Lu, and Hsu (2007), Taylor and Todd (1995) and Yi et al. (2006). For these items, we evaluated the survey participants' use intentions with regard to motion-sensitive game consoles in the near

future.

Table 6. *Source of Indicators*

| Construct | Dimension | Source |
|---|---|---|
| Perceived Attributes of Innovation | Relative advantage<br>Ease of use<br>Compatibility<br>Trialability<br>Image<br>Visibility | Adapted from Moore and Benbasat (1990), Yi et al. (2006), Lewis et al. (2003), Teo and Pok (2003), Taylor and Todd (1995), Davis (1989), Desurvire et al. (2004), and Davis et al. (1992) |
| Social Influences | Normative Social Influence<br>Informational Social Influence | Adapted from Bearden et al.(1989) |
| Innovativeness | Earlier adopter<br>Later adopter | Adapted from Hirschman (1980), Goldsmith and Hofacker (1991), Flynn and Goldsmith (1993), and Hirrunyawipada and Paswan (2006) |
| Perceived Risk | Performance Risk<br>Financial Risk<br>Physical Risk<br>Psychological Risk<br>Social Risk | Adapted from Peter et al. (1975), and Jacoby(1972) |
| Use Intention | | Adapted from Hsu et al. (2007), Taylor and Todd (1995) and Yi et al. (2006) |

## *3.3. Analysis Method*

To conduct our research and test the hypotheses, we used the SPSS 14.0 (Statistical Package for the Social Sciences) and structural equation modeling (SEM) with LISREL to help us analyze the collected data. We employ the following analysis methods in the research.

Structural Equation Modeling (SEM) is an important technique of multivariate statistical analysis that has been widely applied in the fields of social science and marketing. SEM is not a completely new statistical technique. It is a combination of factor analysis and path analysis. This technique is comprised of two parts: a measurement model, which is used to reflect the relationships between measured variables and latent variables; and a structural model, which is used to verify the structural relationships between constructs.

### 3.3.1. *Reliability*

Regarding reliability of the scales, the fair threshold generally acknowledged was 0.6 for Cronbach's alpha (Cronbach, 1951; Malhotra, 1993). Broadly speaking, all scales exceed 0.7 and the reliability analysis yielded favorable results.

### 3.3.2. *Measurement Model (Validity)*

**Step1: Exploratory Factor Analysis (EFA)**

PCA with Varimax as the orthogonal rotation method was applied to extract the latent variables. The Kaiser-Meyer-Olkin (KMO) coefficient (greater than 0.7) and significant p-values for the Bartlett's sphericity test were carried out to examine the adequacy for factor analysis. In addition, factors with eigenvalue above 1.0 would be extracted and the absolute value of each factor loading after rotation should reach at least 0.5 on the underlying factor, indicating good construct validity (Hair, Anderson,

Tatham, & Black, 1998).

**Step2: Confirmatory Factor Analysis (CFA)**

CFA was often used in data analysis as a further step to examine the expected factor structure and it was preferred when measurement model had a mature development in the underlying theory. LISERL was employed to examine convergent validity of each construct. We evaluated the model fit from three types of indices describing below:

(1)*absolute indices* such as adjusted goodness-of-fit index (AGFI) greater than 0.8 (Gefen, Straub, & Boudreau, 2000), root mean square eroor of approximation (RMSEA) lower than 0.08 for a acceptable fit (Bagozzi & Yi, 1988), and standardized root mean square residual (SRMR) lower than 0.1 (McDonald & Ho, 2002) (2) *comparative indices* such as normed fit index (NFI) greater than 0.9, non-normed fit index (NNFI) greater than 0.9 (Bentler & Bonett, 1980), incremental fit index (IFI) greater than 0.9 (Bentler & Bonett, 1980), and comparative fit index (CFI) larger than 0.9 (Bentler, 1995); and (3) *parsimonious indices* such as normed chi-square ($\chi 2$/df) lower than 3 (Hair, Anderson, Tatham,& Black, 1998), parsimonious normed fit index (PNFI) greater than 0.5 (Hu, & Bentler, 1999) and parsimonious goodness-of-fit index (PGFI) greater than 0.5 (Bagozzi & Yi, 1988). Furthermore, the chi-square statistic index was too sensitive to large sample size that the null hypothesis would be rejected

too easily (Hair, Anderson, Tatham, & Black, 1998) so in the loose condition, chi-square ($\chi 2$/df) lower than 5.

### 3.3.3. *Structural Model*

Structural model was evaluated through structural equation modeling (SEM) which was a combination of the traditional factor analysis and path analysis. SEM with maximum likelihood (ML) estimation using LISREL was carried out to examine the hypothesized relationship among constructs.

# 4. Results

## *4.1. Reliability*

The reliability of all instruments was assessed by the Cronbach alpha reliability coefficient (see Table 7).

Table 7. *Cronbach's alpha for each measurement*

| Scale | Items | Cronbach's α |
|---|---|---|
| Relative advantage | 4 | 0.83 |
| Compatibility | 3 | 0.80 |
| Image | 3 | 0.68 |
| Ease of Use | 4 | 0.89 |
| Visibility | 4 | 0.87 |
| Trialability | 5 | 0.88 |
| Normative Social Influence | 5 (Delete 3 items) | 0.88 |
| Informational Social Influence | 4 | 0.88 |
| Perceived Risk | 5 | 0.72 |
| Use Intention | 3 | 0.87 |
| Innovativeness | 6 | 0.60 |

## *4.2. Measurement Model (Validity)*

4.2.1 Exploratory Factor Analysis (EFA)

Regarding the scale on perceived attributes of innovation, the KMO coefficient (0.897) and $\chi^2_{(253)}$(8767.214) for Barletts sphericity test ($p < .001$) showed that they were suitable for factor analysis. Six factors explaining 70.448% total variance yielded: trialability, ease of use, visibility, relative advantage, compatibility, and

image, each item loaded well on the suited factor as listed in Table 8.

Table 8. *Factor Analysis for Perceived Attributes of Innovation*

| | | Component | | | | | |
|---|---|---|---|---|---|---|---|
| **Factor** | **Item** | 1 | 2 | 3 | 4 | 5 | 6 |
| Trialability | TR3 | .845 | | | | | |
| | TR5 | .835 | | | | | |
| | TR2 | .823 | | | | | |
| | TR4 | .689 | | | | | |
| | TR1 | .652 | | | | | |
| Ease of Use | EU3 | | .860 | | | | |
| | EU2 | | .844 | | | | |
| | EU4 | | .803 | | | | |
| | EU1 | | .722 | | | | |
| Visibility | VI2 | | | .829 | | | |
| | VI4 | | | .808 | | | |
| | VI3 | | | .796 | | | |
| | VI1 | | | .646 | | | |
| Relative Advantage | RA3 | | | | .771 | | |
| | RA1 | | | | .760 | | |
| | RA2 | | | | .745 | | |
| | RA4 | | | | .676 | | |
| Compatibility | CO2 | | | | | .856 | |
| | CO1 | | | | | .783 | |
| | CO3 | | | | | .721 | |
| Image | IM3 | | | | | | .770 |
| | IM1 | | | | | | .754 |
| | IM2 | | | | | | .611 |
| Eigenvalues | | 7.644 | 2.981 | 1.814 | 1.446 | 1.215 | 1.102 |
| Cumulative Variance (%) | | 33.237 | 46.199 | 54.087 | 60.374 | 65.658 | 70.448 |

*Note.* Numbers under the shadow are the factor loadings in their underlying constructs.

For the social influences scales, the KMO coefficient (0.855) and $\chi^2_{(36)}$(3739.979) for Barletts sphericity test ($p < .001$) showed that they were suitable for factor analysis. Six factors explaining 71.353% total variance yielded: normative social

influence and informational social influence, each item loaded well on the suited factor as listed in Table 9.

Table 9. *Factor Analysis for Social Influences*

| | | Component | |
|---|---|---|---|
| **Factor** | **Item** | **1** | **2** |
| Normative Social Influence | NS6 | .845 | |
| | NS7 | .835 | |
| | NS8 | .823 | |
| | NS5 | .689 | |
| | NS4 | .652 | |
| Informational Social Influence | IS3 | | .860 |
| | IS4 | | .844 |
| | IS2 | | .803 |
| | IS1 | | .722 |
| Eigenvalues | | 4.431 | 1.991 |
| Cumulative Variance (%) | | 49.233 | 71.353 |

*Note1*. Numbers under the shadow are the factor loadings in their underlying constructs.

*Note2*. Factor loadings below 0.5 are not shown.

For the perceived risk scale, the KMO coefficient (0.760) and $\chi^2_{(10)}$(639.596) for Barletts sphericity test ($p < .001$) showed that they were suitable for factor analysis. Five factors explaining 47.355% total variance yielded: perceived risk, each item loaded well on the suited factor as listed in Table 10.

Table 10. *Factor Analysis for Perceived Risk*

| | | Component |
|---|---|---|
| **Factor** | **Item** | **1** |
| Perceived risk | PSRISK | .766 |
| | PERISK | .747 |
| | FIRISK | .711 |
| | PHRISK | .604 |
| | SORISK | .592 |
| Eigenvalues | | 2.368 |
| Cumulative Variance (%) | | 47.355 |

*Note.* Numbers under the shadow are the factor loadings in their underlying constructs.

For the use intention scale, the KMO coefficient (0.700) and $\chi^2_{(3)}$(1152.734) for Barletts sphericity test ($p < .001$) showed that they were suitable for factor analysis. Five factors explaining 79.405% total variance yielded: perceived risk, each item loaded well on the suited factor as listed in Table 11.

Table 11. *Factor Analysis for Use Intention*

| | | Component |
|---|---|---|
| **Factor** | **Item** | **1** |
| Use intention | UI2 | .926 |
| | UI1 | .910 |
| | UI3 | .835 |
| Eigenvalues | | 2.382 |
| Cumulative Variance (%) | | 79.405 |

*Note.* Numbers under the shadow are the factor loadings in their underlying constructs.

4.2.2 Confirmatory Factor Analysis (CFA)

**Convergent Validity**

Convergent validity was assessed based on the criteria that indicator's estimated coefficient was significant on its posited underlying construct factor. In assessing

convergent validity of measures, four criteria were evaluated:

(1) The measurement model should have good model fit.

(2) Each path must have significant lambda coefficient (Anderson & Gerbing, 1988)

(3) All lamba value in CFA model exceed 0.5 (Fornell & Larcker, 1981).

(4) Composite Reliability[1] should exceed 0.7 (Fornell and Larcker, 1981)

All λ value in CFA model exceeds 0.5 and was significant at $p < .001$. The fit indices for measurement model were good, indicating that the model was reasonably consistent with the data (see Table 12 and Table 13). In addition, the chi-square statistic index of our research was 3.75. That is not fit with criterion. However, according to Hair (Hair, 1998), this index was too sensitive to large sample size that the null hypothesis would be rejected too easily, so the loose rule is smaller than 5.

Table 12. *Model Fit Indices for Measurement Model*

| Index | Criterion | Results |
|---|---|---|
| **Absolute indices** | | |
| $\chi^2$/df | <5 | 3.75 |
| AGFI | >0.8 | 0.87 |
| RMSEA | <0.08 | 0.068 |
| SRMR | <0.1 | 0.06 |
| **Comparative indices** | | |
| NFI | >0.9 | 0.93 |
| NNFI | >0.9 | 0.94 |
| IFI | >0.9 | 0.95 |
| CFI | >0.9 | 0.95 |
| **Parsimonious indices** | | |
| PNFI | >0.5 | 0.81 |
| PGFI | >0.5 | 0.71 |

Table 13. *Convergent Validity Assessment*

| Item | Factor loading | t-value | CR |
|---|---|---|---|
| Perceived Attributes of Innovation(PAI) | | | 0.757 |
| RRA | 0.70 | 17.83*** | |
| CCO | 0.55 | 13.15*** | |
| IIM | 0.56 | 13.36*** | |
| EEU | 0.62 | 15.20*** | |
| VVI | 0.57 | 13.84*** | |
| TTR | 0.50 | 11.93*** | |
| Normative Social Influence(NSI) | | | 0.855 |
| NS4 | 0.66 | 17.51*** | |
| NS5 | 0.78 | 22.03*** | |
| NS6 | 0.83 | 24.27*** | |
| NS7 | 0.82 | 23.79*** | |
| NS8 | 0.79 | 22.19*** | |
| Informational Social Influence(ISI) | | | 0.880 |
| IS1 | 0.63 | 16.60*** | |
| IS2 | 0.80 | 22.96*** | |
| IS3 | 0.90 | 27.27*** | |
| IS4 | 0.87 | 22.19*** | |
| Perceived Risk(RISK) | | | 0.738 |
| FIRISK | 0.60 | 13.94*** | |
| SORISK | 0.50 | 11.39*** | |
| PERISK | 0.67 | 15.85*** | |
| PSRISK | 0.72 | 17.12*** | |
| PHRISK | 0.50 | 11.45*** | |
| Use Intention(UI) | | | 0.870 |
| UI1 | 0.87 | 25.57*** | |
| UI2 | 0.93 | 27.96*** | |
| UI3 | 0.68 | 18.17*** | |

*Note.* ***$p < .001$.

---

[1] $$CR = \frac{\left(\sum_{i=1}^{p} \lambda_i\right)^2}{\left(\sum_{i=1}^{p} \lambda_i\right)^2 + \sum_{i=1}^{p} \varepsilon_i}$$

See Fornell and Larcker (1981), $p$ is the number of items for each construct; $\lambda$ is factor loading; $\varepsilon$ is measurement error.

**Discriminate Validity**

Discriminate Validity was the extent to which the measures of two constructs were not correlated thoroughly (Reichardt & Coleman, 1995) and it was assessed using the criteria recommended by Fornell and Larcker (1981). The square root of the AVE[1] should exceed the correlation shared between and the construct and other construct in the model (See Table 14).

Table 14. *Discriminate Validity Assessment through AVE*

| | PAI | NNS | IIS | RISK | UI |
|---|---|---|---|---|---|
| PAI | 0.586 | | | | |
| NNS | 0.23 | 0.780 | | | |
| IIS | 0.16 | 0.22 | 0.806 | | |
| RISK | -0.46 | -0.72 | -0.40 | 0.604 | |
| UI | 0.32 | 0.60 | 0.33 | -0.52 | 0.833 |

*Note. The diagonal elements are square roots AVE of constructs and the off-diagonal elements are the correlations between pairs of different constructs.*

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[2] $AVE = \dfrac{\sum_{i=1}^{p} \lambda_i^2}{\sum_{i=1}^{p} \lambda_i^2 + \sum_{i=1}^{p} \varepsilon_i}$

See Fornell and Larcker (1981), $p$ is the number of items for each construct; $\lambda$ is factor loading; $\varepsilon$ is measurement error.

## *4.3. Structural Model*

To tests for moderator effects were conducted as follows. First, innovativeness was divided into earlier adopter and later adopter group, using the method mentioned chapter 3. Sizes for adopter category are shown in Table 15.

Table 15. *Sizes of adopter category*

| Adopter category | Frequency | (%) |
|---|---|---|
| Earlier adopter | 99 | (14.12%) |
| Later adopter | 503 | (71.15%) |
| Laggard | 99 | (14.12%) |

Second, two model compared tests were conducted for each variable suggested by Pratibha and Richard (2002). Model A had all factor loadings constrained across the groups, and error variances of the items for endogenous variables were also constrained. Model B had the factor loading free but error variances constrained. Because we have already controlled the error terms, if Models A and B are different from each other, this difference would be caused by factor loadings. Besides, if the $\chi^2$ difference between these two models divided by the change in degrees of freedom is significant ($\Delta\chi^2/\Delta df > 3.84$), then there are significant moderator effects across earlier adopters and later adopters. The results for these hypotheses and changes in standardized $\beta$ and $\gamma$ coefficients are presented in Table 16 and Table 17. It is seen that a majority of the moderator hypotheses are supported.

Table 16. *Structural Equations Results for Moderator Effects Models*

| Moderator Variable | Model | $\chi^2$ | df | GFI | RMSEA | SRMR | NFI | NNFI | IFI | PNFI | $\Delta\chi^2/\Delta df$ | *p* value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adopter Category | | | | | | | | | | | | |
| | A | 910.35 | 451 | 0.92 | 0.058 | 0.043 | 0.93 | 0.96 | 0.96 | 0.83 | 8.79 | 0.003** |
| | B | 875.19 | 447 | 0.92 | 0.042 | 0.042 | 0.93 | 0.96 | 0.97 | 0.82 | | |
| Criterion | | N/A | N/A | >0.9 | <0.08 | <0.1 | >0.9 | >0.9 | >0.9 | >0.5 | >3.84 | <0.01 |

*Note*: ***p*<0.01*

Table 17. *Change in Standardized Path Coefficient*

| | Adopter Category | | |
|---|---|---|---|
| | Earlier adopter | Later Adopter | |
| Path | | | significant |
| PAI→RISK | -0.69 | -0.15 | S** |
| NSI→RISK | -0.00 | -0.68 | S** |
| ISI→RISK | -0.22 | -0.16 | S* |
| RISK→UI | -0.20 | -0.92 | S** |

*Note*: S** = support (change is in correct direction and ≥ 0.1), S* = support (change is in correct direction and ≥ 0.05 and ≤ 0.1).

## *4.4. Discussion*

This research explored why people are adopting innovation and what factors help earlier adopters and later adopters reduce perceived risk. Our results supported the expected hypotheses.

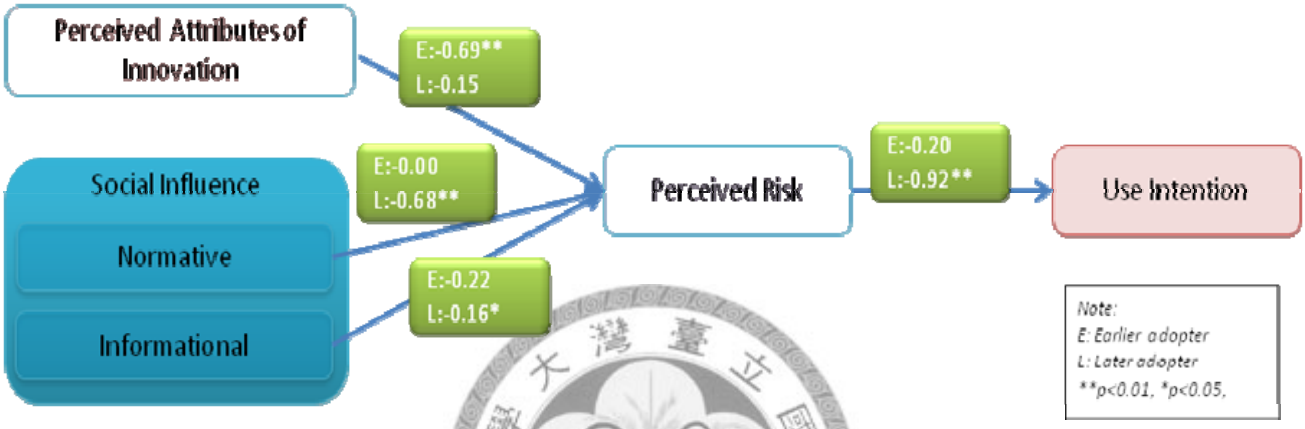


*Figure 3.* Hypotheses Model

In Figure2 supportive findings for H1, H2, and H3 suggest negative association. Perceived attributes of innovation and social influences have negatively associated with perceived risk. Perceived risk has negatively associated with use intention.

Additionally, there is a significant moderating effect in our research model. Finding for H4 ($\beta_{\text{earlier adopter}}$=-0.20, *ns*; $\beta_{\text{later adopter}}$=-0.92, $p$<0.01), suggest that later adopters have more perceived risk than earlier adopters do. The two groups have different perceived risk. Therefore, the factors of reducing their perceived risk are totally different.

First, findings for H5 ($\gamma_{\text{earlier adopter}}$=-0.69, $p$ <0.01; $\gamma_{\text{later adopter}}$=-0.15, *ns*),

compared to later adopters, the relationship between perceived attributes of innovation and perceived risk is stronger for earlier adopters. Moreover, finding for H6 ($\gamma_{\text{earlier adopter}}$=-0.00, *ns*; $\gamma_{\text{later adopter}}$=-0.68, $p$<0.01), compared to earlier adopters, the relationship between informational social influence and perceived risk is stronger for later adopters. Finally, finding for H7 ($\gamma_{\text{earlier adopter}}$=-0.22, *ns, p=0.085*; $\gamma_{\text{later adopter}}$=-0.16, $p$<0.05), compared to later adopters, the relationship between informational social influence and perceived risk is slightly stronger for earlier adopters. In addition, the p value of $\gamma_{\text{earlier adopter}}$ is 0.085 nearly to 0.05. Therefore, earlier adopters are also influenced by informational influence more strongly than later adopters.

The results provide us two implications. First, the major way to help reduce the perceived risk of earlier adopter is to consider perceived attributes of innovation, followed by informational social influence. Second, the key to helping later adopter reduce their perceived risk is to consider normative social influence, followed by informational social influence, and perceived attributes of innovation.

# 5. Conclusion

## *5.1. Managerial Implications*

For marketing managers, this research provides a theoretical understanding and the following marketing strategies.

1) Consumers often perceive uncertainty (perceived risk) when they adopt an innovation. Therefore, marketing managers should help them reduce perceived risk. Once they rate the perceived risk as low, they will adopt the innovation.
2) Marketing managers should plan different marketing strategies for earlier adopters and later adopters, such as audience segmentation (Rogers, 2005). They should also promote the novelty features of an innovation via mass media in the early stage of a product's life cycle in order to attract earlier adopters who seek information about innovations more actively that later adopters (Rogers, 2005). After that, the marketing manager should build solid relationships with earlier adopters, and encourage them become opinion leaders in their group.
3) To attract later adopters, marketing managers should promote their products via interpersonal influences because later adopters, who have less knowledge about an innovation, rate uncertainty and risk. The marketing manager should use interpersonal influences such as opinion leaders, friends, and family to help

reduce later adopters' perceived risk.

4) In terms of innovations, our results suggest that "ease of use" and "relative advantage" are the major concerns of users. Therefore, marketing managers should consider these aspects when they provide input during a product's design..

## *5.2. Future Research Direction*

A number of issue remain to be addressed in future research.

1) Adopter category in our research was combined into two groups, namely earlier adopter and later adopter. In future research, other applications can be explored what factors affect four groups to adopt an innovation and make more detail marketing strategies for the four groups.

2) Recently, E-WOM (Electronic Word Of Mouth) has become more popular. WOM often takes the form of objective product information in addition to subjective personal opinions and experiences in an informal way (Arndt, 1967). In blogosphere, it is called E-WOM, which is a kind of social influence. In future research, other applications could incorporate this factor into the conceptual model.

## *5.3. Limitation*

Our work is subject to a number of limitations as follows.

1) The results of our research were based on cross-sectional data. However, it should be longitudinal study to examine technological factors and social factors in different time periods and make comparisons. Thus, the results and conclusion could provide more marketing strategies to marketing managers.

2) This study asked internet users as respondents to answer an online survey. Thus, the sample may not match the profile of the population because the sample was self-selected.

3) A Taiwan-based sample was adopted in this study and might not be generalized to users in other cultures or countries.

4) The research model of this study has investigated the respondents' self-reported behavior patterns. Therefore, social desirable and bias may occur.

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# Appendix

## *Questionnaire (English Version)*

### *Relative Advantage*

1. A motion-sensitive game consoles' remote controller makes it an ideal Video game.
2. Motion-sensitive game consoles are enjoyable to replay
3. The advantages of using motion-sensitive game consoles will outweigh the disadvantages
4. Overall, I find using motion-sensitive game consoles to be more advantageous than other game consoles.

### *Compatibility*

5. Using motion-sensitive game consoles are compatible with all aspects of my needs on entertainment
6. Using motion-sensitive game consoles are completely compatible with my current entertainment situation.
7. I think that using motion-sensitive game consoles fit well with the way I like to play（I'd like to play）

### *Image*

8. Using motion-sensitive game consoles improve my image within my group
9. People in my group who use motion-sensitive game consoles have more prestige than those who do not.
10. People in my group who use motion-sensitive game consoles are trendy.

### *Ease of Use*

11. The interface of motion-sensitive game consoles is clear and understandable.
12. It would be easy for me to become skillful at operating motion-sensitive game consoles
13. It will be easy to learn how to operate motion-sensitive game consoles
14. Overall, I believe that motion-sensitive game consoles are easy to operate when I play.

### *Visibility*

15. I have seen what others do playing their motion-sensitive game consoles
16. Motion-sensitive game consoles are very visible in my group.
17. In my group, one hears others talking about buying a motion-sensitive game console
18. It is easy for me to observe others playing motion-sensitive game consoles in my group.

### *Trialability*

19. I've had a great deal of opportunity to try various motion-sensitive game consoles' games
20. I know where I can go to satisfactorily try out various games of motion-sensitive game consoles.

21. Motion-sensitive game consoles are available to me to adequately test run various games
22. Before deciding whether to buy any motion-sensitive game consoles' game, I was able to properly try them out.
23. I was permitted to use motion-sensitive game consoles on a trial basis long enough to see what it could do

## *Normative Social Influence*

24. I rarely purchase the latest motion-sensitive game consoles until I am sure my friends approve of them.
25. It is important that others like the motion-sensitive game console I buy.
26. When buying motion-sensitive game consoles, I generally purchase those brands that I think others will approve of.
27. I like to know what brands of motion-sensitive game consoles make good impression on others.
28. If I want to be like someone, I often try to buy the same brands of motion-sensitive game consoles that they buy.
29. If other people can see me using motion-sensitive game consoles, I often purchase the brand they expect me to buy.
30. I often identify with other people by purchasing the same motion-sensitive game consoles they purchase.
31. I achieve a sense of belonging by purchasing the same motion-sensitive game console that others purchase.

## *Informational Social Influence*

32. To make sure I buy the right brand of motion-sensitive game consoles, I often observe what others are buying and using.
33. If I have little experience with motion-sensitive game consoles I often ask my friends about the product
34. I often consult other people to help choose the best alternative available from all motion-sensitive game consoles.
35. I frequently gather information from friends or family about motion-sensitive game consoles before I buy.

## *Perceived Risk*

*36. Financial risk*

I think that is 1 2 3 4 5 6 7 that the purchase of a motion-sensitive game console would lead to a Financial Risk for me because of such things as its poor warranty, high maintenance costs, and/or high monthly payments. (Improbable ……. Probable)

As far as I'm concerned, if this Financial Risk happened to me, it would be 1 2 3 4 5 6 7 (Unimportant ……. Important)

*37. Social risk*

I think that is 1 2 3 4 5 6 7 that the purchase of a motion-sensitive game console would lead to a Social Risk for me because my friends and relatives would think less highly of me.(Improbable ……. Probable)

As far as I'm concerned, if this Social Risk happened to me, it would be 1 2 3 4 5 6 7 (Unimportant ……. Important)

*38. Performance risk*

I think that is 1 2 3 4 5 6 7 that the purchase of a motion-sensitive game console would lead to a Performance Risk for me because it would run extremely poorly. (Improbable ……. Probable)

As far as I'm concerned, if this Performance Risk happened to me, it would be 1 2 3 4 5 6 7(Unimportant ……. Important)

*39. Psychological risk*

I think that is 1 2 3 4 5 6 7 that the purchase of a motion-sensitive game console would lead to a Psychological Risk for me because it would not fit in well with my self-image or self-concept(i.e. the way I think about myself). (Improbable ……. Probable)

As far as I'm concerned, if this Psychological Risk happened to me, it would be 1 2 3 4 5 6 7(Unimportant ……. Important)

*40. Physical risk*

I think that is 1 2 3 4 5 6 7 that the purchase of a motion-sensitive game console would lead to a Physical Risk for me because it would not be very safe or would become unsafe.(Improbable ……. Probable)

As far as I'm concerned, if this Physical Risk happened to me, it would be 1 2 3 4 5 6 7 (Unimportant ……. Important)

## *Use Intention*

41. I intend to play motion-sensitive game consoles in the near future
42. I intend to play motion-sensitive game consoles to fit well with all aspects of my needs on entertainment in the near future.
43. I intend to increase motion-sensitive game consoles playing frequency in the near future.

## *Innovativeness*

44. In general, I am among the last in my circle of friends to buy (know or play) a motion-sensitive game console when it appears.*
45. If I heard that a motion-sensitive game console was available in the store, I would be interested enough to buy it.
46. Compared to my friends I own little information about a motion-sensitive game console.*
47. I will buy a motion-sensitive game console, even if I haven't heard it yet.
48. In general, I am the last in my circle of friends to know the names of motion-sensitive game consoles.*
49. I know about motion-sensitive game consoles before other people do.

## *Questionnaire (Chinese Version)*

### *Relative Advantage*

1. 體感式主機的無線感應操作介面使它成為一個理想的電玩主機
2. 體感式主機的遊戲會讓我想要一玩再玩
3. 使用體感式主機的優點多於缺點
4. 整體而言，我發現使用體感式主機的優點較其他電玩主機多

### *Compatibility*

5. 使用體感式主機能夠符合我在娛樂上各種需求(例如：喜歡挑戰、打發時間、追求成就感、追求刺激)
6. 使用體感式主機能夠符合我平常的電玩娛樂習慣
7. 體感式主機能夠提供我喜歡的玩樂方式

### *Image*

8. 使用體感式主機會讓我在團體中的形象加分
9. 在我的生活圈中，玩體感式主機是一件正面的事
10. 我周遭玩過體感式主機的人都較時尚、新潮

### *Ease of Use*

11. 體感式主機的操作介面既清楚又容易理解
12. 對我來說，體感式主機相當容易上手
13. 學習操作體感式主機是容易的
14. 整體而言，我相信我可以很容易的操作體感式主機

### *Visibility*

15. 我曾看過(聽過)許多人在玩體感式主機
16. 體感式主機在我的生活圈中是很常見到的
17. 在我的生活圈中，能常常聽到大家在討論買體感式主機的事
18. 在我的生活圈中，常見到大家在玩體感式主機

### *Trialability*

19. 我曾有過許多試玩體感式主機的機會
20. 我知道去哪裡可以盡情地試玩體感式主機
21. 我可以很容易地取得試玩體感式主機的機會
22. 在決定是否購買體感式主機回家之前，我有機會好好地試玩它們
23. 我有足夠的機會試玩和熟知體感式主機的功能

*Normative Social Influence*

24. 直到親友贊同，我才會購買最近流行的體感式主機

25. 我所買的體感式主機是否受親友喜愛，對我來說是重要的

26. 我傾向購買我認為大家都推薦的體感式主機

27. 我會想知道什麼品牌的體感式主機可以讓親友產生好印象

28. 假如想要模仿我所欣賞的人，我會去買和他們相同品牌的體感式主機

29. 假如別人看得到我所使用的體感式主機，我會去買他們所期望的品牌

30. 我會藉由購買和大家相同的體感式主機來融入群體當中

31. 藉由購買和大家相同的體感式主機，會讓我獲得歸屬感

*Informational Social Influence*

32. 我通常會先觀察親友使用或購買哪些體感式主機，以確保我的購買決策是正確的

33. 如果我對玩體感式主機沒有什麼經驗，我會去詢問我的親友

34. 我會找親友商量要買哪一台體感式主機

35. 我在購買體感式主機之前，我會向親友蒐集資訊

*Perceived Risk*

36. (風險 1)：買了體感式主機會導致財務損失(例如：買貴了、售後維護成本高)

風險 1 發生在我身上的可能性？

風險 1 一旦發生在我身上，我在意的程度？

37. (風險 2)：親友會因為我買體感式主機，而對我有較負面的評價

風險 2 發生在我身上的可能性？

風險 2 一旦發生在我身上，我在意的程度？

38. (風險 3)：所購得的體感式主機功能相當差

風險 3 發生在我身上的可能性？

風險 3 一旦發生在我身上，我在意的程度？

39. (風險 4)買了體感式主機會讓我質疑自己的能力(例如：辨別商品好壞的能力、操作主機的能力)

風險 4 發生在我身上的可能性？

風險 4 一旦發生在我身上，我在意的程度？

40. (風險 5)：買了體感式主機會造成身體傷害(例如：運動傷害)

風險 5 發生在我身上的可能性？

風險 5 一旦發生在我身上，我在意的程度？

*Use Intention*

41. 在不久的將來，我會(打算)繼續玩體感式主機

42. 在不久的將來，我會(打算)繼續玩體感式主機來滿足我的娛樂需求(例如：喜歡挑戰、打發時間、追求成就感、追求刺激)

43. 在不久的將來，我會增加玩體感式主機的頻率

*Innovativeness*

44. 在我的朋友圈中，我是屬於考慮較久才會購買體感式主機的人
45. 如果我知道體感式主機已經開始販售了，我就會有購買意願
46. 相較於我的親友，我對體感式主機的資訊了解不多
47. 當我第一次(看到)聽到體感式主機的時候，我就會有購買意願
48. 在我的朋友圈中，我是屬於比較慢才聽過體感式主機的人
49. 在我的親友知道體感式主機之前，我對它已經有一定的了解