Dissertation for the Degree of Doctor of Philosophy

The Mediating Effects of Flow, Perceived Quality, and Perceived Risk on the Relationship between User Attributes and Purchase Intention in E-commerce

by

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August 2014

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(전자상거래에서 사용자 속성과 구매의도에 있어서 플로우, 지각된 품질, 지각된 위험의 매개효과)

Advisor: Prof. Hakyun Kim

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Won Geun So

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<List of Contents>

<List of Tables>

<List of Figures>

전자상거래에서 사용자 속성과 구매의도에 있어서 플로우, 지각된 품질, 지각된 위험의 매개효과

소 원 근

부 경 대 학 교 대 학 원 정 보 시 스 템 협 동 과정

요 약

본 연구에서는 전자상거래에서 제품 구매-과정 중 발생하는 정보탐색의 외적・내적요인과 대안평가단계의 요인들이 구매결정에 어떤 영향을 미치는지에 대해 규명하고자 한다. 본 연구의 주된 목적은 전자상거래 사용자의 구매의사결정과정(문제 인식→정보탐색→대안평가→구매의사결정→구매 후 행동)의 5 단계를 기초로 하여, 본 논문의 핵심인 정보탐색, 대안평가, 구매결정의 3 단계로 연구모형을 축소하여 설정함으로써 각 과정의 요인이 소비자 구매결정에 어떠한 역할을 하며, 경험론적인 관점에서 소비자의 구매의사과정에 어떠한 영향을 미치는지를 밝히는 것이다. 이를 위하여, 전자상거래 사용자 구매의사결정과정에 해당하는 정보탐색→대안평가→구매의사결정에 영향을 미치는 요인들을 측정항목으로 정리하였고, 문헌자료를 통하여 보편타당성을 입증하고 세부 요인을 실증적으로 증명하였다. 이렇게 도출된 변수와 그에 따른 요인을 이용하여, 전자상거래 정보탐색의 외적요인인 사용자 속성이 정보탐색의 내적요인인 플로우 경험에 미치는 영향, 그리고 플로우 경험이 대안의 평가단계인 지각된 품질과 지각된 위험에 미치는 영향을 알아보았으며, 지각된 품질 및 지각된 위험이 구매의도에 영향을 미치는지도 검토하였다. 실증 연구모형에서는 정보탐색과정의 외적탐색인 사용자속성을 독립 변수로, 내적탐색인 플로우 경험과 대안평가의 지각된 품질, 지각된 위험을 매개변수로, 그리고 구매의도를 종속 변수로 설정하고, 연구모형을 수립하여 이에 따른 구성요소간의 관계에 대한 연구가설을 설정하였다. 본 연구를 위하여, 전자상거래 경험이 있는 사용자들을 대상으로 설문조사를 실시하였고, 탐색적, 확인적 요인분석을 통하여 정보탐색(외적, 내적)→대안평가→구매의사 결정의 과정에 미치는 영향 관계를 알아보았으며, 가설 검정을 위해 SPSS17.0 프로그램과 Amos7.0을 이용하였다. 설문문항의 타당성을 측정하기 위하여 주성분분석과 직교회전방식을 채택하였다. 본 연구 결과, 전자상거래에 대한 네 가지 사용자 속성, 세 가지 플로우 경험, 그리고 세 가지 지각된 품질과 세 가지 지각된 위험 및 구매의도의 13개 요인으로 나누어지는 것으로 나타났으며, 탐색적 요인분석을 통해 본 연구에서 제시한 13개 요인의 46개 측정항목들은 타당성이 있는 것으로 입증되었다. 신뢰도분석 결과에서도 모든 측정항목에 대한 Cronbach's Alpha 값이 0.7 이상으로 신뢰도가 높게 평가되었고, 각 항목구성의 확인적 요인 분석 결과에서도 모형의 적합성이 크게 떨어지지 않아 분석에 무리가 없었다. 가설 검증 결과, 첫째, 전자상거래에서 사용자속성이 플로우 경험(가설 1)에 영향을 미치며, 플로우 경험(가설 2)은 지각된 품질에 유의한 영향을 미치는 것으로 나타났다. 또한, 플로우 경험(가설 3)이 지각된 위험에 미치는 영향은 부분적으로 유의한 수준에서 채택되었고(사회적 위험은 기각), 지각된 품질(가설 4)이 구매의도에 미치는

영향은 부분적으로 유의한 수준에서 채택되었다(결과품질은 기각). 지각된 위험(가설 5)이 구매의도에 미치는 영향은 부분적으로 채택되었다(기술적 위험은 기각). 즉, 전자상거래 소비자는 정보탐색을 통하여 전자상거래의 속성과 심리적 속성인 플로우 경험, 전자상거래업체에서 고려하는 지각된 품질, 전자상거래시에 발생할 수 있는 지각된 위험을 인지하여 전자상거래를 사용하고 있다는 것을 검증하였다. 본 연구결과가 이론적인 관점에서 시사하는 바는 기존의 구매의사결정단계 모형에서 구매 후 평가단계를 제거하여 새로운 구매의사결정 단계를 제안하여 정보탐색과 대안평가가 구매의도 및 만족에 미치는 변수관계에서의 매개효과를 확인했다는 점이다. 또한 사용자 구매의사결정과정의 모델 축소를 통하여 기존의 구매의도를 실증한 많은 연구와 다른 결과를 도출하였는데, 특히 전자상거래에서의 사용자 속성과 함께 플로우 개념, 사용자가 지각하는 위험과 지각된 품질에 대한 구매의도를 연구함으로써 의사결정과정의 내적·외적 탐색요인과 대안의 평가요인이 제품의 의사결정에 중요하다는 것을 보여주고 있다. 또한 소비자행동 관점에서 보면, 소비자는 제품의 사용에 의한 혜택을 극대화하고 위험을 극소화할 의도를 가지고 행동한다는 것을 시사한다. 결론적으로 전자상거래에 대한 기존 연구에서는 정보탐색, 의사결정, 만족도와 같은 요인을 가지고 사용자의 참여에 대한 차이를 설명한 반면, 본 연구에서는 기존 연구모델의 축소를 통하여 정보탐색의 외적·내적 정보탐색과 대안평가, 구매의도에 이르는 의사결정의 전 과정에 대한 차이를 기존 연구모델의 축소를 통한 새로운 모델로서 제안하였다. 실무적인 측면에서 본 연구결과는 전자상거래 정보탐색에 대한 지침을 제공하고 있다. 즉, 정보 탐색에서 사용한 정보는 일종의 실체가 있는 개념으로, 정보탐색과정은 정보에 대한 바람직한 상태와 인지된 실제 상태의 대안을 평가하여 새로운 정보 탐색으로 이어지는 매우 중요한 과정이라 할 수 있다. 잘못된 정보탐색과 즐거움과 흥분 등 쾌락을 위한 제품구매를 하지 않기 위해 전자상거래 구매 사용자는 정확한 정보를 얻기 위한 정보탐색과 함께 대안평가과정을 거쳐 정보를 검증하여 정확하고 구체적인 정보를 얻어야 할 것이다.

주제어: 사용자 속성, 플로우 경험, 지각된 품질, 지각된 위험, 구매의도, 전자상거래

I. INTRODUCTION

1. Background of Dissertation

The surge in Internet use worldwide stems from the potential of the Internet not only as a means of communication, education, and entertainment but also as a means of business. Internet-based transactions lower the cost of purchases, lessen the burden of logistics and inventory management, and facilitate effective production planning and access to new and existing customers. Internet-based transactions are also beneficial to consumers because they reduce costs, expand product choice, and improve consumer convenience.

Because of these benefits, the e-commerce market is growing rapidly. A survey of internet-based companies in 2008 conducted by the Korea National Statistical Office counted 1,416 business-to-business (B2B) e-commerce companies (encompassing listed domestic corporations, KOSDAQ-listed corporations, public corporations, e-marketplaces, and other e-commerce companies), 484 business-to-government (B2G) e-commerce organizations, and 1,016 cyber shopping malls for business-to-consumer (B2C) transactions. The turnover was 2,971 billion, an increase of 16.5% over the previous year.

Despite the rapid expansion of this market, e-commerce companies have experienced many challenges; in particular, the sheer number of smaller companies that have crowded into the e-commerce market has made it difficult to generate a consistent profit. It is easy for Internet users to move between e-commerce companies looking for the best deal because online stores are a

single click of the mouse away. Add to this the natural reluctance of consumers to commit to purchasing goods on the Internet because they cannot directly see the products, and it becomes important for e-commerce companies to attract initial visits from consumers as they search for an item, provide an environment that encourages potential customers to purchase goods once they arrive, and then guarantee user satisfaction with their overall shopping experience in order to give them reason to return.

Accordingly, factors affecting purchase intention, purchase satisfaction, and repurchase intention in e-commerce have been an important focus of research. However, there are many inconsistencies in research findings, and few unified theories or systematic studies exist. Most of the existing e-commerce studies discuss the benefits and challenges of e-commerce on a theoretical basis, assessing the impact of e-commerce by comparing it to traditional marketing through a review of the literature; as such, further empirical research into e-commerce is needed. Many studies follow a traditional research design, conducting empirical research on the consumer decision-making model based on traditional marketing techniques and analyzing the types of products purchased or the demographic variables of consumers who have purchased goods through e-commerce. This involves the analysis of the five stages of the consumer decision-making model: (1) need recognition, (2) information search, (3) evaluation of alternatives, (4) purchase, and (5) post-purchase evaluation. These empirical studies cannot provide clear answers about the elements of information search and alternative information, and factors affecting purchase decisions in e-commerce.

This dissertation investigates how internal and external information searches and the evaluation of alternatives affect purchase decisions in the e-commerce environment.

2. Purpose of Dissertation

The purpose of this dissertation is to examine the role of each stage of the consumer decision-making process in e-commerce purchases and their impact on consumer purchase intention from an empirical perspective. A research model consisting of three core stages – (1) information search, (2) evaluation of alternatives, and (3) purchase decision – was then developed based on the consumer decision-making process in e-commerce.

The specific objectives of this dissertation are as follows. First, the extent to which user attributes affect the degree of immersion, which is referred to as flow in e-commerce, or Internet searching habits, is investigated. It is assumed that user attributes, which are the attributes of external information searches, affect the flow experience of internal information searches. Second, whether flow experience affects perceived quality of products in the evaluation of alternatives is investigated, and third, the extent to which flow experience affects perceived risk in the evaluation of alternatives is determined. Fourth, the effect on purchase intention of perceived quality during the evaluation of alternatives stage is examined. Finally, this dissertation establishes how perceived risk in the evaluation of alternatives stage affects purchase intention.

In achieving these objectives, this dissertation will propose key elements in decision-making process.

3. Research Methods

This dissertation reviews and redefines the concepts of user attributes in the external search stage, flow experience in the internal search stage, perceived quality and perceived risk in the evaluation of alternatives stage, and purchase intention in the purchase decision stage based on the purchase decision-making model in e-commerce. It is based on a review of literature related to shopping malls, including previous publications and relevant laws and regulations. In particular, this dissertation uses factors affecting each stage of the purchase decision-making process in e-commerce – information search, evaluation of alternatives, and purchase decision – as estimation variables, verifies their universal validity through the literature review, and empirically confirms the detailed factors.

Using these derived variables, the effect of user attributes (the external factors of the information search stage in e-commerce) on flow experience (the internal factor of the information search stage) is examined, in conjunction with an examination of the relationship between flow experience and perceived quality and perceived risk in the evaluation of alternatives stage. In addition, this dissertation investigates whether perceived quality and perceived risk affect purchase intention during the purchase stage in e-commerce.

To achieve these objectives, this dissertation simplifies the five stages of the consumer decision-making process in e-commerce into three stages and established a research model based on previous research. In this model, the independent variable was user attributes, and the dependent variable was purchase intention. Flow experience and perceived quality and perceived risk were the mediating variables.

Following this, empirical analysis using a survey of e-commerce users with purchase experience was carried out; factors affecting the Internet consumer decision-making process (information search, evaluation of alternatives, and purchase decision) were examined using exploratory and confirmatory factor analyses. SPSS 17.0 and Amos 7.0 programs were used to test the hypotheses.

4. Contents of Dissertation

This dissertation consists of five sections. In the introduction, the necessity and purpose of the dissertation are stated and the significance and structure are described. In the second section, the main concepts user attributes, flow experience, perceived quality, perceived risk, and purchase intention are explored based on the three stages in the purchase decision-making process of e-commerce users. In the following section, the research questions and hypotheses for the empirical study are proposed. The research model, operational definitions, estimation of variables, data, and analysis methods are also presented. The fourth section describes the attributes of the research targets and analyzes the relationship among the variables according to the

established hypotheses. In addition, the research findings are interpreted and discussed. In the final section, the results are summarized, and the implications of the dissertation are summarized. Limitations and suggestions for future studies are also provided.

II. THEORETICAL BACKGROUND

1. Framework of User Attributes

A. User Attributes

In a review of previous e-commerce studies, Jarvenpaa and Todd (1997) investigated how product perception, shopping experience, customer service, and consumer risk were associated with the attitudes and purchase intentions of Internet consumers. Product perception was found to be related to low price, product/service diversity, and quality products, while shopping experience consisted of shopping convenience, in which the customers' time and effort is minimized, the degree of conformity with a customer's lifestyle, and customers' pleasure. Customer service consisted of responsiveness, reliability, tangibility, empathy, and assurance, while consumer risk included economic risk, social risk, performance risk, personal risk, and privacy risk. However, as an early study on e-commerce during its growth period, the survey

unavoidably relied on the opinions of traditional shoppers unfamiliar with the e-commerce environment. Therefore, it may be expected that customers in the current e-commerce environment may differ in terms of their expectations of on-line retailers from those in Jarvenpaa and Todd (1997).

B. Previous Studies on User Attributes

Koufaris (2002) explained that online consumers have dual attributes as both buyers and computer users, and therefore an integral theoretical structure is required in order to understand online consumer behavior. User attributes are important predictors of the likelihood of e-commerce adoption, with personality, e-commerce experience, and shopping orientation among the most significant of these attributes (O'Cass & Fenech, 2001). Due to the nature of e-commerce, user innovativeness has also been frequently mentioned as an essential user attribute. Innovativeness refers to concepts, practices, and objects perceived as new by individuals; in other words, the subjective judgment of novelty made by an individual and the degree of acceptance of new ideas, especially in relation to individuals in a system. Innovativeness has also been defined as the “degree that an individual performs a new idea and makes an innovative decision regardless of communication experiences with other people” (Midgley & Dowling, 1993). Since those with high innovativeness try to accommodate new life styles, products, and consumption patterns earlier than others, their Internet purchase intentions are also higher than the average consumer (Park, 2000).

It is also generally accepted that customers will favor e-commerce for its economic and timesaving benefits. On e-commerce sites, people are provided with a great deal of information on which to base their purchase decisions, and the disadvantages of visiting physical stores are avoided. In addition, people can more readily locate and purchase rare items in comparison to traditional markets (Hoffman & Nonak, 1996).

Park (2000) defined the effectiveness of e-commerce sites in terms of the awareness of price, variety, and product quality. He studied the impact of four factors on product purchase intention and the use of Internet sites: product perception; Internet shopping experience; the risk as seen by consumers; and the awareness of the benefits of e-commerce. Generally, Internet users want to purchase products more quickly and inexpensively than traditional consumers. Yoo et al (1999) conducted a cost-benefit analysis for on-line purchases from the perspective of the consumer, determining the cost of purchasing goods and services through e-commerce and thus whether e-commerce is more economically effective than traditional markets.

Kim and Joo (2002) set the attributes of Internet shopping malls and their customers as variables determining the positive outcome of e-commerce transactions and analyzed the interaction between them. Interaction, reliability, information usability, and effective service were the attributes of e-commerce, and diversity seeking, innovativeness, self-realization, and information orientation those for users. Suh & Seong (2004) claimed that personal attributes are important in e-commerce, and considered personal attributes as external variables affecting user acceptance of technology and the intention to use online retailers. The authors used personal Internet experience, Internet

technology skills, innovativeness, and self-efficacy as the key variables in their study.

Compeau and Higgins (1995) stated that self-efficacy in computers has a significant impact on computer resistance and use; when self-efficacy was strong, people were more positive towards the use of computers. Self-efficacy was defined as the degree of knowledge about technology, and the authors expected that increased knowledge regarding Internet technology would positively influence decision-making in Internet purchases.

Previous studies on user attributes are summarized in Table II-1. Based this previous research, the following user attributes were investigated in the present dissertation: (1) benefit awareness (the knowledge of low prices and discount benefits); (2) innovativeness (the tendency to pursue faster and more convenient transactions outside of traditional stores); (3) product perception (the knowledge of products before purchase); and (4) knowledge of Internet technology.

<Table II-1> Previous Studies on User Attributes

Variable	Content	References
Benefit Awareness	• Cost benefits • Efficient use of time • Elimination of the inconvenience of visiting stores • Purchase of products difficult to find in the market • Purchase at a low price • Confirmation of the price before purchase • Enjoyment of seeing discount advertisements • Saving costs with purchase	Donthu & Garcia (1999) Park, Lee, & Yoon (2002)
Innovativeness	• Curiosity about new sales methods • Enjoyment of new services • Browsing of various shopping mall sites • Preference for new products • Awareness of the latest web sites • Time spent in search of new products	Agarwal & Prasad (1998) Jeon & Kyoung (2000) Kim & Joo (2002)
Product Perception	• Price information • Wide range of information about similar products • Information about product quality • Information about the product itself	Vellido, Lisboa, & Meehan (2000) Song & Lee (2003) Lee & Joo (2002)
Level of Knowledge of Technology	• Ease of learning Internet use • Clarity understanding of Internet processes • Expertise with Internet information searches • Knowledge of the Internet • Early experience of Internet use • Learning the use of information technology • Innovative acceptance of new technology • Familiarity with the Internet	Yoo (1993)

2. Framework of Flow Experience

Emotional, cognitive and behavioral reactions to Internet technology and factors affecting these reactions have been studied from a variety of theoretical perspectives, including the Diffusion of Innovations (DOI), the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and Social Cognitive Theory (SCT). In these theories, Internet use is considered the result of an emotional response to beliefs and behavior towards technology. The Internet has been recognized as an emerging new media, and to what extent consumers accept it is the main focus of these theories (Lee & Joo, 2002).

Unlike these theories, flow theory, developed for the field of Internet marketing by Hoffman and Novak (1996), focuses not on technology acceptance but on the psychological experience of consumers. Since Internet skills and challenges with Internet use affect flow, Internet immersion increases. Numerous studies on technology acceptance in relation to the Internet have been conducted, but interest in the psychological aspects of Internet use is increasing. Flow theory is particularly applicable to consumer behavior and decision making in e-commerce because it is assumed that consumers seek psychological pleasure in the process of Internet shopping. Thus, in order to understand the psychology of e-commerce users, the definition of flow, the flow research model, and previous research findings will be discussed.

A. Intrinsic Motivation

Flow is an intrinsically motivated state of mind. Intrinsic motivation is defined as a state of participating in activities for their own sake, such as interest, enjoyment, and inherent satisfaction. Intrinsic motivation is conceptually related to the theories of self-determination, learning goal orientation, and goal commitment.

(1) Self-Determination Theory

Csikszentmihalyi (1998) suggested four components of flow experience: control, attention, curiosity, and intrinsic interest. The four components have a close relationship with self-determination theory, which identifies three fundamental human needs – competence, autonomy, and relatedness – in order to achieve personal well-being and social development. In order achieve satisfaction with life, people seek out opportunities to exercise their abilities and to experience a feeling of competence, though according to Donthu & Garcia (1999), the feeling of competence will not promote intrinsic motivation if it is not accompanied by a sense of internal control or autonomy. In other words, self-determination is important in the manifestation of intrinsic motivation. However, it is not the only factor in play; Donthu & Garcia (1999) also suggested that relatedness influences intrinsic motivation, a concept that to some extent contradicts the importance of self-determination. For example, higher intrinsic motivation is often observed when students have a secure relationship with their teachers.

Environmental factors may also affect the intrinsic interest of an individual. In practice, little of the work an individual does require intrinsic motivation. However, by changing an individual's perception of his or her own competence and autonomy, it is possible to internalize regulation with

extrinsically rewarded work and maintain internal interest. For example, individuals are more likely to internalize it if they feel more efficacious, and it is possible to enhance this feeling of efficacy by providing constructive feedback. In addition, individuals may maintain intrinsic interest in their work if they feel autonomous, which can be promoted by giving individuals the opportunity to voice their opinions in the decision-making process while they work. If these measures to increase intrinsic motivation are introduced by someone who has a secure and close relationship with the individuals concerned, then the outcomes are expected to be even more positive.

(2) Goal-Orientation Theory

Davis (1989) reported two cognition-affect-behavior responses in individuals when faced with failure. The first, the adaptive mastery-oriented response, occurs when an individual looks for challenge and maintains their motivation even having experienced failure; the maladaptive helpless response, on the other hand, is when an individual avoids challenge and their performance and motivation deteriorate in the face of difficulty. It has been suggested that individuals respond differently after failure because they harbor contrasting intellectual achievement goals. Performance goals are those in which individuals are concerned with proving their ability and gaining a favorable evaluation of their competence. Learning goals, on the other hand, are those centered around the improvement of skills and knowledge. Individuals who pursue different goals possess different cognitive frames from which to interpret their environment and events within it; in turn, they vary in their response to failure. For example, in the pursuit of performance goals, individuals focus on judgments of competence, and thus are negatively affected

when this does not eventuate, leading to such behavior as attributing their failure to their personal cognitive deficiencies, experiencing boredom with a task, demonstrating nervousness about a task, and exhibiting decreased motivation and interest in performing a task. In contrast, learning goals encourage the improvement of competence and individuals thus confronting obstacles by maintaining interest in and positive affect toward a task.

Based on past empirical research on children, they suggested that failure is a threat to self-esteem for those with a helpless response, whereas mastery oriented individuals perceive difficulty as an opportunity to learn something new.

(3) Goal Commitment

Li & Martha (1999) defined motivation as the desire to achieve a particular goal. Based on numerous empirical studies, it has been proven that specific goals are more effective motivators than vague goals, and that difficult but attainable goals are more effective than easy goals. For example, the goal of achieving an A in a course provides more motivational force than simply aiming to do your best or targeting a B or better. It has also been established that goal commitment and self-efficacy work as moderators in the relationship between goals and performance.

Goal commitment is defined as the strength of the determination to reach a goal, and this can be influenced by a number of elements. Internal factors such as internal rewards and the expectation of success and interactive factors such as the opportunity to participate in setting a goal will both facilitate goal commitment. External factors such as authority, peer influence, and extrinsic rewards may influence goal commitment. Self-efficacy is the belief in one's

competence in achieving a goal or completing a given task. When an individual possesses high self-efficacy, they tend to pursue goals that are more difficult and demonstrate better performance.

B. Concept of Flow

Flow refers to the mental state in which a person is fully immersed in the process of performing an activity, and integrated behaviors naturally follow in accordance with this activity. It occurs when the harmony between challenges and individual skills exceeds a certain level.

Csikszentmihalyi & Lefevre (1989) defined flow as ‘immersion’ in and the ‘pleasure’ of an activity. According to him, in a state of flow, people do not think about or perceive anything unrelated to what they are focusing on. People who experience flow have increased self-esteem and satisfaction as a result of expanding their skills. In a state of flow, people do not act intentionally; their consciousness and behavior are integrated, and they are completely absorbed in their actions. People confidently perform activities without fear or anxiety. Flow occurs when an individual performs an activity they can overcome, and is maintained when the results of the action can be instantly known. Also referred to as the optimal psychological experience, flow is a theoretical concept of psychological analysis. It is utilized in a variety of disciplines, including social sciences, women’s studies, literature, business, and Internet marketing.

Flow has been used to explain the effective interaction between sales companies and customers in the computer-mediated market environment since

the 1990s. Flow was first applied to the field of Internet marketing by Hoffman and Novak (1996), in particular to the optimal psychological state that arises during Internet surfing. According to the authors, flow is experienced when the harmony between personal Internet skills and challenges is above average.

Consumers in a state of flow experience feedback from their interaction with the Internet, and have the feeling of self-determination and self-control. This feeling derives from the fact that Internet activities are pleasurable in themselves and that consumers do not experience self-consciousness as there is no need to worry about social expectations. Their social identities are not exposed no matter what they do. In addition, consumers gain a feeling of self-reward and self-reinforcement by perceiving Internet activities as interesting and pleasurable. As a result, they continue to stay focused on the Internet even in the absence of external rewards.

Internet users' personal skills, challenges, control, and emotional sensitivity in the process of pleasurable Internet immersion are considered key variables affecting flow in an online environment, thus inducing positive emotions or active search behavior. Given the core concept of flow is the pursuit of pleasure through Internet immersion, the act of shopping itself is assumed to include a hedonic value (Hoffman & Novak, 1996).

While hedonic value explains the tendency of Internet consumers to treat the process of connecting to the Internet, searching shopping malls, and purchasing products as a recreational entertainment or diversion (Kim, 1992), flow goes beyond this. It includes challenge, creativity, selectivity, and severe immersion, which causes people to lose their ego. Since flow theory is

emerging as an important concept in understanding Internet user behavior from an empirical perspective, research based on this theory has become more common in the field of Internet marketing.

C. Hoffman and Novak's Flow Model

Hoffman and Novak (1996) proposed a comprehensive flow model by applying the relationship between the antecedent variables that affect flow to Internet consumers. In this model, Internet skills, challenges, and interactions were considered the primary antecedent factors, and focused attention and time distortion were the secondary antecedent factors.

(1) Skill and Challenge

Skills refer to personal ability in Internet use, and challenge refers to the degree to which an individual expands their skills and tries new things on the Internet. Flow is experienced when there is harmony between a challenging activity and the personal skills required to successfully complete it, when control over personal activities and the Internet environment is realized, and when personal curiosity induced by emotional arousal by occurs (Csikszentmihalyi, 1998). According to Hoffman and Novak (1996), personal skills predict control on the Internet environment, and challenge predicts emotional feelings such as curiosity and anticipation. Internet users subjectively assess their skills, challenges, control, and emotional feelings, and all of these affect flow.

(2) Reciprocal Action

Consumers choose items of interest on, and constantly interact with, web sites based on their experience. Two-way communication, in which consumers and companies send and receive information to and from each other, is possible on the Internet, and consumers tend to rate web sites with a greater number of reciprocal actions more favorably and more frequently visit them.

Hoffman and Novak (1996) divided reciprocal actions into human and machine reciprocal actions. They stated that reciprocal actions play a key role in an intricate communication network, with interactions between media and users, as well as among the users themselves. When reciprocal actions are more common, immersion in Internet activities increases.

(3) Focused Attention and Time Distortion

Users experience flow when they feel telepresence in a virtual space by focusing their attention on Internet activities while deeply immersed in them without consciousness of time. In a state of flow, people tend to underestimate the amount of time that has passed (Csikszentmilahyi, 1998). Hoffman and Novak (1996) considered that the speed of interaction and participation are factors affecting focused attention; and focused attention affects virtual spatiality and time distortion.

(4) Flow

Hoffman and Novak (1996) reported that personal Internet skill and challenges on the Internet affect flow, and it inducing favorable feelings or active search behavior. In this sense, flow can be a psychological factor that explains certain aspects of Internet consumer behavior. In addition to Internet skills and challenges, interactions, virtual spatiality, and time distortion affect flow. It was expected that higher Internet skills, a sense of challenge, more

active interactions with the Internet, higher virtual spatiality, and more time distortion would increase flow.

(5) Positive Affect and Exploratory Behavior

It was found that consumers who experienced flow in the interaction with the Internet reported a more positive affect, indicating pleasure and satisfaction. In addition, people in a state of flow searched for information for longer periods of time than did their counterparts.

Since flow influences positive affect and search behavior, Hoffman and Novak (1996) argued that the measurement of flow experience can be used in Internet marketing, explaining that the harmony between personal Internet skills and challenges in the process of interaction between consumers and the Internet produces flow, and this affects consumers' search and purchasing behaviors. Based on their research, numerous studies of consumer purchasing behavior on the Internet have been conducted to determine whether flow theory is applicable to Internet consumers.

D. Previous Studies on Flow

Interested in experiences which act as intrinsic rewards for activities, Csikszentmihaly and Lefevrei (1989) studied flow through in-depth interviews. The characteristics of flow included the merging of action and awareness, the centering of attention, the loss of ego, control of his/her actions and of the environment, activities where one can cope, unambiguous feedback, and autotelic properties.

These aspects of flow have been used to study the interaction between humans and computers; several of these studies are summarized in Table II-2. Woodside, Fray, and Daly (1989) explained how flow is experienced when people use a computer. Initially, a user is aware of control in the interaction between them and the computer; this is followed by the centering of attention in the interaction with the computer. This promotes increased curiosity in the user during the interaction, until finally they become fully interested. In another study, Ghani and Deshpande (1994) reported that students in computer courses exhibited flow by using computers without a sense of time, and in a study of flow on the Internet, Hoffman & Novak (1996) maintained that repeated visits to a web site facilitate flow. When Internet users reach a state of flow, they are immersed in the Internet activities and stay in the Internet space, perceiving Internet surfing as exciting and enjoyable.

According to previous studies, Internet skills and challenges affect flow in the interaction between consumers and the Internet, and eventually influence purchase intention. Many of these studies limited their approach to specific consumers, and thus it remains to be verified whether these findings are applicable to Internet shopping mall consumers. This dissertation attempts to investigate whether flow experience of e-commerce users affect their purchase intention.

<Table II-2> Previous Studies on Flow

Variable	Content	References
Challenge Flow	• Personal Internet skills and challenges induce flow, and flow stimulates active search behaviors in the interaction between Internet users and the Internet.	Hoffman & Novak (1996)
Control Flow	• Flow occurs when the users interact with a computer with perceived control and centered attention. People may never experience it or may experience it intensely.	Trevino & Webster (1992)
Site Attractiveness/ Flow Experience/ Emotional Immersion	• The characteristics of e-commerce affect consumer psychology variables including web site attractiveness and flow.	Kim (1992)
Flow Experience/ Perceived Practical Value/ Internet Purchase Intention	• Reciprocal action between Internet skills and challenges affects flow experience and practical value realization. • Flow experience, practical value realization, service quality evaluation, and perceived risk affect purchase intention on the Internet.	Hoffman & Novak (1996)
Flow Experience/ Satisfaction/ Purchase Type/ Repurchase	• Through an empirical analysis targeting Internet users, contents characteristics perceived by users were established. The effect of these on user attitudes and behaviors, which are measures of flow satisfaction, and the interrelationship between satisfaction and repurchase intention were analyzed.	Trevino & Webster (1992)
Life Style/ Flow Proficiency and Sense of Challenge/ Flow Experience	• Empirical research on the effect of life style on flow experience.	Kim (1992)
Flow/ Information Search Intention/ Purchase Intention	• The effect of the characteristics of e-commerce on consumer psychology variables including “information search intention” and “flow.”	Kim (1992)

3. Framework of Perceived Quality

A. Perceived Quality

Perceived quality is the subjective judgment about the superiority of a particular product, and is considered separate from objective quality. Perceived quality in Internet shopping refers to the degree to which web sites facilitate efficient and effective shopping, purchasing, and delivery for the purpose of selling products or providing various activities, conveniences, or satisfaction in conjunction with product sales to consumers.

The perceived quality of e-commerce is regarded as a differentiating factor that can enhance the competitiveness of companies as a means of guaranteeing purchase intention or increasing consumer loyalty. Although there has been a great deal of research on perceived quality, conceptual studies and theories about perceived quality lack a consensus. In addition, perceived quality in the Internet environment is a relatively new field of research, though marketing researchers, taking the lead from information systems research, have recently begun to pay attention to perceived quality.

Definitions of perceived quality as it relates specifically to the Internet have emerged, but a specific and systematic proposal for a concept of perceived quality has not yet been made. People simply accept or modify the existing notion of perceived quality rather than re-conceptualizing it within the context of the Internet.

The concept of perceived quality does not differ greatly between online and offline environments, but specifically developed tools that consider the unique characteristics of the Internet are required. This dissertation examines previous evaluation scales for perceived quality in both on- and offline environments in order to establish measures appropriate for the analysis perceived quality in e-commerce.

B. Evaluation Scales for Perceived Quality

SERVQUAL has been used as an evaluation scale for perceived quality. It is a multi-dimensional measure that includes five elements: tangibility, reliability, responsiveness, assurance, and empathy; and each element has four to five questions. SERVQUAL has been widely used for a variety of perceived quality studies and in the development of marketing strategies because it is applicable to a diverse range of service categories. However, some elements in certain service categories may be overlooked because the scale is too general. They asserted the need for determinants of perceived quality appropriate for each individual industry. They developed an effective measure applicable to retailers, retail SERVQUAL (R-SERVQUAL). R-SERVQUAL consists of five elements: physical aspects, reliability, personal interaction, problem solving, and policy. It has a total of 28 detailed evaluation items; 11 items were added to the 17 from the original SERVQUAL.

Currently, most studies on perceived quality in e-commerce use evaluation measures by simply modifying and supplementing SERVQUAL and R-SERVQUAL. However, because they were originally intended to measure perceived quality in a traditional market environment, it may not be valid to apply these measures to e-commerce. Unlike traditional businesses, there is no physical space or salesperson in e-commerce. Thus, perceived quality factors may change depending on a customer's environmental conditions because the customer interacts with a website rather than sales personnel. With this in mind, identifying service factors that encompass the unique environmental characteristics of e-commerce is required. What follows is a description of the evaluation scales used in previous studies to measure perceived quality in an online environment, and these are summarized in Table II-3.

(1) Quality Information (QI)

The current market exists under the assumption of information gathering, contract formation, and transaction confirmation. In the process of these transactions, existing information and products were separated, and the accuracy of information became crucial (Clark & John, 1994). In order to measure information quality, Clark & John (1994) developed the scale Quality Information (QI), dividing it into internal, situational, representative, and approach types. These scale items measured consistency, accuracy, freshness, persuasiveness, and ease of understanding information, all of which are applicable to the qualitative evaluation of information provided for online services.

(2) Questionnaire for User Interface Satisfaction (QUIS)

While QI is an evaluation scale for the quality of information provided,

the Questionnaire for User Interface Satisfaction (QUIS) measures the interaction between the computers and the user. QUIS was developed in order to measure satisfaction with computer interfaces. It consists of four dimensions: (a) information presented on the screen, (b) ease of use and feedback, (c) learning, and (d) system performance. When applied to online shopping mall interfaces, it can be divided into the following measures: (a) whether the information provided by a shopping mall is quick and accurate (information presented on the screen); (b) how consistent the information is (terms and feedback); (c) how easy it is to use a shopping mall (learning); and (d) how fast the connection speed is (system performance).

(3) Perceived Usefulness and Ease of Use (PUEU)

PUEU, developed by Davis in 1989, is a scale that measures the degree of usability, an important factor in the acceptance of information systems. Items suitable for e-commerce include the usability of the menu structure, ease of learning, and site organization (Lee & Joo, 2002).

(4) Perceived Quality of an Internet Shopping Site (PQISS)

Donthu & Garcia (1999) developed a perceived quality scale for Internet consumers, PQISS. PQISS includes nine specific evaluation factors for e-commerce: design, price advantage, ease of use, clarity of ordering, reputation, security, system speed, product differentiation, and quality certainty. While QI, QUIS, and PUEU focus on systematic elements, it suggests the integration of the system-centered and consumer-centered evaluation methods.

(5) e-SERVQUAL

Parasuraman & Zeithaml (1998) developed e-SERVQUAL, which includes 11 factors related to perceived quality on the Internet: reliability,

responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics, and customization/personalization. The authors insisted that the discrepanvy between the expectations of customers actuality of service companies used in SERVQUAL also exists in the interaction between the two groups on the Internet. They also discussed the information gap, design gap, and fulfillment gap (Kim, 1992). In addition, .com , a service quality measurement tool consisting of 14 questions and four elements – web design, reliability, security/privacy, and customer service – was suggested. Tan (1999) developed WevQual4.0, which consisted of 22 questions and three elements: usability, information, and interaction.

<Table II-3> Evaluation Scales of Perceived Quality

Name of Scale	Content	Reference
.com	• site design, reliability, security/privacy, customer service	Parasuraman & Zeithaml (1998)
QUIS	• information presentation, terms/feedback, learning, system performance	Chin, Virginia, & Kent (1998)
PUEU	• usability of menu structure, ease of learning, site organization	Davis (1989)
QI	• consistency, accuracy, freshness, persuasiveness, and ease of understanding of information	Parasuraman & Zeithaml (1998)
WebQual 4.0	• usability, information, interaction	Davis (1989)
PQISS	• design, price advantage, ease of use, clarity of order, reputation, security, system speed, product differentiation, quality certainty	Donthu & Garcia (1999)
e-SERVQUAL	• reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics, customization / personalization	Parasuraman & Zeithaml (1998)

C. Previous Studies on Perceived Quality in E-Commerce

Many researchers agree with PZB's (1988) proposal that the five-factor structure of SERVQUAL is an important component of perceived quality (Cronin & Brady, 2001). Since PZB's (1988) five dimensions are mainly functional interactive qualities, elements from studies of perceived quality for retailers and e-commerce were added to the sub-elements of technological quality (final quality) and environmental quality for the present dissertation.

Shopping mall web design, part of the environmental quality, comes from PZB's (1988) usability, and ease of use comes from Dabhalkar et al.'s (1996) concept of convenience. Information presented on the screen comes from information dimension.

Delivery accuracy, part of final quality, is taken from PZB's (1988) reliability; exchange and refund/payment/product type/safety protection policies is based on Dabhalkar et al.'s (1996) policy dimension. Web design and delivery accuracy corresponded to PZB's (1988) measures of tangibility and reliability, but they were modified for e-commerce. Unlike previous studies, personalized interactions between customers and companies and among customers were included as sub-elements; this was in addition to the general interaction between customers and companies, which is taken from PZB's (1988) measures of responsiveness and certainty.

Because customer needs are diverse, the information or transaction functions provided by websites are often unable to meet them all. Thus, services that can create online communities (virtual communities) in addition to transaction functions are increasing (Lee & Joo, 2002). As online communities play an important role as a reference group, they greatly affect the behavior of individuals, such as learning, opinions about products and services, purchase, and consumption. Thus, online communities can be an easy, effective means for companies to access a particular customer group, and these groups can be strategically used by companies (Choi et al., 2004).

The present dissertation has comprehensively examined previous studies on perceived quality set in general, retailer, and e-commerce environments. Multi-level and multi-dimensional measurement can better explain complex

concepts regarding perceived quality in e-commerce. This dissertation divided perceived quality into three elements – environmental, interactive, and final – by applying the conceptual models of three elements from previous studies. Environmental perceive quality was then divided further into three sub-elements: web design appearance, ease of move/search/order, and information presented on the screen. Interactive perceived quality was also divided into three sub-elements, including interaction between customers and companies and interaction among customers, and final perceived quality was divided into two sub-elements: delivery accuracy, and exchange/ refund/payment/product type/safety protection policies. The perceived quality factors used in this dissertation are summarized in Table II-4.

Studies related to the measurement of perceived quality have been limited to procedural quality and quality attributes. However, predicting overall perceived quality based only on procedural quality is ineffective, with a low predictive validity. This is supported by Powpaka (1996), who found that adding technical quality improves the explanatory and predictive validity of a model. Therefore, a balanced consideration of technical aspects and final quality is required.

<Table II-4> Perceived Quality

Dimension	Measurement Item
Environmental Quality	Web design appearance Ease of use Information presented on the screen
Interactive Quality	General interaction between customers ↔ companies Personalized interaction between customers ↔ companies Interaction among customers
Final Quality	Delivery accuracy Exchange and refund/payment/product type/safety protection policies

4. Framework of Perceived Risk

Consumer behavior is essentially a matter of choice, and choice is bound to be accompanied by risk. In consumer behavior research, risk is a subjective concept; consumers perceive risk in the process of making a choice. Perceived risk can be defined as "the possibility that consumer behavior leads to unpredictable results."

Information has the characteristics of a public good. Once information is disclosed, there is no guarantee that it will not spread to a third party. This is because producing information requires money, but it costs little to spread. However, a study found that concealing personal characteristics in order to prevent the spread of personal information to a third party can reduce market efficiency.

According to a survey by commerce.net, a lack of trust, difficulties in

finding requested information, access, and payment were major obstacles to the purchase of items on the Internet. In particular, the level of risk that consumers perceive when they purchase products acts as a major barrier to Internet transactions. The main reasons not to purchase from the web were safety concerns regarding confidential information and quality assurance issues. Since consumers cannot touch or use products before purchase, internet sales will always incorporate some element of risk (Lee & Joo, 2002).

Types of perceived risk vary among researchers. Bettman (1973) classified perceived risk into six types. *Financial risk* refers to concerns about possible financial loss associated with purchase while *performance risk* is the possibility of the product not functioning as intended. *Physical risk* is the possible harm resulting from the purchase of unsafe products, and *psychological risk* is the possible discrepancy between the purchased product and a consumer's predisposed image of that product. *Social risk* refers to the possibility that the purchased product is not recognized by a reference group and, finally, *time risk* is the possible time lost to repairing or replacing defective products.

In addition, in a study on the factors influencing risk perception in consumers, Bettman (1973) reported that the risk of personal information leakage, e-payment safety, and likelihood of a refund are associated with an increase in perceived risk. In particular, the author finds that customers assume risk to be the highest in the following circumstances: (a) when consumers have little or no information about a product category; (2) when consumers do not have experience with a particular brand; (3) when consumers purchase a new product (4) when a product is technically complex; (5) when consumers are not confident with brand evaluation; (6) when there is a big difference in

the quality of a brand; (7) when a product is expensive; and (8) when the purchase is important to the consumer. Internet shopping has a higher level of perceived risk because it is a new type of transaction and is much more complex than previous transaction methods.

Jarvenpaa & Todd (1997) proposed that consumer risk is the major determinant of e-commerce purchases, and measured how much consumers know about economic, social, quality, personal, and privacy risks. In addition, the effect of seller attributes, transaction security, privacy concerns, and consumer attributes on electronic exchanges has been investigated (Swaminathan, Elzbieta, & Rao, 1999). Jarvenpaa & Todd (1997) conducted a study on consumer protection and the perceived risk of Internet shopping. They divided perceived risk into merchantable quality risk, financial risk, psychological risk, and time/convenience risk, and examined whether they affected online shopping behavior.

Lee & Joo (2002) focused on variables affecting the formation of trust and the outcome variables of trust. They found that six factors influence the level of trust in e-commerce: (1) seals of approval, which provide the assurance of security, such as Veri Sign and Visa; (2) brand names, which enable consumers can predict the trust level of a company based on its reputation and the experience of web visitors; (3) navigation, which indicates the ease of finding required information; (4) fulfillment, which is clear information about the ordering process and problem-solving; (5) presentation, which includes elements of quality and technology; and (6) technology, such as technical superiority and novelty.

Hwang (2000) investigated consumer behavior that can decrease perceived

risk in e-commerce in relation to personal and product attributes, and explored the effect of perceived risk on risk reduction behavior. In their study, personal attributes consisted of purchase experience and purchase frequency, and perceived risk consisted of social, financial, psychological, and physical risk. Risk reduction behaviors consisted of information source, neutral information source, consumer-driven information source, consideration before purchase, and brand loyalty.

Internet users usually feel insecure when providing personal information. The right to privacy refers to "the right to control the type of personal information to be collected and the way it is used; the right to know who used the information and who held the information; the right to check the purpose of information use and whether it was used confidentially" (Yoo, 1993). Privacy refers to the control over the collection and usage of information about others, and consumers have the right to prevent unauthorized disclosure of private information.

If there is no difference between "the possibility of creating new information" and "the possibility that the trace of information remains," current personal information protection issues are no different to previous privacy issues (Hwang, 2000). Although the concept of privacy is changing, the installation of a barrier between individuals and society for the flow of information is still common. While privacy was previously primarily a barrier against information inflow, modern privacy is more accurately seen as a barrier against information leakage.

The surge in the Internet use increases the risk of personal information being abused; information leakage may occur through hacking or stealing while

personal information is being processed on a network. In addition, regulations designed to protect personal information have traditionally targeted the hardware of large organizations, which can store and process a great deal of personal data. Nowadays, however, there is little difference between individuals and public organizations or companies in the sending or receiving of personal information due to the high performance and low price of hardware. Because personal information is now easily accessible and stored, anyone can be a potential victim or a perpetrator. Since the identification of personal information is transmitted solely through data on networks, it can lead to the theft of private information.

Major factors that lead to failure in e-commerce by using the same analysis method used to find key success factors in management information systems. According to the study, data security, difficulty of use, system instability, insecure purchases, and social disorder negatively affected the success of e-commerce businesses.

As in traditional transactions, economic and social risk in the Internet shopping environment is the degree to which losses are expected from a particular purchase; these expected losses can often interfere with the likelihood of purchase (Park, 2000). Perceived risk is determined by the impact of purchase results on a consumer or by the importance of consumer purchasing behavior as perceived by other consumers when consumer uncertainty and previous purchasing behavior has led to undersirable results.

A. Perceived Risk

Bettman (1973) first introduced the concept of perceived risk to the field of consumer behavior. He stated that consumers may not be able to clearly predict the results of their decision making, and referred to any potential undesirable results of a decision as risk. Perceived risk can be distinguished from objective or probabilistic risk, and it is assumed that consumers respond only to subjective perceived risk. Bitner (1990) regarded perceived risk as a function of uncertainty about the purpose of a purchase, the consistency between the purpose of the purchase and the available choices, and the dissatisfaction with purchase results and consequent losses. Li et al (1999) defined perceived risk using two factors, uncertainty and loss. As such, the concept, which had originally been defined as a function of uncertainty and performance (profit and loss) from Bettman (1973), was reestablished as a function of uncertainty and loss.

Later, perceived risk came to be defined as an expected loss, and many researchers tried to systematize it. According to Tarpey (1975) and Peter and Ryan (1976), perceived risk refers to the expected loss that can occur as a result of a choice or purchase, resulting in the delay or abandonment of a purchase, rather than the perception of choice uncertainty. Bettman (1973) argued that perceived risk should be developed and defined as a unique concept where risk is the expected loss rather than a function of uncertainty and performance, which is the typical structure of expected value or its derivative. As such, the definition of perceived risk varies among researchers, but it generally refers to the subjective perception of uncertainty about the result of a purchase and the expected value loss. Thus, it can be comprehensively defined as uncertainty (Stone & Gronhaug, 1993).

B. Types of Perceived Risk

Perceived risk has been classified differently depending on researchers. Li et al (1999) divided perceived risk into financial risk, performance risk, physical risk, social risk, and psychological risk. Peter and Ryan (1976) included time/ease loss risk in addition to them.

Zikmund and Scott (1977) added future opportunity loss risk. While Stone and Gronhaug (1993) classified perceived risk into economic, functional, physical, time, social, and psychological risk, Zikmund and Scott (1977) divided perceived risk into financial risk, safety risk, functional risk, social risk, psychological risk, and time waste risk. Kurtz & Clow (1991) classified perceived risk into social/psychological risk, financial risk, and performance risk.

Based on previous studies (summarized in Table II-5), perceived risk can be divided into seven types: financial, functional, physical, psychological, social time loss, and opportunity loss. However, since Internet shopping does not involve any direct contact between sellers and consumers, there is additional uncertainty about the transaction itself. According to Ward and Michael (2000), transaction risk exists in the Internet shopping environment in terms of the discrepancy between the product purchased and that delivered. In addition, payment risk is a factor because payment is made indirectly; although security systems have significantly improved with the use of passwords, authentication, and encryption, privacy concerns still exist (Jarvenppa & Todd, 1997; Swaminathan et al., 1999). Impulse buying, fraudulent sites, and required time (anxiety related to the time required for delivery) are also factors related to

the perceived risk of online shopping (Yoo, 1993).

Based on these studies, Jarvenppa and Todd (1997) divided the perceived risk of Internet shopping into economic, functional, social, personal, and privacy risks, while Ghani & Deshparde (1994) classified it into functional, personal, delivery, personal information loss, payment method, and fraudulent site risks. In summary, the perceived risk of e-commerce consumers can be divided into two major categories: product related risk and transaction related risk caused by the Internet.

<Table II-5> Previous Studies on Perceived Risk Types

Types of Risk	References
Social/ Performance/ Financial/ Physical/ Psychological	Li et al (1999)
Social/ Performance/ Financial/ Physical/ Psychological/ Time loss	Roselius (1971)
Economic/ Socio-Psychological/ Performance/ Time and Ease loss/ Opportunity loss	Kim (1992)
Privacy/ Economic/ Delivery/ Quality	Ryu (2002)
Performance/ Management/ Delivery/ Quality	Kim (1992)
Functional/ Psychological/ Privacy/ Time loss	Lee & Joo (2002)
Quality/ Delivery/ Economic/ Socio-Psychological/ Accordance/ Privacy	Ryu (2002) Lee & Joo (2002)

C. Previous Studies on Perceived Risk

Generally, Internet shopping requires knowledge about price, search options, payment options, and exchange or after service processes. Knowledge of new shopping media varies depending on the level of experience. Experience and subsequent knowledge of Internet shopping increases the intimacy and decreases the uncertainty of shopping, which can then generate positive attitudes toward Internet shopping. In particular, it is assumed that e-commerce experience reduces perceived risk.

The search for information is part of the decision-making process, the commitment by consumers to obtain specific knowledge of certain products and their alternatives. Bitner (1990) argued that products, purchase methods, and brands affect the type and level of perceived risk, and consumers search for information as a way to reduce this risk. Information searches are reliant on access to reliable sources of information.

Bitner (1990) classified information sources into marketer-oriented, consumer-oriented, and neutral sources. Marketer-oriented sources include price, packaging, advertising, and promotions, and consumer-oriented information sources refer to interpersonal communication through word-of-mouth. Neutral information sources refers are those not influenced by marketers or consumers, such as newspaper articles or TV reports.

Schiffman (1972) divided the search process into an internal search, which utilizes information stored in the memory, and an external search, which obtains information from information sources in the external environment. Finally, Kim et .al. (2009) analyzed information searches by dividing them into two factors: time spent on information searches and product attribute searches.

Information searches are a key method of reducing uncertainty and thus

perceived risk. Consumers consider risk at the time of purchase, and consequently try to reduce that risk; generally, this is achieved by reducing uncertainty through information searches and by reducing the overall importance through the lowering of expectations. Thus, information searches can reduce the perceived risk and increase post-purchase satisfaction. Assael (1987) suggested additional ways to reduce risk, such as purchasing lower-priced products, smaller quantities of a product, or previously experienced products, as well as deliberating before purchase.

While a number of studies have claimed that perceived risk negatively affects purchase intention, including Song and Lee (2003), Jeon (2003), Bettman (1973), and Peter and Ryan (1976), the relationship between the two is not always clear. Jarvenppa and Todd (1997) found that the purchase risk dimension of perceived risk, such as transaction security and privacy protection, did not significantly affect purchase intention and frequency. The findings of Swaminathan et al. (1999), who studied interest in security and privacy protection and purchasing behavior in e-commerce, differed from the studies that investigated the effect of perceived risk on purchasing behavior in Internet shopping using multi-dimensional attributes. Hyung & Lee (2000) found a negative effect of perceived risk on purchase intention; however, it was not statistically significant.

In a consumer behavior analysis, Park (1999) found that consumers with telemarketing experience search more for information before purchasing online, and higher innovativeness increases Internet purchases. In addition, Tan (1999) found that consumers who do not avoid risk have higher Internet purchase intention.

Based on this previous research, the perceived risk factors needed for the present dissertation can be summarized as follows. *Product risk* refers to anxiety about possible economic loss and the quality of the product or service, and *social risk* refers to anxiety about the evaluation by others for online shopping. *Technological risk* refers to anxiety about low technological understanding, and *time loss risk* refers to anxiety about possible time loss.

5. Framework of Purchase Intention

A. Purchase Intention in E-Commerce

Since consumers cannot touch products in e-commerce, they have to rely on images or product details provided by websites to make a purchase decision. O'Keefe & McEachern (1998) proposed a customer decision-making support system, arguing that customer purchase intention increases only when sufficient product information and convenient visual systems are provided.

B. Previous Studies on Purchase Intention in E-Commerce

Several empirical studies on Internet purchasing behavior have been carried out, including consumer behavior on the Internet (Sivadas & Kellaris, 1998), consumer decision-making in the online shopping environment (Hubl, 1999; Hubl & Trifts, 2000), socioeconomic, attitudinal, and behavioral characteristics

of e-commerce consumers (Donthu & Garcia, 1999), analysis of differences in information search costs by website design in e-commerce, shopping channels, shopping orientation, and effect of demographic variables perceived through online purchase behavior (Li et. al., 1999), cross-cultural study on consumer trust in web stores (Jarvenpaa & Todd., 1997), differentiating factors between simple browsers and buyers in a virtual space for electronic exchanges (Swaminthan et. al., 1999), differences in perceived risk between those with Internet shopping experience and those without such experience, consumer search and product brands in Internet shopping, the relationship between Internet users' lifestyles and purchase decision-making cyber shopping in virtual distribution channels (park, 1999), consumer satisfaction in e-commerce (Ahn, 1998), determinants of consumer purchase intention in the virtual market using the concept of flow, factors affecting customer trust and the mediating role of trust regarding purchase intention in B2C e-commerce (Yoo et al., 1999), and the impact of the media, consumers, and product attributes on perceived risk and purchase intention(Song & Lee, 2003). Previous studies related to purchase intention on the Internet including the studies above are summarized in Table II-6.

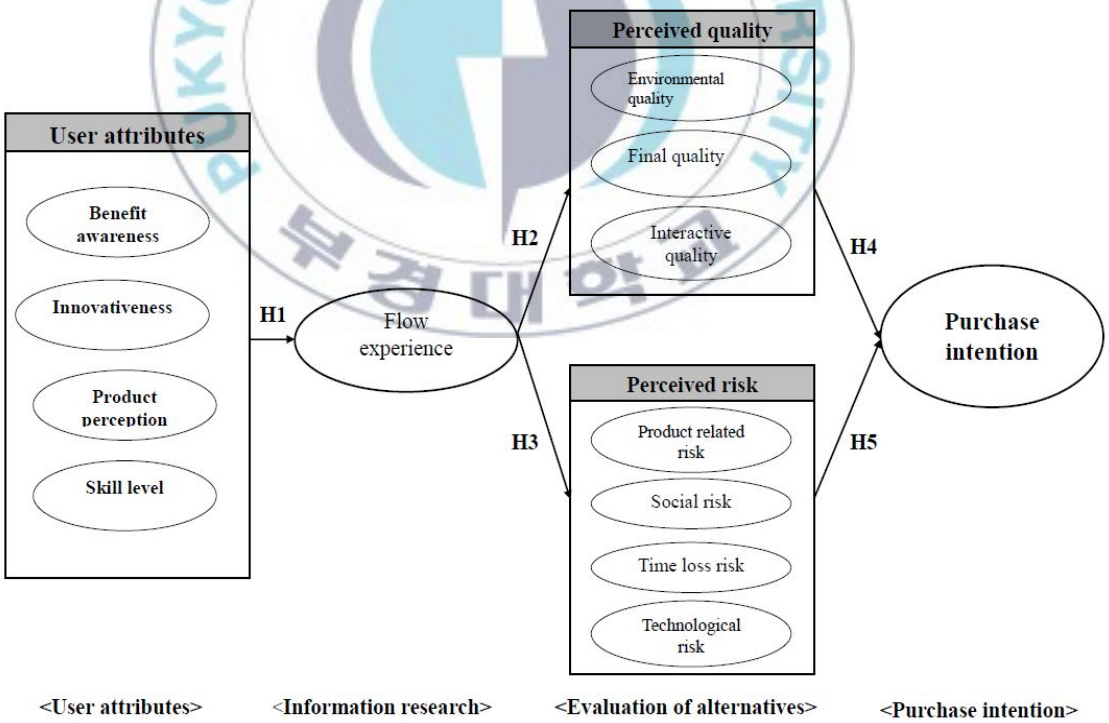
<Table II-6> Previous Studies on Purchase Intention in Internet Shopping

Details	References
• Characteristics of online companies, transaction safety concerns, privacy, shopping orientation, awareness, distribution channels • Characteristics of supply companies, characteristics of the relationship with supply companies, characteristics of sellers, characteristics of the relationship with sellers, trust in purchasing companies by supply companies, sellers' trust in buyers • Perceived quality, reliability • Transaction safety and security, personal information management, refund policy, trust in certain companies • Perception level, perceived reputation, reliability of shopping malls, attitudes toward shopping malls	Han (2006)
• Perception of risk and attitudes • Perceived performance and financial risk • Perceived risk	Song & Lee (2003)
• Demographics • Personal characteristics • Consumer characteristics	Yoo et al. (1999) Song & Lee (2003) Kim & Park (1999)

III. RESEARCH MODEL AND HYPOTHESES

1. Research Model

In the present dissertation, a research model designed to validate and analyze flow experience, perceived quality, perceived risk, and factors affecting purchase intention according to user attributes was established based on the framework described above. Figure III-1 shows the research model for this empirical study.



<Figure III-1> Research Model

2. Research Hypotheses

It is hypothesized that user attributes affect purchase intention in e-commerce through flow experience, perceived quality, and perceived risk. Furthermore, the number of e-commerce sales is steadily increasing due to increasing number of customers in their 20s or 30s. This trend is expected to continue in the future because customers are becoming increasingly familiar with e-commerce. This dissertation attempts to analyze the impact of user attributes, flow experience, perceived quality, and perceived risk on purchase intention in e-commerce. In order to examine the relationship between the variables in the research model, the specific research hypotheses are as follows.

A. Relationship between User Attributes and Flow Experience

Flow is a formalized and extended concept of aesthetic experience that describes the feeling of fun and enjoyment generated while participating in an activity, much like when one is playing (Csikszentmihalyi & Leferve, 1989). Hoffman & Novak (1996) considered immersion and enjoyment to be key concepts of flow. E-commerce users are able to reach a state of immersion, which can lead to favorable feelings and active exploration behavior. Consumers experience freedom, flexibility, or creativity by making a choice

and then experimenting with that choice on a website. (1) Cho and Jeong (2010) examined the relationship between the characteristics and achievement of e-commerce users, with flow as a parameter variable. They also investigated factors affecting flow. Kim et al. (2009) analyzed the structural relationships among UCC attributes, perceived utility, flow, and the intention ofuse,and found a significant relationship between UCC attributes and flow. Thus, a positive relationship between user attributes and flow experience was hypothesized.

Hypothesis 1: User attributes positively affect flow experience in e-commerce.

H1-1: Benefit awareness positively affects flow experience in e-commerce.

H1-2: Innovativeness positively affects flow experience in e-commerce.

H1-3: Product perception positively affects flow experience in e-commerce.

H1-4: Skill level positively affects flow experience in e-commerce.

B. Relationship between Flow Experience and Perceived Quality

Numerous researchers agree that the five factors of SERVQUAL proposed by PZB (1988) are important elements of perceived quality (Cronin & Brady, 2001). The present dissertation used PZB's (1988) five factors, with the addition of the environmental quality and final quality factors. Environmental quality corresponds to PZB's (1988) tangibility of shopping mall web design, and ease of use corresponds to Dabhalkar et al.'s (1996) measure of

convenience. These factors were defined and applied as environmental quality in accordance. Final quality is a combination of various sub-elements. Accuracy of delivery corresponds to PZB's (1998) reliability measure, and exchanges and refunds/payment/product type/safety protection policy correspond to Dabhalkar et al.'s (1996) policy dimension.

Considering perceived quality in e-commerce as multi-leveled and multi-dimensional can better explain complex concepts; thus, this dissertation divided perceived quality into three factors – environmental quality, interactive quality, and final quality – by applying the conceptual models of Cronin and Brady (2001) and Rust and Oliver (1994), and the structure by Dabholkar et al. (1996). It was expected that flow experience would affect perceived quality. Lee and Park (2009) reported that the perceived service quality of Internet shopping malls significantly affects the feeling of enjoyment and autonomy. It was also found that the feeling of enjoyment has a significant impact on flow experience. According to Cheon and Jun (2011), e-service quality factors for low-cost carriers such as responsiveness, security, and reliability positively affect consumer satisfaction, and satisfaction consequently has a positive relationship with flow and loyalty.

Hypotheses 2: Flow experience positively affects perceived quality in e-commerce.

H2-1: Flow experience positively affects environmental quality in e-commerce.

H2-2: Flow experience positively affects final quality in e-commerce.

H2-3: Flow experience positively affects interactive quality in e-commerce.

C. Relationship between Flow Experience and Perceived Risk

Perceived risk refers to uncertainty about the results of a purchase. As in traditional transactions, a variety of perceived risks exist in e-commerce, and it is important to lower the perceived risk in Internet shopping (Burke, 1997). According to Akaah and Korgaonkar (1998), non-store purchases are associated with a higher level of perceived risk than are general store purchases. Consumers consider official information sources, brand image, and brand reputation to be important, and believe that risk can be reduced by shopping at stores that handle high quality products. Tan's empirical study (1999) also found that the level of perceived risk in Internet shopping is higher than that of general offline shopping. In a study by Roselius (1971), 60% of survey respondents chose transaction security as an obstacle in Internet shopping; this is of particular concern because of the reliability of credit cards as a payment method has been suggested as a reason to avoid Internet shopping. In addition, about half of those who visit online shopping sites abandon plans to purchase anything if they are required to register personal information. In another survey, 64% of the respondents thought it was difficult to protect privacy when online shopping (Jasper & Lan, 1992). Kim and Ryu (2006) investigated the effects of Internet flow and Internet shopping on perceived risk and purchase. It was found that Internet flow positively

affects perceived risk. Thus, the impact of perceived risk on Internet sites, users, and product related characteristics was hypothesized as follows.

Hypothesis 3: Flow experience positively affects perceived risk in e-commerce.

H3-1: Flow experience positively affects product related risk in e-commerce.

H3-2: Flow experience positively affects social risk in e-commerce.

H3-3: Flow experience positively affects time loss risk in e-commerce.

H3-4: Flow experience positively affects technological risk in e-commerce.

D. Relationship between Perceived Quality and Purchase Intention

A consensus has not yet formed on the casual relationship between perceived quality and customer purchase intention. Bitner (1990) argued that perceived quality is based on customer satisfaction with purchase and consumption experience. Akaah & Korgaonkar (1998) argued that the concept of perceived quality was similar to attitude. They claimed that customer satisfaction is formed at the time of a particular transaction, and that accumulated customer satisfaction affects overall perceived quality.

In opposition to the claim that customer satisfaction determines perceived quality, Parasuraman & Zeithaml (1998) insisted that high levels of perceived quality increases purchase intention. Woodside, Fray, and Daly (1989) studied the relationship between perceived quality, customer satisfaction, and purchase intention, and argued that customer satisfaction acts as a mediating variable

connecting service quality and purchase intention. They determined that perceived quality is the antecedent variable of customer satisfaction, a conclusion empirically supported by Cronin and Taylor (1992). Therefore, this dissertation formulated the following hypotheses on the relationship between perceived quality and purchase intention.

Hypothesis 4: Perceived quality positively affects purchase intention in e-commerce.

H4-1: Environmental quality positively affects purchase intention in e-commerce.

H4-2: Final quality positively affects purchase intention in e-commerce.

H4-3: Interactive quality positively affects purchase intention in e-commerce.

E. Relationship between Perceived Risk and Purchase Intention

It is important to reduce perceived risk in Internet shopping (Burke, 1997). In a study on the effect of perceived risk on consumer reaction, Jarvenpaa & Todd (1997) reported that perceived risk negatively affected consumer purchase intention online. Kim and Park (1999) proved that non-buyers perceive more benefits than risks when compared to buyers in Internet shopping. Hyung and Lee (2000) found that product risk, transaction risk, and privacy risk negatively affect purchase intention. Thus, this dissertation hypothesized the relationship between perceived risk and purchase intention as follows:

Hypothesis 5: Perceived risk negatively affects purchase intention in e-commerce.

H5-1: Product related risk negatively affects purchase intention in e-commerce.

H5-2: Social risk negatively affects purchase intention in e-commerce.

H5-3: Time loss risk negatively affects purchase intention in e-commerce.

H5-4: Technological risk negatively affects purchase intention in e-commerce.

3. Operational Definition of Research Variables

An operational definition is one that describes selected concepts in research in terms of measurable phenomena. In other words, the methods used to measure the target variables are specified through operational definitions.

A. User Attributes

The reasons for using e-commerce are defined as follows: product perception (the overall product knowledge, including the knowledge of low prices and discount benefits); innovativeness (the tendency to use fast and convenient transactions without visiting traditional stores); benefit awareness (recognition of benefits before purchase); and Internet skills. This dissertation measured these using a seven-point Likert scale based on previous studies on

user attributes (Donthu & Garcia, 1999; Agarwal & Prasad, 1998; Pavlou, 2002). The measured elements of user attributes are summarized in Table III-1.

<Table III-1> Measurement Items for User Attributes

Factor	Measurement Item	References
Benefit Awareness	Internet shopping costs less compared to store shopping.	Donthu & Garcia (1999)
	Internet shopping saves time compared to store shopping.	
	There is no time constraint since shopping is available any time.	
	I can purchase rare products difficult to find in the market.	
Innovativeness	I use Internet shopping earlier than others do due to strong curiosity about new sales methods.	Donthu & Garcia (1999) Agarwal & Prasad (1998) Jeon & Kyung (2000) Kim & Joo (2002)
	I use Internet shopping earlier than others do due to full knowledge of its advantages.	
	I like searching for new things or receiving new services on the Internet.	
Product Perception	I know product information before Internet shopping.	Song & Lee (2003)
	I know price information before Internet shopping.	
	I know quality information before Internet shopping.	
Skill Level	It is difficult to learn how to use the Internet.	Yoo et al. (1999)
	It is easy to find what I want on the Internet.	
	I am active in learning new Internet skills.	
	I can easily use the Internet features that I want.	

B. Flow Experience

Flow experience is defined as a phenomenon where Internet users experience fun and enjoyment in a state of immersion, and this was applied to Internet use. In order to measure this, feelings experienced during Internet shopping, such as excitement, focused attention, remote presence, time distortion, challenges, skills, and control, were estimated using three measurement items based on previous studies (Hoffman & Novak, 1996; Trevino & Webster, 1992, and they were measured using a seven-point Likert scale as shown in Table III-2.

<Table III-2> Measurement Items for Flow Experience

Factor	Measurement Item	References
Flow Experience	I feel stimulated while using online shopping sites (excitement).	Hoffman & Novak (1996)
	I am deeply focused while using online shopping sites (focused attention).	
	I forget about my immediate surroundings while using online shopping sites (presence).	

C. Perceived Quality

Perceived quality refers to the subjective evaluation of various activities related to the online shopping experience, including ordering, delivery, exchanges, refunds, and after service. The present dissertation categorized perceived quality into environmental quality, interactive quality, and final

quality based on the conceptual models of previous studies (Cronin & Brady, 2001; Rust & Oliver, 1994; Dabholkar et al., 1996; Choi et al., 2002). A total of 11 items regarding perceived quality were measured using a seven-point Likert scale as shown in Table III-3.

<Table III-3> Measurement Items for Perceived Quality

Factor	Measurement Items	References
Environmental Quality	Overall atmosphere or harmony of screen	Cronin & Brady (2001) Choi et al. (2004)
	Clean and pleasant visual effects	
	Ease of movement	
Final Quality	Consistency between ordered products and delivered products	Cronin & Brady (2001) Rust & Oliver (1994) Lee & Joo (2002) Choi et al. (2004)
	Non-damaged products when delivered	
	Accuracy of delivery period	
	Various payment methods	
Interactive Quality	Various contact methods	Cronin & Brady (2001) Rust & Oliver (1994) Dabholkar et al. (1996) Choi et al. (2004)
	Rapid responses to questions	
	Customized services to meet consumer preference	
	Community formation space provided	

D. Perceived Risk

Perceived risk is defined as the concern about the possible unintended or negative results of purchasing online experienced by the consumer. This can be divided into three main sub-categories: product-related risk, which includes anxiety about possible economic losses and which products to purchase; social

risk, which includes anxiety about personal information disclosure and how others evaluate a product; and technological risk, which includes anxiety about a poor understanding of technology. Questions related to product-related risk, social risk, technological risk, and time loss risk (the anxiety about possible time loss) were created based on previous studies (Roselius, 1971; Kim, 1992; Ryu, 2002). A total of 15 items were measured using a seven-point Likert scale; these are summarized in Table III-4.

<Table III-4> Measurement Items of Perceived Risk

Factor	Measurement Item	References
Product Related Risk	Product quality, color, and design do not meet expectation.	Jarvenppa & Todd (1997) Tan (1999) Choi et al. (2004)
	Actual products are different from products seen on web sites.	
	Financial loss occurs due to products' performance failure.	
	Unknown defects are found.	
Social Risk	Purchase behavior is not socially acceptable.	Garbarino & Sreahilevitz (2002) Jarvenppa & Todd (1997) Kim (1992)
	Online purchase causes low evaluation of consumers.	
	Others negatively evaluate my shopping behavior due to the nature of the purchase process.	
	Others negatively evaluate my shopping behavior due to the products/services purchased.	
Time loss Risk	It takes a long time for a return or refund.	Garbarino & Sreahilevitz (2002) Jarvenppa & Todd (1997) Park (1999)
	It is difficult to exchange a product or get a refund.	
	It takes a long time to be delivered.	
	Delivery is not made at the desired time.	
Technological Risk	Anxiety about virtual sellers on the computer screen	Garbarino & Sreahilevitz (2002) Jarvenppa & Todd (1997) Park (1999)
	Security measurement tools of Internet banking to protect customers	
	ID verification capability for customer security	

E. Purchase Intention

Purchase intention is defined as the strength of a consumers' willingness to buy a product online. Because the subjects of this dissertation were consumers who had purchased products in e-commerce at least once previously, the concept of repurchase intention was included in the definition. Three questions related to purchase intention in e-commerce, Internet shopping preferences, active time investment in Internet shopping, and purchase experience were developed based on previous studies, (Jeon, 2003; Song and Lee, 2003; Yoo, 1993) and are summarized in Table III-5. As for previous items, these questions were measured using a seven-point Likert scale.

<Table III-5> Measurement Items of Purchase Intention

Factor	Measurement Item	Research
Purchase Intention	I am willing to purchase products in e-commerce if the services (events, reserved fund) suit my taste.	Jarvenpaa & Todd (1997) Jeon (2003) Song & Lee (2003) Yoo et al. (1999)
	I am willing to continue purchasing products in e-commerce.	
	I am willing to actively invest my time in e-commerce use.	

In summary, the questionnaire contained 46 questions, divided into user attributes (benefit awareness, innovativeness, product perception, skill level), flow experience, perceived quality (environmental quality, final quality,

interactive quality), perceived risk (product-related risk, social risk, time loss risk, technological risk), purchase intention, and demographic information. The questions were developed based on surveys from previous studies. Every question except demographic information used a seven-point Likert scale, ranging from one point for "not at all" to seven points for "strongly agree." Table III-6 displays the structure of the questionnaire.

<Table III-6> Questionnaire Structure

Research Variable		Questionnaire Item	Type of Measurement
1. Demographic Information		Ⅰ (Questions 1-9)	Multiple choice or short-answer questions
2. User Attributes	*Benefit Awareness*	Ⅱ-1 (Questions 1-4)	7-point Likert scale
	Innovativeness	Ⅱ-2 (Questions 5-7)	
	Product Perception	Ⅱ-3 (Questions 8-10)	
	Skill level	Ⅱ-4 (Questions 11-14)	
3. Flow Experience		III-1 (Questions 15-17)	
4. Perceived Quality	*Environmental Quality*	IV-2 (Questions 18-20)	
	Final Quality	IV-3 (Questions 21-24)	
	Interactive Quality	IV-4 (Questions 25-28)	
5. Perceived Risk	*Product related Risk*	V-1 (Questions 29-32)	
	Social Risk	V-2 (Questions 33-36)	
	Time loss Risk	V-3 (Questions 37-40)	
	Technological Risk	V-4 (Questions 41-43)	
6. Purchase Intention		VI-1 (Questions 44-46)	

IV. HYPOTHESIS TEST AND ANALYSIS

1. Data Collection and Analysis Methods

A. Data Collection

This dissertation used a questionnaire developed to analyze the factors affecting e-commerce user attributes, flow experience, perceived quality, perceived risk, and purchase intention. The subjects were those individuals who have had experience in e-commerce. Measurement variables were established based on previous studies, both domestic and international, and all measurement items used a seven-point Likert scale.

The survey was conducted from October 10, 2013 to October 30, 2013 in person, and via mail or e-mail. A total of 260 questionnaires were distributed, with 224 returned. Of these, nine were removed (seven insincere responses and two from individuals with little e-commerce experience), leaving a total of 215 questionnaires to be used in the analysis.

B. Characteristics of the Sample

The demographic characteristics of the respondents are shown in Table IV-1. There were more male respondents (61.9%) than female respondents (38.1%), and most of the respondents were in their 20s (68.9%) and 30s

(19.1%). In terms of education, the majority of the respondents had a college education, accounting for 62.3% of the sample. Most respondents were either students or working in management/administration (61.4% and 15.8%, respectively).

<Table IV-1> Demographic Characteristics of the Sample

Classification		Respondent (number)	Percentage of Sample
Gender	*Male*	133	61.9
	Female	82	38.1
Age	*10-19*	9	4.1
	20-29	148	68.9
	30-39	41	19.1
	40-49	11	5.1
	50+	6	2.8
Education	*Finished Middle School (or lower)*	0	0.0
	High School Diploma (or a current student)	25	11.6
	College Degree (or a current student)	134	62.3
	Graduate School Degree (or a current student)	56	26.1
Occupation	*Student*	132	61.4
	Management/Administration	34	15.8
	Professional	12	5.5
	Self-Employed	2	0.9
	Technical	11	5.1
	Housewife	11	5.1
	Other	13	6.1

The characteristics of e-commerce use for the respondents are displayed in Table IV-2. The most common locations of primary e-commerce use were at home (37.7%) and school or work (33.0%). The majority of respondents used e-commerce less than once or twice a week, but 26.1% used it more than 10 times a week, indicating a possible addiction to online shopping. More than half of the respondents visited online shopping sites for fewer than 3 minutes each time, and spent 5,000-10,000 won on average per month. Of the specific product categories listed (fashion/clothing, stationery, electronics, food, jewelry, or computer accessories), fashion/clothing items (19.5%) was the most commonly purchased, though almost half of the respondents (42.3%) reported that they usually bought other items not on this list.

<Table IV-2> Characteristics of e-commerce Use

Classification		Respondents (Number)	Rate (%)
Main Utilization Place	*In transportation*	37	17.2
	School/Work	71	33.0
	Home	81	37.7
	Street	14	6.5
	Other	12	5.6
Frequency of Use (week)	*Less than once*	68	31.6
	1-2 times	43	20.0
	2-5 times	31	14.4
	5-10 times	17	7.9
	More than 10 times	56	26.1
Average Use Hours	*Less than 3 minutes*	91	42.4
	3 – 5 minutes	40	18.6
	5 - 10 minutes	31	14.4
	10 - 20 minutes	34	15.8
	More than 20 minutes	19	8.8
Fees (month)	*Less than 5,000 won*	72	33.5
	5,000 – 10,000 won	42	19.5
	10,000 – 15,000 won	27	12.6
	15,000 – 20,000 won	11	5.1
	20,000- 30,000 won	21	9.8
	30,000- 40,000 won	13	6.0
	More than 40,000 won	29	13.5
Transaction	*Fashion, Clothing*	42	19.5
	Stationery	20	9.5
	Electronics	18	9.3
	Food	21	9.8
	Jewelry	10	4.5
	Computer accessories	13	6.0
	Other	91	42.3

C. Analysis Method

A frequency analysis, a reliability analysis, and a correlation analysis were performed using the SPSS 20.0 statistical package for basic analysis. SPSS

20.0 was also used for the hypothesis testing of the measurement variables.

A frequency analysis was undertaken to identify the general characteristics of the sample, and an exploratory factor analysis was conducted in order to verify the validity of measurement items. In addition, Cronbach's Alpha coefficients were calculated in order to verify the reliability of the measurement items. SPSS 20.0 and Amos 7.0 were used for hypothesis testing and structural equation modeling.

2. Evaluation of Measurement Items

A. Validity Analysis

Reliability and validity analyses were conducted in order to ensure the reliability and validity of the questionnaire used in this dissertation. Validity indicates how accurately the concepts and properties under investigation are measured; in other words, whether the data collected with the measurement tools accurately reflect the actual properties in question. There are three types of validity: content, criterion-related validity, and construct.

Content validity refers to the accuracy of the items in the measurement tool in terms of capturing the corresponding concepts; in particular, were the most representative characteristic of the target concept included in the measurement tool? *Criterion-related validity*, also known as predictive validity, refers to the degree to which the measurement of a property predicts changes in other properties. If the validity of a measurement tool is high, a strong correlation will exist between the measurement of a cause variable and other

related variables. *Construct validity* is present if a collection of measurement items designed to measure the same concept properly does so. It consists of understanding validity, focused validity, discriminant validity, and individual validity. Individual validity is often evaluated by multitrait-multimethod and factor analysis.

An exploratory factor analysis was performed in order to measure validity. In the explanatory factor analysis, a principal component analysis was conducted to extract the components for all measurement variables. For factor rotation, vari-max rotation, which operates under the assumption of independent factors, was adopted. Measurement variables were selected based on an Eigenvalue of 1 or higher and a factor loading of 0.5 or higher. A total of 46 questions were used for further analysis after the removal of four incorrectly loaded questions.

The results of the explanatory factor analysis are shown in Table IV-3. In total 13 factors were analyzed: user attributes about e-commerce (benefit awareness, innovativeness, product perception, and skill level), flow experience, perceived quality (environmental quality, final quality, and interactive quality), perceived risk (product related risk, social risk, time loss risk, and technological risk), and purchase intention. The explanatory power of total variance was 75.13% based on an Eigenvalue of 1 or higher. Thus, the 46 measurement items for the 13 factors were proved to be valid.

<Table IV-3> Exploratory Factor Analysis

Item		Factor													Reliability
		1	2	3	4	5	6	7	8	9	10	11	12	13	
Environmental Quality	SE1	-.121	.085	-.026	.108	.068	.177	-.077	.191	.156	**.646**	-.053	.363	.057	.741
	SE2	.071	-.078	.127	.039	.076	-.123	.058	.087	.108	**.791**	.156	-.099	.145	
	SE3	-.081	-.153	.271	.067	.216	.030	.010	.058	-.036	**.805**	.059	-.017	.023	
Final Quality	LO1	.130	.063	.008	-.037	**.759**	.069	.017	.210	.048	.143	.060	-.275	-.022	.820
	LO2	.071	.002	.041	-.076	**.805**	.100	.077	.070	-.013	.090	-.008	-.172	-.044	
	LO3	-.089	-.025	-.137	.112	**.728**	.021	.013	-.181	.254	.059	.007	.239	.117	
	LO4	.034	.063	.061	.027	**.849**	.028	.080	.043	.024	.054	-.026	-.004	.066	
Interactive Quality	PE1	.167	.254	.046	-.054	.010	.024	.044	**.782**	-.124	.102	-.073	-.058	.134	.777
	PE2	.045	.181	-.052	.025	-.052	.081	-.039	**.707**	.368	.081	.003	.032	.231	
	PE3	-.018	.084	.017	.126	.216	-.050	-.018	**.811**	.068	-.024	.126	.041	.103	
	PE4	.090	-.016	-.073	-.068	-.023	-.007	.111	**.676**	-.131	.188	.004	-.039	-.279	
Purchase Intention	I1	-.008	**.938**	.006	-.054	.026	.032	.138	.110	.061	-.047	.010	-.030	.061	.976
	I2	.030	**.942**	.039	-.093	.070	.016	.080	.160	.041	-.027	.010	-.038	.085	
	I3	.058	**.951**	.031	-.079	.016	.019	.113	.106	.049	-.031	.041	-.033	.066	
Product related Risk	AD1	.199	-.048	**.663**	.090	.054	.123	.004	-.088	.064	.029	.016	.159	.042	.861
	AD2	.130	.075	**.732**	.069	.025	.262	.042	.023	.156	.144	.034	.080	.177	
	AD3	.099	.111	**.842**	.197	-.046	.187	.013	-.003	.103	.083	.059	.006	.080	
	AD4	.162	-.036	**.772**	.316	-.010	.184	.033	.031	.020	.190	.111	-.065	-.062	
Social Risk	EK1	.415	-.040	.142	**.719**	-.014	.056	.013	.094	-.056	-.023	.002	-.226	.032	.902
	EK2	.291	-.008	.408	**.686**	-.047	.053	-.062	.066	-.053	-.001	.068	-.028	-.067	
	EK3	.351	-.124	.195	**.831**	.007	.080	-.020	-.046	-.073	.084	-.010	.028	-.063	
	EK4	.255	-.125	.107	**.841**	.029	.070	.019	-.044	-.010	.098	-.017	.083	.016	
Time loss Risk	TR1	**.727**	.179	.067	.246	-.027	.274	-.012	-.038	.134	.023	.131	-.132	.037	.895
	TR2	**.698**	.051	.198	.298	.048	.186	-.129	.034	.111	.013	.128	-.186	.031	
	TR3	**.802**	-.055	.053	.336	.057	.076	-.051	.111	.025	-.087	-.039	.013	.093	
	TR4	**.753**	-.047	.108	.184	.060	.235	.079	.080	.004	.014	-.043	.187	-.086	
	TR5	**.796**	.043	.230	.138	.060	.105	-.020	.085	.002	-.005	-.044	.049	-.021	
Technological Risk	IU1	.264	.012	.223	.069	.053	**.879**	.030	-.001	-.090	.024	.104	-.036	-.009	.962
	IU2	.328	.027	.236	.086	.075	**.827**	-.023	.005	-.094	.008	.050	-.061	.029	
	IU3	.194	.044	.300	.085	.105	**.856**	.014	.024	-.014	.019	.100	-.021	.005	
Benefit Awareness	C1	-.025	.033	.064	-.043	-.103	.111	**.742**	-.012	.139	.076	-.078	.151	.061	.796
	C2	-.002	.057	-.064	-.097	.068	.039	**.829**	-.040	-.013	.084	.009	.030	.025	
	C3	-.077	.148	-.061	.075	.058	.023	**.811**	.064	.000	-.069	.041	.066	.067	
	C4	.029	.092	.145	.044	.177	-.195	**.681**	.084	.005	-.043	-.070	-.084	.117	
Innovativeness	C6	-.051	-.073	.145	-.101	-.240	.005	.069	.166	.035	-.139	-.045	**.732**	-.059	.692
	C7	.248	.104	-.016	-.081	-.125	-.224	.090	-.248	-.061	.246	.238	**.534**	-.095	
	C8	-.014	-.182	.131	.053	.044	-.082	.246	-.126	-.196	.087	.209	**.532**	-.179	
Product Perception	C14	-.017	.065	.162	.073	-.005	-.056	-.072	.096	-.073	.120	**.743**	.119	.098	.715
	C15	.041	.038	-.011	-.004	-.012	.074	.039	-.001	.008	.122	**.774**	-.146	.052	
	C17	.017	-.065	.028	-.047	.033	.226	-.073	-.042	.110	-.108	**.822**	.198	-.109	
Skill Level	C21	.046	.196	.169	-.156	.122	.031	.043	-.003	**.770**	.178	-.053	-.077	.009	.778
	C22	.092	-.072	.095	-.117	-.026	-.142	.140	.101	**.686**	-.056	.068	-.385	-.032	
	C23	.029	-.029	.018	.119	.062	-.053	.006	-.027	**.859**	.056	.054	.135	.071	
	C24	.074	.211	.211	-.148	.320	-.124	-.016	.007	**.529**	.050	-.089	.062	-.431	
Flow Experience	T1	-.063	.098	.174	-.025	.036	-.089	.143	.052	-.082	.062	-.070	-.015	**.812**	.722
	T2	.090	.209	.123	-.062	.142	.188	.190	.104	.186	.426	.046	-.161	**.455**	
	T3	.172	.190	.018	-.073	.099	.091	.156	.142	.143	.268	.258	-.240	**.640**	
Eigen value		3.844	3.190	3.179	3.081	2.910	2.875	2.658	2.635	2.608	2.319	2.175	1.980	1.853	
Cumulative Variance		8.178	14.966	21.729	28.284	34.475	40.592	46.247	51.853	57.402	62.336	66.963	71.175	75.118	

B. Reliability Analysis

Reliability refers to low variance in repeated measurements of the same concept. In other words, when a subject is measured by comparable independent measurement methods, the results are similar, and thus reliability is an indication of the stability, consistency, predictability, accuracy, and dependability of the measurement tool in question. Reliability can be measured according to test-retest reliability, internal consistency reliability, split-half reliability, and parallel-forms reliability.

This dissertation used Cronbach's alpha coefficient, the most commonly used method in the field of social sciences, to test reliability. Cronbach's alpha coefficient verifies the internal consistency of a group of measurement items; the standard for high reliability using Cronbach's alpha coefficient is often at the discretion of the researcher. Cronbach's alpha coefficient should be higher than 0.6 in the field of exploratory research, 0.8 in the field of basic research, and 0.9 in the field of applied research. Kim (1992) also suggested that reliability is strong when Cronbach's alpha coefficient is higher than 0.6. As can be seen in Table IV-3, the Cronbach's alpha coefficients for all measurement items were greater than 0.7. Thus, the internal consistency of the measurement items was confirmed.

C. Confirmatory Factor Analysis

After testing the reliability of each component of the structural equation model, a confirmatory factor analysis (CFA) was performed in order to confirm the single dimensionality of each research unit. To assess the

goodness-of-fit for the structure of items in a research unit, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) were used.

(1) Confirmatory Factor Analysis: User Attributes & Flow Experience

For the confirmatory factor analysis of the user attributes and flow experience measurement model, the goodness-of-fit was x^2=439.3(df=71,p=0.000), and the GFI was 0.939, which satisfies there commended level of 0.9(Table IV-4). The AGFI, NFI, CFI, and RMSEA were 0.910, 0.880, 0.906, and 0.001, respectively. The NFI and RMSEA did not meet there commended index of 0.9, but the NFI was greater than 0.8. Because the goodness-of-fit of a model needs to be evaluated based on adiverse range of indexes, the over all fit of the proposed model was deemed acceptable for analysis. The results of the confirmatory factor analysis are shown in Table IV-4.

<Table IV-4> Confirmatory Factor Analysis: User Attributes & Flow Experience

Classification	Standardized estimate	S..E.	C..R.	AVE.
Benefit Awareness	.587			.502
	.790	.247	.6172	
	.790	.225	.6272	
	.645	.210	5.534	
Innovativeness	.748			.355
	.552	.252	3.516	
	.448	.233	3.302	
Product Perception	.898			.505
	.580	.176	4.935	
	.611	.187	5.054	
Skill Level	.846			.502
	.669	.094	5.902	
	.672	.100	6.826	
	.653	.097	6.679	
Flow Experience	.609			.519
	.594	.222	5.356	
	.913	.438	4.042	
Goodness-of- fit	(d.f.=71,p=0.000), GFI=0.939, AGFI=0.910, NFI=0.880, CFI=0.906, RMSEA=0.001			

(2) Confirmatory Factor Analysis of Perceived Quality

For the confirmatory factor analysis of the perceived quality measurement model, the goodness-of-fit was calculated to be x^2=115.521(df=41,p=0.000), with a GFI of 0.875. This was slightly lower than there commended level of 0.9. The AGFI, NFI, CFI, and RMSEA were 0.800, 0.807, 0.863, and 0.481, respectively; these were all lower than there commended level of 0.9, but AGFI, NFI, and CFI were greater than 0.8. Again, it was decided that the over all fit of the proposed model was appropriate for further analysis. The results of the confirmatory factor analysis of perceived quality are shown in

Table IV-5.

<Table IV-5> Confirmatory Factor Analysis of Perceived Quality

Classification	Standardized estimate	S..E.	C..R.	A..V..E.
Environmental Quality	.486			.553
	.727	.267	5.340	
	.946	.367	4.831	
Final Quality	.853			.552
	.814	.105	9.692	
	.515	.119	5.814	
	.743	.098	8.906	
Interactive Quality	.757			.502
	.709	.130	7.162	
	.793	.110	7.593	
	.505	.121	5.207	
Goodness-of-fit	(d.f=41, p=0.000), GFI=0.875, AGFI=0.800, NFI=0.807, CFI=0.863, RMSEA=0.481			

(3) Confirmatory Factor Analysis: Perceived Risk & Purchase Intention

The goodness-of-fit for the perceived risk and purchase intention measurement model was x^2=310.262 (df=115, p=0.000), with a GFI of 0.898, slightly lower than the recommended level of 0.9. The AGFI, NFI, CFI, and RMSEA were 0.823, 0.847, 0.920, and 0.081, respectively. They did not meet the recommended level of 0.9 except CFI; however, AGFI and NFI were greater than 0.8. As with the previous models, this proposed model was carried forward for further analysis. The results of the confirmatory factor analysis of perceived risk and purchase intention shown in Table IV-6.

<Table IV-6> Confirmatory Factor Analysis: Perceived Risk & Purchase Intention

Classification	Standardized estimate	S. E.	C..R.	A.V..E.
Product related Risk	.600			.621
	.751	.208	6.789	
	.899	.190	7.549	
	.886	.185	7.503	
Social Risk	.717			.714
	.715	.095	8.294	
	.999	.103	11.367	
	.913	.122	10.689	
Time loss Risk	.837			.615
	.810	.092	10.340	
	.718	.088	8.867	
	.767	.090	9.643	
Technological Risk	.993			.898
	.902	.038	22.116	
	.946	.032	28.959	
Purchase Intention	.952			.915
	.947	.035	28.151	
	.970	.036	27.382	
Goodness-of-fit	(d.f.=115, p=0.000), GFI=0.898, AGFI=0.823, NFI=0.847, CFI=0.920, RMSEA=0.081			

D. Correlation among Variables

A correlation analysis was conducted in order to identify the basic relationships between the factors used in this dissertation before hypothesis testing. The following criteria were applied: if the absolute value from the correlation analysis was less than 0.2, there was almost no correlation; if the absolute value was about 0.4, there was some correlation; if the absolute value was greater than 0.4, there was a significant correlation; and if the absolute

value was greater than 0.7, there was a very strong correlation. The results from the correlation analysis are shown in Table IV-7.

<Table IV-7> Correlation Analysis of Factors

	Mean	S.D.	Benefit Awareness	Innovativeness	Product Perception	Skill Level	Environmental Quality	Final Quality	Interactive Quality	Product related Risk	Social Risk	Time loss Risk	Technological Risk	Flow Experience	Purchase Intention
Benefit Awareness	3.5246	.62461	1												
Innovativeness	3.6212	9.4170	.128	1											
Product Perception	4.5631	1.05339	-.039	.138	1										
Skill Level	5.1686	1.00973	.086 (**)	-.069	-.004	1									
Environmental Quality	3.3939	1.2957	.052	.086 (**)	.172 (*)	.160 (**)	1								
Final Quality	4.5286	9.95941	.121 (**)	.189 (*)	.024	.244 (**)	.245 (**)	1							
Interactive Quality	3.9318	.94611	.085 (**)	-.097	-.045	.1051 (**)	.222 (*)	.103	1						
Product related Risk	4.9205	.97307	-.068 (**)	-.088 (**)	-.174 (*)	-.188 (*)	-.288 (**)	-.055	-.041	1					
Social Risk	4.2765	1.01245	-.048	-.005	-.053 1 (**)	-.059(**)	-.115(**)	-.025(**)	-.039(**)	.43 6(**)	1				
Time loss Risk	4.3652	.77931	-.030 (**)	-.036 (**)	-.095 1 (**)	-.103 1 (**)	-.03 8(**)	-.103	-.156	.413 (**)	.610 (**)	1			
Technological Risk	4.8182	1.20668	-.006 (**)	-.048(**)	.1681 (**)	-.038	-.085 1 (**)	-.140 1 (**)	-.059	.472 (**)	.312 (**)	.478 (**)	1		
Flow Experience	3.9066	.92950	.271 (**)	-.17 6(*)	.128	.1471 (**)	.356 (**)	.213 (*)	.263 (**)	.244 (**)	.012	.114	.159	1	
Purchase Intention	4.1515	1.28167	.216 (*)	-.081	.041 (**)	.169 (**)	-.047	.086 (**)	.290 (**)	-.052 (**)	-.135 (**)	-.065 (**)	-.06 6	.306 (**)	1

S.D. = Standard Deviation
**correlation is significant at the p=0.01 level (both sides)
* correlation is significant at the p=0.05 level (both sides)

3. Results and Hypothesis Test

A. Model Validity Test

According to the results from the validity test of the research model performed prior to hypothesis testing, χ^2 was 1607.109 (df=965, p=0.000). Since χ^2 is premised on the multi-normality of the measurement variables and is sensitive to sample size, it is not an absolute index for evaluating model validity. If the sample size is larger than 200 and the target model follows the framework of the study, χ^2 is recommended to be used as a reference index only (Lee & Joo, 2002). Structural equation models are generally evaluated based on fit indices. None of the fit indices in this dissertation – GFI (0.872), AGFI (0.833), NFI (0,861), CFI (0.827), and RMSEA (0.071) – satisfied the recommended level of 0.9, but an index of 0.8 or higher in the field of exploratory research is considered to be good in practice.

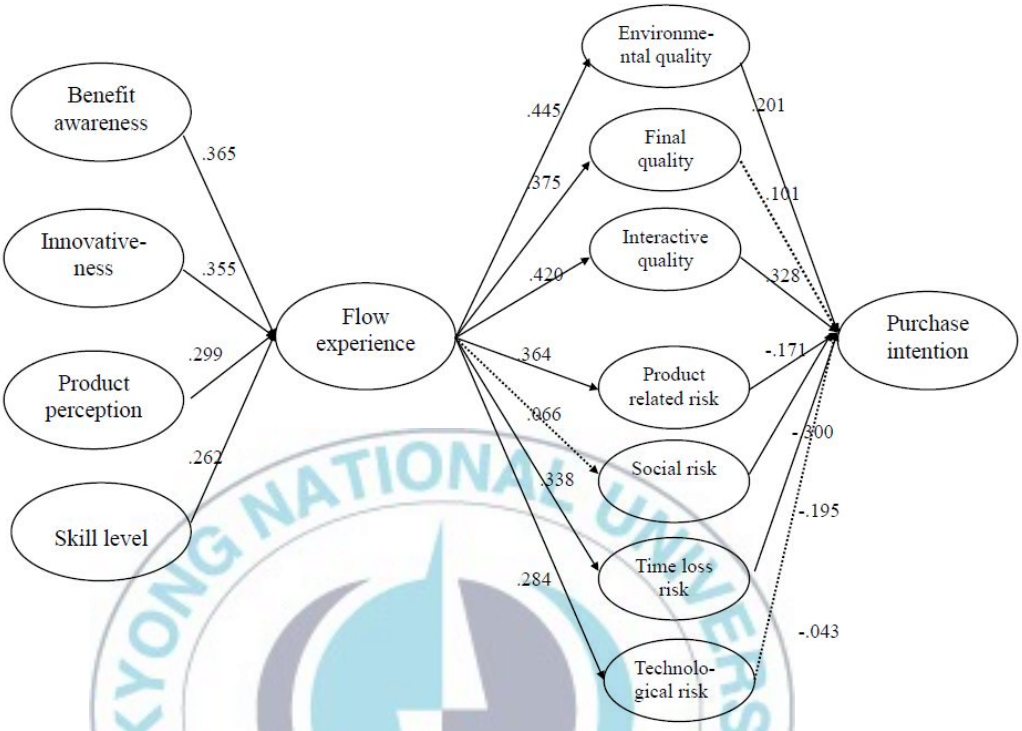
The incremental fit indices AGFI, CFI, and NFI were 0.833, 0.827, and 0.861, respectively, slightly less than the recommended level of 0.9. The simplicity fit indices PGFI and PNFI were 0.795 and 0.825, respectively, which do not meet the recommended level. Considering that this exploratory study is sensitive to sample size and model validity needs to be evaluated based on a diverse range of indices, the overall fit of the proposed model was judged reasonable for further analysis. The results of model validity test are shown in Table IV-8.

<Table IV-8> Model Validity Evaluation

Fit Index	Recommended Index	Result
χ^2	Smaller is better	1607.109
df		965
p-value	≧0.05	0.000
GFI	≧0.9(≧0.8)	.872
RMSEA	≦ 1.0	.071
AGFI	≧0.9(≧0.8)	.833
CFI	≧0.9	.827
NFI	≧0.9	.861

B. Hypothesis Testing

Support for the research hypotheses was determined through a validity test of the structural equation model for the relationship between purchase intention and user attributes, flow experience, perceived quality, and perceived risk in e-commerce. Figure IV-1 shows the hypothesis test for the research model. A solid arrow in the research model indicates support for a hypothesis, while a dotted arrow indicates the rejection of a hypothesis.



<Figure IV-1> Hypothesis Test for the Research Model

(1) User Attributes and Flow Experience

Hypotheses were formed in order to prove the relationship between user attributes and flow experience. Hypothesis 1 was, "User attributes affect flow experience in e-commerce." User attributes consisted of four components: benefit awareness, innovativeness, product perception, and skill level. The results of this analysis are shown in Table IV-9.

Hypothesis 1-1 was, "Benefit awareness affects flow experience in e-commerce." It was found that benefit awareness significantly affected flow experience (t-value = 2.691, $p < .05$).

Hypothesis 1-2 is, “Innovativeness affects flow experience in e-commerce.” It was found that innovativeness significantly affected flow experience (*t*-value = 2.250, $p < .05$).

Hypothesis 1-3 is, “Product perception affects flow experience in e-commerce.” It was found that product perception significantly affected flow experience (*t*-value = 2.289, $p < .05$).

Hypothesis 1-4 is, “Skill level affects flow experience in e-commerce.” It was found skill level significantly affected flow experience (*t*-value = 2.294, $p < .05$).

All hypotheses about the relationship between user attributes and flow experience were supported. It indicates that people become immersed in e-commerce due to user attributes, and they feel excitement and enjoyment. Similar to flow generated in recreational games, people experience flow in e-commerce. The results also meant that the factors selected as user attributes were successfully selected.

<Table IV-9> Path Coefficients of User Attributes and Flow Experience

Hypothesis	Path	Standardized Path Coefficient	S.E.	C.R.	p-value	Support
H 1-1	Benefit Awareness→ Flow Experience	.365	.163	2.691	.007	Yes
H 1-2	Innovativeness→ Flow Experience	.353	.106	2.250	.024	Yes
H 1-3	Product Perception→ Flow Experience	.293	.080	2.289	.022	Yes
H 1-4	Skill Level→ Flow Experience	.262	.047	2.249	.022	Yes

(2) Flow Experience and Perceived Quality

Hypothesis 2 was, “Flow experience affects perceived quality in e-commerce.” Perceived quality consisted of three components: environmental quality, final quality, and interactive quality. The results of this analysis are shown in Table IV-10.

Hypothesis 2-1: It was found that flow experience affected environmental quality (t-value = 2.691, $p < .05$).

Hypothesis 2-2: It was found that flow experience affected final quality (t-value = 3.015, $p < .05$).

Hypothesis 2-3: It was found that flow experience affected interactive quality (t-value = 3.168, $p < .05$).

The hypotheses regarding the relationship between flow experience and perceived quality were all supported(Table IV-10). It indicates that people are aware of the quality of products when immersed in e-commerce. In other words, people do not become immersed with unknown products. In addition, it means that the perceived quality factors were successfully selected.

<Table IV-10> Path Coefficients of Flow Experience & Perceived Quality

Hypothesis	Path	Standardized Path Coefficient	S.E.	C.R.	p-value	Support
H 1-1	Flow Experience→ Environmental Quality	.445	.234	2.961	.003	Yes
H 1-2	Flow Experience→ Final Quality	.375	.223	3.015	.003	Yes
H 1-3	Flow Experience → Interactive Quality	.420	.225	2.949	.002	Yes

(3) Flow Experience and Perceived Risk

Hypothesis 3 was, “Flow experience affects perceived risk in e-commerce.” This hypothesis consisted of four sub-hypotheses related to product-related risk, social risk, time loss risk, and technological risk. The results of this analysis are shown in Table IV-11. Except for social risk, all components of perceived risk were significantly related to flow experience.

Hypothesis 3-1: It was found that flow experience affected product related risk (t-value = 2.949, $p < .05$).

Hypothesis 3-2: It was found that flow experience did not affect social risk (t-value = .647, $p > .05$).

Hypothesis 3-3: It was found that flow experience affected time loss risk (t-value = 2.826, $p < .05$).

Hypothesis 3-4: It was found that flow experience affected technological risk (t-value = 2.610, $p < .05$).

<Table IV-11> Path Coefficients of Flow Experience and Perceived Risk

Hypothesis	Path	Standardized Path Coefficient	S.E.	C.R.	p-value	Support
H 1-1	Flow Experience → Product related Risk	.384	.164	-2.949	.003	Yes
H 1-2	Flow Experience→ Social Risk	.066	.163	-.647	.500	No
H 1-3	Flow Experience→ Time loss Risk	.338	.188	-2.826	.005	Yes
H 1-4	Flow Experience→ Technological Risk	.284	.265	-2.261	.009	Yes

(4) Perceived Quality and Purchase Intention

Hypothesis 4 is, “Perceived quality affects purchase intention in e-commerce.” This hypothesis consisted of three sub-hypotheses related to environmental quality, final quality, and interactive quality. The results of this analysis are shown in Table IV-12.

Hypothesis 4-1: It was found that environmental quality affected purchase intention in e-commerce (t-value = 2.178, $p < .05$).

Hypothesis 4-2: It was found that final quality did not affect purchase intention in e-commerce (t-value = 1.178, $p > .05$).

Hypothesis 4-3: It was found that interactive quality affected purchase intention in e-commerce (t-value = 3.572, $p < .05$).

For the relationship between perceived quality and purchase intention, it was found that all components of perceived quality except final quality significantly affected purchase intention. It means that people do not consider the result when they buy online, but rather purchase products after thorough investigation. In other words, people are unconcerned about the purchase result because they are confident about their selection process.

<Table IV-12> Path Coefficients of Perceived Quality & Purchase Intention

Hypothesis	Path	Standardized Path Coefficient	S.E.	C.R.	p-value	Support
H 1-1	Environmental Quality→ Purchase Intention	.201	.147	2.178	.029	Yes
H 1-2	Final Quality→ Purchase Intention	.101	.117	1.187	.235	No
H 1-3	Interactive Quality→ Purchase Intention	.328	.118	3.572	***	Yes

(5) Perceived Risk and Purchase Intention

Hypothesis 5 was, "Perceived risk affects purchase intention in e-commerce." This hypothesis consisted of four sub-hypotheses covering product related risk, social risk, time loss risk, and technological risk. The results of this analysis are shown in Table IV-13.

Hypothesis 5-1: It was found that product related risk affected purchase intention (t-value = 2.019, $p < .05$).

Hypothesis 5-2: It was found that social risk affected purchase intention (t-value = 3.769, $p < .05$).

Hypothesis 5-3: It was found that time loss risk affected purchase intention (t-value = -2.331, $p < .05$).

Hypothesis 5-4: It was found that technological risk affected purchase intention (t-value = -.557, $p > .05$).

Apart from technological risk, all perceived risk components significantly affected purchase intention. It indicates that people do not know the

technological aspects of the products they buy online. That is, people consider other risks before they purchase, but not technology risks.

<Table IV-13> Path Coefficients of Perceived Risk and Purchase Intention

Hypothesis	Path	Standardized Path Coefficient	S.E.	C.R.	p-value	Support
H 1-1	Product related Risk→ Purchase Intention	-.171	.167	-2.019	.044	Yes
H 1-2	Social Risk→ Purchase Intention	-.300	.118	-3.769	***	Yes
H 1-3	Time loss Risk→ Purchase Intention	-.195	.132	-2.331	.020	Yes
H 1-4	Technological Risk→ Purchase Intention	-.043	.078	-.557	.578	No

(6) Hypothesis Testing Results

The summary of hypothesis testing is as follows. Hypothesis 1, “User attributes (benefit awareness, innovativeness, product perception, and skill level) affects flow experience in e-commerce” was supported as a whole. Hypothesis 2, “Flow experience affects perceived quality (environmental quality, final quality, and interactive quality) in e-commerce” was supported as a whole. Hypothesis 3, “Flow experience affects perceived risk (product related risk, social risk, time loss risk, and technological risk) in e-commerce” was partly supported; of the sub-hypotheses, social risk was rejected. Hypothesis 4, “Perceived quality (environmental quality, final quality, and interactive quality) affects purchase intention in e-commerce” was also partly supported; final quality was rejected.

Similarly, Hypothesis 5, “Perceived risk (product related risk, social risk, time loss risk, and interactive risk) affects purchase intention in e-commerce”

was partly supported; technological risk was rejected. Therefore, Hypotheses 1 and 2 were supported as a whole, but Hypotheses 3, 4, and 5 were only partly supported. The summary of hypothesis testing is shown in Table IV-14.

<Table IV-14> Summary of Hypothesis Testing

Classification		Hypothesis	Support/ Reject
H1	H1-1	Benefit awareness affects flow experience in e-commerce.	support
	H1-2	Innovativeness affects flow experience in e-commerce.	support
	H1-3	Product perception affects flow experience in e-commerce.	support
	H1-4	Skill level affects flow experience in e-commerce.	support
H2	H2-1	Flow experience affects environmental quality in e-commerce.	support
	H2-2	Flow experience affects final quality in e-commerce.	support
	H2-3	Flow experience affects interactive quality in e-commerce.	support
H3	H3-1	Flow experience affects product related risk in e-commerce.	support
	H3-2	Flow experience affects social risk in e-commerce.	reject
	H3-3	Flow experience affects time loss risk in e-commerce.	support
	H3-4	Flow experience affects technological risk in e-commerce.	support
H4	H4-1	Environmental quality affects purchase intention in e-commerce.	support
	H4-2	Final quality affects purchase intention in e-commerce.	reject
	H4-3	Interactive quality affects purchase intention in e-commerce.	support
H5	H5-1	Product related risk affects purchase intention in e-commerce.	support
	H5-1	Social risk affects purchase intention in e-commerce.	support
	H5-1	Time loss risk affects purchase intention in e-commerce.	support
	H5-1	Technological risk affects purchase intention in e-commerce.	reject

V. CONCLUSION

1. Summary of Results

With the rapid growth of e-commerce, research has begun to look more intently at consumer behavior online. However, many e-commerce studies are simple technical exercises examining the profiles of e-commerce users and categorizing them. There needs to be a greater focus on correlations between psychological experience (flow experience), perceived quality, perceived risk, and purchase intention, all of which are elements in the process of searching for and purchasing goods online, and the relationship between these variables, decision-making behavior, and user attributes.

This dissertation examined the decision-making process for consumer purchases in e-commerce, focusing on psychological experience (flow). There were three specific objectives in this dissertation. The first investigated how user attributes – external attributes related to the search for information search – affected flow experience, an internal attribute related to the search for information. The next objective was to establish whether flow experience, perceived quality, and perceived risk affected product purchase intention. The final goal was to determine how perceived quality and perceived risk affected product purchase intention.

The primary targets of this research were students (61.4% of the total

sample) in their 20s to 30s (68.9%) who had purchased items online at least once. Less than three minutes a day was the most commonly reported duration of time spent using e-commerce sites (42.4%). Of the categories listed in the survey, the most commonly purchased products were fashion items and clothing; however, 42.3% of the survey-takers indicated that they purchased "Other" items, which indicates a variety of e-commerce uses. To analyze the data, frequency analysis, a t-test, reliability analysis, correlation analysis, factor analysis, discriminant analysis, cluster analysis, path analysis, and structural equation modeling were used.

The results are as follows. It was found that user attributes significantly affected flow experience (Hypothesis 1), and in turn, flow experience had a significant influence on perceived quality (Hypothesis 2). In addition, flow experience partly affected most sub-categories of perceived risk (Hypothesis 3), with only social risk unaffected. Purchase intention was partly influenced by two factors: all sub-categories of perceived quality except final quality (Hypothesis 4); and all categories of perceived risk apart from technical risk (Hypothesis 5). Thus, it was established that e-commerce consumers recognize flow experience, perceived quality, and perceived risk in the course of searching for information on a product and then deciding whether to purchase that product online.

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2. Contribution and Implications

A. Theoretical Implications

The results of this dissertation differed from many past empirical studies on purchase intention due to the use of a reduced purchase decision-making model. The need recognition stage was removed from the traditional purchase decision-making process (need recognition, information search, evaluation of alternatives, purchase, and post-purchase evaluation), and user attributes (an external stage) and flow experience (an internal stage) together replaced the information search stage. The post-purchase evaluation stage was removed, and the mediating effect of both the information search and the evaluation of alternatives on purchase intention/satisfaction was found. Using this model and examining user attributes, flow, perceived risk, perceived quality, and purchase intention, it was found that internal and external search factors and the evaluation of alternatives play an important role in decision making when buying online.

In terms of consumer behavior, online shoppers seek to maximize benefits and minimize risk in their product selection. While previous studies have explained online user participation using information searches, decision making, or satisfaction level, this dissertation investigated the entire decision-making process using a reduced decision-making model consisting of internal and external information searches, the evaluation of alternatives, and purchase intention. This dissertation confirms that an approach using flow and user attributes is important in conceptualizing purchase intention.

B. Practical Implications

This dissertation provides guidelines for information searches in e-commerce. The information search is a very important process where consumers compare the information they desire with the actual information available, and thus decide the utility of continuing the search. The fact that information itself can be a means of purchase online, and e-commerce itself is information, a seller, and a product should not be overlooked. In order to avoid the purchase of products based on the collection of incorrect information or due to excitement and enjoyment, unnecessary or unsatisfying information should not be used. E-commerce consumers should obtain accurate and specific information through a process of verifying information and evaluating alternatives.

3. Limitations and Future Research

The survey on which this research was based relied on the recollection of the respondents regarding their previous online shopping experiences in order to assess the consumer decision-making process. As such, their answers may not necessarily accurately reflect their individual decision-making process due to recall error or the oblivion effect. Therefore, product purchases online should be directly observed and studied in the future.

Numerous studies on the purchase intentions or satisfaction levels of consumers have been carried out, but the various factors experienced at the time of purchase need to be investigated. In addition, emotional factors affecting the consumer purchase decision-making process should be examined,

and they should be integrated into the decision-making model.

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Appendix: Questionnaire

Questionnaires on the Factors Affecting Purchase Intention in E-commerce

Hello,

Thank you for your time in completing this survey. This questionnaire has been created to collect data for the research project "User Attributes and the Factors Affecting Purchase Intention in E-commerce." This questionnaire is designed to uncover user attributes, flow experience, perceived quality, perceived risk and purchase intention factors in e-commerce.

As your responses are valuable to this research, it would be appreciated if you could complete this questionnaire as accurately as possible. Please answer all items in the survey. Your responses are anonymous, and all data collected will be used only for the purpose of this research. It takes around 8-12 minutes to fill out this questionnaire, and I will endeavor to produce a dissertation that is worthy of your time.

Thank you again for your help.

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Survey Item	Strongly disagree Average Strongly agree
Provided e-commerce contents are accurate.	① ② ③ ④ ⑤ ⑥ ⑦

Benefit Awareness	Strongly Disagree Average Strongly agree
1. E-commerce transaction saves money compared to store shopping.	①---②---③---④---⑤---⑥---⑦
2. E-commerce transaction saves time compared to store shopping.	①---②---③---④---⑤---⑥---⑦
3. There are no time constraints since I can use e-commerce any time I want.	①---②---③---④---⑤---⑥---⑦
4. I can purchase rare items difficult to find at the market.	①---②---③---④---⑤---⑥---⑦

Innovativeness	Strongly Disagree Average Strongly agree
1. I use e-commerce earlier than others do since I am curious about new sales methods.	①---②---③---④---⑤---⑥---⑦
2. I use Internet shopping earlier than others do since I know about the benefits of e-commerce.	①---②---③---④---⑤---⑥---⑦
3. I use e-commerce without the knowledge of others' experience.	①---②---③---④---⑤---⑥---⑦

Product Perception	Strongly Disagree Average Strongly agree
1. I have information about a product before purchasing in e-commerce.	①---②---③---④---⑤---⑥---⑦
2. I know about information about price before purchasing in e-commerce.	①---②---③---④---⑤---⑥---⑦
3. I have access to information about the quality of a product before purchasing in e-commerce.	①---②---③---④---⑤---⑥---⑦

Skill Level	Strongly Disagree Average Strongly agree
1. It takes me less time than others to learn how to use the Internet.	①---②---③---④---⑤---⑥---⑦
2. It is easy to find what I want in e-commerce.	①---②---③---④---⑤---⑥---⑦
3. I am active in learning new Internet skills.	①---②---③---④---⑤---⑥---⑦
4. I can use nternet functions easily due to my Internet skills.	①---②---③---④---⑤---⑥---⑦

Flow Experience	Strongly Disagree Average Strongly agree
1. I feel stimulated while using e-commerce.	①---②---③---④---⑤---⑥---⑦
2. I concentrate while using e-commerce.	①---②---③---④---⑤---⑥---⑦
3. I forget about other things while using e-commerce.	①---②---③---④---⑤---⑥---⑦

Environmental Quality	Not important Average Very important
1. Overall atmosphere or harmony	①---②---③---④---⑤---⑥---⑦
2. Neat and clean visual effect	①---②---③---④---⑤---⑥---⑦
3. Ease of movement	①---②---③---④---⑤---⑥---⑦

Final Quality	Not important Average Very important
1. Consistency between the delivered product and the ordered product	①---②---③---④---⑤---⑥---⑦
2. Non-breakage during the delivery process	①---②---③---④---⑤---⑥---⑦
3. Various payment methods	①---②---③---④---⑤---⑥---⑦
4. Nice A/S	①---②---③---④---⑤---⑥---⑦

Interactive Quality	Not important Average Very important
1. Various contact methods	①---②---③---④---⑤---⑥---⑦
2. Quick responses to questions asked	①---②---③---④---⑤---⑥---⑦
3. Customized services which meet my preference	①---②---③---④---⑤---⑥---⑦
4. Providing information that I want to know	①---②---③---④---⑤---⑥---⑦

Product-Related Risk	Not important Average Very important
1. Product quality, color, and design do not satisfy my expectation.	①---②---③---④---⑤---⑥---⑦
2. There is a discrepancy between products on web sites and actual products.	①---②---③---④---⑤---⑥---⑦
3. Financial loss occurs due to unsatisfactory production function.	①---②---③---④---⑤---⑥---⑦
4. Previously unknown flaws are found.	①---②---③---④---⑤---⑥---⑦

Social Risk	Not important Average Very important
1. Purchase behavioris not socially acceptable.	①---②---③---④---⑤---⑥---⑦
2. Online shopping lowers my self-evaluation	①---②---③---④---⑤---⑥---⑦
3. People negatively evaluate my shopping behavior due to my decision-making style (short decision-making time).	①---②---③---④---⑤---⑥---⑦
4. People negatively evaluate my shopping behavior due to purchased products/services.	①---②---③---④---⑤---⑥---⑦

Time-Loss Risk	Not important Average Very important
1. It takes long time to exchange or refund products.	①---②---③---④---⑤---⑥---⑦
2. It is hard to exchange or refund products.	①---②---③---④---⑤---⑥---⑦
3. It takes long time to receive products.	①---②---③---④---⑤---⑥---⑦
4. Products are not delivered at the desired time.	①---②---③---④---⑤---⑥---⑦

Technological Risk	Not important Average Very important
1. Anxiety about the virtual seller	①---②---③---④---⑤---⑥---⑦
2. Security tools for customer protection.	①---②---③---④---⑤---⑥---⑦
3. ID verification capability for customer protection	①---②---③---④---⑤---⑥---⑦

Purchase Intention	Strongly Disagree Average Strongly agree
1. I am willing to purchase in e-commerce if the service policy (events, reserved money) is good.	①---②---③---④---⑤---⑥---⑦
2. I will shop at the best shopping mall through a comparative analysis of e-commerce whenever I shop.	①---②---③---④---⑤---⑥---⑦
3. I am willing to purchase in e-commerce in the future.	①---②---③---④---⑤---⑥---⑦