Aalto University
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Uncertainty as a Determinant of Consumers' Searching Pattern and Its Impact on Satisfaction

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Abstract

Purpose – Several studies found negative relationship of uncertainty and consumers' perceived satisfaction. The purpose of this study was to find out whether various search behaviors of consumers are related to uncertainties and able to moderate the relationship between uncertainties and satisfaction.

Design/methodology/approach – A comprehensive model of consumer uncertainty, search behavior and satisfaction is developed using general decision making framework and previous literature study. A set of hypotheses are offered and survey data was collected and tested using several quantitative data analysis tools within SPSS.

Findings –It was found that consumers' uncertainty at different stages of their decision making process influences their choice of search behavior; however, no significant difference within parallel and iterative searching process was found. Search behavior had very little or no significant impact in moderating negative relationship between consumers' uncertainty and perceived satisfaction.

Research limitations– The data were collected from customers of Finland who are technologically advanced, which somewhat limits the generalizability of the findings. Furthermore, the data are collected some years ago and one must be careful in reasoning our findings to present online travel purchase.

Managerial implications – It will help tourism marketers and developers of decision support system (DSS) to better understand the consumers' decision making process. Therefore, the finding can help managers to identify uncertainties of consumers' decision making process and reduce them by providing appropriate information and capabilities.

Keywords decision-making, uncertainty, search behavior, satisfaction

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List of abbreviations

Abbreviation	Meaning
DSS	Decision Support System
ICTs	Information and Communication Technologies
KU	Knowledge Uncertainty
EU	Evaluation Uncertainty
CU	Choice Uncertainty
IU	Implementation Uncertainty
PCKU	Principal Component of Knowledge Uncertainties
PCEU	Principal Component of Evaluation Uncertainties
PCCU	Principal Component of Choice Uncertainties
PCIU	Principal Component of Implementation Uncertainties
PCK	Product Category Knowledge
BK	Brand Knowledge
MCAR	Missing Completely At Random
MAR	Missing At Random
MNAR	Missing Not At Random
MANOVA	Multivariate Analysis of Variance
ANOVA	Analysis of Variance

Chapter 1: Introduction

1.1 Relevance of the study

Information search is an essential part of the purchase decision process. With the rapid development of information technology, information search is becoming increasingly important to consumers and marketers (Kulviwat;Guo;& Engchanil, 2004; Chiang;King;& Nguyen, 2012; Fodness & Murray, 1997; Kambele;Li;& Zhou, 2015; Moorthy;Ratchford;& Talukdar, 1997). The consumer oriented market place making it essential for the marketers to play significant roles in consumer's decision making process along with offering products. Consumers search for information to decide what, where, and how to purchase and to reduce purchase related uncertainties. Although decision-making styles for traditional offline shopping were tested in many studies (Mitchell & Walsh, 2004; Tai, 2005; Mokhlis, 2009; Wang;Siu;& Hui, 2004), decision-making styles have not been widely studied in the online context (Cowart & Goldsmith, 2007; Park & Gretzel, 2010; Sam & Chatwin, 2015). Therefore, it needs to be studied intensively. In this study, the procedure of consumers' online purchasing was described as a search and decision making process. A conceptual framework was developed using Simon's decision making model (Simon, 1960) and related it to the uncertainty dimensions introduced by Urbany et al. (Urbany;Dickson;& Wilkie, 1989).

Information searching process is, especially, important for travel decision making (Kah & Lee, 2015; Standing;Taye;& Boyer, 2014; Amaro & Duarte, 2013; Gursoy & McCleary, 2004; Xu;Morgan;& Song, 2009). Consumers search for travel information to make selection decisions on destination, transportation, accommodation, meals, and entertainments, they seek consistent information through different channels: travel agencies, friends and relatives, the Internet, newspapers and magazines, airline companies, and commercial advertisements. Therefore, travel information search is very important point of concern for travel marketers (Jang, 2004; Amaro & Duarte, 2013; Chiang;King;& Nguyen, 2012; Luo;Feng;& Cai, 2004). Despite the importance, little attention has been given to online information search behavior of the travel and tourism field (Jang, 2004). In this study, consumers' online travel data was used to identify the relationship between the uncertainties and information search.

The outcomes of this study can be useful to a range of fields. It is not only a point of interest to marketers or researchers working with consumer behavior (Chiang;King;& Nguyen, 2012; Bettman, 1979; Dey & Sarma, 2010; Jang, 2004; Kambele;Li;& Zhou, 2015), but also can be helpful for travel researchers and user interface designers or researchers of Decision Support System (DSS) to reduce uncertainties at different stage of decision making (Kohli;Devaraj;& Mahmood, 2004; Häubl & Trifts, 2000; Kuo;Hu;& Yang, 2013). In a competitive market place, marketers always attempt to recognize the underlying rationale of consumers' decisions, so that marketers can efficiently identify their prospective customers, communicate to them, and persuade them to purchase their products and services. Again, from the travelers' viewpoint, information search is an effective tool as a mean of reducing uncertainties and perceived risks (Urbany J. , 1986; Urbany;Dickson;& Wilkie, 1989). It also enables travelers to enhance the quality of a trip with reduced uncertainty (Fodness & Murray, 1997). Online consumers will be better served when the marketers and DSS providers understand how consumers make their decisions, and then provide appropriate information and capabilities to support the process. Kohli, et al. (2004) claimed that the number of studies conducted to reduce the online shopping uncertainties and risks does not meet the demand of increasing awareness of risks associated with the online shopping (Kohli;Devaraj;& Mahmood, 2004). According to Bhatnagar and Ghose (2004), consumers were more concerned about attributes of websites associated with perceived uncertainty (*e.g.*, security of information and vendor reliability) than those associated with perceived gains (*e.g.*, convenience), which underlies the importance of reducing online shopping uncertainty and risks (Bhatnagar & Ghose, 2004).

Previous studies have proposed different ways to provide assurance by reducing uncertainties. Mauldin and Arunachalam (2002) claimed that a third-party service can improve the reliability of specific information provided on a website to help instill consumer confidence in an online retailer, and can ultimately increase consumers' intention of purchasing online. However, they believe that a higher level of purchasing intention was only generated within consumers when they did not observe retailer disclosures and their familiarity with products was low (Mauldin & Arunachalam, 2002). Huang, et al. (2004) suggested to manipulate product brand names (Huang;Schrank;& Dubinsky, 2004), whereas Ruyter, et al. (2001) suggested to improve organizational reputation, which is able to trade off the effect of perceived risks on consumer shopping attitude and behavior. They claimed that when an online retailer has a good reputation, even if risks are high, consumers still have

confidence in online transactions (Ruyter;Wetzels;& Kleijnen, 2001). However, it may take a long time for the above approach to become effective. Therefore, other effective approaches should be explored in future research.

Klein, et al. (2004) mentioned that the consumers` ability-to-choose is significantly influenced by the amount and quality of information available. The fairly complete information on multiple alternatives promotes attribute based decision strategies, on the other hand, the low quality or missing information may force consumers to make inferences and to resort to decision strategies that require less complete information, such as brand based choice. The amount and quality of information are positively related to decision quality (Klein;Köhne;& Öörni, 2004). Thus, the utilization of right amount and quality of information at right place can considerably influence decision quality of consumers by reducing uncertainty.

The study of Urbany, et al. (1989) was very relevant to this study where the authors investigated the relationship between consumer uncertainty and information search based on a nationwide survey of appliance purchasers. They found that choice uncertainty appeared to increase search, but knowledge uncertainty had a weaker, negative effect on search (Urbany;Dickson;& Wilkie, 1989). Shiu, et al. (2011) developed, conceptualized, and operationalized a new dimension of evaluation uncertainty in response to Urbany, et al. (1989) proposed knowledge and evaluation uncertainty (Shiu;Walsh;Hassan;& Shaw, 2011). Niinivaaraand her colleagues (2008) also studied the relationship within uncertainty and search behavior and reported significant relationship within them determined by search outcomes (measured by time and purchased price). They also found no significant dependence of search on the uncertainties of the task. In this study, the relationship was examined in terms of search pattern prioritizing on the moderating impact of search types to increase/decrease consumer´s perceived satisfaction by reducing level of uncertainty (Niinivaara;Saarinen;Sunikka;& Öörni, 2008).

1.2 Research objective and research questions

Along with the tremendous growth of business-to-consumer (B2C) online shopping, e-commerce channel providers will need to explore ways to anticipate consumers' needs and uncertainties to deliver an efficient shopping experience. The consumers' decision-making process and its relationship with perceived uncertainty as well as search process are not well understood yet. The relationship was tested in this study using Simon's decision-making

model and impact of this relationship on consumers' perceived satisfaction was also examined by collecting survey data of 2000 Finnish online travel consumers. Simon's model was also extended by including implementation phase; consumer´s perceived uncertainties at each stage as well as their satisfaction where information search will play the role of moderator. The tourism sector is an information- rich industry because its products and services are mostly intangible and cannot be evaluated before purchase (Fodness & Murray, 1997; Zhou, 2004). Travelers rely on information to make vacation decisions, and getting appropriate, detailed, and accessible travel information. Understanding consumer´s travel information search behavior can help marketers in making better decisions by optimizing where and how to allocate their limited marketing budgets, thereby ensuring well spent marketing dollars. Several previous research indicated information search as the first step of consumers' decision making process (Farahani;Mohamed;& Som, 2011; Kambele;Li;& Zhou, 2015). Our purpose is to find out whether there is any moderating effect of search behavior on the relationship between consumers' perceived uncertainty (at different stages of consumers decision making process) and customers´ satisfaction in online context.
Our research questions are stated as follow:

1) How are uncertainties at different stages of consumers' decision making process involved in their search behavior?
2) What is the ultimate relationship among satisfaction, search behavior and uncertainties?

1.3 Research outline

In order to find out answers of research questions, a literature review was done to accumulate the relevant information and to better understand uncertainties in different stages of consumer's decision making process and search behavior. Based on the literature review, a conceptual framework and a set of hypotheses were developed to examine how uncertainties at different stage of consumer's decision making process are related with the searching types. The impact of searching behavior as a moderator of negative relationship between the uncertainties and perceived satisfaction was also examined. Survey data on 2000 Finnish speaking adults (18 and over) from the mainland Finland was collected to test the hypothesized relationships. Afterward, survey data was analyzed using various quantitative methods to test the hypotheses.

Thus, this thesis is divided into six chapters. First chapter introduced a brief background and motivation of this study. It also gives guidelines in the form of research questions to lead this study forward. Second chapter includes a literature review to build understanding on the topic. The hypotheses are developed in this chapter. Materials and methods are introduced in the third chapter. Fourth chapter consists of data analysis. The findings of this study are presented in the fifth chapter. Limitations and suggestions for future research are also discussed in this chapter. Finally, a conclusion was added in the sixth chapter summarizing the findings of this study.

Chapter 2: Literature review and hypothesis development

2.1 Uncertainty

2.1.1 Concept review

According to the Oxford English dictionary, the word “uncertainty” means not known or definite or unreliability or riskiness, although the terms uncertainty is used in various ways in different fields of study (Einhorn & Hogarth, 1981; Urbany J. , 1986; Moorthy;Ratchford;& Talukdar, 1997; Stigler, 1961). In consumer behavior literature, it is explained as individual`s lack of control over how future is going to unfold. According to uncertainty reduction theory (Berger & Calabrese, 1975), there are two types of uncertainty that a person will feel – cognitive uncertainty and behavioral uncertainty. This theory explains that when interacting, people need information about the other party in order to reduce uncertainty in order to ensure better predictability. Again, Urbany defined uncertainty in a study related with economics of information as “the amount of information the buyer brings to the search process” (Urbany J. , 1986). Refsgaard (2007) defined uncertainty from management points of view that uncertainty is the lack of exact knowledge; regardless of what is the cause of this deficiency (Refsgaard;van der Sluijs;Højberg;& Vanrolleghem, 2007). Moreover, Quintal, et al. (2009) has clarified the difference between risk and uncertainty by the probabilities of their outcomes. Risk will exist in a decision when the probabilities of outcomes are known, while uncertainty will exist when the probabilities of outcomes are not known (Quintal;Lee;& Soutar, 2009)

2.1.2 Uncertainty in online context and it´s dimensions

Uncertainty has been studied in many contexts, such as decision making, choice behavior, information search and human judgment (Urbany J. , 1986; Urbany;Dickson;& Wilkie, 1989; Shiu;Walsh;Hassan;& Shaw, 2011; Niinivaara, Uncertainty is the Other Side of the Coin of Information Online Search, 2010). Pavlou, et al. (2005) claimed that there are three key sources of uncertainties in online context that prevent the adoption of B2C e-commerce by consumers: information asymmetry (created by spatial and temporal separation between buyers and sellers in online context), seller opportunism (product uncertainty and seller quality uncertainty), and information privacy concerns (generated from concerns about the reliability of the Internet infrastructure) (Pavlou;Liang;& Xue, 2005).

Consumer´s decision making generally produces some consequences that cannot be anticipated with certainty, especially in online context and some of these consequences can be unpleasant, which lead to psychological discomfort. In their pre-purchase evaluation of product/service in online, consumers often experience uncertainty as they think about the probabilities that something might go wrong or perform less than expected and thus uncertainty is an indispensable part of online purchase process. The term "uncertainty" was defined in different ways in different context and by different authors. Pfeffer and Salancik (1978) have defined uncertainty in their book as the degree to which the future states of the environment cannot be accurately anticipated or predicted due to imperfect information (Pfeffer & Salancik, 1978).

Shiu, et al. (2011) defined consumer uncertainty as a condition where the information available deviates from the consumer's ideal information state (Shiu;Walsh;Hassan;& Shaw, 2011). In developing two-dimensional consumer uncertainty scale, Urbany, Dickson, and Wilkie (1989) conducted a survey to explore the dimensions of uncertainty and demonstrate a differential impact of the two uncertainty dimensions on consumer information search behavior in the context of the purchase of domestic appliances (Urbany;Dickson;& Wilkie, 1989) and Shiu, et al. (2011) found it as multi-dimensional – Knowledge uncertainty, evaluation uncertainty and choice uncertainty (Shiu;Walsh;Hassan;& Shaw, 2011), whereas some other studies on consumer uncertainty have treated uncertainty as a unidimensional construct (Koufteros;Vonderembse;& Jayaram, 2005). Niinivaara explained uncertainty as four dimensional construct (Niinivaara, Uncertainty is the Other Side of the Coin of Information Online Search, 2010). Similarly in this study, uncertainty was considered as a four dimensional construct.

Knowledge uncertainty: According to Urbany, et al. (1989), Knowledge Uncertainty (KU) may arise from a lack of genuine information about alternative choices and/or uncertainty over what decision rules are relevant. KU may also be related to uncertainty over how to acquire the necessary information to make a choice (Urbany;Dickson;& Wilkie, 1989). Shiu, et al. (2011) explained that KU is related with the degree of confidence individuals have in their understanding of salient information, features, functionality, and utilities regarding the product under consideration (Shiu;Walsh;Hassan;& Shaw, 2011). Thus, KU is related with not having enough information to make the decision statement.

Evaluation uncertainty: Urbany, et al. (1989) defined it as uncertainty about how to accumulate the information available to form judgments about brands (Urbany;Dickson;& Wilkie, 1989). According to Shiu, et al. (2011), Evaluation uncertainty relates to the application of knowledge in differentiating and evaluating alternatives across products/brands (Shiu;Walsh;Hassan;& Shaw, 2011).

Choice uncertainty: Urbany, et al. (1989) described it as uncertainty regarding which alternative to choose and might arise either from a high level of ignorance about the product or the marketplace, or from a relatively well-informed base of knowledge that suggests that there may be yet undiscovered alternatives (Urbany;Dickson;& Wilkie, 1989). Chorus, et al. (2010) made a study to conceptualize travelers' choice behavior when confronted with a number of uncertain travel alternatives as well as a number of travel information options and found that travelers prefer information that adds previously unknown alternatives to their choice set rather than information that provides estimates for uncertain attributes of known alternatives (Chorus;Walker;& Ben-Akiva, 2010).

Implementation uncertainty: According to Niinivaara (2010), Implementation uncertainty (IU) means uncertainty about fulfilment of purchase (Niinivaara, Uncertainty is the Other Side of the Coin of Information Online Search, 2010). This uncertainty is especially relevant in online purchase context because of its immaterial nature. In this study, IU was considered as uncertainty regarding getting to the store which selling preferred travels, whether chosen travel would be available at a particular time, whether preferred seats will be available, whether buying the travel would be problem free, whether buying will be possible at announced price or whether chosen travel will be as promised.

Kah and Lee (2015) have recently found that consumers who use information technology change their intended behaviors, while those who use 'traditional' information sources actualize their intended behaviors. Therefore, use of right promotional message to target consumers can ensure presence of existing consumers and can persuade travelers who are at a destination even though such travelers do not have the intention to purchase his/her products/ services over those of competitors (Kah & Lee, 2015).

Many previous researches have concluded that one reason consumers search for information prior to purchase is to reduce their uncertainty about the decision to a tolerable level (Beatty & Smith, 1987; Shiu;Walsh;Hassan;& Shaw, 2011). In online context,

consumers will either proceed with the decision-making process and make a purchase decision or search for information to reduce their uncertainty to a tolerable level. Therefore, the level of information search prompted by uncertainty is likely to vary depending on the type of perceived uncertainty.

2.1.3 Decision making framework for studying uncertainty

The process of consumers' decision making involves a considerable amount of uncertainty which may be generated from lack of knowledge about all of the available options, may be unable to identify the quality of each option, or lack of reasonable information. A consumer decision-making style can be defined as a mental orientation describing how a consumer makes choices. In order to keep pace with the rapid development of e-commerce activities, it is necessary for marketers and advertisers to profile online consumers' decision-making styles that influence the willingness of online consumers to purchase products (Sam & Chatwin, 2015).

Many fields of study have given a lot of attention to the relationship between uncertainty and information search (Wilson;Ford;Ellis;Foster;& Spink, 2002; Guo, 2001; Niinivaara;Saarinen;Sunikka;& Öörni, 2008; Kohli;Devaraj;& Mahmood, 2004). Decision making process of consumers is often complicated and many different theories may involve with it. Several perceptions on consumer decision making have been considered in the previous literature (Dewey, 1910; Foxall, 2005; Kotler P. ;Armstrong,;Saunders;& Wong, 2001; Simon, 1960). The perceptions of decision making and uncertainty have been discussed since the early 20th century, when John Dewey (Dewey, 1910) had recognized uncertainty as the necessary precondition and often a constraint of choice. Dewey (1910) mentioned this concept in his book as "Unless there is something doubtful, the situation is read off at a glance; it is taken in on sight, *i.e.* there is merely apprehension, perception, recognition, not judgment." Dewey's formulation of the problem solving process in five logically distinct steps, was among the first frameworks for investigating the individual decision making - "(1) a felt difficulty, (2) its location and definition, (3) suggestion of possible solution, (4) development by reasoning of the bearings of the suggestion, and (5) further observation and experiment leading to its acceptance or rejection; that is the conclusion of belief or disbelief."

The five stage buying decision making model developed by Kotler, consisting of (1) problem recognition, (2) information search, (3) evaluation of alternatives, (4) purchase

decision and (5) post-purchase behavior, is often used in marketing literature (Kotler, Marketing Management, 2000). Many consumer behavior researchers were heavily influenced by John Dewey, who has elaborated his basic scheme and suggested that the consumer as a decision maker undergoes several cognitive stages during the purchase process. Foxall (2005) have summarized such information processing models in his book which is given in the Table 1 below (Foxall, 2005):

Table 1 : Some Information Processing Depictions of Consumer Choice

Author(s)	Year	Sequence
Starch	1925	Seeing " Reading " Believing " Remembering " Acting
Strong	1925	Awareness " Interest " Desire " Action
Lionberger, Rogers	1960 1962	Awareness " Interest " Evaluation " Trial " Adoption
Colley	1961	Unawareness " Awareness " Comprehension " Conviction " Action
Lavidge and Steiner	1961	Awareness " Knowledge " Liking " Preference " Conviction " Purchase (*i.e.* cognition " affect " conation)
McGuire	1969	Exposure " Attention " Comprehension " Yielding " Retention " behaviour
Howard and Sheth	1969	Attention " Brand Comprehension " Attitude " Intention " Purchase
Rogers and Shoemaker	1971	Knowledge " Persuasion " Decision " Confirmation
McGuire	1976	Exposure " Perception " Comprehension " Agreement " Retention " Retrieval " Decision making " Action
Engel, Blackwell and Kollat	1978	Perceived information " Problem recognition " Search ["] Evaluation of Alternatives " Beliefs " Attitudes " Intentions " Choice
Britt	1978	Exposing " Attending " Perceiving " Learning and Remembering " Motivating " Persuading " Desired Action
Foxall and Goldsmith	1994	Environment " Attentional and perceptual filter " Interpretation (involving experiences, beliefs, attitudes and goals held in short and long term memory) " Brand beliefs " Brand attitudes " Brand purchase intentions " Response
Rossiter and Percy	1997	Need arousal " Information and evaluation " Purchase " Usage

Source: (Foxall, 2005)

It is understandable from Table 1 that different stages of decision making and purchase process are mixed in many of these information processing models and have been regularly criticized for not being testable. As this consumer information processing models tend to incorporate much more information than is necessary for the analysis of this study

which complicates their verification and usage, consequently a more reasonable model of decision making was tried to found out for this study.

Rather than explaining the notion of decision making as a sequence of decomposed stages to meet a solution like John Dewey (1910), Herbert Simon (1960) established the dominant model of the decision-making process as a three phase "intelligence-design-choice" sequence (Simon, 1960; Dewey, 1910), which was later supplemented with a fourth stage of “implementation” as many authors felt it significant enough to be shown separately (Sprague & Carlson, 1982). According to Simon (1960), decision making process starts with intelligence phase where the decision makers identify the available alternate strategies. He finds, gets, processes, and examines raw data for hints that may identify problems with the strategies. In the design phase the decision makers determine and evaluate the consequences of all the alternative strategies and evaluate these sets of consequences although it is often impossible for the decision makers to identify all of the alternatives, or their consequences. Choice phase of decision making is about choosing strategy and in the implementation phase decision maker puts the chosen strategy to use (Simon, 1960).

In order to choose among these decision making models, their content was examined. Simon’s model seemed most suitable for our study as it is a description of general decision making process. Other consumers’ purchase or information processing models mostly attempt to capture the sequence of acts in purchase process rather than focus on the distinctive stages of decision making. Simon´s model indirectly holds the concept of uncertainty as the precondition for bounded rational decision behavior. The stages of the model also closely match the dimensions of uncertainty which were identified through the review of consumer behavior literature. The aim of this study is to identify the general dimensions of uncertainty facing consumers in any purchase of their decision making process to link it with search behavior and satisfaction. Therefore, it seemed that the model of decision-making process introduced by Simon best fits with our goal. Simon´s decision making model suggests that four logically distinct dimensions can be identified in any decision and each with a related uncertainty. Moreover, Kohli et al. (2004) also used Simon’s model when studying consumer decision making which demonstrating its prospect for our purposes as well (Kohli;Devaraj;& Mahmood, 2004). A measurement instrument was developed and tested for testing the four dimensional uncertainty construct in consumer decision context.

In brief, the aim of this thesis was to model the structure of consumer decisions related uncertainty from the decision making perspective and relate it with search behavior and perceived satisfaction and a theoretically coherent framework was searched for it. The classical three phase (Intelligence, Design, and Choice) decision process model originally proposed by Herbert Simon (1960) was chosen for this purpose and later completed by Sprague and Carlson (1982) with the Implementation phase, to identify the salient dimensions of uncertainty and to test for their relevance in consumer pre-purchase behavior (Sprague & Carlson, 1982). Corresponding with phases of decision making, four dimensions of uncertainty were offered in this study: Intelligence = Knowledge Uncertainty, Design = Evaluation Uncertainty, Choice = Choice Uncertainty and Implementation = Implementation Uncertainty. Those four dimensions are major determinants of total uncertainty related to consumers' pre-purchase decision process. The details of Simon (1960)'s decision making model is given below:

2.1.4 Simon`s decision making model

Herbert Simon was one of the most important researchers in the field of behavioral studies in human decision making, and indeed all his research enhanced our understanding of this phenomenon. Simon (1960) explained decision-making with distinct stages. Again, Newell and Simon (1972) provided a framework (Means-ends problem solving) for understanding problem solving that can provide the needed bridge between learning and performance (Newell & Simon, 1972). Simon´s model of decision-making has three stages: intelligence, design, and choice (Simon, 1960).

The Intelligence Phase: The intelligence phase consists of finding, identifying, and formulating the problem or situation that needs a decision. This phase is explained as deciding what to decide (Niinivaara, 2010; Simon, 1960; Urbany;Dickson;& Wilkie, 1989). The intelligence stage may involve, for example, identifying needs of traveling. This is the first step towards the decision-making process and the end result of this phase is a decision statement. Simon borrowed the term "intelligence" which can be confusing, from its military meaning, which involves the gathering of information without necessarily knowing what it will lead to in terms of decisions to be made. In making any decision, we often need to collect a great deal of information before we realize that a decision is called for. In intelligence phase of decision making, contribution of *Knowledge uncertainty* is seen which indicates uncertainty regarding lack of genuine information about alternative choices.

The Design Phase: In the design phase, we develop alternatives strategies for solution and evaluate them. This phase may involve a great deal of research into the available options and need to keep in mind objectives for the decision we are to make (Niinivaara, 2010; Urbany;Dickson;& Wilkie, 1989). Each alternative solution is evaluated after gathering data about the solution and identifying and evaluating the positive and negative aspects of each solution. Quantitative tools and models are often used to arrive at these solutions. Sometimes, a lot of creativity and innovation is required to design solutions which are outlines of actual solutions and are meant for analysis of their suitability. *Evaluation Uncertainty* can contribute in design phase of decision making as it indicate uncertainty regarding how to evaluate and integrate the information available to form judgments about brands or alternatives.

The Choice Phase: In the choice phase of Simon´s decision making theory, consumers evaluate the alternatives that they developed in the design phase and choose one of them. This phase ends with a decision that consumers can carry out. In this phase, consumers choose a particular course of action from the available ones. Consumers may face with a large number of alternatives to choose from and may need to deal with a large amount of information available from many sources (Niinivaara, 2010; Urbany;Dickson;& Wilkie, 1989). Choice of an alternative may not be as easy as it sounds because each solution presents some consequences and the problem itself may have multiple objectives making the choice process a very difficult one. Again, uncertainty related with outcomes and scenarios make the choice of a single solution difficult. In choice phase of decision making one can see contribution of *Choice Uncertainty*, as it indicates consumer's perceived uncertainty regarding which alternative to choose.

Implementation Phase: Implementation phase is important in online purchasing because of immaterial character of purchase (Niinivaara, 2010). In this implementation phase of decision making, one can see contribution of *Implementation Uncertainty* which is a new concept and especially relevant in online purchase context.

2.2 Search behavior or types

2.2.1 Concept review and travel searching

One needs to look at the buying process from consumer´s perspective, in order to understand what a manager must do to convert online searchers into online buyers. Information search is

one of the most important parts of most consumers' decision making process. Jang (2004) claimed that there were a few generally accepted views on information search behavior (Jang, 2004). Zeng and Reinartz (2003) have defined search as the process of accessing sources of information and becoming aware of product alternative (Zeng & Reinartz, 2003). Bettman (1979) had explained information search in two phases, internal and external search. Internal search refers to the acquisition of information that is available in memory, whereas external search is the acquisition of information from sources outside of memory, such as friends, advertisements, magazines, internet and so forth (Bettman, 1979). An enduring interest in consumer behavior is the investigation of external pre-purchase information search (Guo, 2001). Beatty and Smith (1987) defined "external search" as the degree of attention, perception, and effort directed toward obtaining environmental data or information related to the specific purchase under consideration (Beatty & Smith, 1987). The Internet is now source of a huge amount of information which essentially represents the "external memory" for many people. For travel searching, an unimaginable amount of information has been made available through different destination portals and distribution channels, online travel agencies, and travel-specific search engines (*e.g.*, Kayak) for promotional and transaction-related purposes (Xiang;Wang;O'Leary;& Fesenmaier, 2015). Grant et al. (2007) propose that online search as a process is not well understood and call for further research (Grant;Clarke;& Kyriazis, 2007) and in their paper they identify and review a series of factors that affect online search behavior. Xiang, et al. (2015) found a number of key trends in travelers' use of the internet and suggest that there is a growing "bifurcation" between traditional online travelers, that is, those who use the Internet for standard travel products and those who are beginning to adopt alternative channels and products in search of deeper and more authentic experiences. They provided a summarized picture of sequential development of internet in the field of technology, e-commerce and social media as well as in tourism and hospitality industry from 1995-2015 (Xiang;Wang;O'Leary;& Fesenmaier, 2015) which is presented in **Figure 1** below:

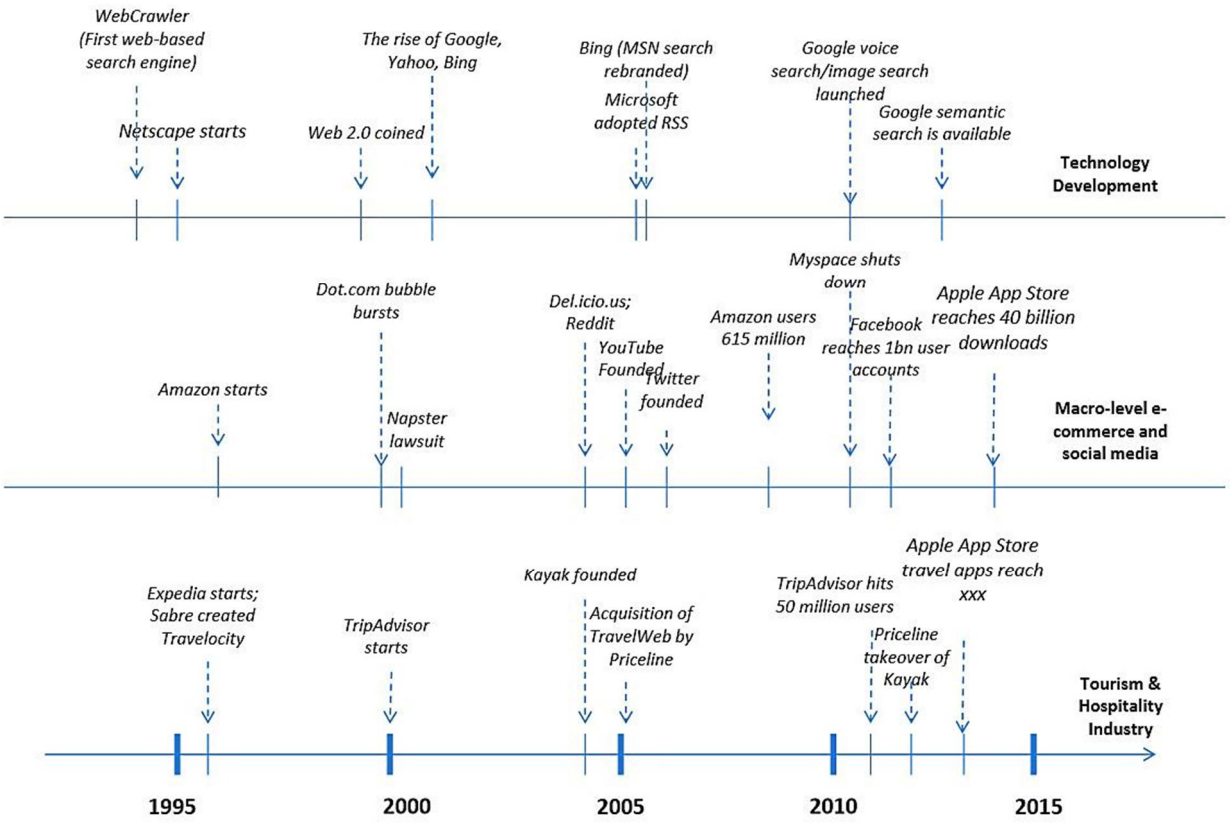

Figure 1: Important Developments in the Internet (Xiang;Wang;O'Leary;& Fesenmaier, 2015)

Figure 1 shows that in the late 1990s, a series of online travel agencies (such as Expedia, PreviewTravel, Priceline, and TravelBids) began to provide direct access to the travel products. Since then the innovations in the travel and hospitality sector have been widely adopted by consumers. At present tourism embraces online travel agencies (OTAs) and other business models and are coexisting with the growth of activities such as online shopping and online social networking supported by prominent websites such as Amazon, Facebook, Twitter, and YouTube (Xiang;Wang;O'Leary;& Fesenmaier, 2015).

The amount of information search in online vs offline was studied widely in previous literature (Bhatnagar & Ghose, 2004; Ratchford;Lee;& Talukdar, 2003; Kim & Ratchford, 2012). Ratchford et al. (2003) found that those who use the internet to search for automobiles are younger and more educated and search more in general and they would have searched even more if the internet had not been present (Ratchford;Lee;& Talukdar, 2003). Kim and Ratchford (2012) started that that the share of time devoted to the internet increases considerably with overall search time. They also found that more educated buyers under age 40 who search extensively are likely to rely heavily on the internet in their search (Kim & Ratchford, 2012).

Information search is considered as an essential part of tourism decision-making as decisions are likely to be a high cost and high-involvement purchase and the search process is often seen as an enjoyable part of the travel experience (Quintal;Lee;& Soutar, 2009; Rodríguez & Trujillo, 2013). The rapid development of Information and Communication Technologies (ICTs) have changed travelers' information searching behavior that now consumer´s depend on the internet to search for information, plan their travel, and make purchase decision (Amaro & Duarte, 2013). The internet is perfect for the tourism industry due to the characteristics of its products which are intangible, inseparable (production and consumption), perishable and seasonal in nature (Rodríguez & Trujillo, 2013). Chiang, et al.(2012) have explained travelers information searching as a process of accumulating knowledge that will influence subsequent choices about the purchase and use of products or services (Chiang;King;& Nguyen, 2012). They found that destination-related information searching is closely associated with the travel planning process and can help in explaining and predicting prospective destination experiences. By lessening traveler uncertainty on upcoming trips, information search can lead to an improvement of the quality of experiences (Jun;Vogt;& MacKay, 2007). The academic background of information search behavior is highly imbedded in Stinger's (1961) theory of economics of information where he claimed that the search behavior is a function of the utility and cost meaning that consumers will continue spending resources for search until the utility obtained from the search exceeds the cost (Stigler, 1961). A large number of factors have been identified by researches that have been found to influence the extent of information search (Kambele;Li;& Zhou, 2015; Guo, 2001; Punj & Staelin, 1983).

The rapid growth of online sales and web-based stores and search engines has created a need to understand how consumers search for and evaluate products while shopping online. Several factors can influence consumer's information search behavior (Rose & Samouel, 2009; Grant;Clarke;& Kyriazis, 2007). The interactive nature of the internet offers opportunities for consumers to use the web shopping facilities effectively by improving the availability of product information thus enabling direct multi attribute comparisons and subsequently reduce prospective buyers' information search costs (Alba;Lynch;Weitz;& Janiszewski, 1997). Web-based stores are not only offering consumers immense choice and great convenience, finding products that fit needs can sometimes be a difficult task but also assisting in a variety of decision-making tasks. For instance, an electronic decision can help

people search and evaluate products by screening (based on price or date or word) and/or organizing information about available alternatives.

The consumer's ability to choose is strongly influenced by the amount and quality of information available. While fairly complete information on multiple alternatives promotes attribute based decision strategies, low quality or missing information may force consumers to make inferences and to resort to decision strategies that require less complete information, such as brand based choice. The amount and quality of information are positively related to the decision quality (Klein;Köhne;& Öörni, 2004).

The type or amount of consumers search may differ based on consumers experience level. Newell (1990) in his book argued when we become familiar with a problem domain, we learn which operators apply without having to search among them. The experience of consumers is correlated with the amount of problem-solving search. Newell claimed that we are always in a search universe, as witnessed by what happens when we hit on some novel problem state in an otherwise routine problem space (Newell, 1990).

The economics literature is interested in exploring optimal search behavior with the cost – benefit framework. Stigler proposed in his classic economics of information theory that buyers inform themselves about what is available in the marketplace only to the point where the marginal cost of gathering more information equals or exceeds the marginal return (Stigler, 1961). Most studies see sequential search as the dominant way of searching. In this study, three types of searching behavior in online context were used which were presented by Niinivaara, et al. (2008). In addition to the two classical search patterns, sequential and simultaneous searching, a third pattern, they have used iterative search (Niinivaara;Saarinen;Sunikka;& Öörni, 2008).

Sequential searching: Geng and Lee (2013) have defined sequential search as "search inside any given channel is a sequential-search" (Geng & Lee, 2013). Ommeren and Russo (2014) have claimed that sequential search is more appropriate when one want to gather detail information about each specific searching object but it is most costly and time consuming (Ommeren & Russo, 2014). Niinivaara, et al. (2008) have defined sequential search as a process whereby a consumer wishing to buy one unit of commodity obtains quotations one-at-a–time until a satisfactory price is obtained. In an online context, sequential search can be explained as consumer surfing through different web pages, and visiting various online-sellers (Niinivaara;Saarinen;Sunikka;& Öörni, 2008).

Baye et al. (2006) clarified the sequential searching process as, the number of alternatives searched is not fixed but is a random variable which depends on the outcome of the search; this allows a consumer to economize the information costs and his explanation was similar with the concept of "Economic of information" (Stigler, 1961). When, the consumers obtain new price quote, they weighs the expected benefits and costs of gathering additional price information and if they obtain an acceptable price early on, the expected gains from additional searches will be small and there is no need to pay the cost of additional searches (Baye;Morgan;& Scholte, 2006).

Simultaneous/ parallel searching: Simultaneous search can be explained as product comparison, where consumers evaluate available alternatives side by side. According to Stigler (1961), search takes place when a buyer (or seller) wishes to ascertain the most favorable price, and must thus canvass various sellers (or buyers). Stigler (Stigler, 1961) developed the "economics of information (EoI)" theory on the assumption of the so called fixed sample size (FSS) searching, according to which an individual obtains all samples at once, and the commodity is purchased from the seller quoting the lowest price. In other than the economics literature, FSS searching is also called simultaneous searching. The essence of simultaneous searching is that a consumer is able to evaluate available products side by side. Tara (1988) have claimed that as information acquisition is costly and time consuming, the returns to parallel effort are higher than when undertaking a single project at a time (Tara, 1988). Simultaneous search is often called agent search in online context, because the internet tools that make information comparing available are called search agents (Öörni, 2003; Whinston;Stahl;& Choi, 1997)

In online context consumers can use various tools (comparison sites or agents) to collect information, whereas in offline circumstances, a consumer might collect a simultaneous sample based on either internal information formed by experience, or by external search, for example, acquainting herself/himself with special issues of consumer journals that compare products the consumer is interested in. According to Whinston et al., price search in a price database is an example of a simultaneous search in an online environment (Whinston;Stahl;& Choi, 1997).

Öörni (2003) defined simultaneous search in online context, the characteristics of which are i) the information channel is electronic, ii) all the information is retrieved in a single stage iii) no human interaction is required. He claimed that the use of electronic and

simultaneous search in the context of travel services was very rare in the beginning of 2000's (Öörni, 2003).

Agrawal et al. *(2005)* made a comparison of simultaneous and sequential search, and found that simultaneous search allows for information gathering quickly (though over investment in information gathering may occur), on the other hand, sequential search is slow (but avoids unnecessary information gathering). They suggested combining the speed of simultaneous search with the flexibility of sequential search to avoid unnecessary costs (Agrawal;Hariharan;Kishore;& Rao, 2005). However, Manning and Morgan stated that both simultaneous search and sequential search may be considered special cases of a general search pattern, according to them a searcher obtains more than one sample at a time and then has to decide how many more times to sample (Manning & Morgan, 1982).

Iterative searching: Grant, et al. (2007) have used the term iteration to explain as "an information search behavior where both online and offline information sources are used for product searches and do not restrict themselves to online sources only" (Grant;Clarke;& Kyriazis, 2007). Niinivaara and her colleagues defined it as possibility to return to price/product information that was previously searched but not chosen (Niinivaara;Saarinen;Sunikka;& Öörni, 2008) and in this thesis; the term iterative search was used similarly. Iterative search allows back-and-forth movement as consumers compare product and service offerings. It starts just as a sequential query to the product information. It can be explained as sequential search with recall. The query results are compared to each other, and then results are noted. The difference of iterative and sequential search is that after finding the outputs, consumer will make the query again, and the process is then repeated.

2.2.2 Searching at different stages of consumers decision making process and Uncertainty

Uncertainty has studied widely in consumer search literature as it was identified as the ultimate cause of search (Grant;Clarke;& Kyriazis, 2007; Quintal;Lee;& Soutar, 2009; Stigler, 1961). Uncertainty can generate from the changing identity of sellers and buyers and also fluctuations in supply and demand, since information becomes outdated (Stigler, 1961). Dewey (1910) introduced the term uncertainty as the necessary precondition of choice (Dewey, 1910). Einhorn and Hogarth (1986), in their "behavior decision theory" claimed

that uncertainty has often taken the form of subjective probability and can be quantified (Einhorn & Hogarth, 1981).

Punj and Staelin (1983) proposed in their study that once a need for some consumption activity is recognized, the consumer is motivated to conduct a functional information search to enhance the quality of purchase outcomes (Punj & Staelin, 1983). Again, Zeng and Reinartz (2003) mentioned that, when consumers choose a product or service for purchasing, they perform a series of tasks: searching for information about different product alternatives, evaluating these alternatives, and transacting the chosen alternative. Thus, consumer's decision making process was explained as a three step process in their study, where searching for information was first step (Zeng & Reinartz, 2003). Chiang (2006) described information searching as a stage of the decision-making process during which consumers actively collect and utilize information from internal and/or external sources to make better purchase decisions (Chiang K. , 2006).

The study of uncertainty was formalized mainly by Urbany, Dickson, and Wilkie in 1989, by exploring its relationship with information search. They conceptualized uncertainty as a two-dimensional construct comprised of both knowledge and choice uncertainty and concluded with a call for further research to explore an additional dimension of evaluation uncertainty, as well as to identify antecedents to uncertainty (Urbany;Dickson;& Wilkie, 1989).

Moorthy, et al. (1997) has claimed that the extent of consumer´s search for product information is determined by their uncertainty about the absolute utility associated with an alternative and about the relative utility of alternatives in a set (Moorthy;Ratchford;& Talukdar, 1997). Alba, et al. (1997) has mentioned that, in an online shopping environment, the amount of information search is not only dependent on perceived uncertainty of consumers but also dependent upon the consumer's ability to screen information effectively (Alba;Lynch;Weitz;& Janiszewski, 1997). The Recommendation Agent automatically sorts available products based on criteria provided by the shopper and lead to a reduction in the amount of search (Moorthy;Ratchford;& Talukdar, 1997).

Payne, et al. (2001) explained information searching of online context in two phases that combine planning with action (Payne;Howes;& Reader, 2001). The initial phase involves screening choice alternatives by performing search iterations to identify alternatives that match preferences. Once identified, alternatives may subsequently be examined for more

detailed information. In the web environment, consumers can be expected to conduct multiple search iterations as they seek to identify alternatives for inclusion in the consideration set. Lynch and Ariely (2000) found evidence of more "drill-down" search, which is similar to iterative search (Lynch & Ariely, 2000). As the number of alternatives increases, the number of search iterations is likely to decrease in the web environment due to the reduced likelihood of criteria over-specification and less "information foraging" (Punj & Moore, 2009).

One reason consumers search for information prior to purchase is to reduce uncertainty. Information search is often seen as a mean to lessen decision-related uncertainty. Therefore, greater uncertainty should lead to more extensive search behavior. Some early studies of uncertainty constructs and uncertainty dimensions of "knowledge uncertainty" and "choice uncertainty" have been done in the sixties and seventies. However, many researchers have argued that there may be certain conditions, under which uncertainty reduces, (instead of increases), search behavior (Niinivaara;Saarinen;Sunikka;& Öörni, 2008).

Quintal, et al. (2009) mentioned that consumers who are averse to risk and uncertainty are likely to engage in risk and uncertainty reducing activities, such as looking for quality assurances by searching extensively for information (Quintal;Lee;& Soutar, 2009). Uncertainty is more evident in tourism because of its 'intangible and experiential nature' of purchase process, which leads people to 'search for information and move back and forth between search and decision-making stages' (Jun;Vogt;& MacKay, 2007). Thus, based on above literature, it can be assumed that uncertainties at different stages of consumers' decision making process have significant relationship with consumers search processes.

H_1: Customers with high Knowledge Uncertainties (KU) like to choose sequential search to reduce or remove those uncertainties.

H_2: Customers with high Evaluation Uncertainties (EU) like to choose sequential search to reduce or remove those uncertainties.

H_3: High Choice Uncertainties (CU) increase probability of choosing parallel search.

H_4: High Implementation Uncertainties (IU) increase probability of choosing parallel search.

H_5: If customers feels uncertainties in all stages (both buying and learning stages) of their decision making process, they like to use iterative search process to reduce or remove them.

2.3 Consumer satisfaction

2.3.1 Concept review

Customer Satisfaction has been a central concept in marketing literature and is an important goal of all business activities. Satisfaction is defined as customers' judgments about products or service fulfilment (Oliver, 1981). Today, companies face their toughest competition, because they move from a product and sales philosophy to a marketing philosophy, which gives a company a better chance of outperforming competition (Kotler, Marketing Management, 2000). Kotler (2000) defined satisfaction as: "a person's feelings of pleasure or disappointment resulting from comparing a product perceived performance (or outcome) in relation to his or her expectations". According to Hansemark and Albinsson (2004) "satisfaction is an overall customer attitude towards a service provider, or an emotional reaction to the difference between what customers anticipate and what they receive, regarding the fulfillment of some need, goal or desire" (Hansemark & Albinson, 2004). Anderson and Srinivasan (2003) have defined satisfaction in the e-commerce environment. They defined e-satisfaction as "the contentment of the customer with respect to his or her prior purchase experience with a given electronic commerce firm" (Anderson & Srinivasan, 2003). Many researchers have shown that customers´ satisfaction leads to initial and repeat purchase intention as well as customers´ loyalty and this positive relationship is also true in the e-commerce environment (Anderson & Srinivasan, 2003; Oliver, 1981; Law & Bai, 2008; Bai;Law;& Wen, 2008; Wen, 2009; Kuo;Hu;& Yang, 2013).

Furthermore, researchers differentiate between attitude and satisfaction. So an attitude is a perceived service quality whereas, satisfaction is related to a specific transaction. Oliver (1981) summarizes the transaction- specific nature of satisfaction, and differentiates it from attitude, as follows: Attitude is the consumer's relatively enduring affective orientation for store, or process (*e.g.*, customer service) while satisfaction is the emotional reaction following a disconfirmation experience which acts on the base attitude level and is consumption - specific (Oliver, 1981). Parasuraman (1988) distinguish service quality and satisfaction: "perceived service quality is a global judgment, or attitude, relating to the superiority of the service, whereas satisfaction is related to a specific transaction" (Parasuraman;Zeithaml;& Berry, 1988). Customer satisfaction as an attitude is like a judgment following a purchase act or based on series of consumer- product interactions (Yi, 1990).

When a consumer/customer is pleased with either the product or services, it is termed satisfaction. Satisfaction can also be a person's feelings of pleasure or disappointment that results from comparing a product's perceived performance or outcome with their expectations (Kotler & Keller, Marketing Management, 2009). As a matter of fact, satisfaction could be the pleasure derived by someone from the consumption of goods or services offered by another person or group of people; or it can be the state of being happy with a situation. Satisfaction varies from one person to another because it is utility. "One man's meal is another man's poison," an old adage stated describing utility; thus highlighting the fact that it is sometimes very difficult to satisfy everybody or to determine satisfaction among group of individuals.

Client happiness, which is a sign of customers´ satisfaction, is and has always been the most essential thing for any organization. Customer satisfaction is defined by one author as "the consumer's response to the evaluation of the perceived discrepancy between prior expectations and the actual performance of the product or service as perceived after its consumption" (Tse & Peter, 1988) hence considering satisfaction as an overall post-purchase evaluation by the consumer" (Fornell, 1992). Some authors stated that there is no specific definition of customer satisfaction, and after their studies of several definitions they defined customer satisfaction as "customer satisfaction is identified by a response (cognitive or affective) that pertains to a particular focus (*i.e.* a purchase experience and/or the associated product) and occurs at a certain time (*i.e.* post-purchase, post-consumption)" (Giese & Cote, 2002). This definition is supported by some other authors, who think that consumer's level of satisfaction is determined by his or her cumulative experience at the point of contact with the supplier (Sureshchandar & Anantharaman, 2002). It is factual that, there is no specific definition of customer satisfaction since as the years passes, different authors come up with different definitions. Customer satisfaction has also been defined by another author as the extent to which a product's perceived performance matches a buyer's expectations (Kotler P. ;Armstrong,;Saunders;& Wong, 2001). In a nutshell, customer satisfaction could be the pleasure obtained from consuming an offer.

Millana and Esteban (2004) listed the following customer satisfaction definitions up to 1996, and the list was updated in this thesis with some more definitions (Millana & Esteban, 2004).

Table 2 : Definition of Satisfaction

Author(s)	Years	Definitions
Oliver (p. 27)	1981	Final psychological state resulting from the disconfirmed expectancy related to initial consumer expectation
Swan, Trawick, and Carroll (p. 17)	1982	Evaluative or cognitive opinion which analyses whether the product represents a satisfactory or poor result for its end users Emotional response towards product
Churchill and Surprenant (p. 491)	1982	The conceptual response by the consumer to the purchase and use of a product which comes from the comparison of the rewards and cost of purchase relative to expectations Operatively, similar to an attitude because it can be measured as the total satisfaction from various attributes
Labarbera and Mazursky (p. 394)	1983	Subsequent evaluation of purchase Evaluation of surprise derived from the purchase of a product or service
Cadotte, Woodruff, and Jenkins (p. 305)	1987	Impression after the evaluation of use of the product or service
Tse and Wilton (p. 204)	1988	Consumer response to the evaluation of the perceived difference between expectations and final result after consumption
Westbrook and Oliver (p. 84)	1991	Subsequent evaluative opinion of choice relative to specific purchase
Fornell (p. 11)	1992	Overall evaluation after purchase
Oliver (p. 242)	1992	The coupling of coexisting attributes to other sensations derived from consumption
Halstead, Hartman, and Schmidt (p. 122)	1994	Emotional response associated with a specific transaction resulting from the comparison of the result of the product to some set standard prior to purchase
Oliver (p. 13)	1996	Judgement of sufficient level of satisfaction offered by a product or service during consumption
Giese and Cote (p. 14) (Giese & Cote, 2002)	2002	An effective response of varying intensity based on an evaluation of products and other standards of comparison at the time of purchase or temporal points during consumption and lasting for a finite but variable amount of time
Cengiz (p. 79) (Cengiz, 2010)	2010	A highly personal assessment that is greatly influenced by individual expectations
Jiradilok et al. (p. 5)	2014	Outcome by comparing the prior expectation and the perceived

(Jiradilok;Malisuwan;Madan;& Sivaraks, 2014)	performance for each antecedent factor in order to measure the attitude (satisfaction/pleasing) of the respondents for each of those factors

2.3.2 Factors involved with consumers online purchase satisfaction

There is no recipe of the antecedent factors used to measure satisfaction which will finally lead to purchasing intention. Empirical studies have discovered the impact of purchase-related factors, such as retail service employees (Sureshchandar & Anantharaman, 2002), retail environment (Tam, 2011) and service quality in a retail setting (Chadee & Mattsson, 1996; Reibstein, 2002; Schaupp & Bélanger, 2005), on consumer satisfaction. Chadee and Mattsson (1996) studied how different quality factors impact on global satisfaction of tourists and found that distinct quality factors (cleanliness, price, sightseeing, overall experience) had significant influence on different tourist encounters which varied based on culture (Chadee & Mattsson, 1996).

Reibstein (2002) studied the factors attracting customers to the site and factors being able to retain customers by mainly considering the role of price. However, customers tend to shop at other sites unless the vendors provide them good customer service and on-time delivery. Interestingly, e-shopping site using low prices or price promotions to attract customers do mostly tend to draw price-sensitive customers who are well known as having low loyalty (Reibstein, 2002).

Factors' motivating the youngsters to shop the commodity product in the cyber-shop examined includes attitudes, demographic, characteristics and purchase decision perceptions (Dillon & Reif, 2004). Schaupp & Bélanger (2005) pointed out that the factors those made customers the most satisfied, were privacy (Technology factor), Merchandising (Product factor), and convenience (Shopping factor); also followed by trust, delivery, usability, product customization, product quality and security (Schaupp & Bélanger, 2005). Surprisingly, security was chosen as the last choice comparing to others. This was assumed that security is perceived as a standard attribute in any websites so other attributes take priority once customers have to choose the site to shop from.

Tam (2011) found that perceived performance has a stronger influence on satisfaction when purchase importance is low, whereas satisfaction seems to be influenced both by

disconfirmation and perceived performance when purchase importance is high. His results also suggested that customers are more likely to engage in elaborate information processing activity in determining customer satisfaction when purchase importance is high (Tam, 2011). Rao, et al. (2011) has studied importance of Electronic Logistics Service Quality (e-LSQ) as an indicator of online purchase satisfaction. They found that satisfaction with the physical distribution quality of online retailers and cost are positively related with customers´ purchase satisfaction and customer retention (Rao;Goldsby;Griffis;& Iyengar, 2011). Hsu, et al. (2012) have found that customers' satisfaction and purchase intention are influenced by website quality and the service quality is more important than information and system quality in influencing customer satisfaction and purchase intention (Hsu;Chang;& Chen, 2012).

Huang and Dubinsky (2014) have recently studied how various elements accompanying a purchase process affect customers' satisfaction towards the shopping experience before they make a purchase. Their findings revealed 6-dimension scale measuring customers' pre-purchase satisfaction - customer service, store environment, return, product availability, information accessibility, and delivery (Huang & Dubinsky, 2014).

Jiradilok and his colleagues grouped the purchase perceptions or factors influencing online consumer's purchase decision into four clusters including (Jiradilok;Malisuwan;Madan;& Sivaraks, 2014):

1. Product understanding (Product Perception): price, product quality, and product variety
2. Shopping Experience: attributes of time, convenience, and product availability, effort, lifestyle compatibility and playfulness of shopping process
3. Customer service: vendor responsiveness, assurance, and reliability
4. Consumer Risk: economic, social, performance, personal and privacy risk

Hossain, et al. (2015) had also found significant influence of quality cues. Their findings have revealed that perceived quality and perceived risk were the main antecedents of perceived satisfaction (Hossain;Quaddus;& Shanka, 2015).

2.3.3 Satisfaction measurement literature

Although, measuring customer satisfaction could be very difficult at times because it is an attempt to measure human feelings, it is vital to be able to measure customer satisfaction in the context of e-commerce since this will define the success of the vendors (Schaupp &

Bélanger, 2005). The literature suggests that every research is different mainly by the antecedent factors of customer satisfaction since the researchers chose the variables and factors best suit for each circumstance in their perception; thus, the results are varied by time and location. Measuring customer satisfaction is not only involved with constitution of happy customers but also with profit and competitive advantage. To achieve long term success in the market, firm should monitor the customer satisfaction indicators regarding product, service and relationship. Measuring customer satisfactions provide a comprehensive insight to the customer pre and post purchase behavior. Without this approach understanding, improving and developing better customer services could not be possible. Thus, business consultants, corporations and others have worked to identify the characteristics of organizations that consistently please their customers, to develop tools for monitoring customer satisfaction, and to build continuous, quality improvement systems that respond to consumer feedback. Cengiz (2010) reported that every customer satisfaction measurement process needs to have clear objectives to reach, without any obvious target set before measuring customer satisfaction; the process is not very useful for researchers and organizations. Satisfaction measures can allow business to know how well the business process is working, where to make changes to improve, if changes are needed as well as will help to determine if the changes led to improvement. Knowledge of customer perception and attitudes will allow the company to know their customer requirements or expectations and will be able to determine if they are meeting those requirements (Cengiz, 2010).

2.3.4 Travel search and satisfaction

Several researchers found that information is one of the main critical success factors for tourism websites (Law & Bai, 2008; Bai;Law;& Wen, 2008; Wong & Law, 2005). Forgas, et al. (2012) concluded in their study that in order to gain e-satisfaction to maintain and increase the number of users of websites, airlines need to gain users' trust by continuous improvement of site quality (ease of use, security, information, responsiveness) but this must be linked traditional airline performance attributes including punctuality and responding to complaints that positively influence the attitudes of passengers (Forgas;Palau;Sánchez;& García, 2012). Whereas, Herrero and Martín (2012) found that information on the accommodation and destination positively influences the perceived usefulness (Herrero & Martín, 2012).

In today's highly competitive global tourism market it is crucial to know how and where tourists acquire travel information before and during their vacations. Researchers have

paid close attention to travelers' information-seeking behavior (Chiang;King;& Nguyen, 2012; Xu;Morgan;& Song, 2009; Dey & Sarma, 2010; Gursoy & McCleary, 2004). Chiang (2006) described information searching as a stage of the decision-making process during which consumers actively collect and utilize information from internal and/or external sources to make better purchase decisions (Chiang K. , 2006).

A recent study by Kambele, et al. (2015) found significant differences in terms of regional difference as how the two groups sought travel information as well as in their respective travel behaviors. American travelers relied heavily on the internet while the Chinese preferred word-of-mouth recommendations (Kambele;Li;& Zhou, 2015). Unlike other consumer products, travellers need information collection for selecting a destination and for on-site decisions such as choosing accommodation, means of transportation, and tours. The tourism sector is an information-rich industry because its products and services are mostly intangible and cannot be evaluated before purchase (Zhou, 2004; Fodness & Murray, 1997). Travelers rely on information to make vacation decisions, necessitating appropriate, detailed, and accessible travel information. Traditionally, tourism service providers and suppliers use mass media and other print media such as brochures, to provide information for travelers, along with travel agents playing an important role in distributing the travel information (Zhou, 2004).

Bai, Law, and Wen (2008) also proposed that in online environments, striving for consumer´s satisfaction should be very important to increase intentions for actual purchase of tourism products online (Bai;Law;& Wen, 2008).

Based on the above literature review related to consumer decision-making process and related uncertainties, search behavior and perceived purchase satisfaction, a conceptual model was developed. The conceptual model presented in **Figure 2**, which shows that consumer feels different types of uncertainties at different stages of decision making process. It was assumed here that consumers prefer specific types of searching pattern to reduce specific uncertainty and increase their perceived satisfaction (as uncertainties negatively influence satisfaction). To summarize the proposed relationships, the following hypotheses were developed:

H_6 = If customers with high KU use sequential search, they will be more satisfied

H_7 = If customers with high EU use sequential search, they will be more satisfied

H_8 = If customers with high CU use parallel search, they will be more satisfied

H_9 = If customers with high IU use parallel search, they will be more satisfied

H_{10} = If customers face high uncertainties in all stages of decision making process and use iterative search to reduce those, they feel more satisfied

The conceptual model based on different hypothesized relationships of uncertainties of consumers' decision making process and related search behavior and perceived satisfaction is given below in **Figure 2**:

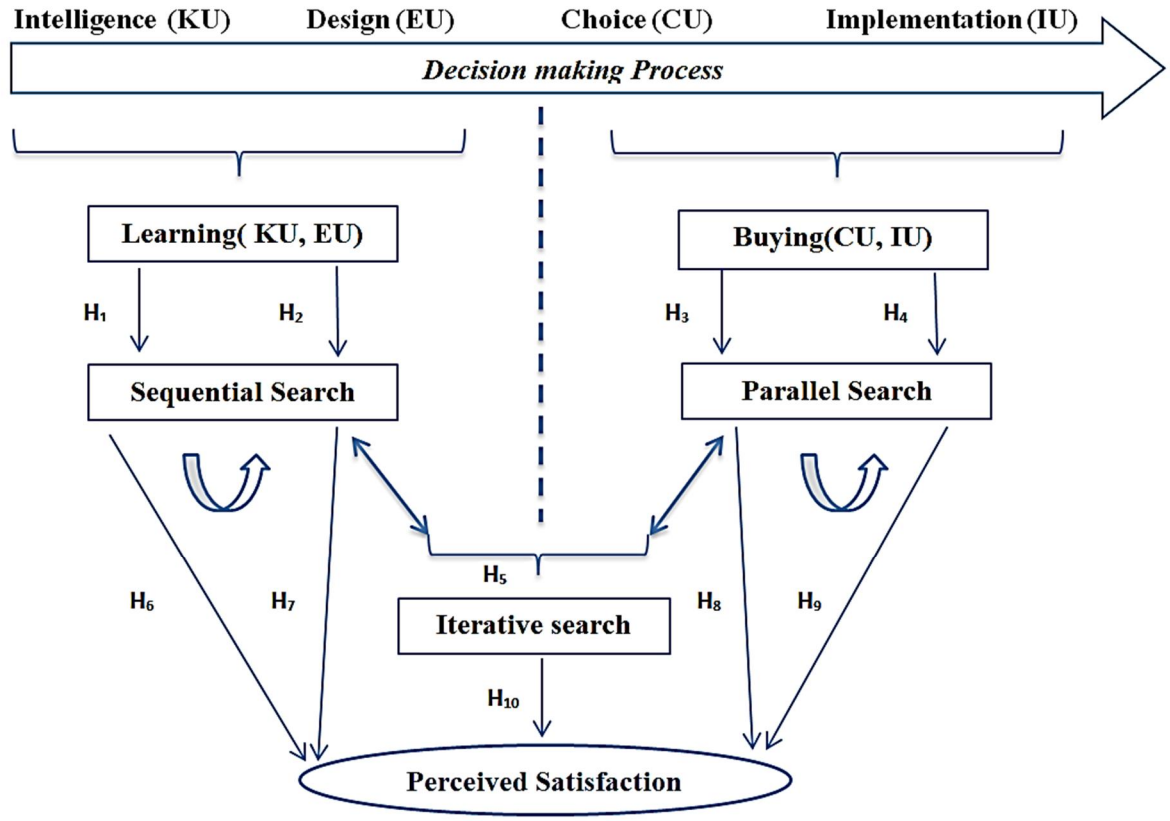

Figure 2: Conceptual framework for studying relationship among, uncertainty, search behavior and satisfaction

In **Figure 2**, the four stages of consumers decision making process were explained as two part – learning and buying, because it was hold in this paper that during first two stage consumers develop problem statement by collecting information (both internally and externally) and thus learn about different alternatives evaluating them. In buying stage, consumers make choice and implement that choice in order to buying their chosen alternative. Therefore, in learning stage consumers face KU and EU to learn about differ alternatives and in buying stage CU and IU to make the purchase.

Chapter 3: Methodology

3.1 Data collection and description of data:

A literature survey was conducted first to build up the set of uncertainty constructs. The original uncertainty paper by Urbany, et al. (1989) was used as the primary source, and was complemented with literature on the substitutes of uncertainty, namely consumer knowledge, experience, familiarity, and confidence. The original items were adjusted to fit with the reformulated uncertainty concepts, although the uncertainty paper gave some advice about developing the measurement instrument. When constructing the measurement items, the decision making terminology was employed in deciding what kind of questions should be included in the measurement items: ***knowledge uncertainty*** (identity of choice alternatives and attribute information), ***evaluation uncertainty*** (identity of choice criteria), ***choice uncertainty*** (choice strategy), and ***implementation uncertainty*** (action).

A pilot study was then conducted to ensure the validity and structural relationship of the uncertainty constructs and the effect of these constructs on consumer search process and pre-purchase search behavior. The influence of individuals' differences and purchase situations on search behavior is complex, often shared, and difficult to interpret and generalize about. Consequently, a homogeneous group of participants was chosen for the observation research. Our response group consisted of 56 teenagers (12-15 year old) living in the same geographic area. The data collection method that used in this pilot study was a controlled laboratory test with observation. In the pilot study, *knowledge uncertainty*, *evaluation uncertainty*, and *choice uncertainty* were used as the treatments, although the first empirical analyses suggested that these dimensions do not exhaust the uncertainty space.

A fourth type of uncertainty, implementation uncertainty was identified, while reflecting the pilot study observations against decision making theories and decided to take the four uncertainty dimensions to the test with a survey. Tentative items for the measurement instrument were first made, and decided to use the seven-point Osgood scale for measuring these items. Seven iterations were made as a group when creating the items of each uncertainty dimensions. After the iterations, the validity of the measurement instrument was tested by using a group of 17 experts (*e.g.* professors, ICT directors and ICT consultants). The instruments with a questionnaire were tested, which measured how the respondents thought our tentative items were related to the varieties of uncertainty in different phases of the decision

process. The pre-test suggested that some of the questions would benefit from reformulation, and the questionnaire was edited accordingly.

In order to further validate and refine the questionnaire, questionnaire was pretested with 27 consumers of different age and demographics which resulted in additional refinements to the questionnaire. Finally, there was a set of 21 questions regarding uncertainty, 3 questions about searching pattern and 4 regarding satisfaction (see Appendix A) in this study to measure their relationship.

3.2 Survey

A self-administered mail survey was conducted in the period of May - June 2006 to collect the dataset. The participants were obtained by drawing a random sample of 2000 people from the sample frame of adult (18 and over) Finnish speaking residents of the mainland Finland. Participants were contacted twice, two weeks apart, by mailing them the printed questionnaire. The option of using a web-form was letter accompanied for the respondents to answer the survey.

The response was active in answering the survey, and 639 filled questionnaires were received of which 604 included answers to every question. Therefore, the response rate was 32 %. Moreover, to check whether our sample represented its frame, the demographic variables were identified that influence consumer search most, and used these variables to compare the sample statistics with the latest census figures for the Finnish population.

The profiles of respondents are given in Appendix B. Among respondents 58,1 % were males and 41,9 % females. Our sample includes also more highly educated and financially better off population than the general. The sample's location of residence, however, matched well with that of the general population. Since gender, education, and income are all demographic variables that were known to associate positively with Internet use, the data was judged corresponding to the population of active Finnish Internet users.

The collected survey data were than screened, reduced, and analysed using a set of quantitative research tools of IBM SPSS statistical software. The descriptions of data analysis are given in next chapter with necessary interpretation.

Chapter 4: Analysis and interpretation

Analyses have been done in four parts. At first, a missing value analysis was done to screen the data to ensure that data is clean and ready for further statistical analyses. Next, factor analyses have been conducted to reduce the data into meaningful parts. Then, a multinomial logit regression has been done to test the relationship between the search behavior and uncertainty variables. Finally, a MANOVA has been conducted to portrait how satisfaction was influenced by different searching behavior if they were used to reduce uncertainties at different stages of consumers' buying process. All the calculations conducted in this study were performed using the SPSS statistics software.

4.1 Missing value analysis

Data analysis part was started with a missing value analysis of all involved variables. Observations were filtered, and those having value of types-of-search variable were kept in. Moreover, observations having more than 30% missing values were removed beforehand. The missing value analysis was done to identify missing pattern (MCAR – missing completely at random or MAR- missing at random or MNAR- missing not at random) in order to select right imputation techniques for missing value. The number and percentage of missing value of all variables are shown in **Table 3**.

Table 3 : Missing value analysis of all variables

Univariate Statistics							
	N	Mean	Std. Deviation	Missing		No. of Extremes[a]	
				Count	Percent	Low	High
KU1	326	2,71	1,746	1	,3	0	0
KU2	327	2,90	1,697	0	,0	0	7
KU3	324	3,27	1,791	3	,9	0	0
KU4	327	3,08	1,762	0	,0	0	11
KU5	327	3,16	1,896	0	,0	0	0
EU1	326	2,25	1,438	1	,3	0	17
EU2	323	2,23	1,395	4	1,2	0	15
EU3	325	2,27	1,379	2	,6	0	11
EU4	325	2,66	1,594	2	,6	0	0
EU5	322	2,56	1,470	5	1,5	0	17
EU6	326	2,59	1,475	1	,3	0	0
CU1	326	2,00	1,343	1	,3	0	46

CU2	324	2,24	1,502	3	,9	0	17
CU3	326	2,13	1,426	1	,3	0	53
CU4	324	2,10	1,425	3	,9	0	14
IU1	320	2,09	1,426	7	2,1	0	12
IU2	320	1,96	1,425	7	2,1	0	40
IU3	317	2,86	1,761	10	3,1	0	0
IU4	320	3,44	1,952	7	2,1	0	0
IU5	320	2,69	1,748	7	2,1	0	0
IU6	318	2,58	1,784	9	2,8	0	0
IU7	320	2,88	1,862	7	2,1	0	0
Satisfactionchoice	325	6,12	1,130	2	,6	26	0
Satisfactiontrip	326	6,17	1,176	1	,3	22	0
Satisfactionprice	326	5,61	1,407	1	,3	13	0
Satisfactionbest	327	5,55	1,548	0	,0	18	0
TypesofSearch	327			0	,0		
a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).							

Little's MCAR test: Chi-Square = 774,091; DF = 493; Sig. =0,000

The missing values are present in almost all variables, except four variables, but the percentage of missing values is low for all variables (the highest percentage is 3,1%). The type of missing is not completely random in nature as significance level in Little's MCAR test is lower than 0,05 (Sig. =0,000). Thus the pattern of missing value is either MAR or MNAR in nature.

The linear regression (model based) method was chosen to impute missing values as Little's MCAR test is showing that the missing pattern is not completely random (MCAR) with significance level lower than 0,05. Thus missing pattern of this dataset was MAR or MNAR and the percentage of missing value in no any variable is higher than 10%.

4.2 Factor analysis (uncertainty variables)

After screening the data with missing value analysis, a factor analyses was done with 22 uncertainty variables to test whether the classification of the uncertainty variables into four categories is reasonable or not. Four component solutions were chosen, because the eigenvalue (variance explained) of the fifth component was less than 1. The results of the four component solution are reported in **Table 4**.

Table 4: The Four Principal Component Solution with 22 Uncertainty Variables

Component Matrix[a]					
Uncertainty Variables		Component			
		1	2	3	4
KU1	General market information	,588			
KU2	Identity of available alternatives	,681	-,434		
KU3	Prices of available alternatives	,658		,446	
KU4	Quality of available alternatives	,682	-,423		
KU5	Sellers	,636			
EU1	Evaluation criteria in general	,678			
EU2	Relevancy of product attributes	,680			
EU3	Importance of criteria	,671			
EU4	One's own ability to compare information	,747			
EU5	Comparability of information	,737			
EU6	Availability of comparable information	,745			
CU1	General difficulty of choosing	,703			
CU2	Difficulty in choosing the brand	,657			
CU3	Difficulty in choosing the best alternative	,717			
CU4	Difficulty to choosing where to shop	,733			
IU1	General difficulty of purchasing	,682			
IU2	Difficulty of reaching the store	,637			
IU3	In production status at purchase time	,524		,453	
IU4	Stock levels at purchase time	,448		,572	
IU5	Problems in purchasing the chosen product	,655			
IU6	Validity of announced prices	,613			
IU7	Realization of promised quality	,555			
Eigenvalues (Variance explained by each factor):		9,574	1,915	1,780	1,110
Percentages of Variances of Each Factor		43,5%	8,7%	8,1%	5,1%
Cumulative Percentages		43,5%	52,2%	60,3%	65,4%

As one can see, about 44% of the total variances of the variables can be explained by the first principal component, which can be named as "Total Uncertainty". All loadings of the component vary between 0,448 and 0,747 meaning that at least 20 % (= 0,4502) of the variance of each variable is explained by the first component. All questions also seem to be quite relevant to "Total Uncertainty". However, components 2 - 4 seem to provide relevant

information about uncertainty as well. On the other hand, it seems from the component loadings that all the variables were highly loaded in the first component and some of the variables were cross-loaded. At this situation, a rotation may improve interpretation of the components. Because of simplicity and better interpretability, a Varimax rotation was chosen and output of rotated component matrix is shown in **Table 5**.

Table 5 : The Rotated Principal Component Solution with 22 Uncertainty Variables (Varimax Rotation)

Rotated Component Matrix[a]					
Uncertainty Variables		Component			
		PCEU	PCCU	PCKU	PCIU
KU1	General market information	,489			
KU2	Identity of available alternatives			,756	
KU3	Prices of available alternatives			,826	
KU4	Quality of available alternatives			,805	
KU5	Sellers			,766	
EU1	Evaluation criteria in general	,603			
EU2	Relevancy of product attributes	,687			
EU3	Importance of criteria	,774			
EU4	One's own ability to compare information	,720			
EU5	Comparability of information	,793			
EU6	Availability of comparable information	,709			
CU1	General difficulty of choosing	,407	,632		
CU2	Difficulty in choosing the brand		,802		
CU3	Difficulty in choosing the best alternative		,774		
CU4	Difficulty to choosing where to shop		,758		
IU1	General difficulty of purchasing		,621		
IU2	Difficulty of reaching the store		,657		
IU3	In production status at purchase time				,713
IU4	Stock levels at purchase time				,725
IU5	Problems in purchasing the chosen product				,660
IU6	Validity of announced prices				,705
IU7	Realization of promised quality				,602
Eigenvalues (Variance explained by each factor):		4,328	3,809	3,202	3,040
Percentages of Variances of Each Factor		19,7%	17,3%	14,5%	13,8%
Cumulative Percentages		19,7%	37%	51,6%	65,4%

The results in the **Table 5** show that the rotated solution revealed the four-dimensional structure of uncertainty. Each variable is clearly associated to one dominant principal component. The principal components can be easily named according to the variables with the highest loadings and to associate to the phases of Simon's decision making process model. Thus the components are called Evaluation Uncertainty (PCEU), Choice Uncertainty (PCCU), Knowledge Uncertainty (PCKU), and Implementation Uncertainty (PCIU). Moreover, reclassification of some variables is needed. The loading of variable KU1 is the highest on component PCEU, and the loadings of IU1 and IU2 on component PCCU. The variable KU1 will be regrouped to measure Evaluation Uncertainty, even if it originally was associated to Knowledge Uncertainty. Correspondingly, IU1 and IU2 are reclassified to measure Choice Uncertainty instead of Implementation Uncertainty. A closer look at the KU1 question reveals that the question measured the product category knowledge (PCK) rather than brand knowledge (BK). Regrouping of IU1 and IU2 to choice uncertainty tells us that these instruments reflect internal rather than external attribution. Choice is under control of the individual, and thus attributed to factors such as needs and demands, while implementing one's decision is often subject to favorable external factors. Implementation uncertainty is really about purchase related issues beyond the consumer's control, yet, IU1 and IU2 do not imply this as clearly as the rest of the IU questions.

4.3 Multinomial logistic regression

Multinomial Logistic Regression is an extension of logistic regression to conduct when the dependent variable is nominal with more than two levels. In our study, the dependent variable TypesofSearch is nominal with three levels. Like all linear regressions, the multinomial regression is a predictive analysis. It is used to describe data and to explain the relationship between one dependent nominal variable and one or more continuous-level (interval or ratio scale) independent variables. Logistic regression jumps the gap of standard linear regression, which requires the dependent variable to be of continuous-level (interval or ratio) scale. Logistic regression assumes that the dependent variable is a stochastic event and the independent variable describes the outcome of this stochastic event with a density function (a function of cumulated probabilities ranging from 0 to 1). Thus, statisticians claim that one event will occur if the probability is less than 0,5 and the opposite event happens when probability is greater than 0,5. In this study, the multinomial logistic regression was chosen

because the dataset of the analysis contains one nominal dependent variable with three levels and four continuous independent variables to test the relationship of uncertainty and types of search behavior.

One requirement of Multinomial logistic regression is that the minimum ratio of valid cases to independent variables be at least 10 to 1. The ratio of valid cases (327) to number of independent variables (3) was 109 to 1, which was equal to or greater than the minimum ratio. The requirement for a minimum ratio of cases to independent variables was satisfied. Moreover, the preferred ratio of valid cases to independent variables is 20 to 1. The ratio of 109 to 1 was equal to or greater than the preferred ratio. Therefore, the preferred ratio of cases to independent variables was satisfied. The outputs of multinomial logistic regression are presented below with all required explanation.

Table 6: Model fitting information of multinomial logistic regression

Model Fitting Information				
Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	644,280			
Final	631,533	12,747	8	,121

Table 6 shows that the probability of the model chi-square (12,747) was 0,121, greater than the level of significance (at 10% significance level). Moreover, a rerun was conducted adding Parallel and Iterative Search, where model fitting information was showing significant results indicated the existence of relationships between the independent variables and the dependent variable. However, the relationships of dependent and independent variables were consistent with this output. Therefore, it was decided to continue the analysis.

Table 7: Likelihood ration Tests of overall relationship

Likelihood Ratio Tests				
Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	684,410	52,877	2	,000
PCEU	636,243	4,710	2	,095
PCCU	633,026	1,493	2	,474
PCKU	635,916	4,383	2	,112
PCIU	633,688	2,155	2	,340

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

The likelihood ratio test evaluates the overall relationship between the independent and dependent variable. **Table 7** shows that there was a statistically significant relationship between the independent variable PCEU (Evaluation Uncertainty) with the dependent variable (types-of-search) (sig. < 0,05). The parameter estimate of the relationships is given in **Table 8**.

Table 8 : Parameter Estimates: Iterative search as reference category (DV: types of search, IV: Four uncertainty variables)

Parameter Estimates									
TypesofSearch[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Sequential Search	Intercept	-,148	,123	1,451	1	,228			
	PCEU	,263	,125	4,418	1	,036	1,301	1,018	1,664
	PCCU	-,119	,124	,919	1	,338	,887	,695	1,133
	PCKU	-,256	,126	4,160	1	,041	,774	,605	,990
	PCIU	,036	,123	,084	1	,771	1,036	,815	1,318
Parallel Search	Intercept	-1,074	,166	41,697	1	,000			
	PCEU	,195	,167	1,361	1	,243	1,215	,876	1,686
	PCCU	,058	,160	,134	1	,714	1,060	,775	1,450
	PCKU	-,169	,167	1,015	1	,314	,845	,609	1,173
	PCIU	-,212	,172	1,517	1	,218	,809	,577	1,134

a. The reference category is: Iterative Search.

The Parameter Estimates table (**Table 8**) shows the logistic coefficient (B) for each predictor variable for each alternative category of the outcome variable. Here, category 3 (Iterative search) was hold as **reference category**, which played the same role in multinomial logistic regression that it plays in the dummy-coding of a nominal variable. Reference category is the category coded with zeros for all of the dummy-coded variables that all other categories are interpreted against. The parameter estimates in this study revealed that Evaluation and Knowledge Uncertainty of customers significantly influenced people choice of sequential search from iterative search, but none of the uncertainty

variables had significant influence on customer's choice of parallel search from iterative search.

Customers who had high *Evaluation Uncertainty* (higher values correspond to Higher uncertainty) were more likely to choose *Sequential Search* (DV category 1), rather than *Iterative Search* (DV category 3). The probability of the Wald statistic (4,418) for the variable PCEU was 0,036 which was less than or equal to the level of significance of 0.05, the null was rejected. For each unit increase in EU, the odds of choosing *Sequential Search* rather than *Iterative Search* increased by 30,1% (1,301 – 1, 0 = 30,1).

Customers who had high *Knowledge Uncertainty*, were less likely to choose *Sequential Search* (DV category 1), rather than *Iterative Search* (DV category 3). The probability of the Wald statistic (4,160) for the variable PCKU was 0,041 which was less than or equal to the level of significance of 0.05. For each unit increase in KU, the odds of choosing *Sequential Search* rather than *Iterative Search* decreased by 22,6% (0,774 – 1,0 = -0,226).

The test was run again by holding *Sequential Search* of dependent variable as reference category. The results were consistent with previous run. The parameter estimates of second run are shown in **Table 9**.

Table 9: Parameter Estimates: Sequential search as reference category (DV: types of search, IV: Four uncertainty variables)

Parameter Estimates									
TypesofSearch[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Parallel Search	Intercept	-,926	,170	29,778	1	,000			
	PCEU	-,068	,166	,170	1	,680	,934	,674	1,293
	PCCU	,178	,165	1,162	1	,281	1,195	,865	1,651
	PCKU	,088	,173	,257	1	,612	1,091	,778	1,531
	PCIU	-,248	,175	2,008	1	,156	,780	,554	1,100
Iterative Search	Intercept	,148	,123	1,451	1	,228			
	PCEU	-,263	,125	4,418	1	,036	,768	,601	,982
	PCCU	,119	,124	,919	1	,338	1,127	,883	1,438
	PCKU	,256	,126	4,160	1	,041	1,292	1,010	1,652
	PCIU	-,036	,123	,084	1	,771	,965	,759	1,227
a. The reference category is: Sequential Search.									

The above parameter estimates (**Table 9**) held *Sequential search* as reference category, because theoretically *Iterative search* was the combination of *Sequential* and *Parallel search* and there was a little difference within Parallel and Iterative search. It is clear from the above **Table 9** that customers' *Evaluation* and *Knowledge Uncertainty* significantly influenced people to choose *Sequential search* and *Iterative search*. However, both **Tables 8** and **9** didn't find any significant relationship between *Choice* and *Implementation Uncertainty* based on consumers' choice of search process.

Customers who had high *Evaluation Uncertainty*, were less likely to choose *Iterative Search* (DV category 3), rather than *Sequential Search* (DV category 1). For each unit increase in EU, the odds of choosing *Iterative Search* rather than *Sequential Search* decreased by 23,2% (0,768 – 1,0 = 0,232). Therefore, it is clear from **Tables 8** and **9** that consumers with high EU preferred to choose *Sequential search* over iterative search process and there was no significant influence of evaluation uncertainty in consumers' choice of parallel search.

Customers who had high *Knowledge Uncertainty*, were more likely to choose *Iterative Search* (DV category 3), rather than *Sequential Search* (DV category 1). For each

unit increase in KU, the odds of choosing *Iterative Search* rather than *Sequential Search* increased by 29,2% (1,292– 1,0 = 0,292). Therefore, both **Tables 8** and **9** ensure that consumers with high KU preferred to choose *Iterative search* over *Sequential searching* process and KU also didn't has any significant influence on consumers' choice of parallel search.

Therefore, the output of Multinomial logistic regression revealed that level of customers' perceived uncertainty influenced people choice of search behavior.

The classification accuracy of the multinomial logistic regression model was also checked (shown in **Table 10**) to assess its utility. It compares the predicted group membership based on the logistic model to the actual, known group membership, which is the value for the dependent variable.

Table 10: Case processing summery of search variables

Case Processing Summary			
		N	Marginal Percentage
TypesofSearch	1	128	39,1%
	2	51	15,6%
	3	148	45,3%
Valid		327	100,0%
Missing		0	
Total		327	
Subpopulation		314[a]	

a. The dependent variable has only one value observed in 311 (99,0%) subpopulations.

The chance accuracy rate was computed by calculating the proportion of cases for each group based on the number of cases in each group in the "Case Processing Summary", and then squaring and summing the proportion of cases in each group ($0{,}391^2 + 0{,}156^2 + 0{,}453^2 = 0{,}38$). The proportional by chance accuracy criteria is 48% (1,25 x 38% = 48%).
To characterize the model as useful, the overall percentage accuracy rate produced by SPSS at the last step was compared in which variables were entered by 25% more than the proportional-by-chance-accuracy. (Note: a cross-validated accuracy rate was not calculated by SPSS for multinomial logistic regression).

*Table 11: Custom table (Predicted Category Value * Type of search Cross-tabulation)*

Observed		Predicted Response Category			Percentage correct
		Sequential Search	Parallel Search	Iterative Search	
Type of search	Sequential Search	45	0	83	35 %
	Parallel Search	18	0	33	0 %
	Iterative Search	30	0	118	80 %
	Overall Percentage	25%	0 %	75 %	57,5%

The Classification Table (**Table 11**) shows how well the full model correctly classifies cases. It shows that the model didn't impute any value in response category *Parallel Search*. A perfect model would show only values on the diagonal correctly classifying all cases. The row sums represent the number of cases in each category in the actual data and the column sums represent the number of cases in each category as classified by the full model. The key piece of information is the overall percentage in the lower right corner. The classification accuracy rate was **57,5%**, which was greater than or equal to the proportional-by-chance-accuracy criteria (1,25 x 38% = 48%). The criterion for classification accuracy is satisfied here.

4.4 MANOVA (with two types of search behavior)

Multivariate analysis of variance (MANOVA) is simply an ANOVA with several dependent variables. That is to say, ANOVA tests the difference in means between two or more groups, while MANOVA tests the difference in two or more vectors of means. The main objective in using MANOVA is to determine if the response variables are altered by the observer's manipulation of the independent variables. Like ANOVA, MANOVA requires continuous response variables and categorical predictors.

Before conducting MANOVA, the assumptions were checked; those need to satisfy for conducting this test. Minimum ratio of observations to variables should be 5:1, but preferred ratio can be 15:1 or 20:1. In this dataset, the ratio of observations to variable is about 40:1 (357:9), which seems quite satisfactory. The assumption of the greatest importance is the homogeneity of variance-covariance matrices across the groups. Meeting this assumption allows for direct interpretation of the results without having to consider

group sizes, level of covariance in the groups and so forth. The model design used for MANOVA test was as below:

Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU

The outputs of MANOVA for testing Homoscedasticity are given below with all required explanation.

Table 12: Multivariate test of Homoscedasticity (in appendix C)

Box's M tests in **Table 12** show near significant result ($p \leq 0,05$), and Levene's test of equality of error variances shows significant results for "Satisfactionchoice" variable. Therefore, "Satisfactionchoice" variable was decided to remove from MANOVA test as corrective remedies. Moreover, the rerun of MANOVA was conducted, where rather than using three category of search behavior, parallel search was added with iterative search because Multinomial logistic regression didn't find any significant difference within these two categories. The homoscedasticity test outputs of repeated MANOVA are presented below in **Table 13**:

Table 13: Homoscedasticity test after Removing Choice_Satisfaction

Box's Test of Equality of Covariance Matrices[a]	
Box's M	8,260
F	1,362
df1	6
df2	492127,005
Sig.	,226
Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.	
a. Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU	

Levene's Test of Equality of Error Variances[a]				
	F	df1	df2	Sig.
Satisfactiontrip	1,553	1	325	,214
Satisfactionprice	,013	1	325	,910
Satisfactionbest	1,072	1	325	,301
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.				
a. Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU				

After removing Choice_Satisfaction, the Box's M test showed non-significant result. The Sig. = **0,226** ($p \geq 0,05$) in **Table 13** satisfied homoscedasticity assumption of MANOVA test. Therefore, corrective actions improved overall outputs.

Table 14 Multivariate test (in Appendix D)

In essence, **Table 14** (in Appendix C) provides information about the effect of the independent variable on each of the dependent measures separately. It was clear from all the tests presented in **Table 14** (Multivariate Test, Tests of Between-Subjects Effects as well as Parameter Estimates table) that all uncertainty variables except knowledge uncertainty have significant negative impact on consumers' level of satisfaction. Multivariate test shows four most commonly used multivariate test results and was significant for most variables of this study. Along with, the influence of interaction effect was checked. Although the interaction of "TypesofSearch* PCKU" and "TypesofSearch*PCCU" was significant in Multivariate Tests table, some more individual impact of interaction on satisfaction variables were found in tests of Between-Subjects Effects and Parameter Estimates holding 10% significance level. The "Tests of Between-Subjects Effects" results showed that, PCKU didn't influence any satisfaction variable significantly. PCIU had significant impact on consumers' level of price and trip satisfaction (higher the level of uncertainty lowers the level of satisfaction) and PCCU had significant relationship with Satisfactionbest. On the other hand, PCEU had significant impact on all satisfaction variables, but types of search did not have any significant influence on satisfaction variables.

The Parameter Estimates output showed that Satisfactiontrip had significant negative relationship with PCEU (sig. = 0,003) and PCIU (sig. = 0,054) whereas its relationship with PCKU was positive (sig. = 0,003). Only one interaction effect was significant for

Satisfactiontrip. Consumers who chose Sequential search to reduce Knowledge uncertainty were less satisfied (sig. = 0,021).

Satisfactionprice had significant negative relationship with all uncertainty variables except PCKU. Moreover, it was the satisfaction which was mostly influenced by interaction effect. Consumers who chose Sequential search to reduce EU were less satisfied with price (sig. = 0,036) and who chose Sequential search to reduce CU was more satisfied with price (sig. =0,019).

Satisfactionbest had significant negative relationship with EU (sig. = 0,074) and CU (sig. = 0,023). The interaction effects showed that consumers chose sequential search to reduce IU was less satisfied (sig. = 0,072).

4.5 Validity and reliability of the study (Cronbach´s alpha)

This chapter briefly discusses the validity and reliability of this study. Validity refers to the extent to which the observed differences in responses reflect true differences in the measured characteristics. In other words, whether the selected instrument truly measured what it is supposed to measure. Reliability, on the other hand, refers to the extent to which measures are free from random error and the results are consistent across repetitions.

Reliability of a scale is good if the results are consistent across time and repetitions. One way to test reliability of a scale is to test the internal consistency of items. This can be done by splitting half the items that are assumed to measure the same construct and then correlating the two halves with each other. Cronbach's alpha is a popular measure for testing internal consistency of a scale. It is the average of all possible correlations between the split items. The value can vary from 0 to 1 and values greater than 0,6 are considered acceptable. In this study all 22 factors received a value above 0,6 (**Table 15**) indicating good internal consistency and reliability.

Cronbach's alpha is the most common measure of internal consistency (reliability). It is used when there are multiple Likert questions in a survey/questionnaire that form a scale and one wishes to determine the reliability.

The Reliability Statistics presented in **Table 15** provides the actual value for Cronbach's alpha.

Table 15: Reliability and Item-Total Statistics of Uncertainty Variables

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,934	,937	22

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
KU1	54,04	485,815	,536	,439	,932
KU2	53,86	478,792	,652	,689	,930
KU3	53,47	477,274	,636	,680	,931
KU4	53,67	476,687	,654	,706	,930
KU5	53,59	476,660	,602	,585	,931
EU1	54,51	488,435	,623	,534	,931
EU2	54,50	489,386	,618	,636	,931
EU3	54,47	491,005	,608	,667	,931
EU4	54,10	479,230	,694	,685	,930
EU5	54,18	483,498	,679	,752	,930
EU6	54,16	483,228	,690	,696	,930
CU1	54,75	489,949	,645	,568	,931
CU2	54,52	488,054	,602	,630	,931
CU3	54,62	486,407	,662	,666	,930
CU4	54,66	485,477	,680	,689	,930
IU1	54,66	488,242	,633	,579	,931
IU2	54,80	490,884	,586	,571	,931
IU3	53,87	487,601	,509	,489	,933
IU4	53,31	489,037	,432	,480	,935
IU5	54,05	479,216	,630	,552	,931
IU6	54,15	480,989	,588	,475	,931
IU7	53,84	483,126	,523	,391	,933

In this study Cronbach's alpha of uncertainty variables was **0,934** shown in **Table 15**, which indicates a high level of internal consistency for our scale with this specific sample. The column "Cronbach's Alpha if Item Deleted" presented the values that Cronbach's alpha would be if that particular item was deleted from the scale. The last column of **Table 15** is showing that removal of any question, except IU4, would result in a lower Cronbach's alpha. Removal of IU4 would lead to only a small improvement in Cronbach's alpha (from 0,934 to

0,935). Nevertheless, it can be seen from fourth column of the table that the "Corrected Item-Total Correlation" value was fairly high (0,432) for this item. Therefore, no question was removed. The "Inter Item Correlation Matrix" was also checked for these uncertainty variables and all of these uncertainty variables were significantly correlated with each other. Again, another Cronbach's alpha was run with four satisfaction variables because Likert scale questionnaire were used for them. The outputs were shown in **Table 16**.

Table 16: Reliability and Item-Total Statistics of Satisfaction Variables (Repeated)

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,736	,748	4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Satisfactionchoice	17,33	10,456	,542	,297	,675
Satisfactiontrip	17,28	9,798	,611	,388	,636
Satisfactionprice	17,83	9,281	,517	,317	,684
Satisfactionbest	17,89	8,857	,481	,250	,716

Inter-Item Correlation Matrix				
	Satisfactionchoice	Satisfactiontrip	Satisfactionprice	Satisfactionbest
Satisfactionchoice	1,000	,457	,395	,426
Satisfactiontrip	,457	1,000	,532	,420
Satisfactionprice	,395	,532	1,000	,326
Satisfactionbest	,426	,420	,326	1,000

The Cronbach's alpha of satisfaction variables in the **Table 16** was **0,736** indicating a satisfactory level of internal consistency for our scale with this specific sample.

The column "Cronbach's Alpha if Item Deleted" showed in last column of **Table 16** that removal of any satisfaction variable would result in a lower Cronbach's alpha. Therefore, no question was removed. Moreover, "Corrected Item-Total Correlation" values were fairly high for all four satisfaction variables.

The "Inter-Item Correlation Matrix" is showing satisfactory correlation of all four satisfaction variables.

Chapter 5: Findings and discussion

According to the result of Multinomial logistic regression and MANOVA above, the findings of hypotheses tests are shown in **Table 17**:

Table 17: Hypotheses test results

No	Hypotheses	Result
H_1	*Customers with high Knowledge Uncertainties (KU) like to choose sequential search to reduce or remove those uncertainties.*	Not supported
H_2	*Customers with high Evaluation Uncertainties (EU) like to choose sequential search to reduce or remove those uncertainties.*	Supported
H_3	*High Choice Uncertainties (CU) increase probability of choosing parallel search.*	Not supported
H_4	*High Implementation Uncertainties (IU) increase probability of choosing parallel search.*	Not supported
H_5	*If customers feels uncertainties in all stages (both buying and learning stages) of their decision making process, they like to use iterative search process to reduce or remove them.*	Partly supported
H_6	If customers with high KU use sequential search, they will be more satisfied	Not supported
H_7	If customers with high EU use sequential search, they will be more satisfied	Not supported
H_8	If customers with high CU use parallel search, they will be more satisfied	Not supported
H_9	If customers with high IU use parallel search, they will be more satisfied	Partly supported
H_{10}	If customers face high uncertainties in all stages of decision making process and use iterative search to reduce those, they feel more satisfied	Partly supported

Based on the hypotheses tests results shown in **Table 17**, the following relationships can be noted:

Nature of customers' perceived uncertainty at different stage of decision making process often influences their choice of searching process:

The results of hypotheses test showed significant relationship between uncertainty and search behavior, which is consistent with several other previous researches (Niinivaara;Saarinen;Sunikka;& Öörni, 2008; Quintal;Lee;& Soutar, 2009; Urbany;Dickson;& Wilkie, 1989). Urbany, et al. (1989) found that choice uncertainty appeared to increase search, but knowledge uncertainty had a weaker, negative effect on search. This study shows that different uncertainties influence consumers' choice of search behavior (the relationship was significant for KU and EU). Urbany, et al. (1989) did not use

online searching, but used traditional brick-and-mortar ways of information search as searching pattern. Urbany and colleagues also found significant relationship within uncertainty and search behavior and is consistent with the findings of this study. Furthermore, Quintal, et al. (2010) reported a significant relationship between uncertainty avoidance and search behavior (Quintal;Lee;& Soutar, 2009). Lee and Cranage (2010) found in their study that the participants with high knowledge uncertainty undertake less extensive information search online, whereas those with high choice uncertainty more commit to online information search (Lee & Cranage, 2010).

This study found that people with high knowledge uncertainty like to choose iterative search rather than sequential search indicating that consumers like to iterate their search to gather more relevant information in intelligence phase of decision making, even sometimes it can be offline information. This finding is consistent with Kohli, et al. (2004) as they found no significant difference between the online and offline (*e.g.* brick-and-mortar) channels in intelligence phase (Kohli;Devaraj;& Mahmood, 2004). Therefore, hypothesis 1 and 6 were not supported by our results. From this finding, it can be assumed that the present electronic market place has changed rapidly where problem of having access to product information has ended. Rather than collecting and gathering information sequentially, consumers prefer to iterate their search to collect only that information which is relevant for their purchase decision. Thus, need for effective tools of evaluation, such as recommendation aids or intelligent agents, appears to be in the rise.

It was also found that consumers with high evaluation uncertainty choose sequential search rather than iterative searching process to reduce uncertainty regarding evaluating alternatives, criteria and comparable information, which proves hypothesis 2. The findings of Kohli et al. (2004) also consistent with our findings that online support for gathering information leads to better development of criteria for evaluating decision alternatives (Kohli;Devaraj;& Mahmood, 2004) and sequential search can be a good way for gathering more information about alternatives. However, choice of sequential search to reduce EU did have significant negative influence only on Price Satisfaction and therefore, hypothesis 7 is not supported by this data set.

Hypothesis 3 was not supported from the output of this study that consumers with high choice uncertainty like to choose parallel search rather than sequential searching to reduce their choice uncertainty. No significant relationship was found. However, some

previous study found close relationship of choice uncertainty with search behavior. Lanzetta (1963) claimed that consumers will search more when the choice sets are similar, due to the choice uncertainty generated (Lanzetta, 1963). With high choice uncertainty, consumers will prefer parallel search so that they can judge similar alternatives side-by-side to make a choice. Kohli, et al. (2004) also stated in their study that improved online support during the choice phase leads to consumers' time and cost saving by paying only for those features they need (Kohli;Devaraj;& Mahmood, 2004). Therefore, parallel searching also indicates less costly and less time consuming. Conversely, choice of sequential search to reduce CU did have significant positive impact on consumers' perceived Price Satisfaction and thus, hypothesis 8 is not supported by this data set. This finding indicates some weakness of information alignment of different search agents. Search agents portrait information based on price but the price of some airlines includes cost of food and baggage whereas for some other airlines these costs are not included. Therefore, it requires searching sequentially for detail information rather than searching based on any criteria using searching agents.

No significant influence of IU was also found in this study on consumers' choice of searching process. Therefore, hypothesis 4 was not supported. However, consumers' who chose sequential search to reduce their uncertainty regarding implementing their choice (unclear about having available chosen alternatives at suitable time, place or as they expected) was less satisfied with "Satisfactionbest". But in case of price and trip satisfaction no significant interaction effect was found. Therefore, Hypothesis 9 is partly supported as consumers didn't prefer sequential search to reduce their IU in order to increase the satisfaction that their trip was best.

Hypothesis 5 was partly supported by this study. Consumers with high KU preferred to choose iterative search. Although in case of evaluation uncertainty, consumers' did not prefer iterative searching process and other two relationships was insignificant. The same is true for hypothesis 10 which is also partly supported. Although no significant relationship of search behavior in increasing or decreasing negative relationship of uncertainty with consumers perceived satisfaction was found but some partial relationship were found from parameter estimate. The details of that relationship are described in next finding.

Choice of search processes to reduce uncertainty of decision making process had very little or no significant impact on satisfaction:

The main effects of MANOVA output have found no significant impact of search behavior in moderating the negative relationship of uncertainty and satisfaction. However the iteration effect in parameter estimate found some significant relationship. Consumers who chose Sequential search to reduce Knowledge uncertainty were less satisfied. Customers' Price Satisfaction was negatively influenced if they chose Sequential Search to reduce their Evaluation Uncertainty. Moreover, customers' choice of Sequential Search to reduce Choice Uncertainty had significant positive impact on Price Satisfaction. Moreover, consumers chose sequential search to reduce IU was less satisfied that their trip was best (Satisfactionbest).

Therefore, consumers' choice of different searching pattern was significantly influenced by the nature of uncertainties they felt. Although the results found very little or no significant impact of searching types to moderate the negative relationship of uncertainties and Satisfactiontrip and Satisfactionbest, Price Satisfaction were significantly influenced consumers choice of searching process to reduce their uncertainties.

In addition to hypotheses test, other results were also interesting and were consistent with previous literature. For an adequate representation of data, the main effects of uncertainty variables on satisfaction variables were also present in our models. Although this study doesn't have considerable interest in this relationship for this specific study, the main effects presented the following relationships:

Uncertainties at different stage of decision making process significantly influence consumer satisfaction:

It was found that all uncertainty variables have significant negative impact on consumers' level of satisfaction except knowledge uncertainty. EU had significant negative impact on al purchase satisfaction variables. It refers to the consumers' uncertainty regarding their ability to evaluate products, for example, which criteria and attributes should be considered and which one is more important, or having comparable information. Again, CU also had significant negative influence on consumers perceived purchase satisfaction regarding price and Satisfactionbest. CU refers to the uncertainty of the ranking of the choice alternatives that shows which brand to choose or from where to choose. One of the main reasons for CU can be incomparable choice alternatives. Even if preferences are known, ranking of alternatives cannot be possible if all alternatives do not share their relevant characteristics and it can be cured if the industry agreed on a comprehensive set of features of product description on which the shopping aids can be developed.

Implementation uncertainty also had significant negative impact on price and trip satisfaction, but its impact on satisfaction regarding consumers' believe, that the travel was best (Satisfactionbest), was not significant. It appears that if consumers feel more uncertain about their ability to buy the travel at chosen price, time and the fulfillment of their expectation; it will negatively influence their price and trip satisfaction.

The result of knowledge uncertainty was an exception as our results showed no significant relationship between knowledge uncertainty and satisfaction. These findings make some inference that the modern age of technology have blared the problem of having access to product information. Even sometimes, it is more than processing capability or willingness of consumers, which raise the need for more effective tools of evaluation.

Therefore, consumer pre-purchase uncertainty is a powerful determinant of consumers perceived purchase satisfaction and further study can be conducted on how to reduce these uncertainties.

The findings of hypotheses test are shown in the following conceptual framework as well (in **Figure 3**):

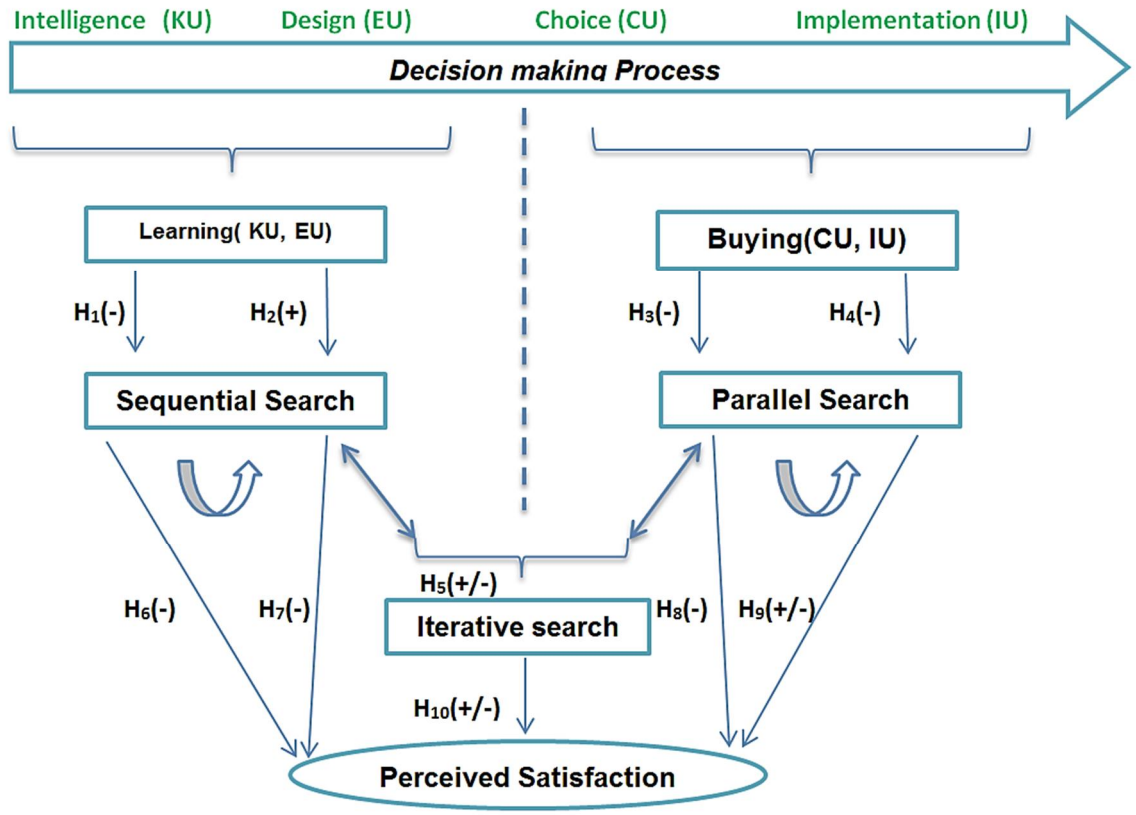

Figure 3 : Conceptual framework with results of hypothesis test

5.1 Limitations of the Study

The study has some limitations. Firstly, online travel Web sites have developed greatly after our May-June 2006 data collection. One must be careful in reasoning our findings to present online travel purchase. The sample used in this study somewhat limits the generalizability of the findings. The data was collected only from Finish consumers who are technologically more advanced and well-educated than most other countries; the results may vary in case of consumers of less technologically advanced countries. Search behavior was only studied as a moderator of the negative relationship of uncertainty while several other factors can also moderate this relationship like consumers' knowledge and experience or various demographic factors (income, sex, age, education, etc.)Moreover, the scope does not cover those potential customers who do not have experience in online travel purchase, but have the intention to engage in online purchase activities. In this study, travel search engine, and agencies (Sky scanner, Kayak, or Orbitz) and Web sites of airlines (turkishairlines.com, Emirates Airline, or Qatar Airways) were considered as sources of travel information, but consumers can gather such information from other sources (FNF, Newspapers, Social media, WOM, *etc.*) and such sources may influence the level of uncertainty and satisfaction. Kambele, et al.(2015) made a cross-cultural study of travel seeking behavior of American and Chinese consumers and found that American travelers relied heavily on the internet while the Chinese preferred word-of-mouth recommendations (Kambele;Li;& Zhou, 2015). Again, the impact of social media in online information search and vacation decision is also a point of concern for many recent researches (Xiang & Gretzel, Role of social media in online travel information search, 2010; López;Gidumal;Taño;& Armas, 2011; Xiang & Gretzel, Role of social media in online travel information search, 2010).

5.2 Managerial implication and recommendations for future research

The findings of this study have some interesting implication for travel marketers and developers of DSS. In order to attract new customers with existing ones, travel marketers must understand popular searching technology and optimize the resultant information to influence the consumers' decision making process. Tourism marketers can provide support in intelligence stage by adding information indirectly as consumers like to iterate their search to reduce their KU. For example, marketers can try to manipulate the development of e-content and e-WOM of dominant product/service attributes and user experience. Furthermore, some

efforts can be given in receiving consumer-generated positive reviews and developing online community in their websites and social media. This study found close relationship of EU with sequential search whereas the use of sequential search to reduce EU made consumers´ less satisfied. It can give interesting inference to the developer of DSS as it is showing poor alignment of information. Therefore, some rating can be included in different search agents based on quality, price, time etc. to help in consumers' evaluation process. Marketers can try to support consumers in design, choice and implementation phase by offering links of information and appropriate tools to compare features, and recommend alternatives in their own travel website so that online shoppers can save time and effort in choosing the final alternatives and keep faith on their chosen option. Moreover, the significant influence of price satisfaction in moderating the negative relationship of uncertainty and consumers' perceived satisfaction can encourage marketers to utilize price information optimally to influence consumers' satisfaction. Price information can be categorized as basic price, baggage fee, food cost, *etc.* in search agents. This way, customers can choose the airline with desired facilities directly from the online agent, which will reduce the burden of consumers.

This study has several implications for future research. It would be really interesting to perform similar test on newly collected data to observe whether the enormous technological advancement in the recent years have changed the level of uncertainty or nature of search behavior, or whether customers are more satisfied now than before. It could be also interesting to collect similar data from overseas (preferably from Asia and America) to check how cultural difference or technological development influence customers` uncertainty variables or perceived satisfaction. Searching behavior of consumers was studied here only as a mediator of satisfaction related with reduced uncertainty, but a lot of other factors can also moderate level of consumers' uncertainty and satisfaction, which can be interesting to study further, such as education, skill, experience, *etc*. The determinants of information search and uncertainty also require further research. It would be interesting to examine the impact of prior knowledge (past experience and familiarity) and situational factors (urgency and number of decision makers) on uncertainty, and types and extent of information search.

Chapter 6: Conclusion

Modern age of technology is making the marketplace more challenging for marketers. The power of market shift from marketers to consumers as consumers are becoming more and more rational day-by-day. In order to keep pace with competitive marketplace, marketers need optimize use of information to influence consumer´s decision making process. Rather than inserting huge amount of information randomly, they need to ensure optimum use of limited marketing resources by identifying the points where consumers are feeling uncertain. Therefore, marketers need to use relevant information and tools to avoid this challenge. In this study, it was found that consumer's with high KU preferred iterative searching process to gather more knowledge process and consumers with high EU preferred sequential search for their decision making. Moreover, no significant difference was found between parallel search and iterative searching in terms of consumers' choice of searching. However, searching types had very little or no significant impact in moderating negative relationship between consumer´s uncertainty and perceived satisfaction except some significant impact was found in case of price satisfaction. The findings of this study have some interesting implication for travel marketers and developers of DSS.

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Appendix A: The questionnaire

TRAVEL SERVICES SURVEY QUESTIONNAIRE

Uncertainty Variables:

What did you think, when you started to search for and choose the trip?

Knowledge Uncertainty

KU1 I was uncertain about whether I had enough information to choose a travel.

KU2 I was unsure about what kind of travels were on the offer.

KU3 I was unsure about the price level of the travels on the offer.

KU4 I was unsure about the characteristics of the travels on the offer.

KU5 I was unsure about where I should buy the travel.

Evaluation Uncertainty

EU1 I was unsure about the criteria I should use to choose the travel.

EU2 I was unsure about the travel attributes I should consider when choosing the travel.

EU3 I was unsure about the identity of the most important criterion.

EU4 It was difficult to compare the travels on the offer.

EU5 It was difficult to find information to compare the travels on the offer.

EU6 It was difficult to get comparable information about the travels on the offer.

Choice Uncertainty

CU1 Choosing the travel was difficult.

CU2 It was difficult to decide which brand I wanted to buy.

CU3 It was difficult to decide which travel I wanted to buy.

CU4 It was difficult to decide where to buy the travel.

Implementation Uncertainty

IU1 I was unsure whether it would be difficult to buy a travel.

IU2 I was unsure whether I could get to the store selling travels that appealed me.

IU3 I was unsure whether the travel of my choice would be available at a particular time.

IU4 I was unsure whether there would be any seats left for the travel of my choice.

IU5 I was unsure whether buying the travel would be problem free.

IU6 I was unsure whether I could buy the travel of my choice for the announced price.

IU7 I was unsure whether the travel of my choice would be as promised.

Searching Types Variables:

Which of following alternatives describes best your search behavior?

(1) ***Sequential search*** (I searched and evaluated each of trip as a whole entity before going on to the next alternative)

(2) ***Simultaneous search*** (I searched trips with search agent, I compared several alternatives in the same time)

(3) ***Iterative search*** (I searched and evaluate each trip before moving to next alternative and I returned back to earlier alternative.)

Satisfaction Variables:

Are you satisfied with your latest trip?

(1) Satisfied with the way I choose the trip

(2) Satisfied with the trip

(3) Satisfied with the price of the trip

(4) Could not find any better trip, fast seeking more

Appendix B: Profile of respondents

		Sample	
		Frequency	Percentage
Gender			
Valid	Male	351	58.1
	Female	253	41.9
Total		604	100
Missing Values		35	5.5
Education			
Valid	Comprehensive school education	127	21.3
	Upper secondary general education	50	8.4
	Vocational and professional education	159	26.7
	Polytechnic education	163	27.4
	University education	96	16.1
Total		595	99.9
Missing Values		44	6.9
Income	Euro /Year		
	– 9999	71	12.9
	10000 – 24999	147	26.7
	25000 – 49999	191	34.7
	50000 –	141	25.6
Total		550	99.9
Missing Values		89	13.9
Community Size			
	The Metropolitan area	130	22.5
	Town, > 45,000 inhabitants	123	21.2
	Town, < 45,000 inhabitants	160	27.6
	Urban or semi-urban municipality	39	6.7
	Rural Municipality	127	21.9
Total		579	99.9
	None of the above	8	1.4
# of non-missing values		587	
Missing values		52	8.1
Sample Size		639	

Appendix C:

Table 12: Multivariate test of Homoscedasticity

Box's Test of Equality of Covariance Matrices[a]	
Box's M	29,963
F	1,464
df1	20
df2	93390,707
Sig.	,082
Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.	
a. Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU	

Levene's Test of Equality of Error Variances[a]				
	F	df1	df2	Sig.
Satisfactionchoice	3,639	2	324	,027
Satisfactiontrip	,910	2	324	,404
Satisfactionprice	,174	2	324	,841
Satisfactionbest	,914	2	324	,402
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.				
a. Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU				

Appendix D:

Table14: Multivariate tests, Tests of Between-Subjects Effects and Parameter Estimates for group differences in satisfaction variables across uncertainty variables

Multivariate test

Effect		Value	F	Hypothesis df	Error df	Sig.	Observed Power[c]
Intercept	Pillai's Trace	,971	3513,287[b]	3,000	315,000	,000	1,000
	Wilks' Lambda	,029	3513,287[b]	3,000	315,000	,000	1,000
	Hotelling's Trace	33,460	3513,287[b]	3,000	315,000	,000	1,000
	Roy's Largest Root	33,460	3513,287[b]	3,000	315,000	,000	1,000
TypesofSearch	Pillai's Trace	,009	,961[b]	3,000	315,000	,411	,262
	Wilks' Lambda	,991	,961[b]	3,000	315,000	,411	,262
	Hotelling's Trace	,009	,961[b]	3,000	315,000	,411	,262
	Roy's Largest Root	,009	,961[b]	3,000	315,000	,411	,262
PCKU	Pillai's Trace	,005	,550[b]	3,000	315,000	,648	,163
	Wilks' Lambda	,995	,550[b]	3,000	315,000	,648	,163
	Hotelling's Trace	,005	,550[b]	3,000	315,000	,648	,163
	Roy's Largest Root	,005	,550[b]	3,000	315,000	,648	,163
PCEU	Pillai's Trace	,079	8,983[b]	3,000	315,000	,000	,996
	Wilks' Lambda	,921	8,983[b]	3,000	315,000	,000	,996
	Hotelling's Trace	,086	8,983[b]	3,000	315,000	,000	,996

Effect		Value	F	Hypothesis df	Error df	Sig.	Observed Power[c]
	Roy's Largest Root	,086	8,983[b]	3,000	315,000	,000	,996
PCCU	Pillai's Trace	,025	2,648[b]	3,000	315,000	,049	,645
	Wilks' Lambda	,975	2,648[b]	3,000	315,000	,049	,645
	Hotelling's Trace	,025	2,648[b]	3,000	315,000	,049	,645
	Roy's Largest Root	,025	2,648[b]	3,000	315,000	,049	,645
PCIU	Pillai's Trace	,058	6,422[b]	3,000	315,000	,000	,968
	Wilks' Lambda	,942	6,422[b]	3,000	315,000	,000	,968
	Hotelling's Trace	,061	6,422[b]	3,000	315,000	,000	,968
	Roy's Largest Root	,061	6,422[b]	3,000	315,000	,000	,968
TypesofSearch * PCKU	Pillai's Trace	,024	2,576[b]	3,000	315,000	,054	,631
	Wilks' Lambda	,976	2,576[b]	3,000	315,000	,054	,631
	Hotelling's Trace	,025	2,576[b]	3,000	315,000	,054	,631
	Roy's Largest Root	,025	2,576[b]	3,000	315,000	,054	,631
TypesofSearch * PCEU	Pillai's Trace	,016	1,656[b]	3,000	315,000	,176	,433
	Wilks' Lambda	,984	1,656[b]	3,000	315,000	,176	,433
	Hotelling's Trace	,016	1,656[b]	3,000	315,000	,176	,433
	Roy's Largest Root	,016	1,656[b]	3,000	315,000	,176	,433

Effect	Value	F	Hypothesis df	Error df	Sig.	Observed Power[c]	
TypesofSearch * PCCU	Pillai's Trace	,022	2,324[b]	3,000	315,000	,075	,582
	Wilks' Lambda	,978	2,324[b]	3,000	315,000	,075	,582
	Hotelling's Trace	,022	2,324[b]	3,000	315,000	,075	,582
	Roy's Largest Root	,022	2,324[b]	3,000	315,000	,075	,582
TypesofSearch * PCIU	Pillai's Trace	,019	2,072[b]	3,000	315,000	,104	,528
	Wilks' Lambda	,981	2,072[b]	3,000	315,000	,104	,528
	Hotelling's Trace	,020	2,072[b]	3,000	315,000	,104	,528
	Roy's Largest Root	,020	2,072[b]	3,000	315,000	,104	,528

a. Design: Intercept + TypesofSearch + PCKU + PCEU + PCCU + PCIU + TypesofSearch * PCKU + TypesofSearch * PCEU + TypesofSearch * PCCU + TypesofSearch * PCIU

b. Exact statistic

c. c. Computed using alpha = ,05

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Observed Power[d]
Corrected Model	Satisfactiontrip	51,235[a]	9	5,693	4,513	,000	,998
	Satisfactionprice	90,185[b]	9	10,021	5,741	,000	1,000
	Satisfactionbest	56,611[c]	9	6,290	2,753	,004	,955
Intercept	Satisfactiontrip	11370,272	1	11370,272	9014,377	,000	1,000
	Satisfactionprice	9582,954	1	9582,954	5490,676	,000	1,000
	Satisfactionbest	9293,254	1	9293,254	4067,869	,000	1,000
TypesofSearch	Satisfactiontrip	1,385	1	1,385	1,098	,295	,181
	Satisfactionprice	,211	1	,211	,121	,728	,064
	Satisfactionbest	2,858	1	2,858	1,251	,264	,200
PCKU	Satisfactiontrip	2,036	1	2,036	1,614	,205	,245
	Satisfactionprice	1,077	1	1,077	,617	,433	,123
	Satisfactionbest	,901	1	,901	,395	,530	,096
PCEU	Satisfactiontrip	24,465	1	24,465	19,396	,000	,992
	Satisfactionprice	31,763	1	31,763	18,199	,000	,989
	Satisfactionbest	24,870	1	24,870	10,886	,001	,908
PCCU	Satisfactiontrip	3,015	1	3,015	2,390	,123	,338
	Satisfactionprice	2,508	1	2,508	1,437	,232	,223
	Satisfactionbest	17,666	1	17,666	7,733	,006	,792
PCIU	Satisfactiontrip	8,721	1	8,721	6,914	,009	,746
	Satisfactionprice	28,988	1	28,988	16,609	,000	,982
	Satisfactionbest	,021	1	,021	,009	,924	,051
TypesofSearch * PCKU	Satisfactiontrip	6,804	1	6,804	5,394	,021	,639
	Satisfactionprice	1,633	1	1,633	,936	,334	,161
	Satisfactionbest	,556	1	,556	,243	,622	,078
TypesofSearch * PCEU	Satisfactiontrip	,382	1	,382	,303	,582	,085
	Satisfactionprice	7,701	1	7,701	4,412	,036	,553
	Satisfactionbest	2,190	1	2,190	,959	,328	,164
TypesofSearch * PCCU	Satisfactiontrip	,063	1	,063	,050	,823	,056
	Satisfactionprice	9,771	1	9,771	5,599	,019	,655
	Satisfactionbest	,007	1	,007	,003	,955	,050
TypesofSearch * PCIU	Satisfactiontrip	9,188E-5	1	9,188E-5	,000	,993	,050
	Satisfactionprice	2,073	1	2,073	1,188	,277	,192
	Satisfactionbest	7,469	1	7,469	3,269	,072	,438

a. R Squared = ,114 (Adjusted R Squared = ,088)

b. R Squared = ,140 (Adjusted R Squared = ,116)

c. R Squared = ,073 (Adjusted R Squared = ,046)

d. Computed using alpha = ,05

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Satisfactiontrip	Intercept	6,208	,080	77,302	,000	6,050	6,366
	[TypesofSearch=1]	-,136	,129	-1,048	,295	-,390	,119
	[TypesofSearch=2]	0[a]	.	.	.	.	.
	PCKU	,234	,079	2,973	,003	,079	,389
	PCEU	-,245	,082	-2,977	,003	-,407	-,083
	PCCU	-,116	,078	-1,487	,138	-,270	,038
	PCIU	-,164	,085	-1,932	,054	-,331	,003
	[TypesofSearch=1] * PCKU	-,303	,130	-2,323	,021	-,559	-,046
	[TypesofSearch=2] * PCKU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCEU	-,070	,127	-,551	,582	-,320	,180
	[TypesofSearch=2] * PCEU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCCU	,029	,131	,224	,823	-,229	,288
	[TypesofSearch=2] * PCCU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCIU	-,001	,125	-,009	,993	-,247	,245
	[TypesofSearch=2] * PCIU	0[a]	.	.	.	.	.
Satisfactionprice	Intercept	5,610	,094	59,391	,000	5,424	5,796
	[TypesofSearch=1]	,053	,152	,348	,728	-,246	,352
	[TypesofSearch=2]	0[a]	.	.	.	.	.
	PCKU	,134	,093	1,450	,148	-,048	,317
	PCEU	-,162	,097	-1,673	,095	-,352	,029
	PCCU	-,275	,092	-2,995	,003	-,456	-,094
	PCIU	-,380	,100	-3,808	,000	-,576	-,184
	[TypesofSearch=1] * PCKU	-,148	,153	-,967	,334	-,450	,153
	[TypesofSearch=2] * PCKU	0[a]	.	.	.	.	.

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	[TypesofSearch=1] * PCEU	-,314	,150	-2,101	,036	-,609	-,020
	[TypesofSearch=2] * PCEU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCCU	,365	,154	2,366	,019	,062	,669
	[TypesofSearch=2] * PCCU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCIU	,160	,147	1,090	,277	-,129	,450
	[TypesofSearch=2] * PCIU	0[a]	.	.	.	.	.
Satisfactionbest	Intercept	5,648	,108	52,262	,000	5,436	5,861
	[TypesofSearch=1]	-,195	,174	-1,118	,264	-,537	,148
	[TypesofSearch=2]	0[a]	.	.	.	.	.
	PCKU	,012	,106	,112	,911	-,197	,220
	PCEU	-,199	,111	-1,793	,074	-,417	,019
	PCCU	-,240	,105	-2,288	,023	-,447	-,034
	PCIU	,144	,114	1,263	,208	-,080	,369
	[TypesofSearch=1] * PCKU	,087	,175	,493	,622	-,259	,432
	[TypesofSearch=2] * PCKU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCEU	-,168	,171	-,979	,328	-,504	,169
	[TypesofSearch=2] * PCEU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCCU	-,010	,177	-,057	,955	-,358	,337
	[TypesofSearch=2] * PCCU	0[a]	.	.	.	.	.
	[TypesofSearch=1] * PCIU	-,304	,168	-1,808	,072	-,635	,027
	[TypesofSearch=2] * PCIU	0[a]	.	.	.	.	.

a. *This parameter is set to zero because it is redundant.*
b. *Computed using alpha = 0,05*