CHOICE OVERLOAD IN E-TOURISM

The influence of choice complexity and maximizing tendency on post choice satisfaction

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Executive Summary

The dynamic nature of the market with constant technological developments continuously changes expectations from users over time. This drives businesses to alter their product and service offerings to maintain a competitive advantage, stable growth and, high customer satisfaction. Since economic goals drive businesses, it is often assumed that abundance of choice options is better, and will eventually result in increased profitability for the business. However, this is not necessarily the case. Consumers may experience a subjective state of mind termed as "choice overload" when presented with a plenitude of choice options. Consequently, consumers may fall victim to indecision, reduced customer satisfaction, and increased regret, to name a few.

Previous research has formulated a cohesive understanding of choice overload in consumer decision making. Extant research in the field of consumer behaviour has identified several antecedents and concomitants of choice overload experienced by consumers. A vast bulk of research has also discovered repugnant effects of choice overload, due to context-dependency and other intrinsic and extrinsic factors influencing the choice overload effect. As a result, the questions of when and whether large assortments are detrimental to consumers remains open. This, offers an opportunity to extend the literature in this field by considering different contextual factors and variables that were thus far overlooked.

The present study specifically aims to reduce the research gap that exists between Human-Computer Interaction (HCI) by understanding the choice overload effect, within the domain of e-tourism. Apprehension of the choice environment and consumer purchase behaviour is essential to close this existing gap and increase customer satisfaction. In this study, choice complexity is considered as an antecedent of choice overload. Choice complexity encapsulates two structural factors of the choice set – number of alternatives and number of attributes/levels. These factors allow for the construction of a measurement variable for choice complexity (entropy) where high entropy translates to high choice complexity. Moreover, individual differences in maximizing behavioural tendency (in terms of strategy and goal) are investigated. When consumers score high on maximizing tendency strategy, they optimize choice through employing a strategy of extensive information search. Similarly, when consumers score high on maximizing tendency goals, they strive to obtain the best possible choice from the available alternatives. Post-choice satisfaction is defined as the post-decision evaluation of the choice selected by the consumer. Specifically measured on two constructs - general satisfaction and outcome satisfaction. General satisfaction measures satisfaction of the consumer related to the process of arriving at a decision. Whereas, outcome satisfaction measures satisfaction related to the certainty in the choice decision.

A choice experiment practically assessed the relationship between choice complexity and post-choice satisfaction, moderated by consumer purchase behaviour. The experimental design consisted of a Low Complex (LC) choice set and a High Complex (HC) choice set (distinguished based on entropy measurements) that allowed for the measurement and

comparison of perceived complexity in a complicated choice environment. Respondents conducted a post-choice questionnaire designed to assess post-choice satisfaction and perceived choice complexity. Consumer purchase behaviour was assessed in a different section of the survey based on two different scales - maximizing tendency strategy and maximizing tendency goal. Statistical analysis was conducted on the obtained data to find the relationship between the variables under study.

The experiment established the existence of choice complexity in e-tourism. Results showed an inverse relationship between choice complexity and post-choice satisfaction indicating that respondents were less satisfied with their choice when presented with a choice set of high choice complexity. Moreover, maximizing tendency strategy negatively influenced this relationship. Maximizers (i.e., respondents who scored high on the scale assessing maximizing behavioural tendency for strategy), extensively search through alternatives, eventually to formulate trade-offs and comparisons between the alternatives presented. Such maximizers were less satisfied with their choice having gone through a choice set of high complexity as compared to a choice set of low complexity. No such effects were found for the scale, maximizing tendency goals.

The detriments of offering too much choice are real. Businesses within service industries such as e-tourism are therefore recommended to improve the quality/quantity of content due to intrinsic (i.e., intangibility, high monetary value, less purchase frequency) and extrinsic (i.e., a high number of alternatives and number of attributes/levels) factors. Each of these factors may make the service offering more complex for consumers to choose from. Managerial implications of the present study include the perspective (technology-centered view and human-centered view) that businesses can adopt. This perspective acknowledges the existence of choice complexity and maximizing tendencies, thereby optimizing the digitized environment towards better personalization. Doing this correctly would result in increased customer satisfaction due to better adaptation of digital environments by businesses to the needs and behaviours of consumers. The inclusion of entropy accurately provides the amount of information in bits; this measurement variable could be used by businesses to improve their algorithms. Finally, some companies in e-tourism have already begun to implement similar strategies, and reported in a significant increase in customer satisfaction, reservations, and overall sales. This gives evidence towards the practical importance of this study, and further emphasizes that businesses can indeed optimize their approach specifically towards the quality/quantity of content provided to consumers.

In conclusion, the present study shows a negative relationship between choice complexity and post-choice satisfaction, with the inclusion of maximizing tendencies within the domain of e-tourism. Business may derive implications from this research to optimize their digital environments through increase in content personalization and reduction in choice complexity.

Acknowledgements

Contents

List of Tables

List of Figures

List of Abbreviations

RCT	Rational Choice Theory
HCI	Human Computer Interaction
MS	Maximization Scale
MT	Maximizing Tendency
MTS	Maximizing Tendency- Strategy
MTG	Maximizing Tendency- Goal
PCS	Post Choice Satisfaction
LC	Low Complexity
HC	High Complexity
ANOVA	Analysis of Variance
ANCOVA	Analysis of Covariance
FFM	Five Factor Model
AI	Artificial Intelligence
ML	Machine Learning

1. Introduction

The introductory chapter establishes the general background of the topic under study, and funnels down the scope of this research within the domain of e-tourism. The problem analysis comprises of the current research gap. It integrates the scientific relevance of this study and the practical problem, including implications businesses are expected to derive through this research. Finally, the research objective, research questions, and details about research methodology will be provided.

1.1. Background

People are faced with multiple choices in different contexts of their life. Everyday purchase decisions for consumers have become overwhelming, especially when there are too many options to choose from. Choice overload is defined as a setting, where an individual experiences difficulty during the choice behaviour due to an abundance of choices (Beierle, Aizawa, Collins, & Beel, 2019). Choice overload has negative consequences on the ultimate decision made by the consumer resulting in a less expected sale that may affect the source or the provider of choice (Scheibehenne, Greifeneder, & Todd, 2010). It might seem like consumers have a larger variety to choose from, but people often lead to indecision due to the wide variety of choices, variable attributes and parameters accompanied with it (Iyengar & Lepper, 2000a; Scheibehenne et al., 2010; Schwartz et al., 2002). When presented with different products, consumers tend to assess the costs and benefits of the product prior to a purchase decision.

Choice overload has essential theoretical and practical implications within various different settings. From a theoretical standpoint, it goes against various (primarily: rational) choice models created in the fields of economics and psychology, by showing its adverse effects when a choice set has increased (Goodman & Arrow, 1953). From a practical standpoint, a decrease in customer satisfaction allows for the interplay between consumer purchase behaviour and product and service offerings. The idea of choice overload is not necessarily the increase in choices in itself. It also depends on the influence of choice complexity, as an antecedent of choice overload (Chernev, Böckenholt, & Goodman, 2012). Choice complexity is dependent on the amount of information in a given choice set. Additionally, high differentiation in the presented attributes within the available alternatives and the choice context may lead to higher choice complexity (Greifeneder, Scheibehenne, & Kleber, 2010a). However, the perception of complexity may vary with the psychological mindset of the individual consumer.

Behavioural economics distinguishes two types of individuals - maximizers and satisfiers, based on the way rationalizing is contemplated when offered with choices. Maximizers usually end up unsatisfied with their final decision, because they strive to choose the best possible choice. They assess the attributes intricately towards their goal to achieve the best choice, ultimately leading to discontent (Schwartz et al., 2002). Satisfiers, on the other hand, choose an option, which adequately satisfies their needs, implying low exhaustive rationalizing during their decision-making process.

A comprehensive understanding of consumer behaviour is essential to increase personalization inherently having a positive influence on customer satisfaction in a particular choice context (e-tourism in this research). Therefore, this research focuses on considering choice complexity, individual differences in maximization and their respective roles on customer satisfaction, with intentions to understand their effects and provide relevant solutions.

1.2. Research Scope

This research focuses on the domain of e-tourism – specifically, on the choice context consumers face in the online booking of hotel accommodation. A vast bulk of research states the detrimental effects of offering more choice in such settings. Choice overload is experienced in a variety of contexts, and e-tourism is an ideal domain where consumers experience a wide variety of choices specifically in an online environment (Werthner et al., 2015).

Research has shown both an inverse and a direct relationship between customer satisfaction and choice set size in choice overload, thereby exhibiting a two pronged effect on customer satisfaction (Chernev et al., 2012b; Chernev & Chernev, 2014; Payne, 1976; Scheibehenne, Greifeneder, & Todd, 2009; Sirakaya & Woodside, 2005). This is due to its dependence on the domain within which this effect is studied, and because of various moderating and mediating factors considered in prior studies. The final stage in the process of consumer decision-making is post-decision behaviour. In this stage, consumers assess if they are satisfied/dissatisfied with their choice termed as post-choice satisfaction (Oliver, 1996). The choice environment can have a significant influence on post-choice satisfaction (Chernev, Böckenholt, & Goodman, 2012a). Variables influencing customer satisfaction may differ based on the context of research, also within the domain of e-tourism.

This enhances possibilities to extend research in choice overload and its influence within a particular domain. Choice complexity is included in this research to further understand the occurrence of choice overload, going beyond previous studies in the domain of e-tourism. An increase in choice complexity influences the decision-making process of the consumer, due to increased cognitive strain (Malhotra, 1982). Different theories in rational decision-making explain the various strategies consumers use to arrive at a decision. The subjective nature of decision-making might explain the variability in results towards the negative effects of choice overload. Researchers (Iyengar & Lepper, 2000; Reutskaja & Pompeu Fabra Barcelona, 2008; Scheibehenne et al., 2010; Schwartz et al., 2002) studied individual differences in maximizing and satisficing when consumers are presented with a large assortment size. These studies found that assortment size influences individual differences in maximization resulting in

negative consequences of choice overload. Consumer purchase behaviour, specifically the tendency to maximize, is included in this research to better understand its influence on customer satisfaction. Surprisingly, there has been no research on the influence of choice complexity on customer satisfaction with the inclusion of maximizing tendencies in the domain of e-tourism.

Therefore, the influence of choice complexity in relation with consumer purchase behaviour (maximizing tendencies) on post-choice satisfaction is studied in this research.

1.3. Problem Analysis

1.3.1. Prior Research and Knowledge Gap

The empirical research conducted by Iyengar and Lepper (2000a) was the first to argue that a large variety of choice is inimical to decision making. In their study, they set up exotic jams in a departmental store with two assortment sizes. One table had 6 varieties, whereas the other had 24 varieties of jam. Interestingly, a higher number of people approached the table, which contained 24 varieties, but only 3% actually purchased the product. Despite having a lower audience attracted to the table containing 6 varieties, 30% of consumers bought at least one product variety.

This study demonstrated that, although a large choice set may look appealing to the consumer (giving them freedom of choice), it can ultimately have negative consequences on the final decision taken. The presence of many different options, each with its own attributes makes it harder to arrive at a conclusive decision. Similarly, Schwartz (2004) has argued that, despite a larger choice set is appealing to consumers, it has demotivating consequences, referred to as the "paradox of choice".

Apart from defining and explaining choice overload based on assortment size, recent research has expounded the use of different moderating variables. Gourville and Soman (2005), for instance, elucidated the moderating effect of assortment alignment based on brand variants. Their study shows how an increase in assortment size and non-alignment of choices (i.e., alignment is operationalized based on brand dimensions) had detrimental consequences on brand choice. Choice overload experienced by consumers is a combination of a large assortment size and non-alignment of choices, making the process of decision-making more complex. A similar study by Fasolo, McClelland, and Todd (2007) found that consumers find it easier to rationally analyse and decide between choices with fewer attributes. Chernev and Hamilton (2009) extend decision research by pointing to the presence of ideal point availability for having positive effects on decision-making in larger assortments. Similarly, the unfavourable effect of choice overload in general is due to the presence of a few necessary preconditions, such as prior preferences. Consumers with specific prior preferences prefer large assortments, thereby decreasing the effects of choice overload (Greifeneder, Scheibehenne, & Kleber, 2010b).

The effect of choice overload is observed based on the change in internal state of the consumer - i.e., an increase in decision regret, decrease in post-choice satisfaction, decrease in decision confidence (Chernev et al., 2012b). When consumers face large assortments, they may experience regret and dissatisfaction. A large number of options tend to increase consumer's

expectations from their selected choice. This leads to comparing their choice with other alternatives, resulting in reduced satisfaction from their chosen option, despite obtaining good results (Diehl and Poynor, 2010).

The effects of choice overload are highly context-dependent (Al-Aomar & Dweiri, 2008). Several studies (Chernev, 2003; Diehl & Poynor, 2010; Gourville & Soman, 2005; Iyengar & Lepper, 2000b) show the negative effects of choice overload in simple goods (i.e., product offerings with limited attributes and contextual factors) influencing the decision-making process. However, research within complex goods (i.e., service offerings that involve high monetary risks, intangibility, exhaustive attributes, and contextual factors) is rather scarce (Bärenbold, Grieder, & Schubert, 2020). The domain of e-tourism in this context offers complex goods, later discussed in section 2.5.

Prior choice overload research within the context of tourism (Matzler & Waiguny, 2005; Nicolau & Más, 2008) suffers from limitations. Specifically, the major antecedents (choice complexity, preference uncertainty, decision goal) and consequences of choice overload (decision regret, post-choice satisfaction, decision confidence, choice deferral, switching likelihood, and option selection) have not been considered. Park and Jang (2013) included choice deferral as a consequence of choice overload in tourism but did not consider the influence of individual behavioural differences in maximizing in an online environment. Furthermore, the recommendations by Park and Jang (2013) mainly centered on the number of options (i.e., options higher than 22 would lead to choice deferral).

Therefore, this study will extend prior research on choice overload in tourism by considering two aspects. First, it will operationalize choice complexity as an antecedent of post-choice satisfaction. It is hard to differentiate choice overload effects between a simple and a complex good based only on the number of options (Townsend & Kahn, 2014). Simple goods (i.e., consumer goods) contain less number of attributes and attribute levels, whereas complex goods (i.e., tourism services) contain multiple attributes and attribute levels that make the decision process far more complicated. It thus is essential to understand the amount of information in a choice set considering the number of alternatives and number of attributes/levels to obtain a cohesive understanding of the choice overload effects in e-tourism. This study will do so by considering choice complexity through an information measurement method (entropy).

Second, this study will consider the moderating effect of maximizing tendencies (based on two components) in a complex choice situation, and investigate the influence on post-choice satisfaction. Cheek and Schwartz (2016) recommended a 2-component model of maximization (based on maximizing strategies and maximizing goals) for future research involving the measure of maximization. This research will follow the recommendation, and use the maximization scales developed by Dalal et al.'s (2015) and Turner et al.'s (2012). This helps us understand individual differences specifically on the strategy and goals of the consumer in a variable complex choice situation.

1.3.2. Practical Problem

In this era of technological advancements, many retailers shift their businesses online due to the change in consumer buying habits. E-tourism by definition refers to "design, implementation and application of IT and e-commerce solutions in travel and tourism" (Werthner et al., 2015, p. 2). The use of technologies focusing on traveller experience, for activities such as online booking, tourist destination information among several others, offers several advantages over the traditional form of businesses. This includes a large variety of product selection, wider reach, and personalization. In the EU alone, there are about 727 million internet users, which accounts for 16% of the internet user distribution in the world – just below Asia which is at 50% (World Statistics, 2019). Travellers are benefitted from the convenience and fulfilling their needs with less effort, forcing retailers to increase customer satisfaction (Buhalis & Law, 2008; Pan, 2015). A growth of 23% every year has been predicted in the e-tourism industry (E-commerce worldwide - Statista, 2015), but choices are likely to increase beyond the corona era making it more difficult for consumers to make a decision (Gretzel et al., 2020).

The rise of e-tourism has brought about options for businesses in the tourism and hospitality industry to sell their services to a larger audience, leveraging their businesses through the use of technology. In order to gain a competitive advantage, businesses offer large varieties of product and service bundles to their consumers under the assumption that it can have positive growth in their profitability. Digital environments offer fewer constraints concerning the amount of information presented to consumers as compared to a brick and mortar environment. However, this may not be necessarily beneficial for the consumer due to the detrimental effects of choice overload (as discussed previously).

The major practical problem is the gap existing between human and computer interaction which inherently influences customer satisfaction (Stephanidis et al., 2019). On one side computer technology is not well adapted to the choice environment (Stephanidis et al., 2019). The choice environment as a component, in this particular context refers to the quality/ quantity of choices presented online in the e-tourism industry. The quality/quantity of choices (i.e., accommodation choices, destination choices, travel choices) presented by the system is not optimized to the specific expectations and needs of the user (Li, McCabe, & Xu, 2019). A technological system should enable users to make strategic decisions easier. Sivaji, Downe, Mazlan, Soo and Abdullah (2011) observed that only 56% of users made an attempt to purchase on an e-commerce website, despite showing interest. Of the several factors explaining this observation, one of them is *the confusion experienced* by consumers *due to the sheer number of options presented*.

On the other side, Preferences, attributes and recommendations are not tuned well enough to individual decision-making strategies and behavioural tendencies (Coba, Rook, Zanker, & Symeonidis, 2019). Personalization within the e-tourism domain is inadequate and has scope for tailoring it better for consumers (Piccoli, Lui, & Grün, 2017). Specifically, 53% of consumers believe that brands should increase personalization, while 36% are willing to pay more for a personalized experience (Loo, 2017). Adaptation mechanisms of personalization have three dimensions namely: user interface, content, and interaction process (Zanker, Rook,

& Jannach, 2019). For this problem analysis, content personalization is a good fit, due to the study of information presented to consumers in an online environment.

Maximizing tendency has been identified as an individual difference measure, well suited to understand and distinguish decision-making behaviour in consumers (Iyengar, Wells, & Schwartz, 2006; Parker, Bruine De Bruin, & Fischhoff, 2007; Schwartz et al., 2002). Consumers within digital environments largely exhibit two types of behaviours: information browsing and goal-directed search. Based on the way people make their purchase decision, maximizers strive towards obtaining the best possible outcome from their decision resulting in lower satisfaction. Satisfiers base their decisions on subjective preferences, hence do not suffer the same detrimental effects as maximizers (i.e., decrease in satisfaction).

Through this study, businesses within the tourism industry are expected to derive two major implications. First, comprehension of choice complexity in a given choice environment. The information measurement method (entropy) to distinguish choice complexity can be applied by businesses to tune their technological algorithms. Entropy provides an output in bits, exhibiting a linear relationship between the bit value and amount of information. Business are expected to reduce choice complexity in their online environments inherently to increase customer satisfaction. Second, personalization algorithms (content personalization) can be enhanced by including more relevant variables related to consumer purchase behaviour (information browsing and goal directed search) in an online environment. Therefore, it is essential for businesses to enhance their understanding on consumer purchase behaviour and focus towards personalizing content – if they aim at research and development in areas of customer/user experience, customer engagement, marketing, recommender systems among several others. Apprehension of the choice environment and consumer purchase behaviour can result in enhanced computer systems that eventually close the gap existing between human and computer interaction.

1.4. Research Objective

This research focuses on the choice overload problem by understanding the main objective of this research –

To investigate the influence of choice complexity on post-choice satisfaction as a function of the consumer's maximizing tendency within the e-tourism domain.

The main variables considered in this research with a short definition are presented below:
- *Choice Complexity:* Choice complexity reflects the combination of two structural features of a consumer product/service: number of alternatives and number of attributes/levels in a given choice set (V. Danthurebandara, Yu, & Vandebroek, 2014; Lurie, 2004). Other intrinsic aspects that are essential determinants of choice complexity specifically within the domain of e-tourism are higher monetary value, intangibility, less purchase frequency and lower experience, which make the decision making furthermore complex (Park & Jang, 2013). The concept of choice complexity is explained in section 2.3 and further applied in the domain of e-tourism in section 2.5.

- *Maximizing tendency:* It is the consumer purchase behaviour where subjective differences (decision difficulty, decision goal, exhaustive information search, decision regret) occur when consumers are presented with an extended array of choices towards their desire to optimize choice (Cheek & Schwartz, 2016). In this research, consumer's maximizing tendency to search for alternatives (strategy) and their decision goal to obtain the best option is studied. The concept is explained in section 2.4.
- *Post-choice satisfaction:* Post-decision evaluation of whether the choice selected among the several different alternatives aligns with the desires and expectations of the customer resulting in satisfaction/dissatisfaction. In this research, two factors are assessed to encapsulate post-choice satisfaction - process satisfaction and outcome satisfaction.

This research aims to understand the consequence of choice overload, and consider choice complexity as a variable influencing post-choice satisfaction. Also, the way in which people perceive a choice situation due to their maximizing tendency plays a role in this context.

1.5. Research Question

To give a clear direction for this research and following from the objective of this research, the main research question has been framed as:

RQ: To what extent does an increase/decrease in choice complexity affect post-choice satisfaction in the domain of e-tourism, and to what extent is this relationship influenced by personal maximizing tendency?

To fulfil the research objective and answer the main research question, the following more specific sub-research questions have been composed based on the variables under study.

- *SRQ1: How does choice complexity exist in the domain of e-tourism?*

It is essential to go beyond the phenomenon of choice overload, and to address the concept of choice complexity within a particular domain. With limited research in this regards, this question aims to understand the concept of choice complexity, and it's fit within the e-tourism domain.

- *SRQ2: Does an increase in choice complexity negatively influence post choice satisfaction?*

It will be interesting to investigate an influence on post-choice satisfaction through variation in information provided to consumers between a low complex choice set and a high complex choice set.

- *SRQ3: Is the negative relationship between choice complexity and post-choice satisfaction moderated by a person's maximizing tendency – strategy?*
- *SRQ4: Is the negative relationship between choice complexity and post-choice satisfaction moderated by a person's maximizing tendency – goal?*

SRQ3 and SRQ4 are based on the 2-component maximizing tendency model by Cheek and Schwartz (2016). This research will especially focus on understanding, if there is a significant difference between a maximizer (an individual scoring high on maximizing tendency) and a satisfier (an individual scoring low on maximizing tendency) on choice complexity, and how this interaction influences post-choice satisfaction.

1.6. Research Methodology

To answer the sub-questions presented in section 1.5, an extensive literature review will be conducted identifying relevant studies. After this, a choice experiment will be designed to simulate a (high vs low) complex choice condition, while also measuring a person's maximizing tendencies (Goal/Strategy). Results from the choice experiment are analysed to derive implications to answer the research questions.

SRQ1	**Research Approach** Literature Review + Statistical Analysis
SRQ2	**Research Approach** Choice Experiment + Statistical Analysis
SRQ3	**Research Approach** Choice Experiment with Maximizing scale - Strategy + Satistical Analysis
SRQ4	**Research Approach** Choice Experiment with Maximizing scale - Goal + Statistical Analysis

Figure 1. Research Methodology

1.7. Thesis Outline

Figure. 2 outlines the structure of the thesis with chapter-wise classification, and a brief description of the content discussed in each chapter.

Ch: 1   Introduction
- Background information of the topic including the problem analysis and research direction

Ch:2   Theoritical Background
- Literature review and background information of the current variables under study

Ch:3   Conceptual Framework
- Conceptual model and hypothesis applied in the research

Ch:4   Research Methodology
- Procedure, experiment design and measures are elucidated

Ch:5   Results
- Data obtianed from the choice experiment is reported and analysed

Ch:6   Discussion
- Implications and recommendations are presented with scientific and practical relevance

Ch:7   Conclusion
- Conclusion of the research, including a brief summary of the findings of this research

Figure 2. Thesis Outline

2. Theoretical Background

This chapter provides the theoretical foundation with all the literature and theories on the way people make choices relevant for this research. It starts with establishing the concept (and detrimental effects) of choice overload, after which an elucidation is provided on contradicting observations in different choice contexts. Since choice overload is a subjective state of a consumer during the decision making process, it cannot be measured/observed directly. Hence, choice complexity is considered as an antecedent of choice overload and explained further in this chapter. The role of consumer purchase behaviour is yet another important characteristic in choice research which is presented using the maximization theory. The chapter concludes by applying the concept of choice complexity and the different determinants applicable within the context of e-tourism.

2.1. How Do People Make Choices?

Scientific literature in the field of psychology (Reutskaja & Hogarth, 2009; Soon, Brass, Heinze, & Haynes, 2008), economics (Babutsidze, 2012; V. Danthurebandara et al., 2014) and cognitive sciences (Scheibehenne, Rieskamp, & González-Vallejod, 2009) attempted to answer the question of how people make choices. Previous research in recommender systems expounds on human decision-making by understanding the process of how people make choices to consequently support choices on behalf of the consumer (Burke, 2002, 2007; Jameson et al., 2015). For instance, extracting research from psychology into the domain of HCI, Jameson et al. (2015) distinguishes choice patterns that humans employ in the decision-making process. One such choice pattern relevant for this research is an attribute-based choice pattern.

The user applies the attribute-based choice pattern when evaluating given options based on the utility attached to its attributes/levels. Roughly speaking, the consumer selects a choice based on important attributes, which have a strong influence in the decision-making process (i.e., within the tourism context, consumers could make their choice only based on the importance attached to the relevant attributes/levels, explained in section 2.5). The consumer then reduces the number of options for further evaluation based on the attribute information provided. When individuals face a large assortment size, they often use a compensatory strategy to reduce their cognitive strain (Payne, 1976). However, the decision- making style of an individual varies based on the moderators present such as prior knowledge, pre-defined preferences, and characteristics of attributes (Scheibehenne & Greifeneder, et al., 2009). Individuals in most cases do not have a precise evaluation criteria to funnel down and select the most suitable choice options from a large choice set (Chernev, 2003).

Consumers are often presented with choice contexts (product/service context) and choice environments (digital/physical environment) where they have limited expertise – hence a lack of an evaluation criteria (Chernev, 2006). In such cases, when consumers are presented with a large assortment they are more likely to experience the negative consequences of choice overload (decrease in satisfaction, increase in decision difficulty, and increase in decision regret). Following the attribute-based choice pattern, an increase in choice set size correspondingly increases the number of relevant attributes/levels. This makes the decision making process more complex, due to more attribute information leading to higher cognitive costs for evaluation. Therefore, high choice overload can have negative consequences depending on the context and environment of choice.

2.2. Pros and Cons of Choice Overload

The concept of choice overload has enticed researches due to its two-pronged effect. As a positive effect, research by Reibstein, Youngblood and Fromkin (1975) describes the increase in "decision freedom" experienced by consumers when they are presented with a large choice set. They also tested the findings of various consumer behaviour studies and found an increase in customer satisfaction and product preference. Businesses can benefit from a competitive advantage by offering more choices, as consumers get a perceived sense of accomplishing their purchase goals from a retailer offering more choices and variety than the other (Betancourt & Gautschi, 1990; Messinger & Narasimhan, 1997). With certain commodities such as food, consumer's consumption increases especially when a variation is presented in terms of the food texture, taste, and appearance (Rolls et al., 1981). This implies to retailers with business establishments serving food, thereby improving their sales accordingly by increasing options provided to consumers.

On the contrary, high cognitive costs eventually contradict the benefits of a large assortment size (Chernev et al., 2012a). More choice gives consumers the freedom to choose between alternatives and product parameters. However, it also delays the decision to choose a particular product due to the level of uncertainty (i.e., if the chosen product matches their precise requirements) (Greenleaf & Lehmann, 1995). Conscientious thinking is a complex process, which helps individuals summarize their decisions based on the comparisons made. This involves much more effort and time to think, contemplate, and eventually execute the right decision (Kahneman, 2013). With a small assortment size - rationalizing, extenuating, and justifying an eventual choice is much easier with less expense of time and effort (Fasolo et al., 2007; Kahneman, 2013; Reutskaja & Pompeu Fabra Barcelona, 2008; Timmermans, 1993).

Current technological developments extend basic product offerings to convenience offerings, shopping offerings, speciality offerings, and unsought offerings. This increases choice concerning all kinds of product/service commodities. Studies use dependent variables in different research fields, accessing the outcome of satisfaction, confidence and measurement of choice overload. These studies give an overview of the positive and negative effects of large choice, simultaneously restricting it only to certain types of commodities and product varieties without considering the behavioural tendencies of consumers in their study. Some studies use different moderating variables such as social presence (Argo, Dahl, & Manchanda,

2005), spatial confinement (Levav Rui Zhu, 2009), and sensory attributes (Inman, 2001) to control the detrimental effects of choice overload and convert it into a benefit. Yet, it is difficult to find a cohesive understanding of the consequences of large assortment size on consumer behaviour.

2.3. Choice Complexity

Iyengar and Lepper (2000) observed the negative consequences of the choice overload effect within a choice experiment consisting of simple goods. However, other studies find a linear relationship between choice set size and satisfaction (Betancourt & Gautschi, 1990; Messinger & Narasimhan, 1997), causing a conflict with the effect under study. This begs the question as to the "when" of the choice overload effect. Several factors elucidate the antecedents of choice overload, namely choice complexity, decision difficulty, decision goal, and preference uncertainty (Chernev et al., 2012b; V. Danthurebandara et al., 2014). The inclusion of a complex good makes choice complexity a plausible variable in this research. This is, because it entails going beyond just a large number of choices but also considering extrinsic and intrinsic factors that make the choice environment furthermore complex (Townsend & Kahn, 2014).

Consumers tend to spend (or rather waste) more time with high choice complexity which, in turn, may lead to choice deferral, lower decision satisfaction, and quality (Fasolo, Carmeci, & Misuraca, 2009). Increase in choice complexity inherently causes an increase in cognitive strain, leading to inconsistency and inefficiency in decision making (V. Danthurebandara et al., 2014; Payne, 1976). Consumers find it harder to make a decision aligning with their preferences causing a "too much choice" effect, leading to lower post-choice satisfaction. If the consumer is provided with information of high quality and structure, it will be easier to assess the utility of an alternative, hence decreasing the complexity of the choice situation (Chan, 2015).

Abundant information provided through choices is essential to align the preferences of the consumer. However, a large number of choices accompanied with a negative correlation between the choices causes an increase in complexity (Fasolo, Carmeci, et al., 2009). A choice set containing dissimilar attributes is less complex than similar attributes (Fasolo, Carmeci, et al., 2009). A dominant option within the choice set also reduces choice complexity (Greifeneder et al., 2010b). A sequential structure is easier than a parallel structure while presenting alternatives in a given choice set (Van Herpen & Pieters, 2002). There are several studies on the concept of the attractiveness of options by Chan (2015), Bollen, Knijnenburg, Willemsen and Graus (2010), and by Chernev and Hamilton (2009b), which all conclude that post-choice satisfaction is negatively correlated with choice complexity. Integration of core products with multiple layers of services consequently increases the complexity in product and service bundles (Werthner & Ricci, 2004). Therefore, it is important to consider the decision environment while modelling consumer choice, and to include other variables that inhibit or facilitate the effect of choice overload.

In summary, choice behaviour is largely affected by dimensions of the information provided, which include information quantity, information quality, and structure of the information

(Keller & Staelin, 1987). These extrinsic dimensions encapsulate the complexity of the choice context as mentioned in the literature on choice complexity. For instance, when a choice set is presented with several alternatives and attributes, it makes the choice context more complex for the consumer. While extrinsic dimensions play a role in determining choice complexity based on the structural components of information, other intrinsic factors play an important role as well. Intrinsic factors such as prior preferences, knowledge of the product/service, and risks make the choice situation further more complex (V. Danthurebandara et al., 2014; Greifeneder et al., 2010b; Payne, 1976).

2.4. Maximization as an Intrinsic Moderator

Rational choice theorists have long debated that people have a certain understanding of their needs and goals, exhibiting action only through rational behaviour. In rational choice theory (RCT; Browning, Halcli, & Webster, 2000), individuals are motivated more towards their needs and goals which best match their preferences. They rationally evaluate their choice, which gives them maximum satisfaction in relation to the alternatives present. The choice made is to maximize their preferences, utilities, or values. While RCT is the fundamental principle of behavioural sciences, it adopts a normative approach, which is unrealistic. That is, people sometimes go against their personal interests in decision making, which is irrational (Herrnstein, 1990).

Nobel laureate Herbert Simon has modelled realistic decision processes in individuals to understand RCT. Apart from information constraints, there are psychological constraints of the individual to compute, analyse, and compare the alternatives to attain maximum utility. The structure of the environment, which affiliates with the goals or needs of the individual is an important variable in decision making (Simon, 1956; 1955). An individual is recognized as a satisfier when goals and expectations are adequately matched. However, a satisfier turns into a maximizer when presented with a plethora of choices. This drives the individual towards maximizing utility by choosing the best possible alternative (Simon, 1978).

Schwartz further developed the work of Simon by creating a personality scale to measure the extent to which an individual is more susceptible to maximizing or satisficing. According to Schwartz and colleagues, the maximizer's sole objective is to get the best alternative from the given choice set. The maximizer experiences higher detrimental effects of choice overload than satisfiers. Once a threshold of acceptability is reached, the satisfier makes its decision, therefore an increase in choices would not cause regret or dissatisfaction post-decision (Schwartz et al., 2002). Moreover, maximizers suffer from low esteem, satisfaction and optimism, while experiencing high levels of depression, regret, and perfectionism. Additionally, maximizers are more likely to make social comparisons than satisfiers (Schwartz et al., 2002).

The research of Schwartz helps us apprehend the reason behind the dissatisfaction of maximizers. In a pursuit to get maximum benefit from their decision, maximizers rely on external sources of information. They focus on one/few parameters evaluating based on reputation, social status, and other external cues. A maximizer is more likely to experience buyer's remorse since they are more prone to social comparisons to gauge the optimality of their choice. Furthermore, when a maximizer is presented with voluminous options of

different products it develops a sense of anxiousness of missing out on choosing the best option. This is because they strive towards perfectionism, thereby augmenting complexity in decision making (Iyengar & Lepper, 2000a; Iyengar et al., 2006).

Early on, Schwartz et al. (2002) had proposed a Maximization Scale (MS) to measure consumer's tendency to maximize. The MS, was later criticized by several researchers for its validity and reliability (Misuraca & Fasolo, 2018). Recent research within this domain has made developments to offer a better scale of maximization. Cheek & Schwartz (2016) made a model of maximization, which integrates all the important aspects considered by researchers on maximization into a 2-component model that explains the goal and strategy of maximization. The goal of an individual highly likely to maximize would always be to choose the best option. Additionally, a maximization strategy would be to consider different alternatives and make a comparison between the attributes assessing the merits and demerits of each choice. Cheek & Schwartz (2016) also made recommendations of scales to measure the distinction between a maximizer and a satisfier following the 2-components. The desire to choose the best option (Maximizing Tendency Goal – MTG) is best measured using Maximizers Tendency Scale (MTS-7) developed by Dalal et al. (2015). Similarly, the process of seeking and comparing alternatives (Maximizing Tendency Strategy – MTS) is best measured using Maximization Inventory (MI) developed by Turner et al. (2012).

2.5. Choice Complexity in E-Tourism

Consumer products provide a large variety in terms of choice options. However, tourism products also are different from other consumer products due to their intangibility (Reisinger, 2013), customer experience, and aspects of novelty seeking (Jang & Feng, 2007). Additionally, the decision-making process is much more complicated, due to the risks associated with choosing a particular option and unclear preferences of the consumer (Sirakaya & Woodside, 2005).

Some research in Human Computer Interaction (HCI) shows that visual representation of product choices has an important influence on the purchase behaviour of consumers (Häubl & Figueroa, 2002). Still other scholars claim that regardless of the user interface or other visual characteristics, the wholesome customer experience on purchasing a product or service has to be considered (Cai, Yu, & Xu, 2008; Minocha et al., 2006). Customer experience is improved by first analysing consumer purchase behaviour. To understand the process of consumer decision making in an online environment, research by Häubl & Trifts (2000) has explained 2 stages a consumer should follow to conclude its purchase decision which is similar to the attribute-based choice pattern elucidated in .

The first stage includes funnelling down options to the few most preferable ones. In the next stage, the available alternatives are further looked at in detail comparing the available attributes to finalize the decision. Individuals take multiple decisions over a period for planning for their vacation. Accommodation is of primary importance for choice selection and is done later in the process of decision-making after selecting a destination (Jeng & Fesenmaier, 2002). There are three factors considered from previous studies to establish the presence of choice complexity in e-tourism: (1) Number of alternatives, (2) Number of

attributes, and (3) Attribute Levels. To understand the choice environment consumer's experiences within e-tourism, two aspects are considered in this study: (1) e-information and (2) e-booking. These two aspects will be discussed in greater detail in the next paragraph.

2.5.1.   Number of Alternatives: E-Information
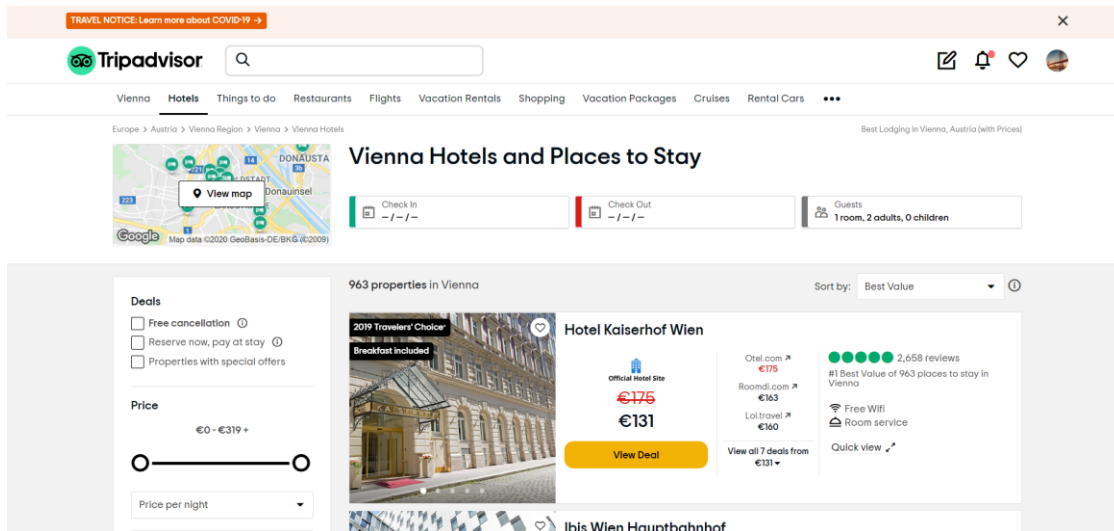
Figure 3 Example for e-information (Source: www.Tripadvisor.com)

E-information (visually depicted in fig. 3) gives an overview of all the choice options presented on the website - including information on virtual travel guides, audio information, and blogs about certain travel destinations (Vila, 2019). Despite providing information to the consumer, the product assortment produced can inherently lead to choice overload. To illustrate, there are 963 properties listed in the website (fig. 3), and each property is defined by its own attribute. This makes it a highly complicated process for consumers to assess their preferences, and to ease their decision-making process. The extensive choice size presented in a given choice environment shows an important determinant of choice complexity – the number of alternatives.

2.5.2.　　Number of Attributes: E-Booking

Figure 4 Example for e-booking (Source: www.Tripadvisor.com)

E-booking (visually depicted in fig. 4) specifically focuses on the service (hotel, airline, or car rental). In this case, the consumer delves deeper into its decision-making process, assessing choice based on the attributes presented. The attributes of the hotel (such as hotel location, reviews, price among several others) are analysed by the consumer. The second and third factor as a determinant of choice complexity in this choice context is the number of attributes and its levels. Consumers in e-tourism find it tedious to align their preferences with the relevant attributes and attribute levels, leading to decreased customer satisfaction and - in most cases - choice deferral and post-decision regret (Sirakaya & Woodside, 2005).

Additionally, other intrinsic factors including - higher monetary value, intangibility, less purchase frequency, and lower experience explain high choice complexity of tourism products (Park & Jang, 2013). The choice complexity is further aggravated based on maximizing tendencies of the consumer. These characteristics contribute to increasing the effects of choice complexity due to the nature of the service offering.

3. Conceptual Framework

This chapter includes the conceptual model and hypothesis development.

3.1. Conceptual Model

Based on the literature review presented in the previous chapter, a conceptual model has been developed, which represents the causal relationship between the variables under study.
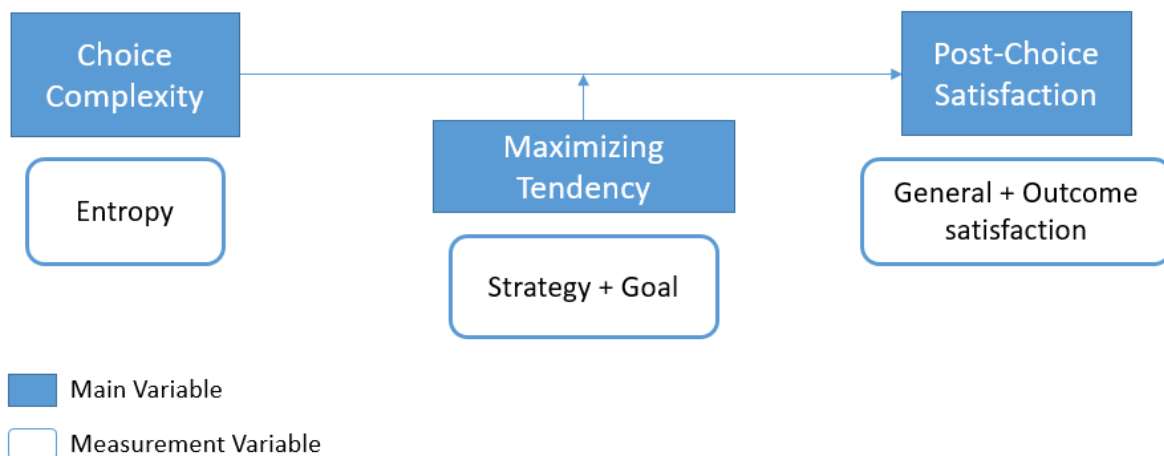
Figure 5. Conceptual Model

The conceptual model depicted in fig. 5 gives a visual apprehension of the interdependence between the main variables. In this research, choice complexity is employed as an independent variable measured in terms of entropy (elucidated in section 4.1). Maximizing Tendency (MT), the overarching moderator variable, assesses the inclination of a consumer towards maximization in decision-making. MT, includes two components – (1) Maximizing Tendency-Strategy (MTS) towards alternative seeking, and (2) Maximizing Tendency- Goal (MTG) towards choosing the best option. Post-choice satisfaction (PCS) is the dependent variable where the influence of main variables on PCS is studied. PCS is measured specifically on two constructs – (1) General Satisfaction: measures satisfaction related to the process of arriving at a decision and if the choice set presented matches with the preferences of the consumer, and (2) Outcome Satisfaction: measures satisfaction related to the certainty in the choice decision. The first construct of PCS aligns with previous literature in consumer purchase behaviour, on using a process to strategize and assess the available alternatives before making a choice. The

second construct of PCS, helps us observe if consumer preferences and the choice set presented are alignable, exhibiting higher, or lower satisfaction as a result after selecting a choice.

3.2. Hypothesis Development

To formulate the first hypothesis choice complexity is considered to influence post-choice satisfaction. The sole consideration of only the number of alternatives to test its influence on post-choice satisfaction has been considered insufficient by several researchers (Chernev, 2006; Goedertier, Geskens, Geuens, & Weijters, 2012; Reutskaja & Hogarth, 2009). Therefore, choice complexity is considered as a plausible variable in this research. Choice complexity extrinsically encapsulates the number of attributes and attribute levels in addition to the number of choice options in a given choice set. Previous studies on choice complexity (V. Danthurebandara et al., 2014; Payne, 1976; Ruokamo, Hanley, Juutinen, & Svento, 2016) observe a decrease in customer satisfaction when choice complexity increased. However, previous research studied the influence of choice complexity on customer satisfaction within simple goods i.e., consumer goods. Following the theoretical establishment of the existence of choice complexity within the domain of e-tourism in section 2.5. H1 helps validate this finding and understand the main effect of choice complexity on PCS. Choice complexity is distinguished into a Low Complex (LC) choice set and a High Complex (HC) choice set based on entropy values. Based on the literature, the following first hypothesis is composed:

H1: "High choice complexity negatively influences post-choice satisfaction"

Besides choice complexity, also subjective differences play an important role in influencing PCS. Maximizers (respondents with high maximizing tendency) are less satisfied with their choice as compared to satisfiers (Coba, Rook, & Zanker, 2020; Li et al., 2019; Misuraca & Fasolo, 2018; Zhu, Dalal, & Hwang, 2017). Hypothesis 2 is formulated to test whether maximizers exhibit lower post-choice satisfaction than satisfiers (respondents with low maximizing tendency), regardless of the complexity in the choice situation. H2a and H2b are formulated separately based on the two-component model of maximization. Maximizing Tendency Strategy (MTS) reflects a component of maximization towards optimizing decision making through exhaustive evaluation of the alternatives presented in the choice set. Maximizers in MTS follow a process of seeking information and comparing all the available alternatives inherently to form trade-offs between the choice options. H2a tests if individual differences in maximization, specifically if increase in MTS has a negative main effect on PCS.

Maximizing Tendency Goal (MTG) measures maximization towards choosing the best option among the alternatives presented. Previous research states that MTG is very similar to having high standards (Misuraca, Faraci, Gangemi, Carmeci, & Miceli, 2015; Richardson, Ye, Ege, Suh, & Rice, 2014; Turner, Rim, Betz, & Nygren, 2012; Werthner et al., 2015). On the contrary, distinguishing maximizers and satisfiers on the basis of high standards may not be accurate as both might have similar standards in some cases. Cheek and Schwartz (2016) drew a clear distinction between the characteristic of exhibiting high standards and the tendency to seek the

best option. Maximizers seek and choose a better option even after their standards are met, finally striving towards their goal to choose the best option from the alternatives provided in the choice set (Cheek and Schwartz, 2016). Therefore, H2b tests if individual differences in maximization, specifically, if increase in MTG has a negative influence on PCS.

H2a: "Increase in maximizing tendency strategy negatively influences post-choice satisfaction"

H2b: "Increase in maximizing tendency goal negatively influences post-choice satisfaction"

Finally, previous research states that maximizers (adopting an exhaustive information search strategy) exhibit lower post-choice satisfaction when presented with a large assortment (Schwartz et al., 2011). Previous research, considered only the number of options and assessed the moderating effect of maximizing tendencies on post-choice satisfaction. H3a is formulated to test the relationship between choice complexity and post-choice satisfaction, moderated by maximizing tendency strategy. This allows us to investigate if a variable complex choice situation has a negative impact on post-choice satisfaction when individuals employ an exhaustive information search strategy (i.e., through a process of searching through alternatives and formulating trade-offs between the choice options). Similarly, previous research states that maximizers (striving towards their goal to obtain the best option) experience low post-choice satisfaction when presented with a higher number of options (Schwartz et al., 2002). H3b tests the relationship between choice complexity and post-choice satisfaction, moderated by maximizing tendency goal (MTG). Investigating if a variable complex choice situation has a negative impact on post-choice satisfaction when individuals focus on their goal to select the best possible choice from the presented alternatives. Through hypothesis 3a and 3b, the final objective of this research - to investigate the relationship between choice complexity and post-choice satisfaction whilst moderated by maximizing tendencies - is tested.

H3a: "Negative influence of choice complexity on post-choice satisfaction is moderated by maximizing tendency strategy"

H3b: "Negative influence of choice complexity on post-choice satisfaction is moderated by maximizing tendency goal"

4. Methodology

This chapter demonstrates the methodology utilized to explore the hypothesized statements presented in the previous chapter. Before disseminating the online survey, variables considered in the experiment are explained in section 4.1, 4.2 and 4.3.

4.1. Measuring Choice Complexity

As discussed in section 2.3, it is inadequate to merely look at the number of choices to capture the influence of choice overload in an online environment. Determinants that influence choice complexity within the domain of e-tourism were conceptualised in section 2.5. The extrinsic measure of choice complexity includes the number of attributes/attribute levels, the number of alternatives, the negative correlation of attributes, and the presence of complex constructs (i.e., the lack of a dominant option, lack of structured information, decision aids, within the choice context). Each of those constructs is a component of complexity, instead of an overall measure (V. M. Danthurebandara, Yu, & Vandebroek, 2011).

Choice complexity in this experiment was operationalized by means of the concept of entropy is used as a measure of choice complexity. Entropy was first used by C. E. Shannon (1948) in the field of communication as a formal measure of information in messages. This concept has since been extended by Broadbent & Garner (1964), and is commonly used by researchers such as Cover & Thomas (2005), Lurie (2004), Fasolo, Carmeci, et al., (2009) & Fasolo, Hertwig, Huber, & Ludwig (2009) in the field of marketing and consumer research to measure choice complexity in a variable complex choice context. Interestingly, an experiment conducted by Jacoby, Speller, & Kohn (1974), varied the number of alternatives and attributes to test this variation on customer satisfaction. Lurie (2004) used equation (1) to obtain a measure of information that involved varying the number of alternatives and attributes. A similar measurement method is used in this research to assess the effect of choice complexity on PCS.

$$I(A) = -\sum_{i=1}^{m} p(a_i) \, log_2 \, p(a_i) \tag{1}$$

Here, $I(A)$ gives the entropy of a choice option in bits, a_i ($a_1, a_2, a_3, ...a_m$) are attribute levels of attribute A, whereas $p(a_i)$ is the frequency with respect to other alternatives in the given choice context. The entropy of a complete choice set is measured using equation (2), which considers the number of attributes, its levels, and the number of alternatives (Kienzler, 2017).

$$I(ASA) = I(A) * I(AS)$$
(2)

Here, AS is the number of alternatives in the given choice set. Entropy is calculated and distributed between two choice groups – Low Complexity (LC) and High Complexity (HC) (depicted in table.1). This gives an accurate distribution of choice sets with respect to the information structure and not just the number of alternatives. Fig. 6 gives a visual representation of the increase in entropy corresponding to the increase in alternatives/attributes.

Table 1. Complexity Division

	Entropy (bits)	Alternatives/Attributes
High Complexity	71.98	30/10
	38.80	30/5
Low Complexity	21.61	3/10
	12.56	3/5
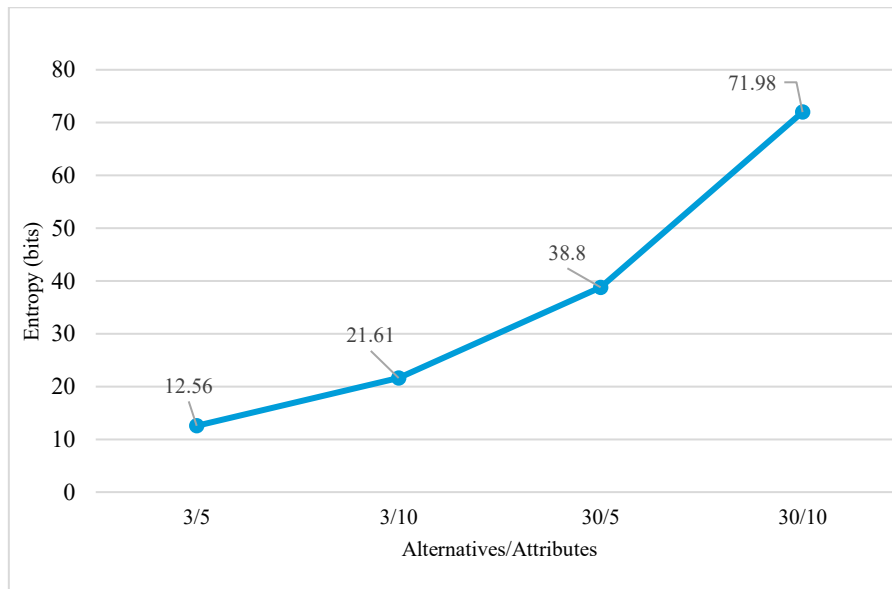
Figure 6. Entropy measurements of alternative/attribute combinations

4.1.1. Choice Alternatives

The variation in the number of alternatives is based on previous research (V. Danthurebandara et al., 2014; Greifeneder et al., 2010b; Ruokamo et al., 2016) as discussed in section 2.3. A high number of 30 alternatives was chosen to avoid the limitations present in the study by Gingras (2003), which failed to simulate a complex choice situation with a variation between 6 and 24 alternatives. Hotel options were presented with a generic picture used across all alternatives in the choice experiment to eliminate the bias of prior knowledge and other contextual factors (see fig.7). To eliminate the presence of a dominant option, the attribute levels were randomly distributed within each alternative in a choice set (refer to Appendix A).
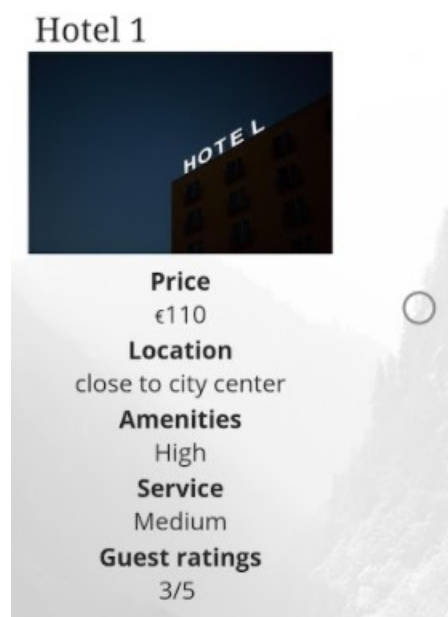
Figure 7. Example of choice option in the experiment

4.1.2. Choice Attributes

Research states that relevant attributes in tourism-related choice behaviour are subjective to the type of travel: business vs leisure. The attributes for the present study - (Table.2) were selected specifically so as to influence choice in leisure travel. Studies by (Lewis, 1983, 1984, 1985) had stated that the most relevant attributes for leisure travel include price, location, service, star rating, amenities, and safety.

Prior research by Dickinger & Mazanec (2008) had also used this set of relevant attributes, but added guest ratings/reviews as additional attribute to resemble an online environment. Additionally, research by Jang, Liu, Kang, & Yang (2018), Wong & Chi-Yung (2002), Kim & Perdue (2013) identified brand recognition, free breakfast, and options in the reservation as important attributes by consumers. In the present study, the attribute 'Options in Reservation' was modified into 'Special Deals' to render it more representative of e-tourism websites. Three attribute levels were selected in this research, as an increase in the number of attribute levels corresponds to an increase in value appointed to a particular attribute by the consumer (Green & Srinivasan, 1978). Information about the attribute levels 'price', 'location', 'hotel class', 'guest rating', 'breakfast included' and 'special deals' were taken from online sources

(Tripadvisor.com, Booking.com, Expedia.com, and Makemytrip.com). A detailed explanation of attribute levels: 'safety', 'service' and 'amenities' were taken from (Hotelstars Union, 2020).

Table 2. Hotel Attributes/ levels

Sl.no	Attributes	Attribute Levels	Literature sources: Attribute	Literature sources: Attribute Level
1.	**Price**	• €200 • €110 • €30	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Tripadvisor.com, Booking.com, Expedia.com and Makemytrip.com
2.	**Location**	• Close to the city centre • Close to Public Transport • Close to monuments	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Tripadvisor.com, Booking.com, Expedia.com and Makemytrip.com
3.	**Hotel Class**	• 4 star • 3 star • 2 star	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Tripadvisor.com, Booking.com, Expedia.com and Makemytrip.com
4.	**Guest Ratings**	• 4+ star • 3+ star • 2+ star	Dickinger & Mazanec (2008)	Tripadvisor.com, Booking.com, Expedia.com and Makemytrip.com
5.	**Service**	• *High*: 24 hr room service, television with full subscription, Laundry service, personalized greetings with refreshments, concierge, valet parking • *Medium*: 14 hrs reception and room service, hairdryer, sewing	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Hotelstars Union (2020)

		kit, minibar, Wi-Fi, restaurant, Valet parking, luggage service, television with basic subscription, telephone, daily room cleaning • *Low*: 14 hours reception and room service, Wi-Fi, television, soap and body wash		
6.	**Safety**	• *High:* 24 hrs security with surveillance, safe neighbourhood, personal locker in the room • *Medium:* Safe neighbourhood, no surveillance within the premise, no personal locker in the room • *Low:* Not a safe neighbourhood, no surveillance, no safe in the room	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Hotelstars Union (2020)
7.	**Amenities**	• *High:* Wi-Fi, Fitness facilities, swimming pool, restaurant, bar, Café, spa, bridal suites, conference facilities, bicycle rental, Jacuzzi, Game room • *Medium:* Wi-Fi, Swimming pool, restaurant/bar	Lewis (1983, 1984, 1985) Dickinger & Mazanec (2008)	Hotelstars Union (2020)

		• *Low:* Wi-Fi, restaurant, free parking, family friendly		
8.	**Brand**	• Internationally recognized • Local establishment	Kim & Perdue (2013)	Kim & Perdue (2013)
9.	**Breakfast included**	• Yes • No	Jang, Liu, Kang, & Yang (2018) Wong & Chi-Yung (2002)	Jang, Liu, Kang, & Yang (2018) Wong & Chi-Yung (2002)
10.	**Special Deals**	• Free Cancelation • Free Reservation, without credit • Loyalty discounts	Jang, Liu, Kang, & Yang (2018) Wong & Chi-Yung (2002)	Tripadvisor.com, Booking.com, Expedia.com and Makemytrip.com

4.2. Experimental Design

This study aimed to focus on the later stages of decision-making within the context of tourism, where decision-making entails accommodation choice.

The choice setting was considered with the following assumptions:

- A considerable amount of information seeking and processing should be performed before deciding to stay at a hotel
- The above point should also be dependent on the consumer decision-making ability/ maximizing tendency of the individual
- The service offered should be complex due to the factors discussed in section 2.5

4.2.1. Design

The experiment had a choice complexity (low, high) between-subject design to which behavioural maximizing tendency (goals, strategy) were added as covariates. A within-subject design was not used in this research to avoid demand artifacts, which occurs when the respondent is presented with a similar scenario multiple times (Sawyer, 1975). The choice complexity manipulation was operationalized based on the number of alternatives (number of alternatives: 3, 30) and the attributes/levels (number of attributes: 5, 10). More specifically, the variation in complexity was computed using the entropy values discussed in section 4.1 and depicted in table.1.

4.2.2. Procedure

The survey was designed using Qualtrics CoreXM and distributed based on a convenience sampling approach. This sampling approach was used due to several merits: simple methodology, cost-effective and a fast response rate. The survey consisted of four main parts. The first part of the survey contained questions to assess respondents' familiarity with e-tourism products, using questions such as "*Have you booked a hotel/travel accommodation in the past 12 months?*", "*How often do your travels include a hotel booking?*", and "*Do you book a hotel/ travel accommodation online?*". The second part of the survey contained the choice experiment which was randomized between an LC and an HC choice set, and distributed evenly among respondents to control bias. Respondents were presented with the same hypothetical choice task situation, as shown in fig. 8.

Context

You have a vacation for 5 days and decided to **travel** to a city in Europe where you have never been to before. Now in the process of **selecting a hotel**, you are browsing through an e-tourism website to find the ideal hotel which fits your preferences.

The information below is required for the next section :
1. Price (EUR): 200/110/30 per night
2. Location: close to city center/public transport/ monuments
3. Hotel class: 4/3/2 star
4. Guest ratings: 4/3/2 star
5. Service:
   - *High*: 24hrs reception and room service, personalized greetings with refreshments, free airport shuttle service, concierge and valet parking, high speed WiFi and television with full subscription
   - *Medium*: 14hrs reception and room service, valet parking, basic WiFi and television with basic subscription
   - *Low*: 14 hrs reception, with basic room necessities, paid WiFi connection
6. Safety:
   - *High*: 24hrs security with surveillance, safe neighborhood and a personal locker in the room
   - *Medium*: Limited surveillance and security, safe neighborhood, no personal locker in the room
   - *Low*: No surveillance, unsafe neighborhood, no personal locker in the room
7. Amenities:
   - *High*: Top tier fitness and recreational facilities
   - *Medium*: Basic fitness and recreational facilities
   - *Low*: No fitness or recreational facilities
8. Brand: Internationally recognized/ Local establishment
9. Breakfast: Yes / No
10. Special deals: Free cancellation / Free reservation, without credit / Loyalty discounts

Task:

In the next page, you will be presented with **choices of hotels** after which you will have to complete a **questionnaire** based on your selected choice.

Note:
- You will have to choose only one option from the presented options
- There are a total of 2 sections, with varying number of choices and information about the hotel

Figure 8. Choice Instructions

Following the above information, the respondent was presented with a randomly allocated choice set of hotels. After selecting a hotel, respondents were asked to evaluate choice complexity and PCS. The third section of the survey included the maximization tendency scales: MTS and MTG. The survey concluded with the fourth and final part with demographic questions about age, education, country of origin, and country of residence.

4.3. Measures

At the end of a given choice set, respondents were presented with questions to understand the causal relationship of extrinsic and intrinsic moderators on post-choice satisfaction as shown in the conceptual model in section 3.1.

4.3.1. Choice Complexity as an Independent Variable

Measures of choice complexity were taken from (Agnew & Szykman, 2005; Greifeneder et al., 2010b). Participants were presented with statements such as "*I found this decision overwhelming*", "*It was difficult to comprehend all the information given to me*" to which they had to answer on a 6-point Likert scale (from 1: "Strongly agree" to 6: "Strongly disagree").

The choice complexity scale considered was reliable and consistent based on the results of this study (LC choice set: Cronbach α = 0.806; HC choice set: Cronbach α = 0.906). A factor analysis of the items in the choice complexity scale registered high loadings on one component.

4.3.2. Maximization Tendency as an Intrinsic Moderator

According to Cheek & Schwartz (2016), Dalal et al.'s (2015) Maximizers Tendency Scale (MTS-7) is the best scale for measuring maximizers goal (MTG). Therefore, for this research Maximizing Tendency Goal (MTG) was measured using the Maximizers Tendency Scale (MTS-7). Participants were presented with statements such as "*No matter what I do, I have the highest standards for myself*", and - "*I never settle for second best*", to which they had to answer on a 5-point Likert scale (from 1: "Strongly agree" to 5: "Strongly disagree").

Similarly, based on recommendations by Cheek & Schwartz (2016), Maximizing Tendency Strategy (MTS) was measured using Turner et al.'s (2012) alternative search scale, the so-

called Maximization Inventory (MI). Participants were presented with statements such as "*I can't come to a decision unless I have carefully considered all of my options*", and *"I take time to read the whole menu when dining out"* to which they had to answer on a 5-point Likert scale (from 1: "Strongly agree" to 5: "Strongly disagree").

The scale used for MTG and MTS were consistent and reliable based on the results of this study (MTG scale: Cronbach α = 0.881; MTS scale: Cronbach α = 0.871). A factor analysis was done on the maximization tendency scale including strategy and goal items. All the items in the analysis registered high loadings on 2 constructs. The items on the MTS scale registered high loadings on component 1 whereas MTG registered high loadings on component 2 (refer Appendix C).

4.3.3. Post-Choice Satisfaction as a Dependent Variable

The scale used to measure post-choice satisfaction was taken from (Goedertier et al., 2012). Two questions were asked: "*How satisfied are you with your choice?"* answered on a 7-point Likert scale. This question was mainly to understand the general choice satisfaction (from 1: "Extremely satisfied" to 7: "Extremely dissatisfied"). The second question was *"How certain are you that you made the best decision?"* answered on a 7-point Likert scale. This question is aimed to understand outcome satisfaction through certainty of choice (from 1: "Extremely certain" to 7: "Extremely uncertain").

The two constructs considered for PCS (i.e., general satisfaction and outcome satisfaction) were combined to form one construct for assessing PCS. The PCS scale was consistent and reliable in this research (LC choice set: Cronbach α = 0.814; HC choice set: Cronbach α = 0.928).

5. Results

A total of 163 responses were obtained, out of which 9 responses were incomplete and 7 outliers were eliminated. This, resulted in a final sample of 147 participants used for analysis. This gives us a response rate of 94.2%.

5.1 Demographics

The sample consisted of diverse nationalities with the majority of respondents being Indians (60%) and Dutch (15%). In terms of gender, 54% were male and 45% were female. The majority of the respondents (51%) were between the age of 18-24 years. Several questions were asked about travel and the usage of e-tourism products – this is to further understand how familiar participants were with booking a hotel online. 74% of the participants had booked a hotel in the past 24 months and 93.5% (51% - Most of the time; 41% - Sometimes) of the respondents had used an e-tourism website to book/reserve a hotel. The tables below give descriptives of the data obtained.

Gender

	Frequency	Percent
Male	80	54.6
Female	67	45.4
Total	147	100.0

Age

	Frequency	Percent
18 - 24	75	51.1
25 - 34	48	32.6
35 - 44	10	6.8
45 - 54	8	5.4
55 - 64	6	4.1
Total	147	100.0

Education

	Frequency	Percent
Less than high school	2	1.4
High school graduate	4	2.8
Bachelor's Degree	58	39.4
Masters Degree	70	47.6
PhD	11	7.4
Other	2	1.4
Total	147	100.0

Have you booked/reserved a hotel in the past 24 months?

	Frequency	Percent
Yes	109	74.1
No	38	25.8
Total	147	100

Which device are you using to complete this survey?

	Frequency	Percent
Mobile Phone	120	81.6
Laptop	20	13.6
other	2	1.3
Total	147	100.0

Do you use an e-tourism website (eg. TripAdvisor, Booking.com, Expedia etc.) to book your hotel?

	Frequency	Percent
Most of the time	73	51.7
Sometimes	59	41.8
Never	9	6.4
Total	147	100.0

How often do you travel abroad for a vacation?

	Frequency	Percent
2-3 times per month	2	1.4
Monthly	3	2.1
Once every 2-3 months	31	21.2
Once a year	61	41.4
less than once a year	50	34
Total	147	100.0

5.2 Manipulation Check

An important precondition for this research was the elimination of a dominant option in the choice environment. A dominant option will decrease the complexity of the choice set, and lead to biased results. The results of the survey did not show a dominant option from the LC and the HC choice sets. The frequency of chosen options in a given choice set is given in Appendix A. This indicated that there wasn't a characteristic choice alternative displaying the presence of a dominant option. Additionally, an ANCOVA test showed a significant main effect of choice set size on sum scores of the complexity measure $F(1,143) = 46.19, p < .001$. Based on the reversed scaling used in this research, a lower mean value denoted higher complexity. Respondents within the LC choice group perceived less choice complexity ($M = 3.99, SD = 1.24$) as compared to those in the HC choice group ($M = 2.73, SD = 1.31$) as depicted in fig. 9. Additionally, table. 3 shows that 75 respondents received the HC choice set whereas 72 respondents received the LC choice set.
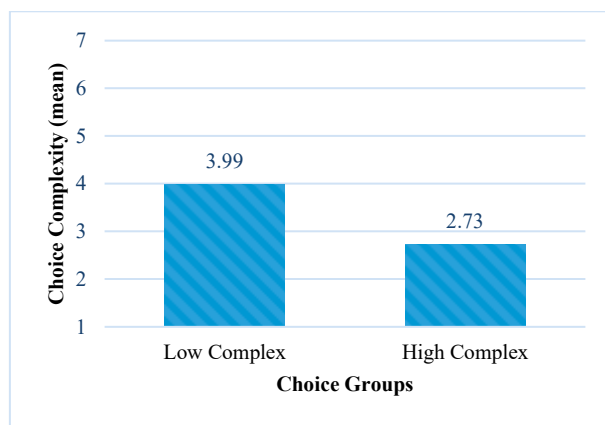
Figure 9. Perceived choice complexity between two choice groups
(Low mean value denotes high complexity)

Table 3. Choice complexity division in the sample

		Frequency	Percent
Complexity	HC	75	51
	LC	72	48.9
	Total	147	100

5.3 Descriptive Statistics & Correlations

Table 4. Descriptive statistics of research factors

Descriptive statistics	N	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Choice complexity	147	3.2890	1.22779	1.507	-.099	.206	-.930	.408
MTG	147	2.6084	.72341	.523	-.024	.206	-.317	.408
MTS	147	2.1349	.56094	.315	.493	.206	.649	.408
PCS	147	2.4155	1.04542	1.093	.946	.204	.368	.406

The descriptive statistics in Table. 4 shows all the main variables considered in this research. All variables followed a normal distribution with acceptable skewness and kurtosis values (see Appendix B for visual representations for each variable). The correlations (depicted in table.5, below) show that choice complexity was negatively correlated with PCS (r = -.36; p < .01). The same applied to MTS (r = -.17; p < .05). Both variables MTS and MTG were positively correlated with each other (r = .39; p < .01), which is consistent with previous literature.

Table 5. Correlations summary of choice complexity, MTG & MTS on PCS

Correlations		1	2	3	4
1.	PCS	1			
2.	Choice complexity	-.356**	1		
3.	MTG	-.152	.007	1	
4.	MTS	-.172*	.134	.392**	1

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

5.4 Hypothesis Testing

Regression and analysis of variance are used extensively in a wide context of experimental designs (Shadish, Cook, & Campbell, 2002). To test the hypothesized statements present in section 3.2, Analysis of Covariance (ANCOVA) was used, MTG and MTS as covariates to test for their moderation in the relationship between choice complexity and PCS. The results for each hypothesis are presented in the following paragraphs.

H1: "High choice complexity negatively influences post-choice satisfaction"

First, an ANCOVA test gave a significant result for the main effect of choice complexity on PCS, $F(1,143) = 5.6$, $p < .019$, $\eta^2 = .042$. Respondents from the LC choice group ($M = 3.88$, $SD = 1.27$) reported higher PCS ($M = 2.38$, $SD = 1.11$) than respondents from the HC choice group ($M = 2.48$, $SD = 1.29$) with considerably lower PCS ($M = 2.93$, $SD = 1.29$). Note that – based on the reversed item scaling used in this research – low mean value for PCS denotes high observed PCS. Similarly, the low mean value obtained for choice complexity denotes high observed choice complexity. Therefore, high choice complexity, indeed, negatively influences post-choice satisfaction *between* the choice groups.

An additional analysis considered the entropy values *within* the choice groups. The LC choice group was presented with two choice sets with entropy values of 12.56 bits (Alternatives: 3, Attributes: 5) and 21.61 bits (Alternatives: 3, Attributes: 10). Fig. 10 depicts an increase in PCS when entropy increased within the LC choice group. Similarly, the HC choice group was presented with two choice sets with entropy values of 38.8 bits (Alternatives: 30, Attributes: 5) and 71.98 bits (Alternatives: 30, Attributes: 10). Fig. 11 depicts a decrease in PCS when entropy increased within the HC choice group. This, again, was in line of predictions. Therefore, H1 was accepted.
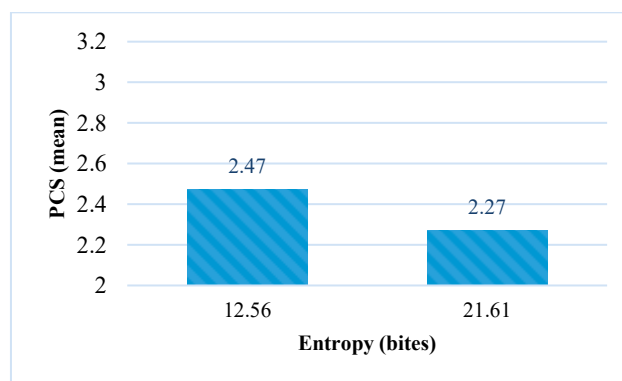
Figure 10. Low complex choice set: Entropy on PCS (Low mean value denotes high PCS)
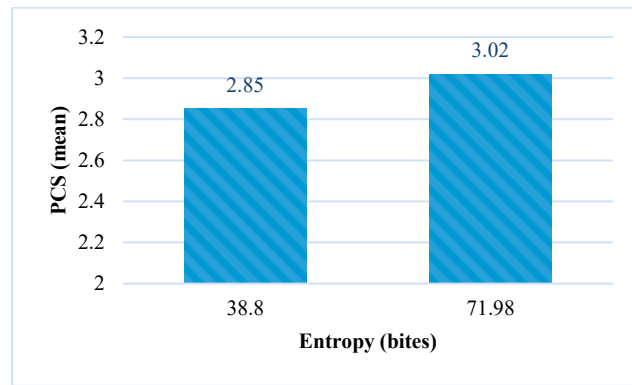
Figure 11. High Complex choice set: Entropy on PCS (Low mean value denotes high PCS)

H2a: "Increase in maximizing tendency strategy negatively influences post-choice satisfaction"

H2b: "Increase in maximizing tendency goal negatively influences post-choice satisfaction"

The ANCOVA results showed a marginally significant main effect for MTS on PCS, $F(1,143) = 3.45$, $p = .065$, $\eta^2 = .026$, but a non-significant main effect for MTG on PCS, $F(1,143) = .038$, $p = .87$. Formally, therefore, both H2a and H2b had to be rejected.

The results obtained for H2a, however, come close to showing that MTS has an influence on PCS (significance was obtained at the 0.1 level, but not at 0.05 level). Based on the reverse scaling used in this research, low values of MTS show a strong tendency to maximize. Fig.12 shows that people who have a strong tendency to search for alternatives may be less satisfied with their choice. Satisfiers (based on the reversed item scaling, have higher MTS values) were significantly more satisfied with their choice.
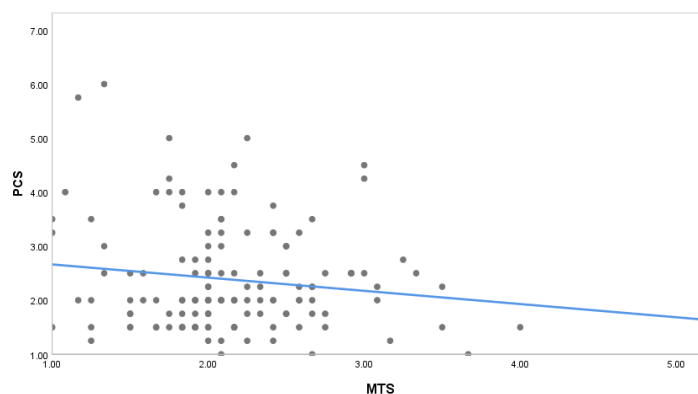
Figure 10. Scatter plot for MTS and PCS

H3a: ***"Negative influence of choice complexity on post-choice satisfaction is moderated by maximizing tendency strategy"***

H3b: "Negative influence of choice complexity on post-choice satisfaction is moderated by maximizing tendency goal"

ANCOVA tests were conducted to test the interaction effects between choice complexity and maximizing tendency on PCS. The interaction effect of choice complexity and MTS on PCS was significant, F (1,143) = 4.18, p = .043, η^2 = .031. There was an influence on PCS with variation in choice complexity as a function of a person's MTS. As shown in fig.13, respondents exhibiting a high tendency to maximize (low MTS value again depicts high tendency to maximize) were less satisfied with their choice in an HC choice group, as compared to the LC choice group. No such trend was observed on PCS for the LC choice group and MTS, but it was observed in the HC choice group. Therefore, H3a was accepted. Unfortunately, a non-significant interaction effect was found of choice complexity and MTG on post-choice satisfaction, F (1,143) = 1.53. Therefore, H3b was rejected.
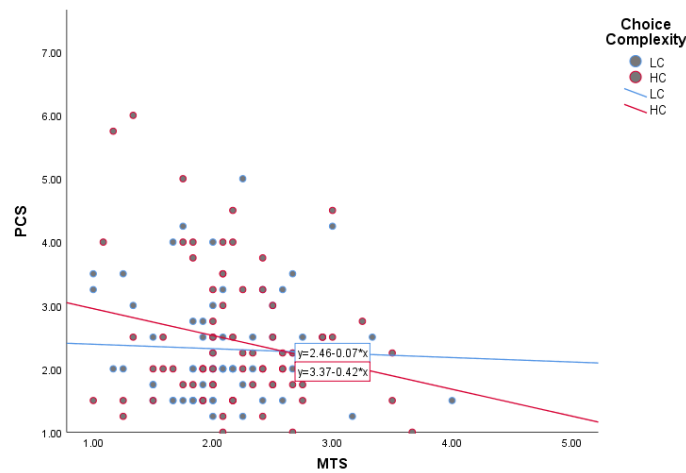
Figure 11. Scatter plot for MTS, choice complexity and PCS

6. Discussion

Following the main objective of this research, the influence of choice complexity on customer satisfaction within the domain of e-tourism was hypothesized and tested with the inclusion of maximizing tendencies. This chapter will present the scientific relevance, practical relevance, and limitations of this research study, and direction for future study.

6.1 Scientific Relevance

The hypothesized statements previously discussed and tested are further presented in this section with the implications of the obtained results with discussions towards scientific relevance.

6.1.1 Choice Complexity on PCS

The experimental design was such that choice complexity was classified based on entropy measurements of the choice set - i.e., choice sets with lower/higher entropy values contained a low/high number of choice alternatives/attributes, respectively. Theoretically, higher entropy translates to higher choice complexity. Manipulation test results of the choice experiment indeed found perceived choice complexity to be higher in the HC choice group as compared to the LC choice group. This confirms findings from previous studies on a simultaneous relationship of choice complexity and the amount of information in choice environments for simple goods (Fasolo, Carmeci, et al., 2009; Greifeneder et al., 2010b; Payne, 1976; Ruokamo et al., 2016), and extends it to the presence of choice complexity within a complex good, specifically within the domain of e-tourism. Previous studies (Matzler & Waiguny, 2005; Nicolau & Más, 2008; Park & Jang, 2013) within e-tourism studied the effects of choice overload only on the number of options. The present study expands literature in e-tourism by considering the precise amount of information and its influence on consumer's experience.

Results from the choice experiment showed that high choice complexity has a negative influence on PCS. The mean PCS values obtained from the LC choice group were higher than those of respondents within the HC choice group, therefore confirming previous studies that PCS decreases with an increase in choice complexity *between* the two choice contexts (V. Danthurebandara et al., 2014; Fasolo, Carmeci, et al., 2009; Greifeneder et al., 2010b). Therefore, consumers are more satisfied with their choice when presented with a choice set containing a low number of alternatives and attributes/levels than with a choice set containing a high number of alternatives and attributes/levels.

In this study, also an interesting relationship was observed *within* the two choice groups that go beyond previous studies in choice complexity (V. Danthurebandara et al., 2014; Fasolo, Carmeci, et al., 2009; Greifeneder et al., 2010b), and in choice overload within the domain of e-tourism (Matzler & Waiguny, 2005; Nicolau & Más, 2008; Park & Jang, 2013). An increase

in PCS was observed within the LC choice group when entropy increased (i.e., respondents were more satisfied when they were provided with more information in the LC choice set). However, within the HC choice group, there was a decrease in PCS when entropy increased (i.e., respondents were less satisfied when they were provided with more information in the HC choice set). A possible explanation for this observation is that respondents with less information of the product/service are uncertain about their choice resulting in dissatisfaction. This leads to a preference for being exposed to more information to make their final decision to select a choice. Conversely, high information of the product/service leads to more expenditure of cognitive resources to make a final choice resulting in dissatisfaction. This leads to a preference for less information which is cognitively less demanding to make their final decision. Previous studies (Reed, DiGennaro Reed, Chok, & Brozyna, 2011) also observed that consumers have low preference towards choice sets with very low/extensive options. Cognitive overload theory argues that with the increase in choice set size, there is an increase in information processing which is cognitively demanding on the individual thereby resulting in reduced satisfaction (Eppler, Mengis, & Science, 2003). Similarly, with very less options, consumers find it difficult to make a choice. This is due to the fear and uncertainty of choosing a suboptimal choice with limited information leading to dissatisfaction (Kuksov & Villas-Boas, 2010). The results obtained in this research is consistent with previous research and further extends in the lines of choice complexity. Respondents are dissatisfied when presented with two extremities of choice complexity - i.e., choice sets with very high/low entropy values.

6.1.2   Maximizing Tendency on PCS

Previous studies within the domain of e-tourism assessed maximizing tendencies using a single construct such as decision difficulty (Coba et al., 2020) to distinguish between maximizers and satisfiers. The present study expands research in consumer purchase behaviour within the domain of e-tourism, by using the more accurate two-component model of maximization (capturing strategic and goal-directed maximizing behaviours) recommended by Cheek and Schwartz (2016) and with other studies that have used the two-component model for their research within simple goods (Misuraca & Fasolo, 2018; Zhu et al., 2017). The results of the present study show that this model of maximization can be used to comprehend more complicated consumer choice behaviours in the tourism domain as well.

The results from this research came close to showing a significant influence of MTS on PCS. Individuals who registered high scores on MTS (maximizers) adopt a strategy that may involve making exhaustive comparisons between alternatives in a choice set. A lower PCS value for maximizers suggests that consumers find it difficult to trade-off between the alternatives especially while adopting an exhaustive strategy of alternative searching and aligning with their preferences. This becomes cognitively demanding and leads to dissatisfaction. Previous studies in simple goods (Dar-Nimrod, Rawn, Lehman, & Schwartz, 2009; Turri, 2001) observed that maximizers searching through all alternatives lead to decrease in post-choice satisfaction due to high expenditure of cognitive resources. This study extends previous research by observing a decrease in satisfaction by maximizers (MTS) in complex goods like e-tourism. A non-significant result obtained on the impact of MTG on PCS retrospectively makes sense. It

confirms the focus of this research on the *process* of assessing the choice set and the *strategy* used by consumers to settle on a final decision rather than aiming towards the end *goal*.

6.1.3   Moderating Effect of Maximizing Tendency on PCS

A significant influence of the interaction on PCS of choice complexity and MTS was found. Participants in the HC choice group exhibited a significant reduction in PCS with variable maximizing tendencies compared to those in the LC choice group. When exposed to an HC choice set, maximizers (i.e., respondents using a time consuming compensatory strategy in browsing through alternatives) were significantly less satisfied with their choice than satisfiers. However, when respondents were given a low complex choice set, regardless of the maximization tendencies, a significant change in PCS values was not observed. Previous studies (Cheek & Schwartz, 2016; Li et al., 2019; Reutskaja & Hogarth, 2009) reported a negative influence of large assortment size and individual differences on customer satisfaction. The results of this research extends these observations by finding the influence of choice complexity and individual differences on PCS.

Importantly, this study has brought to light the importance of taking into consideration the factor of choice complexity within the domain of tourism. It is necessary to include the negative influence of high choice complexity on post-choice satisfaction, especially when consumers are likely to adopt a compensatory search strategy. Consumers who adopt such a compensatory search strategy spend more time and cognitive resources to assess each alternative, and tend to be less satisfied with a high complex choice set (Coba et al., 2019; Payne, 1976). Also, it makes sense to consider the intrinsic aspects of choice complexity in e-tourism – consumers have low experience and purchase less frequently. In the present study, 75.4% of the respondents reported to travel either once a year or less than once a year. This confirms previous findings (Park & Jang, 2013) that consumer's purchase e-tourism products/services less frequently.

6.2   Practical Relevance

In recent years, research shifted towards understanding choice complexity and consumer purchase behaviour and its influence in a digitized environment (Lee, Son, & Kim, 2016). To adhere to the direction of this research, two practical viewpoints are presented below based on strategies identified by Roetzel (2019) to reduce the detrimental effects of choice complexity namely: (1) a technology-centered view, and (2) a human-centered view.

6.2.1 Technology-Centered View

This research highlighted the importance of optimizing the choice environment for better interaction between the service provider and the customer. Technology can be used as an enabler to optimize the choice environment for the consumer (Werthner et al., 2015), and e-tourism companies use different kinds of technologies (such as Artificial Intelligence and Machine Learning) within their digitized environment. The use of technologies such as information filtering mechanisms, chatbots, and recommender systems has helped to better structure the consumer's choice options. It also has resulted in lower choice complexity via smaller choice set size and support in decision making (Denizci Guillet, Mattila, & Gao, 2020).

Despite the benefits of a technology-centered approach to reduce choice complexity, consumers still experience dissatisfaction. One of the most common reasons for this is the quality/quantity of the content provided, which results in discrepancies between the expectations of the user and the system (Adam, Wessel & Benlian, 2020). More specifically, recommender systems use content-based filtering, based on metrics such as purchase history, to recommend products or services to users. Similarly, chatbots use Natural Language Processing algorithms to understand the human language and also integrate recommender systems within chatbots to provide relevant recommendations. The present study may shed light on improving these algorithms used by such technologies. Specifically, algorithms should be designed to avoid the two extremities in choice complexity when presenting choice options to consumers. Entropy measurements are accurate indicators of choice complexity, and this information measurement method can be used within algorithms to measure choice complexity within a given choice set. The nature of the measurement output in bits (high bit value translates to high complexity) could be adopted within Machine Learning algorithms. Additionally, the application of entropy in computer systems can be extended by formulating a threshold in bits to indicate when consumers will be more satisfied with the quantity of content.

6.2.2 Human-Centered View

The usage of technologies is an enabler rather than a final solution to a problem involving consumers and their behaviour. Therefore, understanding consumer purchase behaviour is essential to increase customer satisfaction (pwc, 2020). A website is a primary means through which a computer interacts with a human to provide relevant information towards human preferences. According to Morosan and Fesenmaier (2007), travellers in general exhibit two types of website involvement: (1) goal-directed search, and (2) information browsing. This links to the maximizing tendencies previously discussed in this research. Specifically, within the context of information browsing, website involvement is similar to the tendency to search for alternatives (MTS).

The recommendations are specifically tuned towards optimizing HCI with respondents exhibiting high MTS during the later stages of the decision-making process (i.e., accommodation choice). Businesses can measure this behaviour by two important performance metrics – (1) view time and (2) the number of products accessed during the purchasing process. Generally, maximizers will have high scores on such metrics (Christian, 2012).

Functionality cues can be beneficial to facilitate consumers during the evaluation of alternatives. Several functional design features can be implemented on an e-tourism website to increase customer satisfaction and also assist consumers to complete their purchase decision (Morosan and Fesenmaier, 2007). These include factors such as - aesthetics, font, colour, and visuals. Furthermore, design features could optimize the flow of information to be more interactive (i.e., interactive planning/navigation tools with subtle animations). This stresses the importance of investing time in optimizing the digital environment. With regards to content personalization, companies can tailor the content provided to consumers based on an advanced profile of the individual (i.e., includes demographic information, past preferences, and purchases); (Zanker et al., 2019).

The following sub-section will further illustrate an existing tourism company that has applied these approaches with a focus on closing the gap between human and computer interaction.

6.2.3 Practical Application of Strategies

Figure 12. Company Vision (Source: www.Yanolja.in)

The recommendations provided in sub-section 6.2.1 and 6.2.2 are focused on tourism businesses and aimed to improve their digital environments based on the content provided to the customer. Few businesses have made an attempt to focus on providing content that is best suited to the consumer in terms of quality and quantity to improve customer satisfaction. One such instance is discussed in the following paragraph.

Yanolja is an online travel agency based in South Korea since 2005. Lately, it has gained importance in the tourism industry due to its unique approach to personalize guest experiences. They have accurately acknowledged the gap existing between human and computer interaction. They focused on improving the quality of content provided to consumers through a combination of technology and personalization.

From the technology side, they have improved their Artificial Intelligence and Machine Learning algorithms specifically to reduce the content recommended to each consumer. Instead, they provide the most relevant options at the right time. More specifically, the amount of content provided is reduced to the most relevant ones based on the seasons of travel or travel history of the consumer. Applying the human centred view, Yanolja's mobile application (fig. 13) designed for the consumer market has implemented essential functional cues to enhance the experience of the customer. A customer interacting with the application is taken through a process of selecting relevant attributes. This aligns with customer's preferences and expectations for booking a hotel. Interactive and subtle animations make the process of selection more intuitive. Additionally, Yanolja increases customer engagement through one-on-one game formats (i.e., customers with a certain amount of bookings have a chance to win bonus points which translates to extra add-ons for their next hotel bookings) within their application.

This approach has made the company the fastest growing online travel agency in South Korea - with a 24% improvement in customer satisfaction, a 38% increase in sales and a 32% increase in the number of reservations (AWS re:Invent, 2019). This nicely illustrates the importance of considering the choice environment presented to consumers and its impact on the business resulting in an increase in customer satisfaction. Other e-tourism companies could derive implications from the approach used by Yanolja to enhance their digital environments.

Figure 13. Application Design (Source: www.Yanolja.in)

6.3 Limitations

The results, analysis, and recommendations developed in the present work are based on a single study. Therefore, variables considered in this research may derive different results when studied in the population with a larger sample. Second, the design of the experiment included an online survey to simulate a complex choice environment experienced while booking a hotel. This resulted in a design requiring extensive scrolling of options especially when the survey was accessed through a mobile phone. On the one hand, this may not be considered a major limitation since 70% of respondents use a mobile phone to access an e-tourism website and experience a similar environment (Kim & Perdue, 2013).

On the other hand, it may have given some participants a suboptimal experience. Third, the survey was disseminated to obtain a diverse audience from different age groups and cultural backgrounds. However, the nationality of respondents was majorly Indian (60%) and Dutch (15%). It follows that the results may differ with a sample of a different ethnic background. Fourth and finally, attributes considered for this research were specifically selected to be relevant for an online environment. The potentially important additional factor of hotel image quality was not taken into account. It would have made sense to also use hotel images with high and low quality of images depicting the hotel and rooms as an attribute in this research.

6.4 Future Research

This study fits into a long academic tradition of studying consumer choice processes. It was one of the first attempts within the domain of tourism to establish the existence of choice complexity with a measurement variable (entropy). Therefore, there are several suggestions for future research along these lines. First of all, one of the recommendation provided in this research is towards applying the choice complexity measurement (entropy) method on a

technological (Machine Learning, Artificial Intelligence) algorithm. Therefore, future research could focus on applying entropy measurements to optimize an Artificial Intelligence or Machine Learning algorithm specifically of recommender systems or chatbots in an existing e-tourism website and derive its benefits and implications.

Secondly, this research states that consumers are dissatisfied with very high/low entropy values in a given choice context. Therefore, future research could explore on finding these exact values and formulating a boundary condition. Obtaining a range between which entropy can offset the detrimental effects of choice complexity would potentially be a major breakthrough in choice research (Ruokamo et al., 2016).

Thirdly, in this research individual differences was measured using the 2-component model of maximization by Cheek and Schwartz (2016). Future research could explore the usage of the "Five Factor Model" (FFM) to understand individual differences. FFM is based on a person's personality in five dimensions: (1) Openness, (2) Conscientiousness, (3) Extraversion, (4) Agreeableness, and (5) Neuroticism. These personality traits have shown an influence on decision-making and customer satisfaction by other researchers (Matzler, Bidmon, & Grabner-Kräuter, 2006; Mooradian & Olver, 1997). More specifically, future research can study the influence of choice complexity on certain traits and how they would influence post-choice satisfaction.

Finally, choice behaviour is influenced by intrinsic factors such as consumer values (Crick-Furman & Prentice, 2000), prior experience (Vinson, Scott, & Lamont, 1977), and perceptions on risk (Roehl & Fesenmaier, 1992) in tourism specifically towards choosing brands, products, and product attributes. In future research, the influence of these intrinsic variables on post-choice satisfaction and choice complexity can be studied. For instance, studies could explore if an increase in perceptions on risk or a decrease in prior experience could significantly increase choice complexity resulting in a decrease in satisfaction.

7. Conclusion

The phenomenon of choice overload is an important problem in the field of consumer research. Alternatively termed as overchoice, it is studied in various different contexts of research, encapsulating the detrimental effects of an information-rich choice environment. A "paradox of choice" has been discovered in the literature, where consumers are simultaneously attracted and deterred by the provision of a large number of choices. The results documented in the literature are highly dependent on the choice environment and other intrinsic factors.

Building on this literature, this present study focused on the relationship between choice complexity, consumer purchase behaviour, and post-choice satisfaction in the domain of e-tourism. Choice complexity was considered in this research as an antecedent of choice overload. A complex good (i.e., a service offering that involves high monetary risks, intangibility, exhaustive attributes and contextual factors) was considered as a major driver for detrimental effects of choice overload. The main objective of this research was:

To investigate the influence of choice complexity on post-choice satisfaction as a function of the consumer's maximizing tendency within the e-tourism domain.

In order to fulfil the main objective, a choice experiment was constructed, in which the variable choice complexity was operationalized based on entropy measurements. The choice experiment was designed to simulate the practically relevant choice environment of selecting a hotel accommodation. This represented an advanced decision-making stage that a consumer adopts in the process of destination planning. Consumer purchase behaviour was further measured using the two-component model of maximization (Maximizing Tendency Strategy and Maximizing Tendency Goal). Post-choice satisfaction (PCS) was measured based on general satisfaction and outcome satisfaction. The following paragraphs answer the research questions presented to accomplish the main objective of the research.

SRQ1: How does choice complexity exist in the domain of e-tourism?

Three structural factors were identified in previous studies with reference to choice complexity in e-tourism: (1) Number of alternatives, (2) Number of attributes, and (3) Attribute Levels. These factors were applied on an existing e-tourism website to acknowledge the presence of choice complexity. Other intrinsic determinants such as monetary value, intangibility, purchase frequency and prior experience may further complicate choice behaviour. Survey results confirmed the role of lower purchase frequency (75.4% of the respondents travel either once a year or less than once a year). Practical assessment of choice complexity was done by

manipulating choice complexity via high and low complexity. The results indeed showed a difference in perceived complexity. Respondents found choice sets which consisted of a higher number of alternatives and attributes/levels to be more complex than those low on these aspects. This answered the first research question.

SRQ2: Does increase in choice complexity negatively influence post-choice satisfaction?

A significant main effect was found between choice complexity and post-choice satisfaction (PCS) based on the results of an ANCOVA test. The mean values registered for PCS *between* the choice sets showed a decrease in PCS when choice complexity increased. However, an interesting relationship was noticed *within* the choice sets. Results from the LC choice set recorded a simultaneous increase in PCS with choice complexity, where the HC choice set recorded an inverse relationship between choice complexity and PCS. It can be concluded that an increase in choice complexity does have a negative influence on post-choice satisfaction.

SRQ3: Is the negative relationship between choice complexity and post-choice satisfaction moderated by a person's maximizing tendency – strategy?

SRQ4: Is the negative relationship between choice complexity and post-choice satisfaction moderated by a person's maximizing tendency – goal?

An ANCOVA test showed a marginally significant main effect between Maximizing Tendency – Strategy (MTS) and PCS, while a non-significant main effect was found between Maximizing Tendency – Goal (MTG) and PCS. Furthermore, a significant interaction effect of MTS was found between choice complexity and PCS showing that maximizers were less satisfied with an HC choice set than an LC choice set. PCS values of the HC choice group significantly varied based on the maximization scores (i.e., PCS values significantly decreased with an increase in maximization). In contrast, marginal change in PCS values was observed with regards to the maximization scores in the LC choice group.

Table 6. Research Result

#	Hypothesis	Result
1	High choice complexity negatively influences post-choice satisfaction	Accepted
2a	Increase in maximizing tendency-strategy negatively influences post-choice satisfaction	Rejected
2b	Increase in maximizing tendency-goal negatively influences post-choice satisfaction	Rejected
3a	Negative influence of choice complexity on post-choice satisfaction is moderated by MTS	Accepted
3b	Negative influence of choice complexity on post-choice satisfaction is moderated by MTG	Rejected

These results show that choice complexity and consumer purchase behaviour do have an influence on post-choice satisfaction within the domain of e-tourism. The novel approach to comprehend the choice overload phenomenon (through a measurement variable of choice complexity) used in this research has rich practical and academic implications for future research in e-tourism. This research is hoped to inspire future studies within the domain of e-tourism and consumer choice behaviour, and make a contribution towards optimizing the choice context such that higher customer satisfaction will be obtained.

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Appendix A

Choice sets

30/5

#	Price	Location	Guest_ratings	service	amenities
1	110	close to monuments	3+	low	high
2	200	close to public transport	4+	low	medium
3	30	close to city center	4+	medium	high
4	30	close to city center	2+	low	low
5	30	close to city center	3+	high	medium
6	110	close to public transport	2+	medium	medium
7	200	close to monuments	2+	medium	high
8	200	close to monuments	3+	low	low
9	30	close to public transport	2+	high	low
10	200	close to city center	2+	low	high
11	30	close to monuments	2+	medium	low
12	110	close to public transport	2+	high	medium
13	110	close to monuments	4+	high	low
14	200	close to public transport	2+	high	high
15	110	close to monuments	2+	medium	medium
16	200	close to public transport	3+	medium	low
17	30	close to monuments	4+	high	high
18	30	close to public transport	4+	low	high
19	110	close to city center	4+	medium	low
20	200	close to city center	4+	medium	medium

21	30	close to monuments	3+		low	medium
22	110	close to public transport	3+		medium	high
23	200	close to monuments	4+		high	medium
24	110	close to public transport	4+		low	low
25	110	close to city center	2+		low	medium
26	110	close to city center	3+		high	high
27	200	close to city center	3+		high	low
28	30	close to public transport	4+		medium	low
29	110	close to monuments	3+		high	medium
30	30	close to city center	2+		low	Medium

30/10

#	Price	Location	Guest_ratings	service	Hotel_class	safety	amenities	Brand	Breakfast	Special_Deals
1	200	close to city center	4+	medium	4	medium	high	Internationally recognized	Yes	Loyalty discounts
2	110.00	close to city center	3+	high	3	medium	medium	Locally established	Yes	Loyalty discounts
3	30.00	close to public transport	4+	low	2	medium	high	Locally established	Yes	Free cancelation
4	110.00	close to public transport	2+	medium	4	medium	high	Locally established	No	Free reservation, w/o credit
5	200	close to city center	4+	medium	2	low	medium	Locally established	No	Free cancelation
6	30.00	close to city center	3+	medium	4	high	high	Internationally recognized	No	Free reservation, w/o credit
7	30.00	close to monuments	4+	low	4	low	medium	Internationally recognized	No	Loyalty discounts
8	200	close to monuments	4+	medium	4	high	high	Locally established	Yes	Loyalty discounts
9	200	close to public transport	3+	low	4	high	medium	Internationally recognized	Yes	Free reservation, w/o credit
10	200	close to city center	2+	high	2	high	high	Internationally recognized	No	Loyalty discounts

11	110.00	close to monuments	4+	high	2	high	high	Locally established	Yes	Free reservation, w/o credit
12	200	close to monuments	4+	high	3	medium	low	Internationally recognized	No	Free reservation, w/o credit
13	200	close to city center	4+	high	4	high	high	Internationally recognized	Yes	Free cancelation
14	30.00	close to city center	4+	high	3	low	high	Internationally recognized	Yes	Free reservation, w/o credit
15[a]	110.00	close to monuments	2+	high	4	medium	medium	Locally established	Yes	Free reservation, w/o credit
16	200	close to city center	2+	low	4	low	low	Locally established	Yes	Free reservation, w/o credit
17	30.00	close to city center	2+	medium	3	high	medium	Locally established	Yes	Free cancelation
18	30.00	close to public transport	2+	high	2	high	low	Internationally recognized	Yes	Loyalty discounts
19	30.00	close to city center	2+	high	3	medium	medium	Internationally recognized	Yes	Loyalty discounts
20	30.00	close to monuments	3+	high	4	high	high	Locally established	No	Free cancelation
21	110.00	close to city center	2+	high	4	low	high	Internationally recognized	No	Free cancelation
22	110.00	close to city center	4+	low	3	high	high	Internationally recognized	Yes	Free cancelation
23	200	close to monuments	2+	high	4	medium	medium	Internationally recognized	Yes	Free cancelation
24	200	close to public transport	4+	medium	3	high	low	Internationally recognized	No	Free cancelation
25	200	close to city center	3+	high	4	high	low	Locally established	Yes	Free cancelation
26	200	close to monuments	4+	high	4	high	low	Locally established	No	Free reservation, w/o credit
27	110.00	close to monuments	3+	medium	2	low	low	Internationally recognized	Yes	Free cancelation
28	110.00	close to public transport	4+	high	4	high	medium	Internationally recognized	No	Free cancelation
29	200	close to city center	3+	low	2	medium	high	Internationally recognized	No	Free cancelation
30	30.00	close to city center	4+	high	4	medium	low	Locally established	No	Free cancelation

3/10

#	Price	Location	Guest_ratings	service	Hotel_class	safety	amenities	Brand	Breakfast	Special_Deals
1	110	close to monuments	4+	High	4	low	Medium	Internationally recognized	yes	Free reservation, w/o credit
2	200	close to public transport	2+	Medium	unrated	high	Low	Locally established	yes	Free cancelation
3	30	close to centrum	3+	Low	3	medium	high	Locally established	no	Loyalty discounts

3/5

#	Price	Location	Guest_ratings	service	Hotel_class
1	110	close to city center	high	Medium	3
2	200	close to monuments	Medium	low	4
3	30	close to public transport	Low	high	2

Choice frequency

3/5	Frequency	Percent
Hotel 1	33	22.9
Hotel 2	15	10.4
Hotel 3	20	13.9

3/10	Frequency	Percent
Hotel 1	31	22.9
Hotel 2	10	10.4
Hotel 3	28	13.9

30/5	Frequency	Percent
Hotel 3	10	6.9
Hotel 4	1	.7
Hotel 5	4	2.8
Hotel 6	6	4.2
Hotel 7	1	.7
Hotel 8	1	.7
Hotel 10	5	3.5
Hotel 11	2	1.4
Hotel 12	2	1.4
Hotel 13	8	5.6
Hotel 15	1	.7
Hotel 16	1	.7
Hotel 17	2	1.4
Hotel 18	7	4.9
Hotel 19	2	1.4
Hotel 20	2	1.4
Hotel 21	1	.7
Hotel 22	2	1.4
Hotel 23	3	2.1
Hotel 24	1	.7
Hotel 26	3	2.1
Hotel 27	1	.7
Hotel 28	6	4.2
Hotel 29	1	.7

30/10	Frequency	Percent
Hotel 1	7	4.9
Hotel 2	4	2.8
Hotel 3	8	5.6
Hotel 4	3	2.1
Hotel 5	1	.7
Hotel 6	15	10.4
Hotel 7	1	.7
Hotel 8	4	2.8
Hotel 11	4	2.8
Hotel 13	2	1.4
Hotel 14	2	1.4
Hotel 17	6	4.2
Hotel 18	1	.7
Hotel 19	1	.7
Hotel 22	2	1.4
Hotel 24	3	2.1
Hotel 25	1	.7
Hotel 26	5	3.5
Hotel 28	2	1.4
Hotel 30	3	2.1

Appendix-B

Frequency distributions
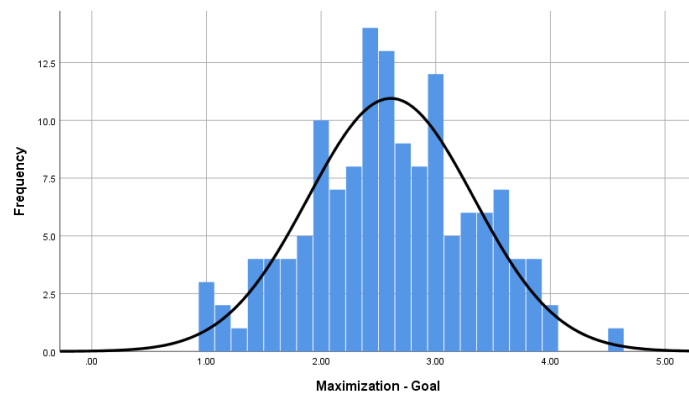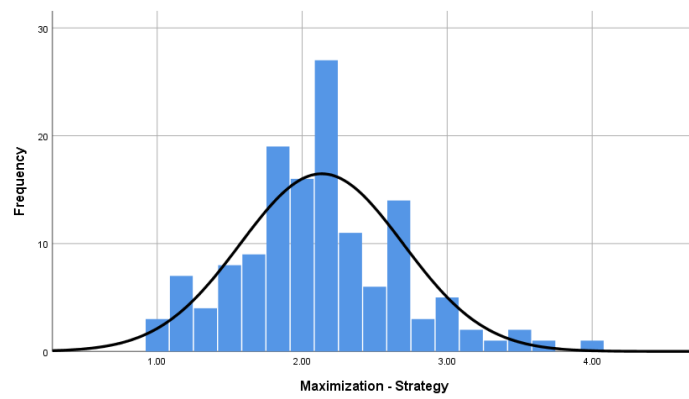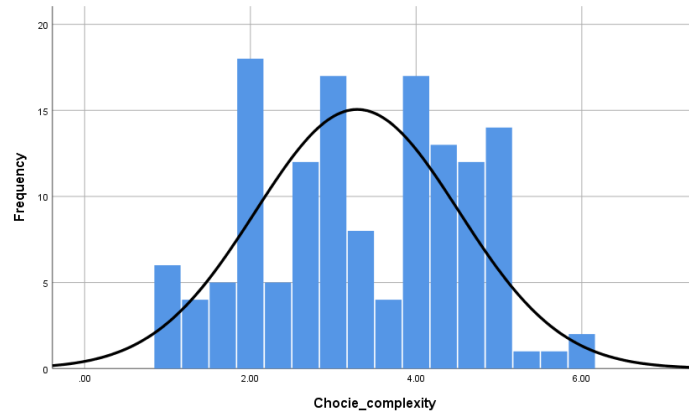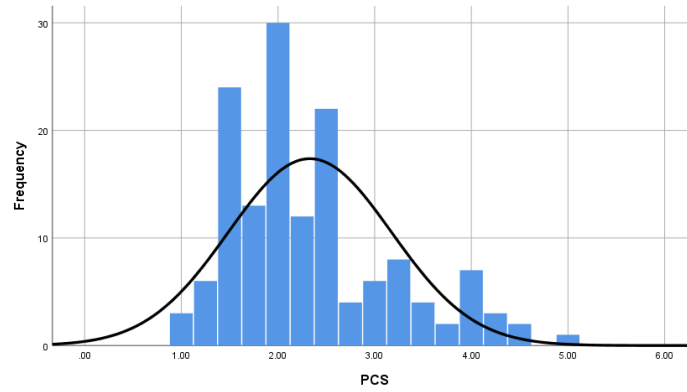
Appendix C

Pattern matrix for MT (MTS+MTG)

	Component	
	1	2
I can't come to a decision unless I have carefully considered all of my options	.496	
I take time to read the whole menu when dining out	.516	
I will continue shopping for an item until it reaches all of my criteria	.709	
I usually continue to search for an item until it reaches my expectations.	.673	
When shopping, I plan on spending a lot of time looking for something.	.716	
When shopping, if I can't find exactly what I'm looking for, I will continue to search for it	.704	
I find myself going to many different stores before finding the thing I want	.517	
When shopping for something, I don't mind spending several hours looking for it.	.651	

I take the time to consider all alternatives before making a decision	.648	
When I see something that I want, I always try to find the best deal before purchasing it	.590	
If a store doesn't have exactly what I'm shopping for, then I will go somewhere else	.571	
I just won't make a decision until I am comfortable with the process	.548	
No matter what I do, I have the highest standards for myself		.641
I never settle for second best		.851
No matter what it takes, I always try to choose the best thing		.802
I don't like having to settle for "good enough."		.754
I am a maximizer.		.622
I will wait for the best option, no matter how long it takes		.670
I never settle.		.766

Component Matrix for Customer Satisfaction

	Component
	1
How satisfied are you with your choice?	.924
How certain are you that you made the best decision?	.924

Component Matrix for Choice Complexity

	Component
	1
I found this decision to be overwhelming	.888
It was difficult to comprehend all the information given to me	.888
This decision required a great deal of thought	.901

Appendix D

Statistical Analysis Results (ANCOVA)

Dependent Variable: Satisfaction (MTS)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	η^2
Choice complexity	4.763	1	4.763	5.640	.019	.041
MTS	2.915	1	2.915	3.451	.065	.026
Choice complexity* MTS	3.536	1	3.536	4.186	.043	.031
Residuals	111.040	143	.841			

Dependent Variable: Satisfaction (MTG)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	η^2
Choice complexity	.046	1	.046	.063	.803	.000
MTG	.027	1	.027	.038	.847	.000
Choice complexity* MTG	.019	1	.019	.026	.872	.000
Residuals	103.840	143	.726			