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Acceptance of Technology in Luxury Hotel Establishments by Portuguese Luxury Customers

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Master in Hospitality and Tourism Management

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BUSINESS
SCHOOL

Department of Hospitality and Tourism Management

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Resumo

Propósito: esta dissertação tem como objetivo analisar a aceitação, por parte dos consumidores portugueses, de hotelaria de luxo, da evolução tecnológica nos vários processos e procedimentos que estes tipos de estabelecimentos possuem. O propósito final é compreender as atuais preferências e necessidades destes consumidores, bem como compreender melhor este segmento hoteleiro nos dias de hoje.

Design/metodologia/abordagem: foram recolhidos dados quantitativos e qualitativos de uma amostra de consumidores de hotelaria de luxo portugueses (N = 537). No sentido de identificar perfis de clientes de hotéis de luxo, dada a natureza qualitativa das variáveis, realizou-se uma Análise Categórica em Componentes Principais (CATPCA).

Resultados: este estudo identificou dois tipos de perfis de consumidor, um mais virado para a evolução tecnológica e outro com uma postura mais tradicional e conservadora em relação ao desenvolvimento tecnológico.

Implicações práticas: os grupos e gestores do setor hoteleiro devem considerar esta segmentação com base nas preferências, nos procedimentos e na segurança na utilização de TI, para melhor otimizarem os seus processos e procedimentos neste setor. Desta forma, a experiência do consumidor irá revelar-se mais positiva, assim como os resultados das vendas.

Originalidade/valor: este estudo é extremamente relevante para profissionais do setor da hotelaria e investigadores, uma vez que analisa a aceitação tecnológica por parte deste tipo de consumidor português. Estas novas gerações serão o futuro deste setor, por isso o novo conhecimento é sempre relevante para o desenvolvimento de novas posições estratégicas no mercado.

Palavras-chave: Hotelaria; Luxo; Portugal; Tecnologia.

Abstract

Purpose: this dissertation aims to examine the acceptance of technological evolution in the various processes and procedures in luxury hotel establishments by Portuguese luxury customers. The final purpose is to better understand today's preferences and needs of this type of customer as well as to provide a new understanding of the luxury hospitality segment in Portugal.

Design/Methodology/Approach: Quantitative and qualitative data were collected from a sample of Portuguese luxury hospitality customers (N = 537). To identify Portuguese luxury hospitality customer profiles, given the qualitative nature of the variables, a Categorical Analysis on Principal Components (CATPCA) was performed.

Results: This research identified two different types of customer profiles, one leading more towards technological development and another one with a more traditional and conservative attitude towards technological development.

Practical Implications: Groups and managers in the luxury hospitality sector should consider this segmentation based on preferences, procedures and security in the use of IT, in order to better optimize their processes and procedures in this sector. This way, the customer experience will prove to be more positive as will the sales results.

Originality/Value: This study is invaluable for professionals in the hospitality sector and researchers, as it analyses the acceptance of technological development by this type of Portuguese customers. These new generations will be the future of this sector, therefore new knowledge is always relevant for the development of new strategic positions in the market.

Keywords: Hospitality; Luxury; Portugal; Technology.

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List of Abbreviations

Acronym	Description
AI	Artificial Intelligence
B	Billion
BBC	British Broadcasting Corporation
BI	Behavioural Intention
CATPCA	Categorical Analysis on Principal Components or Análise Categórica em Componentes Principais
EE	Effort Expectancy
FC	Facilitating Conditions
IBM	International Business Machines
IDT	Innovation Diffusion Theory
IT	Information Technology or Tecnologias de Informação
MM	Motivational Model
MPCU	Model of PC Utilization
OTA	Online Travel Agencies
PE	Performance Expectancy
PWC	Price Waterhouse Coopers
QRC or QR Code	Quick Response Code
SCT	Socio Cognitive Theory
SI	Social Influence
SPA	Special Protection Area
SPSS	Statistical Package for the Social Sciences
SST	Self-Service technologies
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TV	Television
US or USA	United States or United States of America
UB	Usage Behaviour
UTAUT	Unified Theory of Acceptance and Use of Technology

Chapter 1: Introduction

1.1. Problem Statement

"Luxury hospitality represents the third-largest market share in the global luxury goods industry" (Peng, Chen, 2019a, 2019b). This type of hospitality is a sector where service is categorized as a face-to-face, personalized service, historically uncomfortable with changes and hesitant to adopt new environmentally friendly initiatives such as technological changes, due to worries about consumers' reactions.

"Nowadays, many hotels use technology as a value-added amenity to help create differentiation, enhance guest satisfaction and build loyalty among customers" as Cobanoglu (1999) pointed out. Porter and Heppelmann (2014) also defended that "rather than just enhancing products, technology is now becoming a part of the product itself", and this happens especially with younger travellers, who have grown up with technology and automation and see technology (e.g., wi-fi, social media, self-service technologies, QR codes, etc.) as one of the biggest selection criteria to choose their hotel unit. This criterion arrived in recent years to the luxury hospitality sector.

Taking this problem into consideration, this industry is reluctant to change regarding the worries about customers reactions and the necessity to develop technology due to these new generations that see technology as one of the biggest selection criteria to choose their hotel unit.

This research aims to study Portuguese luxury customers' acceptance of technology in luxury hotel establishments, the main technological changes that this population perceives as being crucial services, and the processes that require a faster technological development.

1.2. Relevance of the study

This study is relevant to better understand the positioning that luxury hotel establishments should have towards their clients nowadays. The luxury hospitality sector has been, focused in high-touch since its creation. This study will aim to understand if their clients nowadays still seek a high-touch focused type of service or if they prefer to have technological development (high-tech) or both approaches (Brochado, A., Rita, P. and Margarido, A., 2016).

1.3. Investigation questions

Several questions arise when talking about Portuguese luxury customers' acceptance of technology in luxury hotel establishments, such as:

- Do socio demographic variables such as age and gender have an impact on Portuguese luxury hospitality customers' preferences towards services, information and processes, in luxury hotel establishments?
- Do Portuguese luxury hospitality customers have heterogeneous preferences regarding services, information and processes in luxury hotel establishments?

These investigation questions will be answered through the results and further discussion based on the dissertation survey answers and present literature about the Portuguese luxury customers' acceptance of technology in luxury hotel establishments.

1.4. Research objectives

The main objective of this study is to provide an updated overview of the luxury hospitality market by exploring different segmentations with potential factors of influence in the existing literature, to discover what new types of clients this market segment has nowadays and what's their positioning towards technology development in such hospitality sector and finally to add value to the luxury hospitality market with any relevant conclusions and a new perspective.

It is also important to understand if customers nowadays seek technological development in luxury hotel establishments (high-tech) or if they prefer to see this hospitality segment as a sector less developed in technology and more focused on face-to-face interactions (high-touch).

This research will try to understand as well if through simple costumer behaviours (i.e., behaviours towards OTAs, hotel outlets operations), these customers are leading more towards high-tech or high-touch in this specific hospitality sector.

1.5. Structure of the Dissertation

This dissertation is structured into five different main chapters.

Chapter 1: Introduction

This chapter presents the problem statement, the relevance of the study, the investigation questions, the research objectives, the structure of the dissertations and the study context of the research.

Chapter 2: Literature Review

Before going deeper into the literature, it is crucial to briefly explain the meaning behind hospitality and the differences between hospitality, luxury hospitality and technological hospitality. After explaining these concepts, the literature details what are self-service technologies (SST) and how its implementation occurred in hospitality, as well as the value perceived by customers and their behaviour on using SST. This literature also uses one model, the unified theory of acceptance and use of technology (UTAUT model), that was deepened into an extended unified theory of acceptance and use of technology model (Extended UTAUT model) on this dissertation to better understand Portuguese luxury hospitality customers' acceptance of technology in luxury hotel establishments. Lastly, this literature review also presents the propositions and the conceptual framework of this research.

Chapter 3: Methodology

Taking into consideration the propositions presented and the conceptual framework, an online survey was created to better answer these questions that resulted from this research. The methodology chapter presents the questionnaire design and how the data were collected and treated.

Chapter 4: Results

On this fourth chapter, Microsoft Excel and IBM SPSS Statistics were used to do a descriptive statistical analysis and nonparametric testing on the answers gathered to properly explain and clarify the overall findings. This chapter presents the socio demographic profiles, the general information and consumption profiles, and the discussion resulting from the gathered data.

Chapter 5: Conclusion and recommendations

This last main chapter includes a summary of results, the theoretical contributions, the managerial and practical implications, the limitations and avenues of future research that can be done to complement the present research. All these points were established after a deep examination and comparison between the present literature review and the results from the survey created for this dissertation.

1.6. Study Context

Before analysing and further explaining the different concepts that will lead us to the Portuguese luxury hospitality customers' acceptance of technology in luxury hotel establishments, it is only possible to understand this with a brief explanation of the market context and its background, evolution and current situation.

As it will be deepened in the next chapter of this dissertation, according to the Analytical Research Cognizance (2019) the luxury hospitality market reached a value of $171 billion in 2019 and it is expected to reach $222 billion by 2024. According to Peng, Chen, 2019a, 2019b, it represents the third-largest market share in the global luxury goods industry. This reenforces the positive predictions that this market will further reach the market shares leading this luxury goods industry even with the recent disadvantages created by the Covid-19 pandemic and the present war in Europe.

Through these very positive predictions across this market history, many companies and other industries started to look at this luxury goods market as being one to invest and the IT/AI market was one that significantly increased in investment throughout the years. The self-service technologies that will be deepened in the literature review are an example of a tendency of investment that has increased dramatically in recent years and many studies predicted that it will continue to experience a significant growth, increasing from $54.4B in 2016 to $83.5B by 2021 (Lee, Cranage, 2019).

This investment brought by IT/AI markets throughout the recent years has made people that work in this sector (both hospitality companies and its employees) uncomfortable and with negative attitudes towards this technological development justified by the threat of being replaced and considered outdated in the market. There are several predictions throughout the years that show us this growth tendency, over 20 million manufacturing jobs worldwide are to be automated globally by 2030 (BBC, 2020), 25% of the hospitality jobs in the U.S. are to be automated by 2030 (PwC, 2019) and up to 800 million jobs are to be automated globally in the same timeframe (Manyika, 2017).

All of this made this market unaware of what are nowadays perspectives on luxury customers' acceptance of technology in luxury hotel establishments and Portugal, for instance, never had a study on luxury customers' acceptance of technology, specifically in the luxury hotel sector. This will be the case presented in this research, as a platform for future research, to try to

understand if customers still prefer a more high-touch type of service (that's known for a more face-to-face type of service and one of the main characteristics of the luxury hospitality market), a more high-tech type of service or a combination between both approaches (Brochado, A., Rita, P. and Margarido, A., 2016) and that's what this research will discover, taking in consideration this market context.

Chapter 2: Literature Review

2.1. Hospitality

The hospitality industry is an integral part of the service industry where we can find five main sub-sectors: tourism, food and beverage service, events, transportation and lodging service. Hospitality provides products and services to customers, in order to enhance their well-being through different activities and services with the goal to provide customer satisfaction. “As hospitality is shared between a host and a guest, hospitality service provision is based on “hospitableness” which refers to the positive attitudes of service providers; they make guests feel cared for, welcome, and valued” (Kim, Kim, 2020, p. 2).

2.2. Luxury hospitality

Taking in consideration what’s hospitality and how important this concept is for this study, it is now key to understand what’s “luxury hospitality” and what this concept adds to this research as the hospitality sector is the focus of this study.

Luxury hospitality or a luxury hotel can be represented, for instance, by either a four-star superior hotel or a five-star hotel, meaning that not only five-star hotels are considered luxury and not all five-star hotels are considered luxury. They can be defined as a hotel that is unique and superior in quality and that provides excellent service, symbolizing the wealth and status of its patrons (Peng and Chen, 2019a, 2019b). Taking into consideration such notions, this concept aligns with the idea of “more” (e.g., more staff, more amenities, more services, more decor, etc.), which is what categorizes what luxury hospitality is. As said in the begging by Peng and Chen (2019a, 2019b), it’s a hospitality or hotel that’s superior, that offers “more”.

Luxury hospitality represents the third-largest market share in the global luxury goods industry (Peng and Chen, 2019a, 2019b) and according to the Analytical Research Cognizance (2019) the global luxury hospitality market reached a value of $171 billion in 2019 and it is expected to reach $222 billion by 2024. This type of hospitality sector is not historically comfortable with change.

To do the parallelism with technology that's going to be deepened further, if we take the example of environmental changes in this hospitality sector, and if we take the argument that “luxury hotel managers may be worried that adopting environmentally friendly behaviours could decrease their hotels’ perceived luxury value and brand image” (Kang, 2012a, b), we can

assume that it applies as well for this new technological implementations studied on this research. Peng (2020) recently argued that luxury restaurants may be hesitant to adopt new environmentally friendly initiatives due to worries about consumers' reactions, and these same worries and hesitations apply as well to technological changes in this hospitality sector.

2.3. Technological hospitality

Taking into consideration what's hospitality and luxury hospitality, it is crucial to understand the concept of technological hospitality to better understand the concept of technology acceptance not only by customers but also by the hospitality industry itself. We know that the hospitality industry started adopting technology in the 1970s and this has been evolving quickly ever since (Collins, Cobanolgu, 2008; Erdem, 2009).

As Cobanoglu (1999) said, "Many hotels use technology as a value-added amenity to help create differentiation, enhance guest satisfaction and build loyalty among customers." Throughout the years, technology (e.g., wi-fi, social media, self-service technologies, QR codes, etc.), is one of the biggest selection criteria for clients to choose their hotel unit and this criterion is now arriving in the recent years to the luxury hospitality sector.

Porter and Heppelmann (2014) defended that rather than just enhancing products, technology is now becoming a part of the product itself, calling these technological products "smart products" These very same products have been applied to hotel services in a variety of capacities. Hotels that adopt a series of these smart technology products are smart hotels or intelligent hotels (Wu, Cheng, 2018), and this happens especially with younger travellers, who have grown up with technology and automation.

Hilton surveys showed that 89% of their customers carry a cell phone and 49% have a HD TV at home (Avery, 2008) that was back in 2008 so it is easy to imagine what it is like nowadays! We can understand that nowadays technology is a crucial factor for customers and this research focuses on understanding if this same factor is a key factor for luxury hospitality customers as well as for other hospitality segments. Previous studies show that "since guests' preferences can change over time, it is crucial to discover current trends in how the importance of technology varies according to the purpose of travel." (Brochado, Rita, Margarido, 2016, p. 4). It is also particularly important to understand, reg ardless of your purpose of travel, whether luxury customers consider that luxury hospitality can also be technological hospitality, or if

they are two opposite concepts, favouring formalism and classic service over technological development.

2.4. Self-service technologies (SST's) and its implementation in hospitality

Now that we know what's hospitality, luxury and technological hospitality, we need to understand, and establish the connection between these concepts, what are self-service technologies (SST) and the relation between SST and Artificial Intelligence (AI).

The concept of self-service technologies means that there are interfaces that enable customers and clients to perform a certain service independently of direct service employee engagement. These technologies are known as self-service technologies (SST).

The use of these new SST has increased dramatically in recent years. Studies predict that it will continue to experience a significant growth of this tendency, increasing from $54.4B in 2016 to $83.5B by 2021 (Lee, Cranage, 2019). The fact that companies finally understood the profit in the use of new SST in hospitality, led to a social dilemma in terms of job insecurity in the perspective of the workers in hospitality. One of the more impactful themes in AI literature is the predictions for technology replacing human labour and making humans expendable, with news and studies coming out - for instance, according to BBC, robots could take over 20 million manufacturing jobs worldwide by 2030 (BBC, 2020) - and with the current projections for 25% of the hospitality jobs in the U.S. to be automated by 2030 (PwC, 2019) or for up to 800 million jobs to be automated globally in the same timeframe (Manyika, 2017). All this led to this negative social perspective by the hospitality workers through the new technology developments.

This can be confirmed by existing studies that reveal that usually employees have more negative attitudes toward AI service devices than positive attitudes. Li, Bonn, and Ye (2019) investigated the impact of hotel employees' awareness of AI and robots on their turnover intention and found that AI and robotic awareness is positively related to employees' turnover intention due to the threat of being replaced.

Taking this into consideration, more research is needed to understand how to preserve "touch" when "tech" is being adopted, and to try to find ways to make the hospitality workers look at these technological developments and implementations as a positive attribute and as Patrick (2008) said, trying to show how these implementations can have positive attributes,

"When done right, self-service is the way to go. Not only will it please the customers of the hotels, it will even please the staff, as they will be able to do more important tasks such as greeting customers away from the front desk." (Patrick, 2008 p. 4).

2.5. Value perceived by customers and their behaviour on using SST

Taking into consideration what are self-service technologies (SST) and their implementation in hospitality leads us to understand what's the value perceived by customers and their behaviour on using SST. The luxury hospitality segment has expanded at an unprecedented rate in the recent years and is leading the development of the lodging industry (Chun, Yhang, Kim, 2019; Yang, Cai, 2016).

Taking into consideration this impressive performance, previous studies examined consumer behaviour in the luxury hospitality context (Han, Hyun, 2013; Kim, Han, Lee, 2001; Lee, Hwang, 2011; Walls, Okumus, Wang, Kwun, 2011). The most well-known SST platforms are physical kiosks, mobile phones and smartphone applications. Today customers do almost everything through their mobile phones and if we take into consideration a study made of the technological preferences for check-in and check-out, room control and service orders, we can see that,

"The majority of respondents (56.8%) would like to use digital options for the check-in process. Of these, 45.2% prefer to use a smartphone application, and only 11.6% reported a willingness to use a self-service check-in kiosk. Nevertheless, many hotel guests still prefer to go to the front desk to check-in (43.2%). However, the number of customers who prefer to go to the front desk to check-out is lower (26.5%). A smartphone application was the first option for check-out for almost half of the respondents (47.4%)".

(Brochado, Rita, Margarido, 2016, p. 8).

Taking this study into consideration, we can see that in most cases customers prefer the use of SST for this type of services, but does this apply as well for luxury hospitality customers? This research will not only study that, but also as for which generation and gender, for instance, is more stimulated to have such position towards the use of SST. This is mentioned in the study above but on this research, will focus exclusively on Portuguese luxury hospitality customers. This study also points to the demand for more research in hospitality literature as the hospitality industry and the specific segment of luxury hospitality are especially sensitive to the development of AI.

2.6. The unified theory of acceptance and use of technology (UTAUT model)

The UTAUT model represents 70% of the variance in user intention, which makes it the most effective model to analyse technology acceptance. Since the adoption of computers and new technologies there is numerous research about the intention of use of information technologies. They've been developing through different areas, such as psychology, sociology and information systems (Boonchai K. et al., 2009).

To study the acceptance of technology in luxury hotel establishments by Portuguese luxury customers, an extended unified theory of acceptance and use of technology (Extended UTAUT model) was used. This model is an extension of the original UTAUT model that explains the intention to adopt a new technology. (Venkatesh, Thong, & Xu, 2012).

This model has been used a lot on research about the adoption of different technologies in the labour context and in particular contexts such as this research (Venkatesh, Thong, Chan, Hu, & Brown, 2011).

The extended unified theory of acceptance and use of technology (Extended UTAUT model) is orientated to customers. It explains the intention to adopt a new technology by consumers, whereas the UTAUT model was created originally to explain the main factors that affect the adoption of a technology by the employees of a company (Escobar-rodríguez & Carvajal-trujillo, 2014).

As we can see in the table below, the original UTAUT model was created by Venkatesh et al. (2003) and it was based in several other existing models about the intention to use technologies (Venkatesh et al., 2012).

Model / Theory	Constructs of the UTUAT model that derived from the model
Theory of reasoned action (TRA)	Social influence
Technology acceptance model (TAM)	Expectancy of performance, expectancy of effort and social influence
Motivational model (MM)	Expectancy of performance
Theory of planned behaviour (TPB)	Social influence and facilitating conditions
Decomposed theory of planned behaviour	Expectancy of performance, facilitating conditions and social influence
Model of PC utilization (MPCU)	Expectancy of performance, facilitating conditions, social influence and expectancy of effort
Innovation diffusion theory (IDT)	Expectancy of performance, facilitating conditions, social influence and expectancy of effort
Socio-cognitive theory (SCT)	Expectancy of performance

Table 1 - Constructs of the original UTAUT model.

Source: (Escobar-rodríguez & Carvajal-trujillo, 2014)

The UTAUT model consists of six main constructs, performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), behavioural intention (BI) and usage behaviour (UB). The UTAUT model contains four moderators that are essential to determine the components for this study.

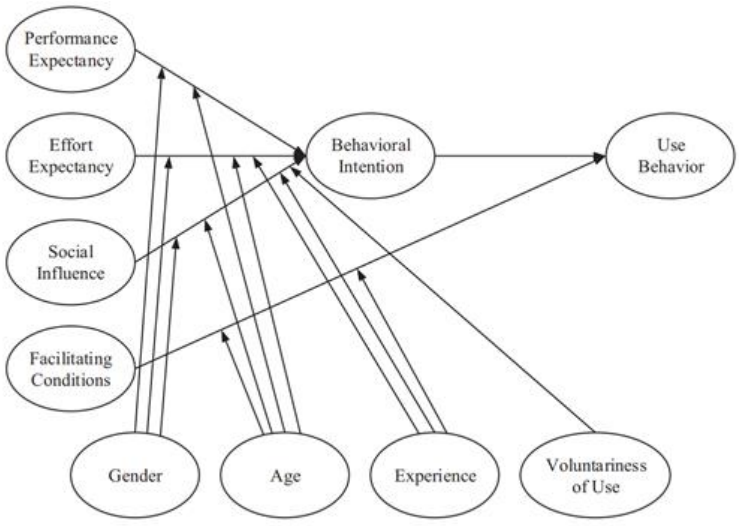

Figure 1 - The unified theory of acceptance and use of technology (UTAUT model).

Source: Chao (2019)

According to this model, the four determining components of BI and UB are PE, EE, SI, and FC (Venkatesh et al., 2003). In addition, gender, age, experience, and voluntariness of use are the moderating variables for the causal relationships between these constructs that affect the usage of technology.

Taking this model concept into consideration we can understand that there are many factors that influence the behaviour intention and use of technology and that is why understanding costumer acceptance of technology is so important.

Performance expectancy

Performance expectancy is one of the constructs of the UTAUT model. This construct defines how the use of a technology will generate benefits in the performance of certain activities (Venkatesh et al., 2003). In other words, the performance expectancy is defined as the degree to which an individual believes that the use of a certain technology will help him/her to achieve performance gains, namely at work (Boonchai K. et al., 2009).

In several studies carried out on IT acceptance, performance expectancy has been shown to be a strong indicator of the intention to use IT (Boonchai K. et al., 2009). This suggests that an individual's beliefs about the expected performance of a technology before its use can influence the effective use of that technology. People tend to rely on their initial beliefs and impressions in shaping their future beliefs (Venkatesh et al., 2011).

Effort expectancy

Another construct of this model is the effort expectancy, which defines the degree of effort that the user will have in using a certain technology. Expected effort refers to the level of ease related to the use of any given information technology or system (Magsamen-conrad, Upadhyaya, Youngnyo, & Dowd, 2015).

Social influence

Social influence is the construct that defines the user's perception that close people, namely friends and family, believe that they should use a certain technology (Venkatesh et al., 2012).

Facilitating conditions

Finally, the construct of facilitating conditions concerns the user's perception of the resources and support available to assist in the use of technologies or information systems (Venkatesh et al., 2003).

Some research indicates that the facilitating conditions are especially important for older populations. There are also other studies that highlight the importance of organizational and technical infrastructures in the acceptance of a technology (Magsamen-conrad et al., 2015). That means that a worker will more easily adopt/accept a technology, if there are resources in the business environment that help and support him/her.

Behavioural intention and use behaviour

The UTAUT model identifies two direct predecessors to the acceptance of a technology: the Behavioural Intention captures the motivational factors that influence behaviour. It is an indicator of the effort an individual is willing to make in order to adopt a technology. This variable is also influenced by three of the constructs (performance expectancy, effort expectancy and social influence) (Martín & Herrero, 2012).

The Facilitating conditions are a direct determinant of the use of a technology as they reflect the environmental factors that limit or encourage its acceptance (Martín & Herrero, 2012).

Moderating variables

These four constructs are influenced by external variables such as age, gender, experience and voluntariness of use.

2.7. Extended unified theory of acceptance and use of technology (Extended UTAUT model)

This extended unified theory of acceptance and use of technology was adopted to better understand how these five contextual predictors (mobile self-efficacy, perceived enjoyment, satisfaction, perceived risk and trust), can affect three of the main UTAUT predictors: effort expectancy (EE), performance expectancy (PE) and behaviour intention (BI).

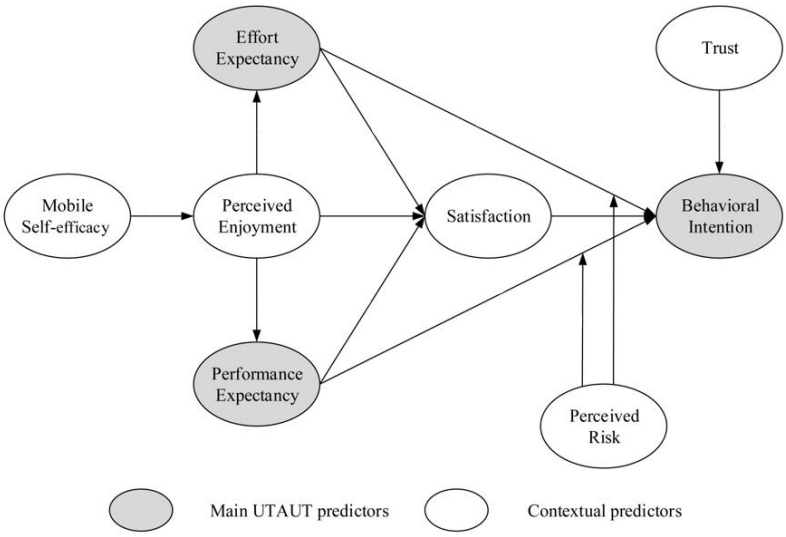

Figure 2 - Conceptualized extended UTAUT model for measuring the acceptance of technology in luxury hotel establishments by Portuguese luxury customers

Source: Chao (2019)

Satisfaction and trust

It is essential to understand four main effects on this extended unified theory of acceptance and use of technology. One of them is the satisfaction and trust factors that are very important when talking about predicting the individual's behaviour intention (BI) toward the usage of these technologies. User satisfaction can significantly influence the individual's behaviour intention (BI) to use a particular system (DeLone and McLean, 2016). If a user is satisfied with a specific type of technology, (s)he will easily be more willing to use it again.

Maillet et al. (2015) understood that effort expectancy (EE) and performance expectancy (PE) have significant effects on satisfaction, meaning that there is a direct relation between expectancy and satisfaction when using this type of technologies. Moreover, Shiau and Luo (2013) indicated that perceived enjoyment also has a significant influence on satisfaction, indicating this to better understand that enjoyment also has a crucial direct relation with satisfaction.

We can understand that luxury hospitality customers' satisfaction towards technological development may be influenced not only by cognitive appraisals, like effort expectancy (EE)

and performance expectancy (PE) but also by emotional experiences, such as perceived enjoyment.

As for trust, it is crucial to understand the reliability and trustworthiness of this type of technologies and systems. It really depends on the individual's beliefs concerning reliability and trust. The effect of trust on behaviour intention (BI) remains inconclusive, although we can understand through previous studies that trust is very important to determine consumers' likelihood to adopt this type of technologies.

Perceived enjoyment

Another main effect that is crucial to understand on this extended unified theory of acceptance and use of technology is perceived enjoyment, which relates the fun and joy of doing such activity to the usage of technology or a particular technological system. In this study, it is crucial to understand the positive and negative effects of this concept of perceived enjoyment on the use of technology.

Taking into consideration previous studies, we know that perceived enjoyment is a key external factor that influences the individual's usage intentions towards the usage of technology or a particular technological system.

Nevertheless, there are a few studies that have examined whether perceived enjoyment is an influential external factor in the UTAUT model, and which stated that performance expectancy (PE) and effort expectancy (EE) are the two most relevant predictors of this model. Taking this into consideration, this position maintained that perceived enjoyment in relation to technology has significantly positive effects on performance expectancy (PE) and effort expectancy (EE).

Mobile self-efficacy

The third main effect that is crucial to understand on this extended unified theory of acceptance and use of technology is the mobile self-efficacy which refers to people's ability to perform a certain task well, meaning that it is related not only to the skills of an individual but also to how (s)he makes use of these skills to perform that task.

Self-efficacy is a notion that a certain individual has certain skills and aptitudes when using a technology-related task. Mobile self-efficacy has that same meaning but it is directly related to the use of mobile devices to accomplish those same particular tasks, for example, browsing the Internet.

Mobile self-efficacy plays a significant role in the adoption of mobile devices to supplement the use of technology. There has been no study yet to investigate the direct effects of mobile self-efficacy on perceived enjoyment, and theoretical foundations for such a study have not been established.

Having this in mind we can assume that costumers' self-efficacy in using mobile devices can directly affect their perceived enjoyment and their acceptance of technologies.

Moderating effect of perceived risk

The last main effect that is crucial to understand on this extended unified theory of acceptance and use of technology, but by no means less important, is the moderating effect of perceived risk. When talking about the Internet and mobile devices, risk factors had to be measured as they are one of the main worries for customers when using technology. Customers often worry about risks such as system errors, privacy problems, losing passwords, low system quality and incompatibility of mobile operating systems and security software.

It is crucial to understand that risk factors in mobile services are a worry for customers about using these platforms. The higher the risk involved on using a new technology the lower their willingness to use it. In this study, perceived risk is defined as the likelihood of a costumer to suffer a loss in the use of technologies.

Most related studies state that perceived risk is an external factor that has a significant influence on the external variables of the UTAUT model. Even though there has been no study that examined whether the perceived risk acts as a moderating factor for any of the UTAUT model moderator variables, in this study the UTAUT model will be evaluated in relation to customers' acceptance of technologies by adding the factor of perceived risk to this extended model.

In this study, it will be understood as a moderating factor if the perceived risk can influence customers' EE and PE on customer acceptance of technologies. In other words, the perceived risk moderates the relation between the independent variables (EE and PE) and the dependent or outcome variable (BI).

2.8. Propositions & Conceptual Framework

Conceptual framework

A conceptual framework is a researcher's own constructed model that aims to explain how the research problems should be explored. It is based on interconnected concepts that are the main variables of the study organized in a logical visual display (Adom, Hussein and Joe, 2018).

The following conceptual model (Table 2) aims to reflect the propositions previously defined and it was designed based on the concepts developed by the unified theory of acceptance and use of technology (UTAUT model) and the Extended unified theory of acceptance and use of technology (Extended UTAUT model) logical visual model (Figures 1 and 2) for measuring the acceptance of technology in luxury hotel establishments by Portuguese luxury customers.

Subject	Articles
Age (P1)	Venkatesh et al., 2003
Gender (P2)	Chao, 2019
Preferences (P3) - Services - Processes	Brochado, A., Rita, P. and Margarido, A. (2016)

Table 2 - Conceptual framework basis

Source: Dissertation author

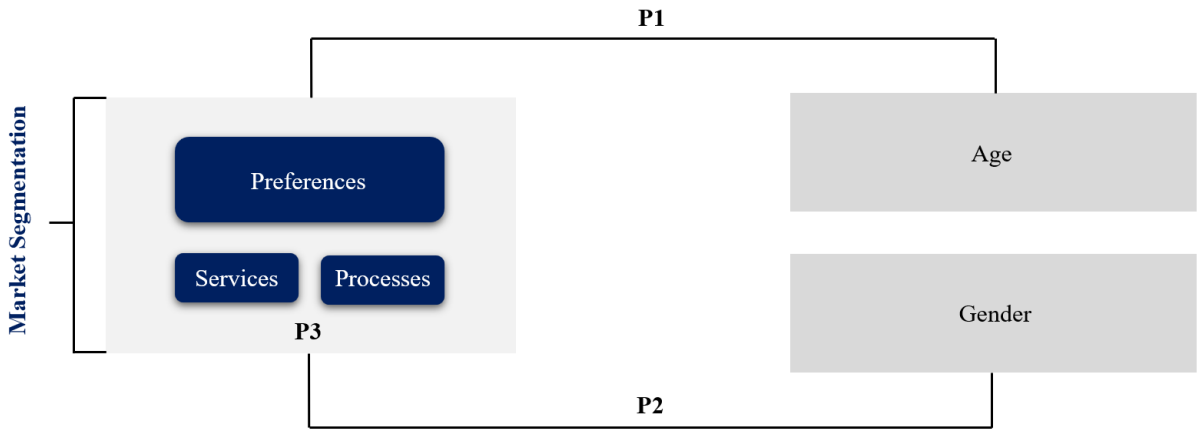

Figure 3 - Proposed Conceptual Model

Source: Dissertation author

Propositions

Propositions are presented to better understand where these different groups further identified on this research can be heterogeneous and compare these propositions with the findings gattered ahead.

Market segments defined in terms of preferences, are associated with different demographic profiles, such as age (P1) and gender (P2).

Portuguese luxury hospitality customers are heterogeneous in terms of preferences regarding services, information and processes (P3).

Chapter 3: Methodology

3.1. Research context

This dissertation aims at encouraging the development of useful theory for the understanding of nowadays technology acceptance in luxury hospitality by Portuguese luxury customers that is currently changing. Therefore, it is essential to construct propositions and a conceptual framework, as done above, to collect relevant facts and feedback. Moreover, to validate these propositions, it is necessary to develop a survey, to define how and where it will be shared and how data will be collected and treated.

3.2. Survey design

Taking into consideration that this research aims to know more about the acceptance of technology in luxury hotel establishments by Portuguese luxury customers, the questionnaire was written in Portuguese, so that every person inquired could better understand the questions asked.

This questionnaire was created in the Google Forms platform as it is an online free channel which allows unlimited answers for un unlimited period of time. Giving that it is a very intuitive and mobile-friendly platform, with dynamic answer options of answer it is the most used for these purposes, making it easier for the respondents to understand how to properly answer each type of question.

This questionnaire was divided into eight main different parts: the consent initial questions, the general information, the consumption profile, the attribute selection, the risk perception, the source selection, the socio-demographic profile and the submission.

Part 1: Consent

Since this investigation has academic purposes, consent questions were required.

The questionnaire started with four mandatory questions: The first one related to the acceptance to answer voluntarily, a second question regarding the commitment to give honest answers through the whole inquiry, another question validating if the person is more than 18 years-old (the minimum age required for the permission to do a hotel reservation in Portugal), and the fourth one if the respondents had ever been to a four or five-star luxury hotel establishment.

Those who selected "No" to any of these four initial questions were directed to "Part 7: Socio-demographic profile" of the survey, since to be elegible for this study you have to answer positively to these four main questions (Appendix A - Survey - Part 1 – Consent).

Part 2: General Information

In this second part of the survey, there were two questions. The first one if the person had already been to a four or five-star luxury hotel establishment (if the respondent selected "Yes" a new question appeared on how often; if the answer was "No", three different options were displayed regarding the reasons why the respondent hasn't yet had the opportunity to do so, leaving him/her space to give his/her own insights on why (s)he hasn't done it yet). Finally another question on how frequently (from 1 to 10) the person carries his/her mobile phone to luxury hotel establishments.

These questions are relevant to understand if there was a growth of customers carrying a mobile phone to a luxury hotel establishment nowadays, in comparison to the previously mentioned Hilton surveys (Avery, 2008), if those same mobile phones are being brought to this specific hospitality sector, the luxury hospitality, and being used in online mobile self-service operations inside of them, and how much it has grown and can grow, in comparison to previously mentioned studies (Appendix B - Survey - Part 2 - General information).

Part 3: Consumption Profile

For this third part, the respondents were asked if they have ever made a hotel reservation online for a luxury hotel establishment, with a "Yes" or "No" type of answer. If they answered "Yes" there would be another question on how many times did they made an online reservation in a luxury hotel establishment. If the answer was "No", then the question would be why haven't they yet made any online reservation for a luxury hotel establishment.

Finally, there was a question if they had ever made an online check-in and out operation in a luxury hotel establishment, with a “Yes” or “No” type of answer leading them again to another separate question regarding their answer. If they selected “Yes”, another question on how many times they checked-in and checked-out online at a luxury hotel establishment, and if the answer was “No”, why haven't they yet made an online check-in and check-out operation at a luxury hotel establishment.

These questions were included in the survey to assess if the current behaviours match the previous research regarding luxury hospitality customers nowadays (Appendix C - Survey - Part 3 - Consumption profile).

Part 4: Attribute Selection

In this part of the questionnaire, the respondents were asked if they ever did a room service request thought their mobile phone, with a “Yes”” or “No” type of answer. If the selected answer was “Yes” the next question was why did they do it on their cell phone instead of their hotel room phone, and if the answer was “No” why haven't they ordered yet a room service on their mobile phone at a luxury hotel establishment.

Another question was taking into consideration that all the options where possible, which way would they prefer to book a SPA in a luxury hotel establishment, with “Mobile phone”, “SPA/Hotel reception” or “In person at the hotel/SPA reception” as possible choices, followed by another question regarding why would they choose to do that reservation that way.

The last main question of this part is similar to the one described above but regarding a reservation at the luxury hotel establishment restaurant, where the respondents also had three options choose from: “Mobile phone”, “Hotel reception” or “In person at the hotel reception” followed by another question regarding why would they choose to do that reservation that way (Appendix D - Survey - Part 4 - Attribute selection).

Part 5: Risk Perception

In this part, the goal is to answer to the moderating effects of perceived risk (1 and 2) mentioned previously, through questions regarding the main cause of risk perception that customers have when using technologies in luxury hotel establishments.

The questions regarding this perception of risk of online payments are whether if they were given the option to choose between paying online or paying in the hotel reception, which one would they choose to do the payment (using an online payment process or thought traditional

payment at the hotel reception). If the selected answer was “Online payment” they were asked to select the options that support the reason for that answer, and if they selected the option “Payment in the hotel reception” the same was asked in order to better understand the reasons that support those payment choices.

On the next question of this survey, the question was to select from 1 to 10, if the person inquired agreed that payments online are less safe than a payment in person in the hotel reception (“1” completely disagree and “10” completely agree).

The last question of this main part is regarding QR code keys through clients mobile phones, and for that risk perception, there was a question regarding if the hotel had the free of charge option of their hotel room key being a QR code on their mobile phone, would they prefer to use that QR code as their room key instead of a traditional card/key or not. If the selected answer was “Yes”, they were asked to select the options that support the reason for their answer, with different types of answer options if the selected answer was “No” (Appendix E - Survey - Part 5 - Risk perception).

Part 6: Source Selection

In this part of the questionnaire, the respondents were asked if when they think about going to a luxury hotel establishment, they do their search on their phone or computer on channels like Google, Booking, TripAdvisor, etc., to get more information about that specific luxury hotel establishment, with a “Yes” or “No” type of answer. If the answer was “Yes” there was a question on how often do they do this research through these channels and if the answer was “No”, how do they get that information, where they could identify the sources for that information.

Finally, another frequency question if after leaving the luxury hotel establishment, they leave a review on online channels like Google, Booking, TripAdvisor, etc., (Appendix F - Survey - Part 6 - Source selection).

Part 7: Socio-demographic profile

On the 7th main part of this survey, it is necessary to collect all the basic socio-demographic profiles information in order to support the present study. Those questions asked were related to age groups, gender, current living district, social status, current occupation, and education level, respectively (Appendix G - Survey - Part 7 - Socio-demographic profile).

Part 8: Submission

In the final part, which is the submission of the survey, after all the previously presented above questions were answered, the persons inquired had to click the “submit survey” option to send the information to the present data base.

After this submission, a thank you message was displayed saying, “Thank you for taking the time to fill in this questionnaire. If you have any questions or concerns about this study, please contact "avbnm@iscte-iul.pt”.”

3.3. Data collection

The present dissertation collected the necessary data to validate the propositions defined previously thorough a quantitative and qualitative methodology. An online questionnaire was created having in consideration the literature review and was shared online through several social media platforms (such as LinkedIn, Facebook, Instagram, WhatsApp) and via e-mail.

The research target population was the Portuguese population, and the sample design used was a non-random, convenience plus snowball type of collection.

The option to do it online was taken into action since this is a dissertation where a lot of technological aspects are being studied and there is no better way to approach the entire Portuguese population than having an online questionnaire that allows responses from the entire country and beyond. Also taking into consideration all the previously mentioned studies regarding the growing intention of a bigger online approach it only made sense to reach the respondents via online channels and platforms.

The chosen data collection method for this questionnaire was Google Forms, through the link https://docs.google.com/forms/d/e/1FAIpQLScdU3fVH4yf7yHIwy3mdBsRWYAtrhYP8I4EpUJgIwCdUfvUDQ/viewform?usp=sf_link, that was available for response from the 20th of February to the 20th of April throughout all Portuguese districts and universities.

The most used platform was Facebook, which is still the largest social media platform, and that approach was done through Facebook groups related to hospitality and tourism in all Portuguese districts, and also via e-mail (with the help of the Pestana Hotel Group HR department, that was also a big help gathering these responses since it is a hospitality group renowned by its luxury hotels and tech approaches on Pestana Hotel Group hospitality units).

These data were collected as mentioned for a period of 2 months, throughout all these social media and online platforms as well as through word-of-mouth and private messages, leading to a total of 476 valid responses and insights for analysis.

3.4. Data treatment

In this present dissertation both Microsoft Excel and IBM SPSS 20 statistics software were used for the analysis of the collected data.

To better reduce and organize the data before adding them to the IBM SPSS 20 statistics software, there is no better platform than Excel to do so. The use of this platform was mandatory to aggregate the answers that were not elegible for this analysis as well to organize the ones which were elegible before adding them to the statistics software.

IBM SPSS 20 statistics software was the computer program demoed in a lecture in one of the courses of the Master's in Hospitality and Tourism Management, as it is known to be the most complete program to do analysis like the ones that were made in this research.

This statistic software also allows the transformation of variables among other complex types of analytics (e.g., cluster analysis, factor analysis, etc.). Microsoft Excel was helpful in the survey closed questions, but it does not treat columns and rows as one only variable like IBM SPSS 20 statistics software and that's why SPSS was the chosen software to examine the survey multiple choice questions.

A multivariate analysis was carried out on the answers related to services, information and processes in the use of technology (IT), and the Categorical Analysis in Principal Components (CATPCA) was the chosen method to do that analysis. Without the help of this statistics software it wouldn't be possible to affirm statistically whether there is a significant difference or association between them.

Lastly, the survey contained many frequency tables to better demonstrate the positions for each variable and for its measures, since it is easier and simpler to observe which are the largest and smaller values and their overall weight.

Chapter 4: Results

On this survey there were four initial questions that defined if the inquired person was elegible for this research or not. These four questions regarded voluntariness to answer to the academic survey, commitment to give honest answers throughout the whole inquiry, if the respondents were over eighteen years old and if they have ever been to a four- or five-star luxury hotel establishment.

If the inquired person answered "Yes" to these four initial questions, that person was legible for the research. If at least one of those four questions was answered with a "No", that person was automatically considered ineligible for this research.

Having this in consideration, the total of respondents that answered this survey was 537, 476 (88.64%) of which were valid respondents and 61 (11.36%) were considered not valid for the present study.

4.1. Socio demographic profiles

Looking at Appendix H, we can see that in terms of age ranges, this survey identified that from the 476 respondents the vast majority was part of the "41-60" age range with 225 respondents (47.3%). The second most representative age range was "25-40" with 150 respondents (31.5%), followed by "18-24" with 70 respondents (14.7%), then "61-76" with 27 respondents (5.7%) and lastly ">76" with 4 respondents (0.8%).

When talking about gender, we can see that from the original 476 respondents there are only 179 respondents (37.6%) that identify themselves as being "Male", while 292 (61.3%) identify themselves as being "Female", not forgetting the 2 respondents (0.4%) that identified themselves as being "Non binary"" and the 3 other respondents (0.6%) that selected the option "Prefer not to answer" in this survey. Despite this gender discrepancy, whereby "Female" taking almost double the size of "Male", it is always interesting to better understand this segment behaviour and the reasons for this discrepancy.

Since there isn't much literature about the acceptance of technology in luxury hotel establishments by Portuguese luxury customers, this survey was shared through several Portuguese districts and regions of Portugal, including the archipelagos (i.e., Açores and Madeira), also reaching Portuguese customers are currently living outside of Portugal. We can

see through the data table presented in Appendix H, that the majority of the respondents are currently living in “Lisbon” with 159 respondents (33.4%), followed by “Leiria” with 74 (15.5%), then “Porto” with 47 (9.9%), then the archipelago of the “Açores” with 41 (8.6%), followed by “Fora de Portugal” with 39 (8.2%), then “Setúbal” with 29 (6.1%), “Faro” with 23 (4.8%), Madeira with 18 (3.8%), Coimbra with 12 (2.5%), “Beja” with 8 (1.7%), “Santarém” with 7 (1.5%), “Braga” with 4 (0.8%), ”Évora” with 4 (0.8%), Guimarães with 3 (0.6%), “Vila Real” with 3 (0.6%), “Viana do Castelo” with 2 (0.4%), “Aveiro” with 2 (0.4%), and last but not least “Bragança” with 1 respondent (0.2%).

Another relevant result of this study is that most of the respondents identified themselves as being “Single” with 180 responses, representing 37.8% of the total respondents on this survey, followed by “Married” with 175 respondents (36.8%), then “Non-marital partnership” with 65 (13.7%), then “Divorced” with 42 (8.8%) and lastly “Widow” with 14 respondents (2.9%). This result is interesting in a way to study if these types of technology acceptances can change depending on the different customer relationship status or not.

Looking at the current occupation of the respondents, we can see that more than half of the total inquired respondents are currently “Employee” with 272 (57.1%), followed by “Self-employed” with 66 respondents (13.9%), then “Student” with 56 (11.8%), “Working student” with 33 (6.9%), “Retired” with 32 (6.7%) and lastly “Unemployed” with 17 respondents (3.6%).

Finally, regarding the educational background we can see that the majority of the respondents selected “Bachelor’s degree” as their educational background with 173 respondents (36.3%), followed by “Master’s degree” with 109 (22.9%), then “High school or equivalent” with 74 (15.5%), “Post-graduation” with 71 (14.9%), “Specialization course” with 32 (6.7%), “PhD” with 13 (2.7%) and last but not least “None of the above” for the respondents with less than high school with 4 respondents (0.8%).

4.2. General Information & Consumption Profiles

The first group which is interesting to study was the one that was initially considered ineligible for this research, in order to better understand the reasons behind why they haven’t answered positively to those four initial questions.

There was a total of 61 not valid respondents (11.36%), 1 of which (1.64%) answered “No” to the question regarding the voluntariness of response and the other 60 (98.36%) answered “No”

to the question regarding if they have ever been to a four- or five-star luxury hotel establishment.

Moreover, we can see that the majority of the not valid respondents that answered "No" to the question regarding if they have ever been to a four- or five-star luxury hotel establishment - 58 (96.7%) - haven't done it yet because of the high price of these establishments, followed by 1 respondent (1.7%) that justified it as lack of purchasing power and another one (1.7%) identifying that he had other suggestions.

Although these answers were considered not valid for this research it is always important to understand the reason behind it, so we can better understand why we still have people that haven't yet had these opportunities and understand if there is a personal reason (i.e., lack of curiosity) behind it or if it's really a lack of purchasing power or high prices behind it.

	Count	N %
Lack of purchasing power.	1	1.7%
High price.	58	96.7%
Had other suggestions.	1	1.7%
Total	60	100%

Table 3 - Reason behind not haven't yet had the opportunity to go to a four- or five-star luxury hotel establishment

Source: Dissertation author, output from the collected data inserted in Excel.

Another factor interesting to take into consideration is how often these valid respondents have certain behaviours.

In relation to how many times the valid respondents went to a four or five star luxury hotel establishment we can see that the majority of the respondents answered "More than ten times", with 175 valid respondents (36.8%), followed by "Between two and four times" with 140 (29.4%), then "Between five and seven times" with 79 (16.6%), then "Between eight and ten times" with 47 (9.9%) and last but not least "Only one time" with 35 valid respondents (7.4%).

	Count	N %
Only one time.	35	7.4%
Between two and four times.	140	29.4%
Between five and seven times.	79	16.6%
Between eight and ten times.	47	9.9%
More than ten times.	175	36.8%
Total	476	100%

Table 4 – How many time the respondents went to a four- or five-star luxury hotel establishment

Source: Dissertation author, output from the collected data inserted in Excel.

Another interesting factor is regarding to the frequency in which the valid respondents take their mobile phones with them when going to a luxury hotel establishment, taking into consideration a previous study by Patrick Avery in 2008, about self-service check-in at hotels and motels, where it was mentioned that "Hilton surveys show more than a third of its customers carry an iPod, 89% carry a cell phone, and 49% have a HD TV at home." (Avery, 2008). This question was included in this survey with the purpose of better understanding if fourteen years later this percentage of customers carrying their mobile phones increased or decreased, taking into consideration the Portuguese luxury hospitality customers.

Moreover, the objective of this question was not only if the respondents bring the cell phones with them or not, but to know the exact frequency that they bring them to those establishments, letting them answer in a frequency range of 1-10, where 1 is "Never" and 10 is "Always". We can see that the majority of the inquired respondents answered "10" with 451 (94.7%) valid responses, followed by "9" with 9 (1.9%), "8" with 5 (1.1%), "7" with 2 (0.4%), "6" with 2 (0.4%), "5" with 1 (0.2%), "2" with 2 (0.4%) and lastly "1" with 4 (0.8%). We can see that through these results the mean was of 9.81 the median was 10 and the mode was also 10.

If we consider that the 89% of respondents of the Hilton surveys are clients that always bring their mobile phones with them to their luxury establishments, we can see that fourteen years later we have a growth of 5.7% of customers always bringing their cell phones to luxury hotel establishments from 89% to 94.7%.

	Count	N %
1	4	0.8%
2	2	0.4%
5	1	0.2%
6	2	0.4%
7	2	0.4%
8	5	1.1%
9	9	1.9%
10	451	94.7%
Total	476	100%

Table 5 - Frequency of customers bringing their mobile phones to luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

The next question in this survey was regarding if when the respondents think about going to a luxury hotel, do they search on their mobile phones or computers on channels like Google, Booking, TripAdvisor, etc., to get more information about those luxury hospitality

establishments, in which the majority of the respondents answered "Yes" with 451 valid respondents (94.7%) and only 25 (5.3%) answered "No".

	Count	N %
No.	25	5.3%
Yes.	451	94.7%
Total	476	100%

Table 6 – Online channels searches (i.e., Google, Booking, TripAdvisor, etc.) to get more information about luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

The respondents who answered "Yes" in the previous question were asked about the frequency that those searches were made. The majority of the respondents answered "Always." with 264 valid respondents (58.54%), followed by "The majority of the times." with 138 respondents (30.6%), then "Sometimes." with 38 respondents (8.53%), and lastly "Not that often." with 11 valid respondents (2.43%).

	Count	N %
Sometimes.	38	8.43%
The majority of the times.	138	30.6%
Not that often.	11	2.43%
Always.	264	58.54%
Total	451	100%

Table 7 - Frequency of searches on online channels

Source: Dissertation author, output from the collected data inserted in Excel.

To the respondents who answered "No" it was asked how do they get that type of information, in which the majority of the respondents answered, "Recommendations of friends and family." with 9 (36%) valid respondents, then "Other media channels (i.e., Newspapers, magazines, TV, radio, …)." with 7 (28%) respondents, then "Through a phone call to the hotel." with 6 (24%) respondents and lastly "Going in person to the hotel." with 3 (12%) valid respondents.

	Count	N %
Through a phone call to the hotel.	6	24%
Going in person to the hotel.	3	12%
Other media channels (i.e., Newspapers, magazines, TV, radio, …).	7	28%
Recommendations of friends and family.	9	36%
Total	25	100%

Table 8 - Other types of information sources

Source: Dissertation author, output from the collected data inserted in Excel.

This next question was regarding if the respondents ever did an online reservation of a luxury hotel establishment, in which the majority of the respondents answered "Yes." with 361 (75.8%) respondents and 115 (24.2%) of the respondents answered "No."

	Count	N %
No.	115	24.2%
Yes.	361	75.8%
Total	476	100%

Table 9 - Online reservations on luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

To the ones that answered "Yes." it was asked about the frequency in which they do those online reservations, leading to most of the respondents answering, "Between two and four times." with 118 (32.69%) respondents, followed by "More than ten times." With 105 (29.09%) respondents, then "Between five and seven times." with 69 (19.11%), then "Between eight and ten times." with 35 (9.7%) respondents and lastly "Only one time." with 34 (9.41%) respondents.

	Count	N %
Only one time.	34	9.41%
Between two and four times.	118	32.69%
Between five and seven times.	69	19.11%
Between eight and ten times.	35	9.7%
More than ten times.	105	29.09%
Total	361	100%

Table 10 - Frequency of online reservations on luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

The respondents how answered "No" it was asked why haven't they did it yet, in which the majority answered, "None of the above" with 62 (53.91%) respondents, followed by "I just preferred not to do it." with 38 (33.04%) respondents, then 11 (9.57%) respondents answered, "I didn't felt safe doing it.", then we had "It was too confusing to me." with 3 (2.61%) respondents and lastly "The hotel(s) didn't had that option." with 1 (0.87) respondent.

	Count	N %
I just preferred not to do it.	38	33.04%
It was too confusing to me.	3	2.61%
I didn't feel safe doing it.	11	9.57%
None of the above.	62	53.91%
The hotel(s) didn't have that option.	1	0.87%
Total	115	100%

Table 11 - Reasons for not making online reservations in luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

Another interesting behaviour to study was if the respondents ever made an online check-in or check-out operation in a luxury hospitality establishment, in which we can observe that the majority of the respondents answered "No" with 280 (58.8%) respondents against 196 (41.2%) respondents that answered "Yes".

	Count	N %
No.	280	58.8%
Yes.	196	41.2%
Total	476	100%

Table 12 - Online check-in and check-out operations in luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered "Yes." to the previous question it was asked a frequency question on how many times had they did those types of operations in luxury hotel establishments, showing that the majority of the respondents answered, "Between two and four times." with 74 (37.76%) respondents, followed by "More than ten times." with 53 (27.04%), then "Between five and seven times." with 29 (14.8%), then "Only one time." with 23 (11.73%) and last but not least "Between eight and ten times." with 17 (8.67%) valid respondents.

	Count	N %
Only one time.	23	11.73%
Between two and four times.	74	37.76%
Between five and seven times.	29	14.8%
Between eight and ten times.	17	8.67%
More than ten times.	53	27.04%
Total	196	100%

Table 13 - Frequency of online check-in and check-out operations on luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered "No." it was asked the reason behind why haven't they made it yet, in which we can see that the majority of the respondents identified "I just preferred not to do it." as being the major reason for not having made it yet with 119 (42.5%) of valid respondents, followed by "The hotel(s) didn't had that option." with 82 (29.29%), then "None of the above." with 62 (22.14%), then "I didn't felt safe doing it." with 13 (4.64%) respondents and lastly "It was too confusing to me." with 4 (1.43%) valid respondents.

	Count	N %
I just preferred not to do it.	119	42.5%
It was too confusing to me.	4	1.43%
I didn't feel safe doing it.	13	4.64%
None of the above.	62	22.14%
The hotel(s) didn't have that option.	82	29.29%
Total	280	100%

Table 14 - Reasons for not making online check-in or check-out operations in luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

The next interesting topic to study was regarding traditional room keys vs QR code keys for luxury hospitality establishment rooms, in order to try to understand the positioning of the respondents towards this technological development and for that it was asked if an hotel had the free option of their room key being a QR code on their mobile phone, would they prefer to use that QR code as their room key instead of a traditional room key, in which the majority of the respondents answered "Yes" with 320 (67.2%) respondents against 156 (32.8%) that answered "No.".

	Count	N %
No.	156	32.8%
Yes.	320	67.2%
Total	476	100%

Table 15 - QR code room keys vs traditional room keys

Source: Dissertation author, output from the collected data inserted in Excel.

To better understand the reason behind this respondents answering "Yes" to the previous question it was asked for them to point the reason that justified that positioning towards QR code keys, in which the majority of the respondents answered, "All of the above." as being the major reason for them to choose QR code keys versus a traditional room key with 171 (53.44%) respondents, followed by "It's simpler." with 56 (17.5%), then "It's faster." with 38 (11.88%), then "It's easier." with 31 (9.69%) and lastly "It's safer." with 24 (7.5%) valid respondents.

	Count	N %
It's easier.	31	9.69%
It's faster.	38	11.88%
It's safer.	24	7.5%
It's simpler.	56	17.5%
All the above.	171	53.44%
Total	320	100%

Table 16 - Reasons for choosing a QR code rooms key

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered “No.” to the previous question it was asked the reason behind them preferring to stick with a traditional room key instead of a QR code key, in which we can observe that the major reason for that to happen is regarding “I prefer to have a traditional card/key.” with 79 (50.64%), followed by “I don't think it's practical.” with 32 (20.51%), then “All of the above.” with 26 (16.67%) and lastly “I don't feel safe with a QR code.” with 19 (12.18%) valid respondents.

	Count	N %
I don't feel safe with a QR code.	19	12.18%
I don't think it's practical.	32	20.51%
I prefer to have a traditional card/key.	79	50.64%
All the above.	26	16.67%
Total	156	100%

Table 17 - Reasons for choosing a traditional room key

Source: Dissertation author, output from the collected data inserted in Excel.

Another interesting question was regarding if these respondents had ever made a room service order through their cell phones in which we can see that the vast majority of the respondents answered “No.” with 383 (80.5%) respondents against only 93 (19.5%) respondents that answered “Yes.”.

	Count	N %
No.	383	80.5%
Yes.	93	19.5%
Total	476	100%

Table 18 - Room service order through mobile phone

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered “Yes” it was asked the reasons for them to do it thought their cell phone instead of the hotel room phone in which we can observe that the majority of the respondents answered, “All of the above.” with 54 (58.06%), followed by “I did it to experiment.” with 14 (15.05%), then “It's simpler.” with 9 (9.68%), then “It's faster.” with 8 (8.60%), then “It's easier.” with 7 (7.53%) and lastly “It’s safer.” with 1 (1.08%) respondent.

	Count	N %
It's easier.	7	7.53%
It's faster.	8	8.60%
It’s safer.	1	1.08%
It's simpler.	9	9.68%
I did it to experiment.	14	15.05%
All the above.	54	58.06%
Total	93	100%

Table 19 - Reasons for making it through their mobile phone and not the hotel room one

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered “No” it was asked why haven’t them made it yet, where we can observe that the major reason was “I just preferred not to do it.” with 163 (42.56%), followed by “The hotel(s) didn’t had that option.” with 111 (28.98%), then “None of the above.” with 96 (25.07%), then “I didn’t felt safe doing it.” with 8 (2.09%) and lastly “It was too confusing to me.” with 5 (1.31%) valid respondents.

	Count	N %
I just preferred not to do it.	163	42.56%
It was too confusing to me.	5	1.31%
I didn’t feel safe doing it.	8	2.09%
None of the above.	96	25.07%
The hotel(s) didn’t have that option.	111	28.98%
Total	383	100%

Table 20 - Reasons for not making a room service thought their mobile phone yet

Source: Dissertation author, output from the collected data inserted in Excel.

Another interesting behaviour to study was regarding if the respondents would prefer to do a reservation in one hotel outlet, in which it was asked the respondents to point the way they would prefer to do a SPA reservation, in which the majority of the respondents answered, “Through my cell phone.” with 251 (52.7%) respondents, followed by “In person in the reception/SPA” with 141 (29.6%) and lastly “Through the hotel room phone to the reception.” with 84 (17.6%) valid respondents.

	Count	N %
Through my mobile phone.	251	52.7%
Through the hotels room phone to the reception.	84	17.6%
In person in the reception/SPA	141	29.6%
Total	476	100%

Table 21 - SPA reservation

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Through my cell phone.” it was asked for them to justify the reason behind them choosing that way of doing the SPA reservation, letting us know that the majority of the respondents identified “All of the above.” as the main reason for that behaviour with 112 (44.62%) respondents, followed by “It's faster.” with 65 (25.9%), then “It's simpler.” with 40 (15.94%), then “It's easier.” with 18 (7.17%), then “I did it to experiment.” With 12 (4.78%) and lastly “It’s safer.” with 4 (1.59%) valid respondents.

	Count	N %
It's easier.	18	7.17%
It's faster.	65	25.9%
It’s safer.	4	1.59%
It's simpler.	40	15.94%
I did it to experiment.	12	4.78%
All the above.	112	44.62%
Total	251	100%

Table 22 - SPA reservation through personal cell phone

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Through the hotel room phone to the reception.” it was asked for them to justify the reason behind them choosing that way of doing the SPA reservation, letting us know that the majority of the respondents identified “It's simpler.” As being the main reason for that behaviour with 25 (29.76%) respondents, followed by “It's faster.” with 16 (19.05%), then both “It's easier.” and “All of the above.” with 15 (17.86%) respondents, then “It’s safer.” with 9 (10.71%) and lastly “I did it to experiment.” with 4 (4.76%) valid respondents.

	Count	N %
It's easier.	15	17.86%
It's faster.	16	19.05%
It’s safer.	9	10.71%
It's simpler.	25	29.76%
I did it to experiment.	4	4.76%
All the above.	15	17.86%
Total	84	100%

Table 23 - SPA reservation through the hotel room phone to the reception.

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “In person in the reception/SPA.” it was asked for them to justify the reason behind them choosing that way of doing the SPA reservation, letting us know that the majority of the respondents identified “It's simpler.” As being the major reason for that behaviour with 49 (34.75%) respondents, followed by “All of the above.” with 25 (17.73%),

then “It's easier.” with 24 (17.02%), then “It’s safer.” with 23 (16.31%), then “I did it to experiment.” With 13 (9.22%) and lastly “It's faster.” with 7 (4.96%) valid respondents.

	Count	N %
It's easier.	24	17.02%
It's faster.	7	4.96%
It’s safer.	23	16.31%
It's simpler.	49	34.75%
I did it to experiment.	13	9.22%
All the above.	25	17.73%
Total	141	100%

Table 24 - SPA reservation in person in the reception/SPA

Source: Dissertation author, output from the collected data inserted in Excel.

To be more clear on the positioning of the respondents on the several outlets of an hotel, another interesting behaviour to study was on how would the respondents prefer to do a restaurant reservation, in which it was asked the respondents to point the way they would prefer to do it, were the majority of the respondents answered, “Through my cell phone.” with 294 (61.8%) respondents, followed by “In person in the hotels reception” with 108 (22.7%) and lastly “Through the hotel room phone to the reception.” with 74 (15.5%) valid respondents.

	Count	N %
Through my mobile phone.	294	61.8%
Through the hotels room phone to the reception.	74	15.5%
In person in the hotels reception.	108	22.7%
Total	476	100%

Table 25 - Restaurant reservation

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Through my cell phone.” it was asked for them to justify the reason behind them choosing that way of doing the restaurant reservation, letting us know that the majority of the respondents identified “All of the above.” As being the main reason for that behaviour with 131 (44.56%) respondents, followed by “It's faster.” with 75 (25.51%), then “It's simpler.” with 42 (14.28%), then “It's easier.” with 33 (11.22%), then “I did it to experiment.” with 9 (3.06%) and lastly “It’s safer.” with 4 (1.36%) valid respondents.

	Count	N %
It's easier.	33	11.22%
It's faster.	75	25.51%
It’s safer.	4	1.36%
It's simpler.	42	14.28%
I did it to experiment.	9	3.06%
All the above.	131	44.56%
Total	294	100%

Table 26 - Restaurant reservation through personal mobile phone

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Through the hotel room phone to the reception.” it was asked for them to justify the reason behind them choosing that way of doing the restaurant reservation, letting us know that the majority of the respondents identified “It's simpler.” As being the main reason for that behaviour with 28 (37.84%) respondents, followed by both “It's easier.” and “All of the above.” with 12 (16.22%) respondents, then “It’s safer.” with 11 (14.86%), then “It's faster.” with 10 (13.51%) and lastly “I did it to experiment.” with 1 (1.35%) valid respondent.

	Count	N %
It's easier.	12	16.22%
It's faster.	10	13.51%
It’s safer.	11	14.86%
It's simpler.	28	37.84%
I did it to experiment.	1	1.35%
All the above.	12	16.22%
Total	74	100%

Table 27 – Restaurant reservation through the hotel room phone to the reception.

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “In person in the hotels reception.” it was asked for them to justify the reason behind them choosing that way of doing the restaurant reservation, letting us know that the majority of the respondents identified “It's simpler.” As being the main reason for that behaviour with 37 (34.26%) respondents, followed by “All of the above.” with 21 (19.44%), then both “It's easier.” and “It’s safer.” with 18 (16.67%) respondents and lastly both “It's faster.” and “I did it to experiment.” with 7 (6.48%) valid respondents.

	Count	N %
It's easier.	18	16.67%
It's faster.	7	6.48%
It’s safer.	18	16.67%
It's simpler.	37	34.26%
I did it to experiment.	7	6.48%
All the above.	21	19.44%
Total	108	100%

Table 28 – Restaurant reservation in person in the hotel reception.

Source: Dissertation author, output from the collected data inserted in Excel.

Another interesting customer behaviour to study is regarding its positioning towards types of ways to do payments and for that it was asked the respondents to answer rather if they would prefer to do an online payment or to do the payment at the hotels reception in which we can see that the majority of the respondents answered, “Online payment.” with 305 (64.1%) against the 171 (35.9%) of the respondents that answered, “Hotels reception.”.

	Count	N %
Online payment.	305	64.1%
Hotels reception.	171	35.9%
Total	476	100%

Table 29 - Online payment vs hotel reception

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Online payment.” it was asked the reasons for them to have that position, in which we can observe that the majority of them pointed that “All of the above.” was the option that better defined their positioning with 120 (39.34%) respondents, followed by “It's faster.” with 89 (29.18%), then “It's simpler.” with 49 (16.07%), then “It's easier.” with 38 (12.46%) and lastly “It’s safer.” with 9 (2.95%) valid respondents.

	Count	N %
It's easier.	38	12.46%
It's faster.	89	29.18%
It’s safer.	9	2.95%
It's simpler.	49	16.07%
All the above.	120	39.34%
Total	305	100%

Table 30 - Reasons for choosing online payments

Source: Dissertation author, output from the collected data inserted in Excel.

For the ones who answered, “Hotels reception.” it was asked the reasons for them to have that position, in which we can observe that the majority of them pointed that “It’s safer.” was the

option that better defined that positioning with 100 (58.48%) respondents, followed by “All of the above.” with 28 (16.37%), then “It's simpler.” with 26 (15.20%), then “It's easier.” with 14 (8.19%) and lastly “It's faster.” with 3 (1.75%) valid respondents.

	Count	N %
It's easier.	14	8.19%
It's faster.	3	1.75%
It’s safer.	100	58.48%
It's simpler.	26	15.20%
All the above.	28	16.37%
Total	171	100%

Table 31 - Reasons for choosing paying in the hotels reception

Source: Dissertation author, output from the collected data inserted in Excel.

Other interesting factor to analyse was if the respondents identified online payments less safer then presential payments, being “1” strongly disagree and “10” strongly agree, in which the majority of the respondents answered “1” strongly disagree with 120 (25.2%) respondents, followed by both “8” and ”10” with 53 (11.1%) respondents, then “5” with 45 (9.5%), then “3” with 43 (9%), then “7” and “9” with 37 (7.8%) respondents, then both “2” and “6” with 34 (7.1%) respondents and lastly “4” with 20 (4.2%) valid respondents, giving a total mean of 4.98, a median of 5 and a mode of 1.

	Count	N %
1	120	25.2%
2	34	7.1%
3	43	9%
4	20	4.2%
5	45	9.5%
6	34	7.1%
7	37	7.8%
8	53	11.1%
9	37	7.8%
10	53	11.1%
Total	476	100%

Table 32 - Safety of online payments vs paying presential

Source: Dissertation author, output from the collected data inserted in Excel.

The last important position that this study focused on was regarding if after leaving the luxury hotel establishment the client leaves a review or not on online channels such as Google, Booking, TripAdvisor, etc., in which the majority of the respondents answered “Sometimes.” with 146 (30.7%), then “Not that often.” with 119 (25%), then “The majority of the times.”

with 100 (21%), then “Never.” with 59 (12.4%) and lastly “Always” with 52 (10.9%) valid respondents.

	Count	N %
Sometimes.	146	30.7%
Never.	59	12.4%
The majority of the times.	100	21%
Not that often.	119	25%
Always.	52	10.9%
Total	476	100%

Table 33 - Frequency of leaving online reviews on luxury hotel establishments

Source: Dissertation author, output from the collected data inserted in Excel.

Consumption profiles

To identify customer profiles for Portuguese luxury hospitality customers, regarding their attitude towards technological innovation and the use of technology, a multivariate analysis was carried out on the answers to 10 survey questions, related to procedures, preferences and safety in the use of technology (IT). Given the qualitative nature of the variables, some of which are not multinomial, a Categorical Analysis in Principal Components (CATPCA) was carried out. Considering as explanatory dimensions, those with eigenvalues greater than 1 (Eigenvalue >1) and positive Cronbach's Alpha, three dimensions were retained, which explain a total of 57.27% of the variance of the results. Dimension 1 explains a greater proportion of variance in the results, namely 31.71, followed by dimension 2, which explains 13.55% and dimension 3, which explains 12.01% of the variation in responses (Table 35).

		Variance Accounted For	
Dimension	Cronbach's Alpha	Total (Eigenvalue)	% of Variance
1	,761	3,171	31,713
2	,291	1,355	13,551
3	,186	1,201	12,008
Total	,917[a]	5,727	57,272

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Table 34 - Dimensions to retain: Cronbach's Alpha and Eingenvalues

Source: Dissertation author

From the comparative analysis of the variance accounted for each question against the percentage (%) of variance, it was validated that all 10 questions are relevant for the analysis - variance accounted greater than the percentage (%) of variance in at least one of the three

dimensions (Table 36). In dimension 1, the questions that most contribute to the explanation of the variance of the results are q27 (0.552), q23 (0.535), q34 (0.494) and q31 (0.443). In dimension 2 it is q35 (0.479). In dimension 3 both questions q14 (0.323) and q11 (0.303) contribute similarly.

Variance Accounted For

	Centroid Coordinates			
	Dimension			
	D1 Services	D2 Information	D3 Process	Mean
q27.If all the options below were possible, how would you prefer to make a reservation at the luxury hotel establishment restaurant?	**,552**	,031	,128	,237
q23.Being all the options below possible, which way would you prefer to book a SPA in a luxury hotel establishment?	**,535**	,002	,135	,224
q34.From 1 to 10, do you agree that payments online are less safe than a payment in person in the hotels reception?	**,494**	,200	,047	,247
q31.If it would be given to you the option between paying online or paying in the hotel reception, between which one would you choose to do the payment?	**,443**	,007	,025	,158
q20.Have you ever did a room service request thought your mobile phone?	**,385**	**,233**	,050	,223
q17.If this hotel had the free option of your room key being a QR code on your mobile phone, would you prefer to use that QR code as your room key instead of a traditional card/key?	**,349**	,055	,047	,150
q35.After leaving the hotel establishment, do you leave a review on online channels like "Google", "Booking", "Trip Advisor", etc.?	,154	**,479**	,106	,246
q8.When you think about going to a luxury hotel establishment, do you search on your phone or computer on channels like "Google", "Booking", "Trip Advisor", etc., to get more information about that hotel?	,093	**,301**	,096	,163
q14.Have you ever made an online check-in and out operation on a luxury hotel establishment?	,130	,128	**,323**	,194
q11.Have you ever made a hotel reservation online for a luxury hotel establishment?	,162	,016	**,303**	,161
Active Total	3,298	1,452	1,260	2,003
% of Variance	32,980	14,517	12,596	20,031

Table 35 - Variance accounted for – Relevant questions

Source: Dissertation author

The analysis of component loadings greater than 0.5 led to the identification of the most relevant issues in each dimension (Table 37).

Component Loadings

	Dimension		
	D1 Services	D2 Informations	D3 Process
q27.If all the options below were possible, how would you prefer to make a reservation at the luxury hotel establishment restaurant?	**,743**	,175	-,356
q23.Being all the options below possible, which way would you prefer to book a SPA in a luxury hotel establishment?	**,730**	-,002	-,357
q34.From 1 to 10, do you agree that payments online are less safe than a payment in person in the hotels reception?	**,691**	-,371	,043
q31.If it would be given to you the option between paying online or paying in the hotel reception, between which one would you choose to do the payment?	**,665**	,081	-,157
q20.Have you ever did a room service request thought your mobile phone?)	**,620**	-,482	,224
q17.If this hotel had the free option of your room key being a QR code on your mobile phone, would you prefer to use that QR code as your room key instead of a traditional card/key?	**,591**	,234	-,217
q35.After leaving the hotel establishment, do you leave a review on online channels like "Google", "Booking", "Trip Advisor", etc.?	,216	**,669**	,317
q8.When you think about going to a luxury hotel establishment, do you search on your phone or computer on channels like "Google", "Booking", "Trip Advisor", etc., to get more information about that hotel?	,305	**,549**	,309
q14.Have you ever made an online check-in and out operation on a luxury hotel establishment?	,361	-,358	**,568**
q11.Have you ever made a hotel reservation online for a luxury hotel establishment?	,403	,128	**,551**

Variable Principal Normalization.

Table 36 - Component loadings – Relevant questions in each dimension

Source: Dissertation author

Thus, there is a strong association of six questions with dimension 1, namely: "q27. If all the options below were possible, how would you prefer to make a reservation at the luxury hotel establishment restaurant" (λ=0.743), "q23. Being all the options below possible, which way would you prefer to book a SPA in a luxury hotel establishment" (λ=0.730), "q34. From 1 to 10, do you agree that payments online are less safe than a payment in person in the hotel

reception" (λ=0.691), "q31. If it would be given to you the option between paying online or paying in the hotel reception, between which one would you choose to do the payment" (λ=0.665), "q20. Have you ever done a room service request thought your mobile phone" (λ=0.620) and "q17. If this hotel had the free option of your room key being a QR code on your mobile phone, would you prefer to use that QR code as your room key instead of a traditional card/key" (λ=0.591).

There is a strong association of two questions with dimension 2, namely: "q35. After leaving the hotel establishment, do you leave a review on online channels like Google, Booking, TripAdvisor, etc." (λ=0.669) and "q8. When you think about going to a luxury hotel establishment, do you search on your phone or computer on channels like Google, Booking, TripAdvisor, etc., to get more information about that hotel" (λ=0.549).

There is also a high association of the two remaining questions with dimension 3, namely: "q14. Have you ever made an online check-in and out operation on a luxury hotel establishment" (λ=0.568) and "q11. Have you ever made a hotel reservation online for a luxury hotel establishment" (λ=0.551).

By analysing the content of the questions most associated with each dimension, dimension 1 was designated as Services, dimension 2 as Information and dimension 3 as Process.

The identification of the categories with the highest affinity between them was carried out based on the positive/negative quantification of the coordinates vector of the belonging dimension (Annex I). The results are presented in Appendix I, and reveal that:

Negative coordinate of dimension 1 – Services – There is an affinity between customers that have already done a room service request thought mobile phone, prefer a QR code room key on the mobile phone, prefer to book a SPA in hotel or a reservation at the hotel restaurant by mobile phone, prefer to make the hotel payment online and that completely disagree that online payments are less safe than a payment in person in the hotel reception.

Positive coordinate of dimension 1 – Services – There is an affinity between customers that never have done a room service request thought mobile phone, prefer a traditional room card/key, prefer to book a SPA in hotel or a reservation at the hotel restaurant in person at the hotel reception or through the room phone to the hotel/SPA reception, prefer to make the hotel payment in the hotel reception and that disagree to completely agree that online payments are less safe than a payment in person in the hotel reception;

Negative coordinate of dimension 2 – Information – There is an affinity between clients that when they think about going to a luxury hotel establishment, search on the phone or computer on channels like Google, Booking, Trip Advisor, etc., to get more information about that hotel and always, at the majority of times, sometimes or not that often after leaving the hotel establishment, leave a review on online channels like Google, Booking, TripAdvisor, etc.;

Positive coordinate of dimension 2 – Information – There is an affinity between customers that when they think about going to a luxury hotel establishment, don't search on the phone or computer on channels like Google, Booking, TripAdvisor, etc., to get more information about that hotel and after leaving the hotel establishment, never leave a review on online channels like Google, Booking, TripAdvisor, etc.;

Negative coordinate of dimension 3 – Process – There is an affinity between customers that have made a hotel reservation online for a luxury hotel establishment and also have made an online check-in and out operation on a luxury hotel establishment;

Positive coordinate of dimension 3 – Process – There is an affinity between customers that never have made a hotel reservation online for a luxury hotel establishment and neither have made an online check-in and out operation on a luxury hotel establishment.

In addition, the coordinates of the additional variables gender and age group are presented, in order to put in perspective their location on the profiles to be identified, and they are only presented in some of the categories and for dimensions 1 and 2.

The two-dimensional representation of the coordinates of the categories, depending on the "Services" and "Process" dimensions, makes it possible to identify two luxury hotel customer profiles, namely "Profile A - IT Client" and "Profile B - Traditional Client" (Appendix J).

IT Client - aggregates customers with similar preferences and opinions on preferring to book a SPA at the hotel or a reservation at the hotel restaurant by mobile phone, completely disagree that online payments are less safe than a payment in person in the hotel reception, prefer to make the hotel payment online, have already done a room service request thought mobile phone, prefer a QR code room key on the mobile phone, already made a hotel reservation online and an online check-in and out operation at a luxury hotel establishment.

Traditional client - aggregates clients with affinities for preferring to book a SPA at the hotel or a reservation at the hotel restaurant in person, at the hotel reception or through the room phone to the hotel/SPA reception, disagree to completely agree that online payments are less

safe than a payment in person in the hotel reception, prefer to make the hotel payment in the hotel reception, never done a room service request thought mobile phone, prefer a traditional room card/key, never have made a hotel reservation online, neither made an online check-in and out operation for a luxury hotel establishment, don't search on the phone or computer on channels like Google, Booking, TripAdvisor , etc., to get more information about that hotel and never leave a review on online channels like Google, Booking, TripAdvisor, etc., after leaving the hotel establishment.

The representation for the level of the supplementary variables gender and age allows it to be observed that man and clients between the ages of 18 and 24 overlap on profile A, indicating that the "IT Client" profile is preferably adopted by clients with these sociodemographic characteristics. The "Traditional client" profile, on the other hand, tends to be adopted by clients aged between 41-60 years, 61-76 years and over 76 years and who do not identify their gender (Appendix K).

Finally, Appendix L shows the location of the 476 participants in the study, with a high density of cases in the traditional profile and a lower, but equally high, density in the IT profile.

4.3. Discussion

This research discovered that the luxury costumer nowadays is more technological than it's ever been before, a proof of that is that when in 2008 Hilton surveys showed that 89% of customers carried a cell phone to luxury hotel establishments (Avery, 2008), today we can see that 94,7% of luxury customers always bring their cell phones to luxury hotel establishments and that several processes and services nowadays are desired to be done in a more high-tech approach than high-touch approach than before.

This research also discovered that nowadays there are two main groups of luxury customers when talking about Portuguese luxury customers' acceptance of technology in luxury hotel establishments, one group named in this study as the "IT client" and another group named "Traditional client", one more representative of the male gender and the younger generations and another one leaning more to the female gender, non-binary and the ones who do not identify their gender as well as representative of the older generations.

In regard to the propositions defined in this research, that help us on answering the investigations questions, were, for instances, it was mentioned that the market segments defined in terms of preferences, are associated with different demographic profiles, such as age (P1)

and gender (P2), we can now verify that through the representation of supplementary socio-demographic variables, gender and age group, through "Services" and "Process" dimensions (Appendix K), the perceptual map allowed to identify two groups, one representative of man and clients between the ages of 18 and 24 overlap on profile A, indicating that the “IT Client” profile is preferably adopted by clients with these sociodemographic characteristics and that, on the other hand, the “Traditional client” profile, tends to be adopted by clients aged between 41-60 years old, 61-76 years old and over 76 years old and who do not identify their gender (Appendix J) validating that these socio-demographic variables have impact on Portuguese luxury hospitality customers’ preferences towards services, information and processes, in luxury hotel establishments.

Another proposition defined on this research was that the Portuguese luxury hospitality customers are heterogeneous in terms of preferences regarding services, information and processes (P3), in which we can verify through the luxury hospitality customer profiles, through "Services" and "Process" dimensions (Appendix J) and the distribution of respondents, through "Services" and "Process" dimensions (Appendix L), that show us and allow us to verify that there is heterogeneity in terms of preferences regarding services, information and processes by the Portuguese luxury hospitality customers.

Through this research we can also see that there are still luxury hotel establishments that are not ready for this “IT client” and focusing only in the “Traditional client” profile and the core discovery of this research was that the healthier way to solve this problem is to be ready to provide all this processes and services in both a high-tech and high-touch type of approaches balancing both positionings to satisfy each type of client needs and preferences.

Chapter 5: Conclusion and recommendations

The objectives of this dissertation were to provide an updated overview of the luxury hospitality market by exploring different segmentations with potential factors of influence in the existing literature, to discover what new types of clients this market segment have nowadays and what's their positioning towards technology development in such hospitality sector; and lastly to add value to the luxury hospitality market with any relevant conclusions and a new perspective.

All of these were accomplished throughout this study because its overall findings provide an updated overview of the luxury hospitality market regarding the Portuguese customers with relevant outcomes and perspectives that could not be achieved without a previous proper analysis within this specific segment.

5.1. Summary of results

The findings show that Portuguese customers who never had a chance of staying in a luxury hotel establishment indicated that the reasons for that has to do with high prices and showing as well that the majority of Portuguese who already had that chance to stay in a luxury hotel establishment went already more than 10 times.

The research shows as well that 94.7% of the Portuguese customers that already had the chance to stay in a luxury hotel establishment always bring their cell phones with them and also 94.7% of them search on their cell phones or computers on channels like Google, Booking, TripAdvisor, etc., to get more information about those luxury hospitality establishments and the majority of them also indicating that they always do it before making their reservations, the majority of the Portuguese luxury customers who do not search on those channels indicated that they gather those information's through recommendations of friends and family.

It is showed that the Portuguese luxury costumer in general already did an online reservation for a luxury hotel establishment between two and four times, but it is also showed that the majority of the Portuguese luxury customers never done an online check-in or check-out operation with 58.8% indicating that way. This research shows too that Portuguese customers would prefer QR code rooms keys instead of a traditional room key with 67.2% indicating that way and that 80.5% of them never done a room service order through their mobile phones in luxury hotel establishments.

Another interesting conclusion of this research is that 52.7% of Portuguese luxury customers would rather make a SPA reservation through their mobile phones instead of doing it through the hotel room phone or in person in the hotel/SPA reception, same for a restaurant reservation where 61.8% of them would prefer to make that reservation through their mobile phones instead of doing it through the hotel room phone or in person in the hotels reception.

In this research we can also see that 61.4% of Portuguese luxury customers prefer online payments rather than doing a payment in person in the hotel reception and that most of them strongly disagree that online payments are less safe than in person payments. Lastly it is showed that most Portuguese luxury customers sometimes leave a review on online channels such as Google, Booking, TripAdvisor, etc.

Ultimately, this research shows that the willingness to use technology in this market is growing at a fast pace, Portuguese luxury hospitality customers want to see more automatization and a bigger technological growth as well as a mixed type of approach between high-touch and high-tech, as we can see by the results presented above and also it is undisputed that there is still a lot to be done in order to provide Portuguese luxury hospitality customers their needs and preferences since a lot of them never had the chance to do certain operations but they are willing to do them technologically and this research shows not only what are those operations but also how can we provide those needs and preferences to the costumer.

5.2. Theoretical contributions

Taking into consideration what was previously said in the “Relevance of the study” topic on the introduction of this dissertation, where it was said that this study aims to understand if Portuguese luxury hospitality customers nowadays still seek a high-touch focused type of service or if they want to see a technological development, high-tech, in this luxury sector balancing both approaches, we can now see that this identified new costumer profile “IT client” being representative of the younger generations, technology development is a must that luxury hospitality groups should expect and work towards their needs and preferences but never forgetting the essence of a combined high-touch with high-tech type of approach since this other “Traditional client” costumer profile group is still present and with a similar density as this new generations.

5.3. Managerial Implications

There is much to be gained for researchers, luxury hotel establishments, luxury hospitality groups and its managers from the results presented in this research. Nowadays it is crucial to understand not only who our clients are but most important what are their needs and preferences. There is no single type of client, and as hotel managers and as luxury establishments they need to be ready for all types of clients, needs and preferences that might be necessary to provide and this study provides just a sample of information that needs and will always need to be deepened in the future.

5.4. Practical implications

The theoretical contributions part of this study helps on understanding its practical implications, meaning that, through this research, luxury hospitality groups should be practically prepared for this mixed high-touch and high-tech approaches.

This hotel processes and services should be ready to be provided in both a high-touch as in a high-tech approach to satisfy each type of client needs and preferences, based on the results gathered in appendix L that shows the location of the 476 participants in this research, with a high density of cases in the traditional profile and a lower, but equally high, density in the IT profile, justifying this necessity of combining both approaches to provide a better customer experience.

5.5. Limitations

A research with this dimension in a world currently still facing a world pandemic and an endless war are just the pilar of the limitations that this research faced. Interviews were cancelled, visits were for a long time not possible, the engagement to answer the survey might be putted a side when the pics of both this two moments accord in a larger proportion, but none of that stopped this research to be done even through these difficult times.

There is still a need for research on this matter that will be explained in the next part of this dissertation chapter, but it was certainly a limitation for this research the fact that there were no studies yet made on customers' acceptance of technology in luxury hotel establishments focused on the Portuguese luxury customers, and that lack of information limited the research when comparing the results gathered previously with the ones this research presents.

Another limitation is regarding the usage of a non-random sample convenience data collection that inevitably limited the data gathered in this research.

Although these limitations occurred, there is no doubt that this research will be a pillar for further studies regarding the acceptance of technology in luxury hotel establishments by Portuguese luxury customers and that is already a win for the major objective of this research.

5.6. Avenues of future research

As mentioned before, future research is needed to better understand the needs of nowadays clients, being them younger, older, identifying as male, female, non-binary, it is necessary to be ready and prepared to serve everyone according to their needs and preferences and this research is just a pillar on that matter, there is still a lot to be discovered and better understood.

For the future research it is needed a larger sample as well as for as more qualitative and operational work (i.e., different channels, different sources, interviews) to verify and add to this research discoveries.

It would be interesting to research on what are currently luxury hospitality establishments doing in order to satisfy these new types of clients and their new needs and preferences, as well as a deepened detail on socio-demographic variables (e.g. different incomes, different countries) in proper measurement scales as they can lead to different results and conclusions.

It is crucial to deepen this research studies on this matter, as they are so short in number there is still a lot to be done, discovered and showed to the bigger stakeholders in this luxury hospitality market.

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Appendices

Appendix A – Survey - Part 1 – Consent

Questions	Items
(Q.1) Do you accept to answer voluntarily to this academic survey?	a) Yes. b) No.
(Q.2) Do you commit yourself to give honest insights through the whole inquiry?	a) Yes. b) No.
(Q.3) Are you over 18 years old?	a) Yes. b) No.
(Q.4) Have you ever been to a four- or five-star luxury hotel establishment?	a) Yes. b) No.

Source: Dissertation author

Appendix B - Survey - Part 2 - General information

Questions	Items
(Q.5) If you selected the option "Yes", how many times have you been to one?	a) Only 1 time. b) Between 2 and 4 times. c) Between 5 and 7 times. d) Between 8 and 10 times. e) More than 10 times.
(Q.5) What is the determinant factor for having not yet had this opportunity yet?	a) High price. b) Location. c) Don't have curiosity.
(Q.6) From 1 to 10, how frequently do you carry your mobile phone to luxury hotel establishments?	1-10 frequency type of answer.

Source: Dissertation author

Appendix C - Survey - Part 3 - Consumption profile

Questions	Items
(Q.9) Have you ever made a hotel reservation online for a luxury hotel establishment?	a) Yes. b) No.
(Q.10) How many times have you made an online reservation on a luxury hotel establishment?	a) Only 1 time. b) Between 2 and 4 times. c) Between 5 and 7 times. d) Between 8 and 10 times. e) More than 10 times.
(Q.10) Why haven't you made any online reservation for a luxury hotel establishment yet?	a) The hotel didn't have that option. b) It was too confusing to me. c) I didn’t feel safe doing it. d) I just preferred not to do it. e) None of the above.
(Q.11) Have you ever made an online check-in and out operation on a luxury hotel establishment?	a) Yes. b) No.
(Q.12) How many times have you checked-in and checked-out online at a luxury hotel?	a) Only 1 time. b) Between 2 and 4 times. c) Between 5 and 7 times. d) Between 8 and 10 times. e) More than 10 times.
(Q.12) Why haven't you done an online check-in and check-out operation at a luxury hotel establishment yet?	a) The hotel didn't have that option. b) It was too confusing to me. c) I didn’t feel safe doing it. d) I just preferred not to do it. e) None of the above.

Source: Dissertation author

Appendix D - Survey - Part 4 - Attribute selection

Questions	Items
(Q.15) Have you ever did a room service request thought your mobile phone?	a) Yes. b) No.
(Q.16) Why did you do it on your cell phone instead of your room phone?	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above.
(Q.16) Why haven't you ordered room service on your cell phone at a luxury hotel establishment yet?	a) The hotel didn't have that option. b) It was too confusing to me. c) I didn't feel safe doing it. d) I just preferred not to do it. e) None of the above.
(Q.17) Being all the options below possible, which way would you prefer to book a SPA in a luxury hotel establishment?	a) Mobile phone. b) Through the room phone to the hotel/SPA reception. c) In person at the hotel/SPA reception.
(Q.18) Select the option that supports the reason for your answer, if you prefer to make this reservation through your mobile phone.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above.
(Q.18) Select the option that supports the reason for your answer, from making this reservation through the room phone to the hotel/SPA reception.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above.
(Q.18) Select the option that supports the reason for your answer, to make this reservation in person at the hotel/SPA reception.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above
(Q.19) If all the options below were possible, how would you prefer to make a reservation at the luxury hotel establishment restaurant?	a) Mobile phone b) Through the room phone to the hotel reception c) In person at the hotel reception.
(Q.20) Select the option that supports the reason for your answer, if you prefer to use your mobile phone.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above

(Q.20) Select the option that supports the reason for your answer, if you prefer to use your room phone for the hotel reception.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above
(Q.20) Select the option that supports the reason for your answer, if you prefer to book in person at the hotel reception.	a) It's faster. b) It's safer. c) It's easier. d) It's simpler. e) I did it just to experiment. f) All of the above

Source: Dissertation author

Appendix E - Survey - Part 5 - Risk perception

Questions	Items
(Q.21) If it would be given to you the option between paying online or paying in the hotel reception, between which one would you choose to do the payment?	a) Online payment b) Payment in the hotel reception
(Q.22) If your selected answer was "Online payment", select the options that support the reason for your answer.	a) It's faster b) It's safer c) It's easier d) It's simpler e) All of the above
(Q.22) If your selected answer was "Payment in the hotel reception", select the options that support the reason for your answer.	a) It's faster b) It's safer c) It's easier d) It's simpler e) All of the above
(Q.23) From 1 to 10, do you agree that payments online are less safe than a payment in person in the hotels reception? Being "1" Completely disagree and "10" Completely agree.	10-point Likert scale question of frequency with a type of answer scale from 1 to 10.
(Q.13) If this hotel had the free option of your room key being a QR code on your mobile phone, would you prefer to use that QR code as your room key instead of a traditional card/key?	a) Yes b) No
(Q.14) Select the option that supports the reason for your answer, whether you prefer a QR code on your mobile phone as your room key.	a) It's faster b) It's safer c) It's easier d) It's simpler e) All of the above
(Q.14) Select the option that supports the reason for your answer, of preferring a traditional card/key.	a) I don't feel like it's safe b) I would prefer to have a traditional room key c) I don't think it's practical d) All of the above

Source: Dissertation author

Appendix F - Survey - Part 6 - Source selection

Questions	Items
(Q7) When you think about going to a luxury hotel establishment, do you search on your phone or computer on channels like Google, Booking, TripAdvisor, etc., to get more information about that hotel?	a) Yes b) No
(Q8) How often do you do this research through these channels?	a) Every time b) The majority of the times c) Sometimes d) Not that often
(Q8) How do you get that information?	a) Through recommendations from friends and family. b) Other media platforms (newspapers, magazines, TV, radio, etc.). c) Through a phone call to the luxury hotel establishment. d) Moving in person to the luxury hotel establishment.
(Q24) After leaving the hotel establishment, do you leave a review on online channels like Google, Booking, TripAdvisor, etc.?	a) Always b) The majority of times c) Sometimes d) Not that often e) Never

Source: Dissertation author

Appendix G - Survey - Part 7 - Socio-demographic profile

Questions	Items
Which is your age range?	a) 18-24 b) 25-40 c) 41-60 d) 61-76 e) >76
Which gender do you identify yourself with?	a) Female b) Male c) Non-binary d) Prefer not to answer e) Other
What is your current living district?	a) Lisboa b) Setúbal c) Porto d) Braga e) Guimarães f) Faro g) Beja h) Açores i) Madeira j) Fora de Portugal k) Other
What is your current relationship status?	a) Single b) Married c) Non-marital partnership d) Divorced e) Widow
What is your current occupation?	a) Student b) Working - Student c) Employee d) Self – employed e) Unemployed f) Retired g) Other
What is currently your educational background?	a) High school or equivalent c) Specialization course d) Bachelor's degree e) Post-graduation f) Master's degree g) PhD/ Postdoc h) None of the above

Source: Dissertation author

Appendix H – Socio demographic profiles

		Count	N %
Age	>76	4	0,8%
	18-24	70	14,7%
	25-40	150	31,5%
	41-60	225	47,3%
	61-76	27	5,7%
Gender	Man	179	37,6%
	Woman	292	61,3%
	Non binary	2	0,4%
	Prefer not to answer	3	0,6%
Current district	Lisboa	159	33,4%
	Fora de Portugal	39	8,2%
	Açores	41	8,6%
	Aveiro	2	0,4%
	Beja	8	1,7%
	Others	227	47,7%
Relationship status	Married	175	36,8%
	Divorced	42	8,8%
	Single	180	37,8%
	Non-marital partnership	65	13,7%
	Widow	14	2,9%
Current occupation	Unemployed	17	3,6%
	Student	56	11,8%
	Retired	32	6,7%
	Working student	33	6,9%
	Employee	272	57,1%
	Self-employed	66	13,9%
Educational background	Specialization course	32	6,7%
	Doctor degree	13	2,7%
	High school or equivalent	74	15,5%
	Bachelor's degree	173	36,3%
	Master's degree	109	22,9%
	None of the above	4	0,8%
	Post graduate	71	14,9%
Total		476	100%

Note: * "Others" include: Braga (4;0,8%), Bragança (1;0,2%), Coimbra (12;2,5%), Évora (4;0,8%) Faro (23;4,8%), Guimarães (3;0,6%), Leiria (74;15,5%), Madeira (18;3,8%), Porto (47;9,9%), Santarém (7;1,5%), Setúbal (29;6,1%), Viana do Castelo (2;0,4%), Vila Real (3;0,6%).

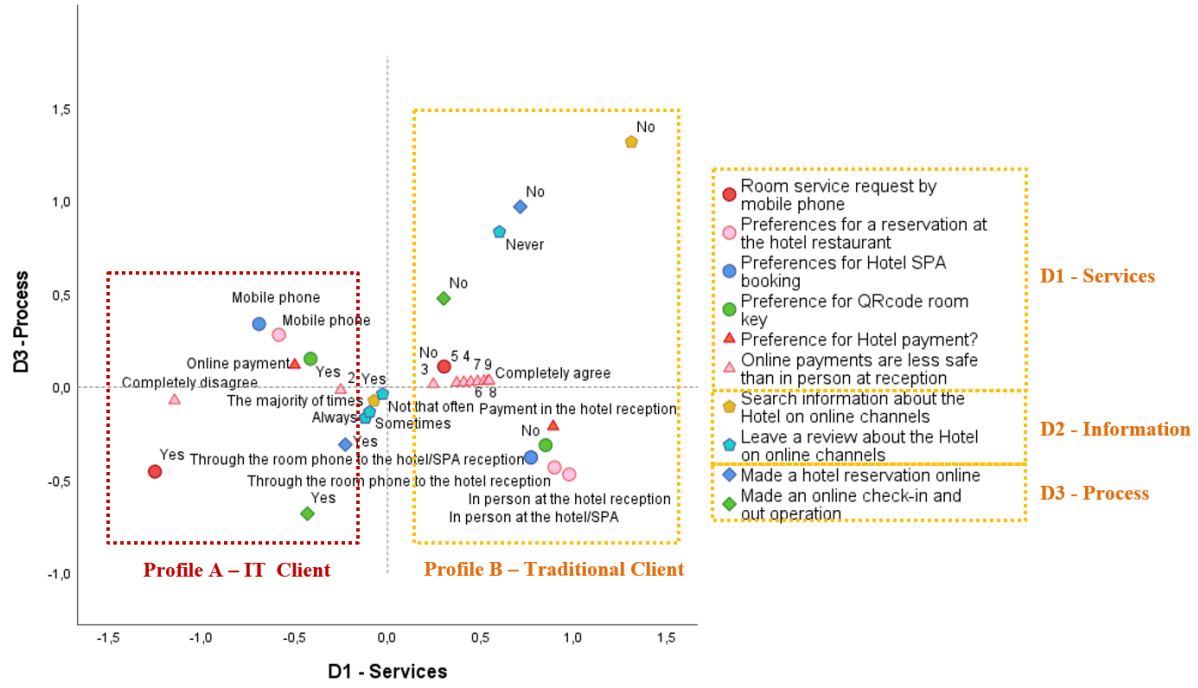
Source: Dissertation author, output from the collected data inserted in Excel.

Appendix I – Categories affinity by dimension

Dimension	Negative coordinate	Operations concerning Luxury Hotels	Positive coordinate
D1 Services	By mobile phone	Preference on booking a SPA in hotel preference on making a reservation at the hotel restaurant	In person at the hotel/SPA reception Through the room phone to the hotel/SPA reception
	Completely disagree (1)	Online payments are less safe than a payment in person in the hotel reception	Disagree (2) to Completely agree (10)
	Online payment	Hotel payment preference	Payment in the hotel reception
	Yes	Have done a room service request thought mobile phone	No
	QR code on the mobile phone	Preference for type of room key (free options)	Traditional card/key
D2 Information	Always, the majority of times, sometimes, not that often	Leave a review about the hotel on online channels	Never
	Yes	Search information about the hotel on online channels	No
D3 Process	Yes	Made an hotel check-in and out operation online	No
	Yes	Made a hotel reservation online	No

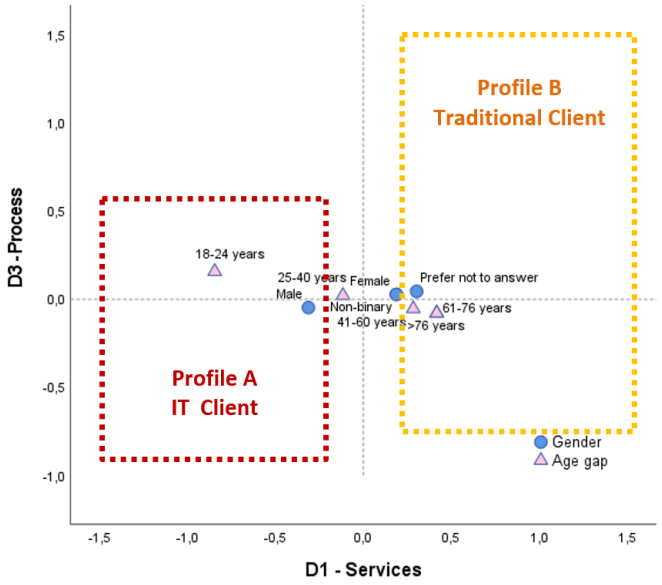
Source: Dissertation author

Appendix J – Luxury hospitality customer profiles, through "Services" and "Process" dimensions



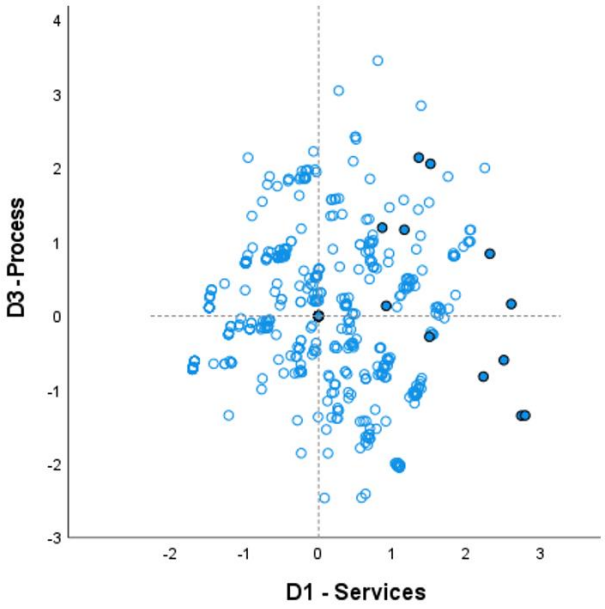
Source: Dissertation author

Appendix K – Representation of supplementary socio-demographic variables, gender and age group, through "Services" and "Process" dimensions



Source: Dissertation author

Appendix L - Distribution of respondents, through "Services" and "Process" dimensions



Source: Dissertation author

Appendix M – Total Cronbach's Alpha based on total Eingenvalues

Model Summary

Dimension	Cronbach's Alpha	Variance Accounted For: Total (Eigenvalue)	Variance Accounted For: % of Variance
1	,759	3,159	31,590
2	,203	1,223	12,233
3	,120	1,121	11,208
4	-,095	,921	9,209
5	-,253	,814	8,144
6	-,301	,787	7,868
7	-,511	,685	6,851
8	-,774	,589	5,893
9	-1,701	,395	3,951
10	-2,527	,305	3,054
Total	1,000[a]	10,000	100,000

a. Total Cronbach's Alpha is based on the total Eigenvalue.

Source: Dissertation author

Appendix N - Vector Coordinates - Dimension 1

q23.Being all the options below possible, which way would you prefer to book a SPA in a luxury hotel establishment?[a]

Category	Frequency	Quantification	Centroid Coordinates Dimension 1	Centroid Coordinates Dimension 2	Centroid Coordinates Dimension 3	Vector Coordinates Dimension 1	Vector Coordinates Dimension 2	Vector Coordinates Dimension 3
1 Mobile phone	251	-,947	-,692	,001	,338	-,691	,002	,338
2 Through the room phone to the hotel/SPA reception	84	1,071	,703	-,084	-,544	,782	-,002	-,383
3 In person at the hotel/SPA	141	1,048	,813	,048	-,277	,765	-,002	-,374

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q27. If all the options below were possible, how would you prefer to make a reservation at the luxury hotel establishment restaurant?[a]

Category	Frequency	Quantification	Centroid Coordinates Dimension 1	Centroid Coordinates Dimension 2	Centroid Coordinates Dimension 3	Vector Coordinates Dimension 1	Vector Coordinates Dimension 2	Vector Coordinates Dimension 3
1 Mobile phone	294	-,786	-,584	-,137	,281	-,584	-,137	,280
2 Through the room phone to the hotel reception	74	1,215	,889	,151	-,492	,903	,212	-,433
3 In person at the hotel reception	108	1,309	,982	,269	-,428	,973	,228	-,466

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q34.From 1-Completely disagree to 10-Completely agree, do you agree that payments online are less safe than a payment in person in the hotels reception?[a]

Category	Frequency	Quantification	Centroid Coordinates Dimension 1	Centroid Coordinates Dimension 2	Centroid Coordinates Dimension 3	Vector Coordinates Dimension 1	Vector Coordinates Dimension 2	Vector Coordinates Dimension 3
1 Completely disagree	120	-1,677	-1,115	,695	-,129	-1,158	,622	-,073
2	34	,031	-,295	-,581	,169	,021	-,011	,001
3	43	,132	-,057	-,281	,394	,091	-,049	,006
4	20	,578	,176	-,644	,423	,399	-,214	,025
5	45	,578	,368	-,311	,080	,399	-,214	,025
6	34	,578	,458	-,011	,008	,399	-,214	,025
7	37	,763	,474	-,490	,074	,527	-,283	,033
8	53	,763	,655	,032	,085	,527	-,283	,033
9	37	,763	,702	-,086	-,209	,527	-,283	,033
10 Completely agree	53	,763	,612	-,090	-,359	,527	-,283	,033

Variable Principal Normalization.

a. Optimal Scaling Level: Ordinal.

Source: Dissertation author

q31.If it would be given to you the option between paying online or paying in the hotel reception, between which one would you choose to do the payment?[a]

Category	Frequency	Quantification	Centroid Coordinates Dimension 1	Centroid Coordinates Dimension 2	Centroid Coordinates Dimension 3	Vector Coordinates Dimension 1	Vector Coordinates Dimension 2	Vector Coordinates Dimension 3
1 Online payment	305	-,749	-,498	-,061	,118	-,498	-,061	,118
2 Payment in the hotel reception	171	1,336	,889	,109	-,210	,889	,109	-,210

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q20.Have you ever did a room service request thought your mobile phone?)[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Yes	93	-2,029	-1,259	,979	-,455	-1,259	,979	-,455
2 No	383	,493	,306	-,238	,111	,306	-,238	,111

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q17.If this hotel had the free option of your room key being a QR code on your mobile phone, would you prefer to use that QR code as your room key instead of a traditional card/key?[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Yes	320	-,698	-,412	-,163	,152	-,412	-,163	,152
2 No	156	1,432	,846	,335	-,311	,846	,335	-,311

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

Appendix O - Vector Coordinates - Dimension 2

q8.When you think about going to a luxury hotel establishment, do you search on your phone or computer on channels like "Google", "Booking", "Trip Advisor", etc., to get more information about that hotel?[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Yes	451	-,235	-,072	-,129	-,073	-,072	-,129	-,073
2 No	25	4,247	1,295	2,332	1,313	1,295	2,332	1,313

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q35.After leaving the hotel establishment, do you leave a review on online channels like "Google", "Booking", "Trip Advisor", etc.?[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Always	52	-,481	-1,023	,174	-,273	-,104	-,322	-,153
2 The majority of times	100	-,481	,025	-,412	-,202	-,104	-,322	-,153
3 Sometimes	146	-,481	,079	-,382	-,152	-,104	-,322	-,153
4 Not that often	119	-,096	,058	-,140	,076	-,021	-,064	-,030
5 Never	59	2,623	,548	1,774	,805	,567	1,755	,832

Variable Principal Normalization.

a. Optimal Scaling Level: Ordinal.

Source: Dissertation author

Appendix P - Vector Coordinates - Dimension 3

q11.OnlineReservation_Done Have you ever made a hotel reservation online for a luxury hotel establishment?[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Yes	361	-,564	-,227	-,072	-,311	-,227	-,072	-,311
2 No	115	1,772	,714	,227	,976	,714	,227	,976

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

q14.Have you ever made an online check-in and out operation on a luxury hotel establishment?[a]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
1 Yes	196	-1,195	-,432	,427	-,679	-,432	,427	-,679
2 No	280	,837	,302	-,299	,475	,302	-,299	,475

Variable Principal Normalization.

a. Optimal Scaling Level: Nominal.

Source: Dissertation author

Appendix Q - Supplementary variables – Sociodemographic

Which gender do you identify yourself with?[a,b]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
Male	179	-1,287	-,309	,231	-,046	**-,313**	,226	-,047
Female	292	,771	,180	-,149	,029	,187	-,135	,028
Non-binary	2	,771	-,454	-,611	-,408	,187	-,135	,028
Prefer not to answer	3	1,246	1,231	1,107	,234	**,303**	-,218	,045

Variable Principal Normalization.

a. Supplementary variable.

b. Optimal Scaling Level: Spline Ordinal (Degree 2, Interior Knots 2).

Source: Dissertation author

In which age gap do you fit in?[a,b]

			Centroid Coordinates			Vector Coordinates		
			Dimension			Dimension		
Category	Frequency	Quantification	1	2	3	1	2	3
18-24 years	70	-2,123	-,789	,436	,164	**-,846**	,229	,158
25-40 years	150	-,293	-,197	-,192	,011	-,117	,032	,022
41-60 years	225	,711	,330	-,091	-,041	**,283**	-,077	-,053
61-76 years	27	1,046	,399	,373	-,156	**,417**	-,113	-,078
>76 years	4	1,046	-,036	2,175	,060	**,417**	-,113	-,078

Variable Principal Normalization.

a. Supplementary variable.

b. Optimal Scaling Level: Spline Ordinal (Degree 2, Interior Knots 2).

Source: Dissertation author