Exploring the relevant factors influencing usability of the online booking process on individual hotel websites applying the eye tracking method

The case of three four-star hotels in the city of Lugano (Switzerland)

Master’s Dissertation

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To my son Liam.
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1. Introduction

Information and Communication Technologies (ICTs), in particular the Internet, are experiencing today a noticeable diffusion throughout the world, becoming more widespread even in developing countries. Within this context, ICTs have a broad impact on the daily life of people, as well as on organizations and businesses, which increasingly adopt them for managerial, productive and communicational purposes, enhancing their competitive advantage. Considering the tourism sector, ICTs play today a fundamental role in the ability of tourism organizations and destinations to compete in the market, likewise in the overall tourism experience. For what concerns the specific sector of tourism hospitality, the Internet profoundly changed the industry, inducing hotels to develop their own websites with the aim of improving and facilitating the communication with the relevant stakeholders and the online distribution of products and services. In this sense, websites represent a fundamental instrument for hotels to acquire larger market shares and improve their image and consequently increase their profits.

Taking into consideration the recent developments in the online distributional channels of the hospitality industry, which nowadays sees the advent of the Online Travel Agents (OTAs), and the growing influence of social media on the image of hotel companies, hotels are challenged by the necessity to provide their customers with a high quality online experience. This is particularly relevant in the case of online booking systems, where the necessity to operate a concrete number of bookings can be considered of primary importance. Accordingly, one of the most significant measures of quality regards usability. In fact, usability plays an essential role in transforming “potential guests” into “real guests”, considering the importance of offering clients a simple and fast booking procedure, free from defects that threaten the efficiency, effectiveness and the satisfaction with which users complete the online booking transactions.

Despite the important role of usability in enhancing the quality of the booking process, the literature still lacks studies that focus on this topic. As a consequence, the present research arises from the need to reach a better understanding on how the user experience of the online booking process on individual hotel websites can be influenced. This is where usability testing, conducted with the
adoption of the most innovative eye tracking technology, comes in, allowing the detection of usability issues and the exploration of the factors that play a crucial role in this sense.

1.1. Aim and objectives

Taking into consideration the lack of studies related to the usability of the booking procedure on individual hotel websites, the aim of the present research is to explore the usability factors that have an impact on the booking process, adopting the point of view of the users. For the purpose of the study, the websites of three individual four-star hotels located in the city of Lugano (Switzerland) were selected to be investigated in depth: Hotel Lido Seegarten, Hotel Lugano Dante, and Villa Sassa Hotel & Residence. Although the research is not aimed at the broad generalization of the results, the detailed investigation of one case is considered useful to provide a first approach to the topic. More precisely, the exploration aims at drawing conclusions about a series of usability guidelines applicable to the design of the booking process in the specific case considered. In this sense, findings are intended to represent a very first step in the definition of the major usability principles to be implemented in the design of the booking procedure on individual hotel websites.

In order to reach the aim of the research, two main objectives were defined:

1. Identify the main usability issues of the booking process on the three websites included in the study.
2. Identify the relevant factors that influenced the usability of the booking process in the specific case studied.

On the basis of the two established objectives, two research questions were formulated:

**RQ 1:** Which are the main issues that threaten the usability of the booking process on each of the three websites included in the study?

**RQ 2:** Which are the relevant factors that influenced the usability of the booking process in the specific case studied?
1.2. Research strategy and design

In order to answer the **first research question** and detect issues that threaten the usability of the booking process on the three websites, the following methodology was undertaken within the present research:

**Step 1: Literature review.** First, the literature related to the following three main topics was analysed: Information and Communication technologies (ICTs) and tourism, usability, and the eye tracking methodology. The major aims of reviewing the literature were to establish the essential theoretical background for the research and identify the most suitable combination of methodologies to be adopted for the collection and the analysis of data.

**Step 2: Development of the user scenario.** Second, a main user scenario, focused on the completion of the booking process on the websites, was developed, with the purpose of guiding the conduction of the user tests performed later on. Hence, the three main components of the user scenario were carefully defined: user profile, goal and tasks.

**Step 3: Conduction of user tests.** Third, user tests were conducted within the first week of December 2014, with the inclusion of ten participants. During the sessions, to each participant the same task was assigned on all the three websites. Data was collected with the adoption of four main methodologies: observation, Think Aloud, eye tracking method and distribution of questionnaires.

Once data was collected and carefully analysed, and the main usability issues were detected for each website, the **second research question** was addressed through the comparison of the results obtained for the three websites. The comparison allowed to identify the relevant factors that influenced the usability of the booking process.
1.3. Thesis outline

The research is structured in five main chapters, briefly presented below.

**Chapter 1- Introduction:** in the introductory chapter, the main rationale for the conduction of the research is explained. The major aim of the research is also presented, together with the main objectives and the formulated research questions. Furthermore, the design of the research is briefly described.

**Chapter 2- Literature review:** the second chapter is dedicated to the review of the literature conducted on three main topics: Information and Communication technologies (ICTs) and tourism, usability, and the eye tracking methodology. Emphasis is placed on the existing relationship between tourism and ICTs, the online tourism and hospitality domains, the concepts of usability and web usability and the existing usability evaluation methods. Moreover, the field of eye tracking research is also presented, with a special focus on the application of the method in the tourism and hospitality field.

**Chapter 3- Methodology:** in the third chapter, the methodology implemented in the research is presented. First, the corpus of analysis is introduced, and the criteria adopted for the selection of the websites included in the study are discussed. Afterwards, the chapter is subdivided in two main sections: data collection and data analysis. In relation to the data collection, the development of the user scenario is described, as well as the conduction of the user tests. For what concerns the data analysis, the main methods adopted are clarified, with a particular focus on the analysis of the eye tracking data.

**Chapter 4- Results:** the fourth chapter is reserved for the presentation and discussion of the results obtained. Initially, results of the usability analysis are displayed, for each of the websites included in the study, and the first research question is answered. Second, results gained for the three websites are compared, in order to answer the second research question.

**Chapter 5- Conclusion, limitations and further research:** the aim of the last chapter is to summarize the research and the main outcomes obtained. In particular, conclusions are drawn about usability
guidelines applicable to the specific case studied. Limitations of the study are also thoroughly discussed, together with suggestions for further research.
2. Literature review

This section provides a review of the literature concerning three main topics, considered important for the elaboration of the research: Information and Communication Technologies (ICTs) and tourism, usability, and the eye tracking methodology. Regarding the first topic covered, one of the main objectives of the literature review was to place the master research in its broad context: the encounter between ICTs and the field of tourism. Furthermore, the research was also contextualized more specifically, in the domain of hotels’ online communication. Considering the second topic, the one of usability, the main purpose of reviewing the literature was to clarify the important concepts of usability and web usability and understand the role that web usability plays in the online tourism and hospitality domains, taking into account the research which has been conducted so far in the field. Moreover, existing usability evaluation methods were explored in depth, in order to choose the combination of methodologies that best suits the objectives of the master research. The major aim of investigating the last topic, the one of eye tracking, instead, was to establish a framework to set the foundations for the analysis of the eye tracking data performed later on. Other important objectives include the clarification of some technical aspects related to the eye tracking methodology and the identification of the existing eye tracking research in the fields of web usability and tourism.

2.1. Information and Communication Technologies and tourism

The first chapter of the literature review is dedicated to the exploration of the relationship between Information and Communication Technologies (ICTs) and the tourism field, being this interaction the context in which this research is situated. In order to provide a comprehensive overview of this topic, the author considered it appropriate to first clarify what ICTs are and how they are spreading. Second, the impact of ICTs on the sector of tourism is investigated and the concept of eTourism and the areas of eTourism research are presented in detail. Last, the specific domain of hospitality and tourism online communication is discussed.
2.1.1. The spread of Information and Communication Technologies

According to Marcelle (2000, 5), ICTs “comprise a complex and heterogeneous set of goods, applications and services used to produce, distribute, process and transform information” which include telecommunications, television, the radio, computer hardware and software as well as computer services and electronic media, such as the Internet and the electronic commerce.

In order to understand ICTs from the point of view of organizations, the definition provided by Buhalis (2003) can be taken into consideration. According to Buhalis (2003, 7), Information and Communication Technologies (ICTs) can be considered as:

“The entire range of electronic tools that facilitate the operational and strategic management of organizations by enabling them to manage their information, functions and processes as well as to communicate interactively with their stakeholders, enabling them to achieve their mission and objectives.”

The tools consist in a “convergence of hardware, software, telecommunications, netware, groupware and humanware”. From this perspective, ICTs are “an integrated system of networked equipment and software that enables effective data processing and communication for organizational benefit” (Buhalis 2003, 8). Therefore, as pointed out by the author (2003), in this context, ICTs comprise also the “groupware”, “netware” and intellectual capacity (humanware) required to create, maintain and program the equipment, and not only the hardware and the software.

Taking into consideration data provided by the International Telecommunication Union (2014) concerning the diffusion of ICTs, it is possible to notice that ICTs’ usage experienced, overall, a noticeable growth in the last years. Particular attention should be paid to the Internet, which established itself with an impressive speed, becoming today a fundamental communication mean, essential to the everyday life of many people. In relation to this aspect, the graph displaying the worldwide diffusion of the Internet in last seven years is displayed below:
As visible from the graph, the worldwide diffusion of the Internet in the last years experienced a remarkable growth. Furthermore, by the end of 2014, the number of people using the Internet is expected to reach almost 3 billion, meaning 40% of the world’s population, with two-thirds of worldwide Internet’s users being located in developing countries. The growth of Internet diffusion can be considered exceptional, especially with regard to developing countries, where the number of Internet users will have doubled by the end of 2014, if compared to year 2009 (from 947 million in 2009 to 1.9 billion in 2014) (International Telecommunication Union 2014).

2.1.2. The eTourism domain

Information and Communication Technologies (ICTs) have today a broad impact on organizations and businesses, improving their management of resources, productivity, and communication activities with all the stakeholders. ICTs also allow organizations to expand geographically and coordinate their activities at regional, national and global level, enhancing their managerial control. Furthermore, the
use of ICTs represents for organizations a great opportunity to increase their competitiveness and competitive advantage (Buhalis 2003).

Considering the impact of ICTs on the specific sector of tourism, it is possible to claim that ICTs highly transformed tourism at the global level, starting from the 1980s, changing both the practices and strategies implemented by businesses, as well as the overall structure of the industry (Buhalis and Law 2008; Buhalis and O’Connor 2005). According to the UNWTO (2001), ICTs are fundamental for destinations and organizations to compete in the tourism industry, as well as for the entire sector. However, ICTs radically changed not only the effectiveness and efficiency of tourism organizations, but also the way customers interact with businesses. In fact, among the different commercial areas where ICTs play a role, tourism is recognized as one of the most affected, both at the demand and offer level (Buhalis 2003).

The interaction of ICTs and tourism can be summarized in the concept of eTourism. As reported by Buhalis (2003, 76), eTourism “reflects the digitalization of all processes and value chains in the tourism, travel, hospitality, and catering industries”. It refers both to the tactical level, where ICTs are applied to maximize the efficiency and effectiveness of the tourism organization, and the strategic level, where eTourism “revolutionizes all business processes, the entire value chain as well as the strategic relationships of tourism organizations with all the stakeholders” (Buhalis 2003, 77). More precisely, eTourism links together three separate disciplines: business management, information system and management, and tourism. The concept of eTourism and its domains are shown in Figure 2:
The figure illustrates how “the eTourism concept includes all business functions (eCommerce, eMarketing, eFinance and eAccounting, eHRM, eProcurement, eR&D and eProduction) as well as eStrategy, ePlanning and eManagement for all sectors of the tourism industry, including tourism, travel, transport, leisure, hospitality, principals, intermediaries and public sector organizations” (Buhalis 2003, 77).

Following the same line of Buhalis, Inversini and Cantoni (2014) specify that eTourism emerges in four main areas:

- Management
- Communication and marketing
- Sales
- Tourism experience

Research in the field of eTourism started to flourish from the end of the 90s, as a result of an increment of activities related to the field, such as the organization of conferences concerning the
topic and the establishment of the Journal of Information Technology & Tourism (1998) and the International Federation of Information Technology for Travel & Tourism (IFITT). Nowadays, eTourism research encompasses three main dimensions: “consumers and demand dimensions”, “technological innovation”, and “industry functions” (Buhalis and Law 2008).

**Consumers and demand dimensions**

As O’Connor (1999) observed, ICTs have a strong impact on tourism demand and the tourists. They provide reliable and accurate information and allow consumers to book quickly and cheaply. They empower the consumer, who acquires more knowledge and looks for extra value for time and money, demanding personalized products and services to satisfy specific needs and wishes (Buhalis and Law 2008). In particular, tourism consumer behaviour has been transformed radically by the Internet. Travellers can now access greater amount of information and are assisted by ICTs in all the three phases of the tourism experience: pre-consumption, consumption and post-consumption (Buhalis and Law 2008; Inversini and Cantoni 2014). In this regard, a research conducted by Gretzel, Fesenmaier and O’Leary (2006) identifies the information needs of Internet users in the three phases of the tourism experience. *Figure 3*, reported below, illustrates the concept and shows the activities performed in each stage.

![Figure 3: Information needs in the tourism experience. Adapted from Gretzel, Fesenmaier and O’Leary 2006.](image)

In the pre-consumption phase, technologies mainly provide support in the creation of expectations, in the travel decision and the economic transaction. Instead, in the consumption phase of the tourism experience, technological support allows tourists to be always connected for navigation and
consultation concerning on-site activities, attractions and special offers. Last, in the post-consumption phase, new technologies improve and facilitate the process of experience-sharing and documentation, providing the tourist the opportunity to live a new experience and develop a sense of attachment to the visited places.

Concerning the influence of new technologies on tourism demand and consumption, similar areas as the ones proposed by Gretzel, Fesenmaier and O’Leary (2006) have been identified by Buhalis and Law (2008). In particular, according to Buhalis and Law (2008), the major areas in which technologies have an influence on tourism demand and the tourism experience are the following:

- Information search
- Travellers’ behaviour
- Economic transactions
- Virtual communities and web 2.0
- Consumer choices
- Feedback and complaints
- Personalization and customization

In order to concretely understand how ICTs, in particular the Internet, influenced tourism demand globally, it is possible to consider the data published by Google (2013) in the annual report “The 2013 Traveler”. According to the research, the Internet is important both for inspiring and planning new travel. More precisely the Internet was indicated as source of inspiration by 61% of respondents, and as travel planning source by 80% of participants. The results of the survey are displayed in Figure 4:
As it can be seen, the Internet is located in the first place for what concerns the travel planning sources (80%) and in the second place as a source of travel inspiration (61%). Other main sources of inspiration are represented by the family, friends, or colleagues (62%), the TV (39%), magazines and newspapers (30%) and informational brochures (25%). Similarly, for what concerns the travel planning, other important sources are the family, friends, or colleagues (49%), the informational brochures (28%), and the TV (18%).

**Technological innovation**

Technological innovation and development make Information and Communication Technologies (ICTs) more influential and complex, but also more affordable and user friendly, allowing people and organizations to benefit of them. In the tourism industry, some technologies, mainly aimed at improving the communication of tourism organizations with partners and consumers, are considered critical for further innovation (Buhalis and Law 2008). According to the authors (2008), some of the most important areas of technological innovation in the tourism industry are interoperability and ontology, multimedia, mobile and wireless technologies, web design functionality and usability.
Considering for instance multimedia, it is essential to mention the important role that photos and graphics play for tourism information, offering tangible images or experiences to people in the planning phase of the trip (Buhalis and Law 2008). As pointed out by Cho and Fesenmaier (2001), information can be enhanced and enriched by the use of animations and video clips, and virtual three-dimensional tours on the web allow people to virtually interact with destinations.

In the area of mobile and wireless technologies, instead, among the most important innovations that play a role in tourism it is fundamental to mention Global Positioning Systems, which allow tourists to access travel information without time and geographic constraints (Buhalis and Law 2008). More in general, mobile services offer travellers the possibility to easily and quickly perform actions such as booking a hotel room/flight and consulting different types of useful information such as destination travel guides, dining guides and transportation schedules (Berger, Lehmann and Lehner 2002).

For what concerns the last mentioned area, the one of design functionality and usability, considering the importance of information in this domain, the fundamental role of usability in tourism online communication should be recognized. In fact, tourism is an information-based business, where it is impossible to evaluate the product in a comprehensive way before its consumption. Therefore, consumers need to rely on the information gathered from different sources, such as TV, brochures, word-of-mouth, and the web (Werthner and Ricci 2004). This makes the quality of information and the usability of tourism websites critical. The topic of usability related to tourism, being the central theme of this thesis, will be discussed in detail later on.

**Industry and business functions**

ICTs play an important role for operational and strategic management of organizations in the tourism industry. First of all, they affect the competitiveness of organizations, allowing for differentiation and specialization of products and services (Buhalis and Law 2008). Furthermore, ICTs transformed the marketing and the distribution of tourism organizations. Adopting the web as a marketing instrument allows organizations in the tourism field to reduce costs, increase the profit and improve marketing research, database management and client fidelity (Morrison et al. 1999). In particular, the Internet permits tourism organizations to engage in a high variety of promotional and distributional activities and address different target markets by designing specialized products and promotion to cater for
individual needs of consumers, enhancing thus the interaction between partners and consumers and providing consumers with added value (Buhalisd and Law 2008).

2.1.3. Online communication in hospitality and tourism

The Internet broadly impacted the hospitality industry, starting from the 1980s. As a consequence, most hotels developed their own websites to compete in the industry and improve their promotion, marketing and online economic transactions (Yeung and Law 2006). In particular, thanks to the Internet, consumers can easily communicate with hotels to ask for information and purchase online products and services, with no time and geographical restrictions. Among the benefits that hotel websites bring to hotel managers, instead, it is important to mention reduced distributional costs, increased profits, and broader market shares (O’Connor 2003). Thus, hotel websites are useful not only for the dissemination of information about products and services, but they are as well a valuable tool to increase the profit (Chung and Law 2003; Yeung and Law 2006). However, only hotel websites that are well designed, deliver important information and provide extra benefits to the clients are useful to create new profit opportunities and a positive impact on the hotel image. On the contrary, if customers do not find a hotel website useful, the efforts to establish and maintain it can be considered as a waste of resources (Chung and Law 2003).

When trying to understand the strategic importance of hotel websites for both information dissemination and the sale of online services, it is essential to consider the recent developments for what concerns the distributional channels in the accommodation industry. In fact, Online Travel Agents (OTAs), such as Booking.com, Venere.com, and Expedia.com radically changed the way products and services are distributed, causing a shift from travel agencies and tour operators toward a “more globalized dimension” (Inversini and Cantoni 2014, 29). In particular, a recent survey conducted by Schegg and Fux (2013) for the year 2012, based on 205 hotels all over Switzerland, shows that, although the majority of hotel bookings in Switzerland do not include the presence of intermediaries, the percentage of reservations made through direct channels is decreasing (from 75% in 2011 to 62% in 2012). Considering real-time bookings, 30% of these were made through online
channels, with OTAs being one of the main booking channels adopted (20.9%) and continuously increasing their market share. Results of the survey concerning the most commonly used booking channels in Swiss hotels for year 2012 are displayed in Figure 5:

![Figure 5: Booking channels of Swiss hotels for year 2012 (Schegg and Fux 2013).](image)

As visible from Figure 5, the predominant booking channel in Switzerland emerged to be the e-mail. OTAs are located in the second place, before booking forms and real-time booking on hotel websites, which gain, respectively, the fourth and sixth places. Nevertheless, it is important to mention that bookings through traditional methods, such as the e-mail and the telephone, are today frequently preceded by the online search. In fact, consumers often use the Internet to choose the hotel and compare among different possibilities, but prefer to use a traditional method for reservations. This behaviour is due to the absence of trust in the online transactions with credit cards and the hope of obtaining a better price (Inversini and Cantoni 2014). Furthermore, a recent research conducted by Inversini and Guerreschi (2011) in Canton Ticino (Switzerland), found that less than 50% of hotels
offer their clients the possibility to book through a dedicated booking engine installed on the hotel website. Hotels, in fact, often prefer to outsource the online distribution to intermediaries, such as OTAs and destinations websites (Inversini and Cantoni 2014). More precisely, data emerged from the research of Schegg and Fux (2013) shows that, in the Swiss hotel industry, most of the hoteliers consider OTAs as essential and trustworthy partners. However, the relationship between hotels and OTAs is often perceived as unfair and antagonistic and OTAs are considered to be too expensive by 60% of hoteliers, which may suggest potential tensions within the sector. Moreover, hoteliers criticise the additional charges related to OTA bookings, such as the management of client requirements, and the lack of control on clients’ data. For this reason, Schegg and Fux (2013, 23) conclude that for hoteliers “it is important to provide an easy and economically interesting booking option on company website (real-time booking) and reward clients who book directly”, in order to improve also the hotel’s relationship with the customers.

There are no doubts that hotels in the online domain are challenged by the advent of OTAs. In addition, another challenge is represented by the web 2.0, social media and the online reviews of users, which highly influence the image of the hotel (Inversini and Cantoni 2014). However, as pointed out by Inversini and Cantoni (2014), hotel websites still represent the heart of the hotels’ online communication strategy. They are a fundamental tool for hotels for their promotion and communication of products, services, and philosophy, which constitutes their unique selling proposition. Hotel websites are essential for hotels to distinguish themselves from competitors in the online domain, given the fact that OTAs usually adopt standardized informational structures that do not allow differentiation. Thus, among all the possibilities that hotels can use to promote themselves online, dedicated hotel websites give hotels the greatest freedom of communication. Consequently, despite the growth of OTAs’ market share, it is possible to affirm that hotel websites still have a crucial role for what concerns hotel promotion, communication and the sale of hotel products and services.

The importance of hotel websites is also easily understandable by looking at data provided by the annual travel report of Google (2013). According to the research, considering online sources, travellers mainly rely on brand sites and search engines to plan their trip. In particular, 58% of leisure
travellers and 68% of business travellers participating in the survey indicated hotel websites as a source for planning their trips. Results of the survey are reported below, in Figure 6:

As it is possible to notice from Figure 6, hotel websites emerged as the first source of travel planning for business travellers, and the second for leisure travellers. For what concerns leisure travellers, other important planning sources are represented by search engines (60%), airline websites (47%) and OTAs (47%). Similarly, further fundamental travel sources for business travellers are the airline websites (57%), the search engines (53%) and OTAs (48%).
2.2. Usability

The second chapter of the literature review concerns the topic of usability. First, the main definitions of usability are reported, in order to provide a first insight to the issue. In this context, key definitions are analysed to identify similarities and differences of the various approaches to the topic. A closer look at web usability is also presented. The second section is dedicated to the specific field of web usability in tourism. The importance of usability in tourism and hospitality online communication is underlined, and the main research conducted with regard to hotel websites’ usability is discussed. In this regard, the online booking process on hotel websites is also presented. Last, the main features of different existing usability evaluation methodologies, together with their main advantages and disadvantages, are explained.

2.2.1. Defining usability and web usability

One of the most commonly mentioned definitions of usability is the one proposed by ISO, the International Organization for Standardization (2010). According to ISO 9241, usability can be defined as:

“The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”

The definition implies the relevance of the three major concepts of effectiveness, efficiency and satisfaction in relation to usability (usability dimensions). In particular, ISO 9241 describes effectiveness as the “accuracy and completeness with which users achieve specified goals”, efficiency as “resources expended in relation to the accuracy and completeness with which users achieve goals”, and satisfaction as “freedom from discomfort, and positive attitudes towards the use of the product”. Another important notion highlighted by ISO 9241 is the one of context of use, defined as “users, tasks, equipment (hardware, software and materials), and the physical and social environments in
which a product is used”. The definition suggests that usability is highly dependent on the context where the product is used, whose boundaries are demarcated by various different elements that comprise the user himself/herself with his/her goals and tasks to achieve these goals, the product itself and the external environment. Last, the focus on the user of the product is as well a fundamental aspect of the definition.

The focus on the user is highly noticeable also in the definition provided by Dumas and Redish (1999, 4), according to whom “usability means that the people who use the product can do so quickly and easily to accomplish their own tasks”, and in the one of Krug (2000, 5), who stated that “after all, usability really just means that making sure that something works well: that a person of average (or even below average) ability and experience can use the thing - whether it's a Web site, a fighter jet, or a revolving door - for its intended purpose without getting hopelessly frustrated”.

The usability definition of ISO 9241 has been expanded by Quesenbery (2003), who extended the number of fundamental dimensions of usability from three (effectiveness, efficiency and satisfaction) to five:

1. Effectiveness: “the completeness and accuracy with which users achieve their goals” (83)
2. Efficiency: “the speed (with accuracy) with which users can complete their tasks” (84)
3. Engagement: “the degree to which the tone and style of the interface makes the product pleasant or satisfying to use” (86)
4. Error Tolerance: “how well the design prevents errors, or helps with recovery from those that do occur” (87)
5. Ease of learning: “how well the product supports both initial orientation and deepening understanding of its capabilities” (88)

Another frequently mentioned and detailed definition of usability is the one proposed by Nielsen (1993, 26), who, similarly to Quesenbery, relates usability to five main principles, underlining that “usability is not a single, one-dimensional property of a user interface”:

1. Learnability: “the system should be easy to learn so that the user can rapidly start getting some work done with the system”
2. Efficiency: “the system should be efficient to use, so that once the user has learned the system, a high level of productivity is possible”
3. Memorability: “the system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again”
4. Errors: “the system should have a low error rate, so that users make few errors during the use of the system, and so that if they do make errors they can easily recover from them…”
5. Satisfaction: “the system should be pleasant to use, so that users are subjectively satisfied when using it, if they like it”

Similar principles to the ones proposed by Nielsen and by Quesenbery are suggested also by Dix et al. (2004), who identified some general rules that should be applied to the design of an interactive system in order to support its usability. These general rules are part of three major subcategories: learnability, flexibility, and robustness.

1. Learnability: “the ease with which new users can begin effective interaction and achieve maximal performance” (261).
2. Flexibility: “the multiplicity of ways in which the user and system exchange information” (266).
3. Robustness: “the level of support provided to the user in determining successful achievement and assessment of goals” (270).

As visible from the examples provided above, different definitions of usability exist. However, given the purpose of this research, it is essential to approach usability from the specific point of view of websites. For this reason, the topic of web usability has been investigated and presented below.

Usability has gained a much greater importance in the Internet economy compared to the past, becoming a fundamental aspect of web design. This is due especially to the fact that, whereas in product design and software design consumers experience usability after having paid, in web design users experience usability before paying. This makes web usability critical, because visitors can experience the usability of a site before they have decided to use it and to spend money on potential purchases (Nielsen 2000). The level of trust that users feel toward a website broadly determines whether the consumer will finally make a purchase (Lee 2002). According to Lee (2002), consumers
experience three phases when making an online purchase: “building trust and confidence”, “online purchase experience”, and “after-purchase needs”. The author argues that, after the first phase, which can be considered the most important, the second most important phase is broadly influenced by the ease of navigation. Thus, usability seems to play a crucial role in determining the profit possibilities that businesses can achieve through their websites. Furthermore, an empirical study conducted by Roy, Dewit, and Aubert (2001) identified a strong relationship between interface quality/usability and the establishment of trust in web retailers.

The importance of web usability has been highlighted also by Nielsen (2000, 9), according to whom “usability rules the web”, because customers, overwhelmed with choices, are impatient and in search of immediate gratification. The web empowers customers, giving them the opportunity to decide everything and easily leave the website to go elsewhere, because, in fact, “all the competitors in the world are but a mouseclick away” (Nielsen 2000, 9). The importance of the user experience for the web has been underlined also by Garrett (2003, 11) who sees the website as a “self-service product”, without an instruction manual to read or a customer service representative to consult before approaching it. According to Garrett (2003), if users have a bad experience on the company’s website, they would not come back and would rather choose a competitor. For this reason, businesses have to understand the importance of providing a high quality user experience, which allows them to achieve competitive advantage.

As underlined by Matera, Rizzo and Carughi (2006), when correlating usability to web applications it is important to take into consideration the specificity of this application category, considering the tasks that users may perform on the web (e.g. search of desired information and services). According to the authors (2006, 5), applying the above mentioned ISO definition of usability to web applications would mean that

“web usability can be therefore considered as the ability of web application to support such tasks with effectiveness, efficiency and satisfaction”

Another useful approach to understand web usability is to consider the WCM (Website Communication Model) elaborated by Cantoni and Tardini (2006). According to the model, a website
consists of four main pillars. Pillars 1 and 2 represent things, while pillars 3 and 4 concern people. Furthermore, a fifth fundamental aspect must be considered to complete the structure: the context/world, together with the relevant market, in which the website is situated. The four pillars of the WCM are listed below:

1. Contents and functionalities: what is present in the website and what you can do with the website (e.g. booking a room)
2. Accessibility tools: tools necessary in order to access contents and functionalities. More precisely: hardware, software and the interface.
3. People responsible for the website: people that produce, update and promote the website.
4. Users/clients: people who access the website. Users represent the reason why websites are conceived, developed, run, promoted and evaluated.

Now that the WCM has been introduced, it is finally possible to present a comprehensive definition of web usability. Cantoni and Tardini (2006, 129) defined web usability according to the WCM as:

“The adequacy of contents/functionalities (pillar I) and accessibility tools (pillar II), between themselves and with respect to the users (pillar IV) and the relevant context (world). However, this adequacy has to be measured taking into consideration the goals of people who commission, project, develop, promote and run the website (pillar III).”

2.2.2. Web usability of hotel websites and the online booking process

As reported by Law, Qi and Buhalis (2010, 297), when it comes to the relationship between ICTs and tourism, it is important to underline that the Internet, in particular, can be considered today “a valuable tool for both suppliers and consumers for information dissemination, communication, and online purchasing”. Given the significant rise in the quantity of Internet users, businesses, including the ones in the tourism field, are more and more embracing e-business models to reach their aims. Thus, preserving an effective website is today fundamental for businesses that want to reinforce their customer relationship and acquire larger market shares. This is particularly true in the case of the tourism online domain, a competitive environment in which many players participate, trying to gain
the attention of end users. Furthermore, tourism websites, such as attraction and DMO websites, are today highly challenged also by the User Generated Content (UGC) (Inversini and Buhalis 2009). As a consequence, the research area of website evaluation, which also comprises website usability, has gained popularity in the tourism field. In particular, a review of quantitative and qualitative website evaluation studies conducted from 1996 to 2009 in the field of tourism research, performed by Law, Qi and Buhalis (2010) shows that, considering the industry sectors, the majority of website evaluation studies in the period considered fall into the category of hospitality, whereas destination websites and travel websites, earn, respectively, the second and third place in the ranking. For what concerns usability studies, web usability researches in the field of tourism carried out so far mainly cover destination websites (e.g. Inversini and Cantoni 2009; Shanshan, Buhalis and Law 2007; Zhou and DeSantis 2005), hospitality websites (e.g. Abdinnour-Helm and Chaparro 2007; Yeung and Law 2006) and travel websites (e.g. Carstens and Patterson 2005; Inversini, Cantoni and Bolchini 2011). Some studies have also been conducted in the area of cruise websites usability (e.g. Adukaite, Inversini and Cantoni 2013) and airlines websites usability (e.g. Selvidge 1999; Wei and Ozok 2005).

In the existing hospitality and tourism literature, it is possible to identify a discrete number of studies that focus on the evaluation of hotel websites performance and quality (e.g. Chung & Law 2003; Schmidt, Cantallops and Dos Santos 2008; Zafiropoulos and Vrana 2006). For instance, Chung and Law (2003) investigated the information quality of websites of hotels in Hong Kong and developed a model to assess the performance of hotel websites. The model is based on five dimensions: “facilities information”, “customer contact information”, “reservations information”, “surrounding area information”, and “management of the websites”. Results show that there are significant differences among different hotel classes for what concerns website performance. Luxurious high tariff hotels generally performed better than the mid-priced high tariff ones, in all the dimensions. Similarly, the mid-priced high tariff hotels collected higher performance scores than the budget medium tariff ones.

Considering pure usability studies on hotel websites, few researches have been conducted so far. For instance, Yeung and Law (2006) measured the usability of hotel websites in Hong Kong. The study was conducted on 77 websites members of the Hong Kong Hotel Association, using the heuristic evaluation method. The evaluators checked the compliance of the websites with recognized usability criteria part of the following dimensions: “language” (e.g. spelling and grammatical errors), “layout
and graphics” (e.g. scrolling text, marquees, and constantly running animations), “information architecture” (e.g. outdated information”), “user interface and navigation” (e.g. internal links not working), and “general” (e.g. long download times). Evaluators were asked to rank the severity of the usability problems found on the different websites, for each dimension. Results show that minor problems were identified in the area of language, layout and graphics, information architecture, and general. Instead, usability problems in the dimensions of user interface and navigation were ranked as medium. Additionally, for what concerns usability hazards, no significant differences were found among different hotel categories.

Another important study is the one of Essawy (2005). The research investigated the usability factors of hotel websites affecting online purchase and repeat purchase and the establishment of relationships among hotels and customers. Within this study, usability problems of three UK-based hotel websites were assessed through empirical testing. The author (2005) assigned to 12 participants the following search tasks: search for the best deal, book a weekend break for two adults and two children, and explore the in-house facilities and the nearby attractions. Common and severe problems were then identified for what concerns the usability dimensions of interface, information quality, and service quality. Consequently, from the analysis of the critical problems, essential factors for task completion and user satisfaction were identified.

Given the perishability of hotel products, the competitiveness of the hospitality sector, and the low differentiation of the products in terms of functional capacity, it is possible to claim that the user interface of hotel websites is increasingly a determinant of customers’ purchasing intentions. Thus, user satisfaction with the website constitutes a fundamental competitive advantage for hotels (Essawy 2005). This relationship has been empirically demonstrated by Kim and Kim (2004), who conducted a study to assess which are the factors determining hotel customers’ online reservation intentions. Results show that usability determinants under the category “ease of search” play a fundamental role in purchasing intentions both for people who had already purchased online and people that had never purchased a product on the web. Another study that reveals the importance of usability in the online purchase of hotel products and services has been carried by Jeong, Oh and Gregoire (2005), who found that information completeness and ease of use of hotel websites largely
affect the quality, value, and attractiveness perception of hotels’ features and services displayed on the website.
**Usability of the booking process on hotel websites**

According to Bainbridge (2003, 4), considering websites that offer the possibility to reserve a hotel room, “a booking process determines how the user navigates through a series of sequential phases in an online hotel reservation”. Therefore, in order to accomplish the booking, the user is required to experience different phases, which may include, for instance, the insertion of the search-related information, the review of the available options for the rooms/rates, the selection of the room/rate, the provision of guest and payment details and the reservation confirmation. More precisely, according to the author (2003), a hotel online reservation involves three main phases, related to two main goals that users may have on the website when reserving a hotel room: information gathering and reservation making. The three phases, together with the main stages included in each phase, are reported and described below. It is important to consider that the author mainly refers to the following types of websites: travel agencies websites, hotel booking agencies websites and hotel chains websites. However, the subdivision of the booking process in these three main phases can be applied to the websites of individual hotels as well.

1. **Search and evaluation (information gathering)**
   - Input of stay requirements (e.g. dates of stay, city)
   - Comparison and evaluation of the search’s results (e.g. room/rate combinations)
   - Decision (choice of the preferred combination)

2. **Selection (reservation making)**
   - Selection of the hotel/room/rate
   - Selection of additional services

3. **Checkout (reservation making)**
   - Input of the details related to the guest (e.g. name and address)
   - Input of the details related to the payment (e.g. credit card)
   - Reservation confirmation
Considering usability of the booking process on travel websites, it is essential to mention that, as pointed out by Anckar, Olofsson and Walden (2001), although online self-booking often represents for consumers a cheap and convenient alternative, users are often faced with problems when confronted with the online booking of travel-related products and services, given the fact that the online booking process may be difficult and time consuming. More precisely, among the different areas that threaten the online purchase of travel services, Anckar and Walden (2001) mention the lack of Internet expertise of the users, the difficulty of locating the website, and the technical and quality related problems (including usability) as being among the most relevant aspects to consider.

Online reservation systems such as the ones provided by hotels on their websites also offer a great competitive advantage to their owners, not only to the potential guests. They simplify the distribution of the hotel product, generating profit and value to hotel companies. However, online hotel reservation systems only create value when a sufficient number of bookings is generated, and the possible competitive advantage is transformed in a concrete advantage. This is only possible if the hotel website design “...helps the website generate real bookings, not just visits” (Anckar, Olofsson and Walden 2001, 8). In this sense, usability of the hotel booking process’ design plays a crucial role.

Despite the importance of usability for the booking process on individual hotel websites, there is a lack of usability studies that focus on this topic. For instance, Bainbridge (2003), conducted an analysis on the relevant usability aspects of the booking process on hotel booking websites, including in the study a wide range of websites. The author (2003) developed a series of “booking process design guidelines” concerned with the different aspects of the booking process related, for instance, to the overall structure of the process and the rates’ display. The research, however, does not include individual hotels, although some of the findings are applicable also to individual hotel websites. On the contrary, only websites offering different opportunities for the choice of the hotel are included in the analysis: travel agencies websites, hotel booking agencies websites and hotel chains websites. As a consequence, there is the need for further investigation of the aspects that influence the usability of the booking process on individual hotel websites and the various phases involved in the procedure.
2.2.3. Usability evaluation methods

Usability evaluation comprises a wide range of different techniques and methods. However, two major methods exist: usability inspection methods and empirical testing. Within these two categories, the most frequently adopted approaches are heuristic-driven evaluation and task-driven evaluation (Triacca, Inversini and Bolchini 2005).

Usability inspection methods

Usability inspection consists of a set of different methods based on inspection and examination of the aspects of a user interface concerned with its usability. Inspection is conducted by usability specialists, software development consultants with special expertise, end users with content and task knowledge, and other kinds of professionals. The goal of usability inspection is to find the main usability problems, namely the features of the user interface that reduce usability of the system for the end user, and formulate recommendations that help in solving problems and improving usability of the user interface design. For instance, elements may be identified as problems because they cause usage errors or make the system hard to learn or slow to perform users’ tasks. When the inspections is conducted, usability problems are counted and classified (Nielsen 1994b).

The most commonly used inspection techniques are heuristic evaluation and cognitive walkthroughs (Hollingsed and Novick 2007; Matera, Rizzo and Carugh 2006). While these two techniques are discussed in depth in the next paragraphs, an overview on all the major inspection techniques is displayed in Table 1:

<table>
<thead>
<tr>
<th>TECHNIQUE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heuristic evaluation</td>
<td>It involves usability specialists judging the interface based on its</td>
</tr>
<tr>
<td></td>
<td>conformity with accepted usability principles, called heuristics.</td>
</tr>
<tr>
<td>2. Guidelines reviews</td>
<td>The interface is evaluated on the base of its compliance with a list of</td>
</tr>
<tr>
<td></td>
<td>usability guidelines.</td>
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<tr>
<td>3. Pluralistic walkthroughs</td>
<td>Usability issues are discussed on the basis of scenarios, by users, developers and human factors people.</td>
</tr>
<tr>
<td>4. Consistency inspections</td>
<td>The interface is inspected by designers representing multiple projects, in order to check consistency among all the components of a system.</td>
</tr>
<tr>
<td>5. Standards inspections</td>
<td>The interface is inspected by some interface standards’ experts.</td>
</tr>
<tr>
<td>6. Cognitive walkthrough</td>
<td>Users’ problem solving process is simulated and the interface is evaluated based on scenarios representing users’ tasks, actions and required interface-user interaction.</td>
</tr>
<tr>
<td>7. Formal usability inspections</td>
<td>This type of inspection is conducted by the product owner and a group of peers applying a formal process to identify and describe usability issues that cause the tasks supported by the product difficult or unpleasant to be accomplished.</td>
</tr>
<tr>
<td>8. Feature inspections</td>
<td>Inspection is focused on the functions delivered by a software system.</td>
</tr>
</tbody>
</table>

Table 1: Major usability inspection techniques. Adapted from Mack and Nielsen 1994.

**Heuristic evaluation**

Heuristic evaluation involves examining and judging the interface based on its compliance with recognized usability principles, called *heuristics*. Inspection is normally performed by a small group of evaluators, with each single evaluator conducting the inspection alone. During the evaluation session, the inspector examines the various elements of the interface several times, comparing them with a list of recognized usability principles. The outcome of heuristic evaluation is a list of usability issues which refers to violated usability principles (Nielsen 1994a).

In the literature concerning usability, the most frequently mentioned heuristics are the ten usability heuristics developed by Nielsen (1994a, 28), which consist of “general rules that seem to define common properties of usable interfaces”. The ten heuristics proposed by Nielsen are reported in Table 2, together with a brief description of each one:
<table>
<thead>
<tr>
<th>HEURISTIC</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visibility of system status</td>
<td>The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.</td>
</tr>
<tr>
<td>2. Match between the system and the real world</td>
<td>The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.</td>
</tr>
<tr>
<td>3. User control and freedom</td>
<td>Users often choose system functions by mistake and will need a clearly marked emergency exit to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.</td>
</tr>
<tr>
<td>4. Consistency and standards</td>
<td>Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.</td>
</tr>
<tr>
<td>5. Error prevention</td>
<td>Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.</td>
</tr>
<tr>
<td>6. Recognition rather than recall</td>
<td>Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.</td>
</tr>
<tr>
<td>7. Flexibility and efficiency of use</td>
<td>Accelerators- unseen by the novice user- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.</td>
</tr>
<tr>
<td>8. Aesthetic and minimalist design</td>
<td>Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.</td>
</tr>
</tbody>
</table>
9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Table 2: Ten usability heuristics. Adapted from Nielsen 1994a.

Obviously, the checklist of general heuristics may be used together with other usability principles that the evaluator considers important for the selected application. In addition, category-specific heuristics for specific classes of products may be built as a supplement for general heuristics (Nielsen 1994a).

Cognitive walkthrough

The cognitive walkthrough is a review process in which one aspect of a design is presented by its author to a group of peers, in order to be evaluated in accordance to the criteria appropriate for the design issues. The proposed interface is assessed in the context of specific user tasks, which are considered during the walkthrough process together with all the actions required to perform the tasks. For each action, a characteristic user’s interaction with the interface is taken into consideration (What actions would the user try to do? What actions are made available through the interface?). If appropriate actions correspond to users’ intentions, the interface design is considered good. Furthermore, the interface should as well show clear feedback concerning the progress of task completion. This method, which is mainly focused on the attribute of usability referred as “ease of learning”, evaluates each step needed to accomplish a task by identifying errors that would affect learning by exploration. The outcome of the process concerns for instance incongruities between users’ and designers’ tasks’ conceptualization, or wrong choices of wording for menu titles and button labels (Wharton et al. 1994).
**Advantages and disadvantages of usability inspection methods**

The choice of inspection methods for web usability evaluation has both advantages and disadvantages. From the advantages side, inspection methods, such as the heuristic evaluation, are generally regarded as highly cost efficient, being able to reveal a large amount of usability problems in a restricted amount of time and without the need to set up an appropriate equipped laboratory (Jeffries and Desurvire 1992; Nielsen 1994b). Furthermore, usability inspection methods such as the cognitive walkthrough allow the inspection to be performed on specifications of the user interface that have not been implemented yet, using only a text description of the user interface, thus in the early stages of the usability engineering lifecycle (Matera, Rizzo and Carughi 2006; Nielsen 1994b; Scholtz 2004).

Considering disadvantages, inspection methods are often focused only on the “surface-oriented” elements of the graphical interface, not addressing usability of the application structure, such as the content organization or navigation patterns (Green and Benyon 1996). Moreover, inspections are highly dependent on evaluators’ skills and results produced by different evaluators may vary considerably (Matera Rizzo and Carughi 2006).

**Empirical testing**

Empirical testing methods, often referred to as user based methods, examine usability based on the observation of how the application is actually used by a representative sample of real users interacting with it (Dix et al. 2004). According to Dumas and Redish (1999), usability empirical testing is a method characterized by five main features. First of all, the major aim of empirical testing is to enhance usability of a product. Second, people participating in the empirical test must represent real users (people who use the product or will use it in the future). Third, participants should be asked to perform real tasks, the same that they would do at home/on their job. Fourth, researchers during a usability test observe participants and record what they do or say. Finally, qualitative and quantitative data gained must be analysed to identify and document the product’s usability problems.

Concerning empirical testing, two main evaluation styles can be distinguished: laboratory studies and field studies. In laboratory studies, users participate in controlled tests that take place in equipped usability laboratories. On the contrary, in field studies, the evaluator visits the user’s environment, in
order to test the interaction as it occurs in actual use. Both approaches have positive and negative aspects and the choice of the method depends on many different factors, such as the research object and the available resources (Dix et al. 2004).

Empirical methods comprise different techniques, including experimental methods, observational methods, query techniques, and methods based on physiological monitoring, such as eye tracking (Dix et al. 2004). A list of all the different techniques, together with a brief explanation, is reported in Table 3:

<table>
<thead>
<tr>
<th>TECHNIQUE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Experimental evaluation</td>
<td>Controlled experiment: it delivers empirical evidence to sustain a particular claim or hypothesis.</td>
</tr>
<tr>
<td>2. Observational techniques</td>
<td>Users are observed while interacting with the system, usually by completing a series of predetermined tasks. This technique comprises for instance the Think Aloud and the cooperative evaluation.</td>
</tr>
<tr>
<td>3. Query techniques</td>
<td>Users are directly asked about the interface through interviews and questionnaires.</td>
</tr>
<tr>
<td>4. Monitoring of physiological responses</td>
<td>Directly measuring what the users do or feel, through eye tracking, heart activity, electrical activity in muscles and brain, and activity of sweat glands.</td>
</tr>
</tbody>
</table>

*Table 3: Major empirical testing methods for design evaluation (Dix et al. 2004).*

Considering the techniques part of empirical usability evaluation, Think Aloud and contextual inquiry are among the most commonly used and mentioned in the literature concerning usability (Cantoni, Di Blas and Bolchini 2003; Triacca, Inversini and Bolchini 2005; Triacca et al. 2004).
Think Aloud

The Think Aloud, an extensively used technique in usability research, is a particular form of observation that implies the user to talk through what he is doing while being observed (Dix et al. 2004). During the session, users are required to think aloud while executing tasks through the use of the application, making it easier for researchers to understand how people deal with it and the assigned tasks and to get insights about people’s expectations and reactions to the interface (Cantoni, Di Blas and Bolchini 2003). Evaluation sessions recordings are called protocols and can be performed using different methods, including paper and pencil recording, audio recording, video recording, computer logging and user notebooks. Protocols are then analysed by hand or through automatic software analysis. A variation of this technique, in which the user is invited to collaborate in the assessment, is called cooperative evaluation. During a cooperative evaluation session, the evaluator can ask questions to the user if his/her behaviour appears ambiguous. Vice versa, the user can ask the evaluator to provide clarifications. In this way, confusing points can be clarified when occurring, thus maximizing the identification of problem areas, and the user is more stimulated to criticize the system (Dix et al. 2004).

Advantages and disadvantages of empirical testing methods

Empirical methods, in the same way as inspection methods, have both advantages and disadvantages. Considering advantages, it is widely accepted that the main benefit of conducting empirical tests comes from the employment of a sample of real users. Engaging real users, in fact, allows better identification of the problems that truly afflict the actual users of the application and provides thus reliable results (Jeffries and Desurvire 1992; Scholtz 2004). Another advantage of empirical methods is their usefulness in quickly assessing the general impact of the application, because reactions of users are verified in real time (Cantoni, Di Blas and Bolchini 2003; Triacca et al. 2004).

From the point of view of disadvantages, a discrete number of main issues has been recognized. First, it is very difficult and costly to select a sample that is truly representative of the application target. Second, costs and difficulties may also arise when training people in using the most advanced functionalities of the application, which is required in order to avoid a superficial assessment (Cantoni, Di Blas and Bolchini 2003). Third, reproducing realistic situations of use may be problematic.
Consequently, results may vary because of participants adopting a different behaviour in the laboratory, compared with how they would behave in the real environment (Lim, Benbasat and Todd 1996). This is widely known as the “Hawthorne effect”, which implies the behaviour of observed subjects to be influenced by the observation itself. Last, additional costs may occur from setting up usability laboratories to conduct the tests, comprising necessary equipment and dedicated personnel (Cantoni, Di Blas and Bolchini 2003).

**Heuristic driven evaluation and task driven evaluation**

As previously mentioned, both empirical methods and inspection methods are based on two main techniques, generally adopted alternatively: heuristic driven evaluation and task driven evaluation. Although heuristic driven evaluation has already been discussed in the context of usability inspection methods, it is appropriate to clarify the way in which it is employed in empirical methods and inspection methods. As previously described, during an inspection, heuristics are used to guide the expert in exploring the website/application and checking its adherence to usability principles. Instead, during an empirical test, heuristics are useful to make the users comment in a structured way their experience, through, for instance, the use of heuristic questionnaires (Triacca et al. 2004).

**Task driven/scenario based evaluation**

According to Rosson and Carroll (2009), scenario-based evaluation is focused on describing how people use a system to achieve some tasks. In user testing, these tasks are first defined and then assigned to the users. The authors (2009, 1) describe scenarios as stories, which “consist of a setting, or situation state, one or more actors with personal motivations, knowledge, and capabilities, and various tools and objects that the actors encounter and manipulate”. The main elements of a scenario are the *user profiles* (defined also in terms of personas and roles), the *goals* and the *tasks* (Inversini and Cantoni 2014). These components are listed and described in Table 4:
### ELEMENT DESCRIPTION

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| **1. User profiles, personas and roles** | **User profiles** identify some stable characteristics of potential end-users of the application. End-users can be classified according to different types of criteria, such as demographic (age, gender), social (employment status), cultural (educational level) and related to the Internet (knowledge of the website).

**Personas** are defined by one specific characteristic. For instance, in the case of a destination website, a relevant persona could be characterized by the fact that he/she is visiting the website for the first time.

**Roles** define the context that guides the user through the interaction with the website. Roles consist in the motivation behind visiting the website, for instance: “Searching for information”. Roles allow the identification of goals and tasks. |

| **2. Goals** | Goals define the achievement of the interaction. |
| **3. Tasks** | Tasks define the necessary steps to achieve the goals. |

*Table 4: Main elements of a user scenario (Inversini and Cantoni 2014).*

### 2.3. Eye tracking methodology

The last chapter of the literature review is focused on the eye tracking methodology. First, eye tracking is defined and its functioning is introduced, in order to help the familiarization with the topic. Second, the relationship between eye tracking and web usability is presented. In particular, eye tracking metrics, visualization techniques and the correlation with usability problems are summarized, with the aim of establishing a useful framework for the analysis of eye tracking data that will be performed later. Third, the Retrospective Think Aloud method, a usability evaluation method useful to supplement quantitative eye tracking data, is presented. Last, the main eye tracking researches conducted in the field of tourism and hotel websites are discussed.
### 2.3.1. Eye tracking and web usability

According to Nielsen and Pernice (2010, 3), “eye tracking is simply following the trail of where a person is looking”. Considering it as a practice, it is a method to measure eye’s movements of individuals to know where they are looking and the order in which their eyes are moving from one point to another (Poole and Ball 2006). The movements of the eyes are then recorded while the person looks at a stimulus (Ehmke and Wilson 2007).

The study of eye movements dates back to almost one hundred years ago, and since then, many different technologies have been used to track them (Jacob and Karn 2003). In fact, the first eye tracking methods required electrodes to be mounted on the skin around the eye or people to wear large contact lenses, equipped with metal coil, on the cornea and the sclera. Today, instead, modern and less invasive eye trackers determine where a person is looking by using video images of the eye (Duchowski 2003). For instance, eye tracking equipment can be mounted on computer monitors and eye tracking software can record what is exhibited on the screen at the same time a person is looking at it (Nielsen and Pernice 2010).

Today’s systems track eye’s movements by reflecting infrared light in the eye and using a geometrical model to establish the exact point where a person is looking (Tobii 2010). The model used by contemporary eye trackers to measure the point of regard (the point, in space, where a person is looking) is called “the corneal-reflection/pupil-centre method”. With this method, normally, an infrared camera is mounted on a display monitor and an appropriate software locates and detects the features of the person’s eye. Infrared light is directed into the eye, enters the retina, and a huge amount of it is reflected back, making eye features such as the pupil appear very bright and easier to track. The infrared light also generates the corneal reflection, which appears as a small and sharp glint. Last, once the image processing software has detected the centre of the pupil and the location of the corneal reflection, the point-of-regard can be established (Goldberg and Wichansky 2002). The figures below illustrate the corneal reflection and bright pupil as seen in the infrared camera image and how the corneal reflection position changes according to the point of regard:
In case of video-based eye trackers, such as the one used for the present research, there is the need to perform a calibration process, in order to adapt the eye tracker to the peculiarities of each person’s eye movements. During the calibration, a dot is displayed on the screen and, when the eye fixates for a given amount of time and within a given area, the system records that pupil-centre/corneal-reflection as matching to a precise coordinate on the screen. This process should be repeated over 9 to 13 point grid-pattern to reach a precise calibration for the entire screen (Goldberg and Wichansky 2002).

Eye tracking has been broadly used in different fields of research, such as neuroscience, computer science, psychology and market research (Duchowski 2003). Today it is applied for instance in advertising testing (e.g. TV/web/printed advertising, packaging and retail shelf design and placement), psychology and philology research (e.g. infant research, studies of autism, ADHD and schizophrenia, reading studies), and usability studies (e.g. websites, software, computer games) (Tobii 2012). Among
all the research fields in which eye tracking can contribute, usability is one of the most promising ones. In this context, the method can be applied to identify a huge number of usability problems, especially on websites (Olsen, Smolentzov and Strandvall 2010).

Web usability eye tracking research is based on the so-called “mind-eye hypothesis”, formulated by Just and Carpenter (1976), according to whom what a person is looking at and what this person is thinking about are the same. Thus, people are normally thinking about what they are looking at, and tend to look at the same thing they’re thinking about. This does not mean that they always fully understand or are involved with it, but they are certainly paying attention to it. Consequently, on the basis of this hypothesis, eye tracking methodologies can reveal what users pay attention to on web pages (Nielsen and Pernice 2010). This means that, by recording eye movements, it is possible to keep a dynamic trace of where the user’s attention is being focused with regard to a visual display (Poole and Ball 2006). In particular, in case that tasks are assigned during usability testing with eye tracking technology, the required tasks will determine users’ looks (Nielsen and Pernice 2010).

The largest eye tracking web usability study has been conducted by Nielsen and Pernice (2010), who recruited more than three hundred people and assigned them eighty five tasks, measuring, in total, more than one million fixations on a huge variety of websites. Qualitative and quantitative data collected provided useful results about websites’ page layout (how people look at pages, how people buy online, the organization of pages, etc.), navigation (menus and information architecture, navigational elements such as links, buttons, headings, etc.), the fundamental web design elements (home page, logos, shopping carts, etc.), images, and advertisements. According to the authors (2010), eye tracking is a powerful tool for usability research because it provides useful insights about how people behave on the web, enriching the analysis of behavioural phenomena with important details that help to understand users’ attitude to websites’ content, words, and pictures.

Eye tracking metrics, visualization techniques and correlation with usability problems

Eye trackers produce both numerical data and visual results that can be used to evaluate the usability of the interface tested (Tobii 2009). In eye tracking research, the most commonly used measurements are fixations, defined by Poole and Ball (2006, 3) as “moments in which the eye is relatively stationary, taking in or ‘encoding’ information”, and saccades, the quick eye movements occurring between one
fixation to another. Fixations and saccades can be both detected by the eye tracking software from the data gathered by the eye tracker (Ehmke and Wilson 2007). A scanpath designates a whole saccade- fixation- saccade sequence, and a gaze is the sum of all fixation durations within a specific area (Poole and Ball 2006).

Considering visual eye tracking results, these can be visualized in three main ways: slow motion gaze replay videos, heat maps, and gaze plots. Heat maps are color-coded screenshots, in which different colours represent the different amounts of looks that each part of the screen attracts. Thus, they are normally aggregated across different users. However, heat maps can represent either the number of fixations or the duration of fixation. Different areas of the screen are coloured with three different colours, such as red, yellow and blue. In this case, red parts indicate areas that received the hugest amount of users’ looks, yellow areas represent parts that gained fewer looks, and blue areas are the last-viewed ones. Areas that remain grey didn’t receive any fixations. In case heat maps represent the duration of fixations, different colours would represent different amounts of seconds that the users dedicated to each area. To create a robust heat map, a large number of users is needed. More precisely, it is suggested to obtain eye tracking recordings from at least thirty users (Nielsen and Pernice 2010). An example of a heat map is shown in the figure below:
Figure 9: Example of a heat map (Nielsen and Pernice 2010).

Gaze plots, instead, show single user’s fixations to a page. In a gaze plot, user’s fixations are represented by dots, each designating one fixation. The duration of the fixation is represented by the size of the dot, with larger dots denoting longer looks. Each dot is numbered, and thin lines, representing the saccades, connect the fixations. In this way, the sequence of fixations can be understood. It is important, when interpreting gaze plots, to remember that humans are blind during eye movements from one fixation to the other (saccades). Gaze plots can be drawn for users’ entire
visit of a page or for different moments of the visit (Nielsen and Pernice 2010). An example of a gaze plot is displayed below:

Even if some research associating eye tracking metrics and usability problems has been conducted, there is still a lack of a general correlation scheme between these two (Poole and Ball 2006; Ehmke and Wilson 2007). An important study conducted by Poole and Ball (2006) offers a comprehensive overview on how various eye movements can be measured to evaluate interface usability in the field of Human-Computer Interaction. In this study, previous eye tracking research is analysed and eye metrics are interpreted in the context of interface design and usability evaluation. Another significant research on the topic is the one conducted by Ehmke and Wilson (2007), who, similarly to the previous authors, summarized the main researches correlating eye tracking metrics with usability
problems investigation and proposed a correlation framework. The outcome of these two reviews has been considered as a starting point for the development of Table 5, shown below, where the main researches on the topic are reported and possible correlations between eye movement metrics and usability problems identified in the literature are described.

<table>
<thead>
<tr>
<th>Eye-movement metric</th>
<th>Cognitive process or usability problem</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixation-related metrics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of fixations overall</td>
<td>More overall fixations indicate less efficient search. The number of fixations can be linked to the amount of components that the user must process to reach the correct one.</td>
<td>Goldberg &amp; Kotval 1999</td>
</tr>
<tr>
<td>Fixations per area of interest</td>
<td>The element/area is more noticeable or more important</td>
<td>Jacob &amp; Karn 2003; Poole, Ball and Phillips 2005</td>
</tr>
<tr>
<td>Fixation duration</td>
<td>A longer fixation indicates difficulty in extracting information, or it means that the object is more engaging.</td>
<td>Just and Carpenter 1976</td>
</tr>
<tr>
<td>Time to first fixation on target</td>
<td>Good (if short) or bad (if long) attention getting properties.</td>
<td>Byrne et al. 1999</td>
</tr>
<tr>
<td>Fixations on target divided by total number of fixations</td>
<td>A lower ratio indicates lower search efficiency.</td>
<td>Goldberg and Kotval 1999</td>
</tr>
<tr>
<td>Percentage of participants fixating an area of interest</td>
<td>Attention getting properties of an interface element.</td>
<td>Albert 2002</td>
</tr>
<tr>
<td>Fixation per area of interest adjusted for text length</td>
<td>If areas of interest are comprised of text only, the mean number of fixations per area of interest should be divided by the mean number of words in the text, to understand if the number of fixations is high because the element is hard to be recognized or only because there is a huge amount of text to read.</td>
<td>Poole, Ball and Phillips 2005</td>
</tr>
<tr>
<td>Post-target fixations (fixations on another area after the target has been captured)</td>
<td>Higher number of fixations off-target after the target has been fixated indicate a lack of meaningfulness or visibility of the target.</td>
<td>Goldberg and Kotval 1999</td>
</tr>
<tr>
<td>Fixation/Saccade ratio (Comparison of the time spent searching and the time spent processing)</td>
<td>Higher ratios denote either more processing or less searching.</td>
<td>Goldberg and Kotval 1999</td>
</tr>
</tbody>
</table>

### Saccade-related metrics

| Number of saccades | More saccades indicate greater amounts of searching. | Goldberg and Kotval 1999 |
| Saccade amplitude | Larger saccades indicate more meaningful cues. If the interface is well designed, the user’s scanning is easily directed to the desired target, with few intermediary fixations. This results in larger saccades' amplitude. | Goldberg and Kotval 1999 |
| Regressive saccades (represented by acute angles) | Regressions indicate the presence of less meaningful cues, changing in goals or a mismatch between users’ expectations and the observed interface layout. | Poole and Ball 2006; Goldberg and Kotval 1999 |
| Saccade duration | Low image quality. | Vuori et al. 2004 |

### Scanpath-related metrics

| Scanpath duration | Scanpath duration is related to processing complexity, since much more time is spent in fixations than in saccades. | Goldberg and Kotval 1999 |
| Scanpath length | Longer scanpaths indicate less efficient scanning behaviour. | Goldberg and Kotval 1999 |
| Spatial density of scanpath (spatial distribution of) | Small spatial density indicates more direct and | Goldberg and Kotval 1999 |
Gazepoint samples) efficient search.

Scanpath regularity Irregular scanpaths indicate searching problems. Goldberg and Kotval 1999

Transition matrix (frequency with which eye move between areas of interest) Frequent transitions denote inefficient scanning with extensive search. Goldberg and Kotval 1999

Scanpath direction Scanpath direction determines a participant’s search strategy. Altonen, Hyrskykari and Räihä 1998

Spatial coverage calculated with convex hull area Scanpath length plus convex hull area circumscribing the scanpath can be a useful measure to determine if lengthy search covered a huge or a localized area on a display. Goldberg and Kotval 1999

Gaze-related metrics

Gaze duration mean on area of interest Difficulty extracting or interpreting information from the element. Jacob and Karn 2003

Frequency of gazes on area of interest Possible importance of the element. Jacob and Karn 2003

Table 5: Eye movements and usability problems (Poole and Ball 2006; Ehmke and Wilson 2007).

As visible from the table, correlations between eye-movement metrics and cognitive processes/usability problems can often be interpreted differently depending on the situation. For instance, considering the metric “fixation duration”, it is possible that a longer fixation indicates both difficulty in the information extraction and interest for the object. Thus, when evaluating usability, it is important to combine eye tracking quantitative data with more qualitative methods, because eye movements and metrics are often difficult to be understood if participants do not contextualize the data and supplement it with additional information. A common approach to enhance eye tracking usability evaluation is to combine it with Think Aloud method (Tobii 2009). However, it is fundamental...
to mention that eye tracking data analysis can also be conducted using a bottom-up approach, totally based on observation of the data instead of on cognitive theories and hypothesis (Jacob and Karn 2003).

**Retrospective Think Aloud (RTA) method**

Eye tracking usability methods can be qualitative and quantitative. As previously explained, in eye tracking research, it is often necessary to enrich quantitative numerical data, gathered by the eye tracker, with additional qualitative information provided by participants (Tobii 2009). Selecting the most appropriate method is crucial in order to extract significant and useful data from the participants (Olsen, Smolentzov and Strandvall 2010). Among all the methods available to supplement eye tracking numerical data, one has received particular attention in the literature related to eye tracking web usability and has proven to be an efficient method: Retrospective Think Aloud (RTA) (Eger et al. 2007; Guan et al. 2006; Olsen, Smolentzov and Strandvall 2010; Van den Haak and De Jong 2003; Tobii 2009).

Retrospective Think Aloud (RTA) is a method for usability evaluation in which the verbalization of the user’s performance is collected after the performance is over (Olsen, Smolentzov and Strandvall 2010). When RTA is applied, participants first complete the required tasks and only after verbalize their experience. RTA differs from the most commonly used approach called Concurrent Think Aloud (CTA), or simply Think Aloud (TA), in which participants verbalize their thoughts while they are completing the required tasks. Retrospective Think Aloud seems to be the best option when combining eye tracking with Think Aloud methods, since it is able to avoid certain problems and limitations of Concurrent Think Aloud (Tobii 2009). First of all, given the fact that cognitive processes are faster than verbal processes, it may be that participants, with CTA, only verbally explicit a part of what they are thinking about (Eger et al. 2007). Second, CTA can be largely affected by the issue of reactivity (e.g. participants working in an unusual way because of their thinking aloud). Third, with CTA it is not possible to truly measure timing variables about the length of task completion (Van Den Haak and De Jong 2003). Fourth, participants may forget to express their thoughts aloud in case there are some complications in interacting with the interface (Guan et al. 2006).
However, also the RTA method has been criticized, especially because it can cause participants to forget important things or fabricate information. Fortunately, these problems can be minimized thanks to the use of cued RTA methods, in which a replay of the session is showed to the participants during the interview to help them with the Think Aloud process (Tobii 2009). In particular, Olsen, Smolentzov and Strandvall (2010) conducted a study in order to compare different eye tracking cues when applying the RTA method in web usability testing. The study compared no cued RTA, video cued RTA, gaze plot cued RTA and gaze video cued RTA to understand the effectiveness of these four methods in stimulating comments from the participants and gathering information concerning usability problems of the website. Results show that cued RTA is always more effective than no cued RTA, and that the most effective method among all is video cued RTA, which stimulates participants to generate the greatest number of comments and mention more usability problems.

2.3.2. Eye tracking research in the tourism field

In the field of tourism, only little research has been conducted using eye tracking methodology. Considering the specific area of web usability, Pan and Zhang (2009) combined eye tracking methodology with verbal protocol and surveys in order to assess the effects of images and the sizes of choice sets in the online hotel decision making process. The authors conducted empirical tests showing to each participant four sets of hotels presented on four separate mock-up pages and asking them to choose a hotel room for each of the four sets. Hotel sets were arranged differently: the first consisted of five hotels, with two images for each hotel and a small hotel description, the second showed five hotels with only text description, the third comprised twenty hotels, each with two images and a text description, and the last included twenty hotels with only text description. Results of the study provide interesting insights in how consumers choose hotels in a website context. For instance, results show that, in case of a hotel list placed on a web page, hotel options appearing at top tend to receive more attention. Furthermore, pages overwhelmed with hotel options caused certain hotel options to be ignored (too much information). Images, on the contrary, were found to be
helpful in enhancing the user experience, reducing the cognitive load and allowing users to evaluate more hotel options and more in depth.

Always taking into account the field of web usability, FACT-Finder (2011), performed a comparative study on Online Travel Agencies’ websites, testing thirty participants and applying both qualitative and quantitative methods of analysis. The aim of the research was to compare the conventional search box offered by OTAs websites with a new type of semantic single-box search. Results showed that, despite participants were able to use the conventional search box, they showed a greater amount of appreciation for the customized search, which also emerged as more efficient in terms of the resources employed by users in the search (time and mouse clicks).

The usability of the booking process of airlines’ websites has been tested as well with the application of the eye tracking method. For instance, Valsplat (2011) conducted a series of usability studies to evaluate the design of KLM Royal Dutch Airlines’ booking tool. In the last phase of the project, eye tracking was adopted to conduct usability tests on a prototype of the newly-designed booking tool, with the aim of refining it. Participants were asked to perform a booking task, composed of different subtasks, and video cued Retrospective Think Aloud was implemented at the end of the sessions. Results showed that eye tracking data was exceptionally useful in identifying specific and detailed issues. In particular, from the analysis conducted on the visual data of participants one interesting aspect emerged: a huge amount of saccades was detected between the flight’s schedule and the corresponding price, which were situated at the opposite sides of the section dedicated to the flights’ details. As a consequence, the elements were repositioned, in order to facilitate the process. The outcome of the overall re-design of the booking tool resulted in a 30% increase in the number of users who proceed from searching to concretely reserving a flight ticket.

Another eye tracking study in the field of tourism and Human-Computer Interaction has been carried out by Qvarfordt, Beymer, and Zhai (2005), who developed RealTourist, an experimental online tourist information service which allowed tourists to talk by voice to a remote tourist consultant while planning a trip. The tourist and the consultant also shared the view of a city map, exhibited on both their displays. In addition, the consultant could visualize the tourist’s eye gaze on the interactive map of the city. The map was controlled by the consultant, who could show to the tourist pictures of
restaurants, museums, etc. The authors conducted an empirical study in which they asked participants to perform specific preselected tasks and plan two conference trips using RealTourist, one giving the consultant the possibility to see the tourist’s eye-gaze, the other without eye-gaze representation. The sessions were thus observed and recorded and data was analysed. Results show that eye tracking gaze-related data can be extremely useful in the field of human computer dialogue systems and computer-mediated communication. For instance, eye gaze was identified as a good indicator of the listener’s interest and as useful to consider whether to stay on the current topic or switch to a new one. Subsequently, Qvarfordt and Zhai (2005), incorporated the knowledge gained in this first study in an interactive system for trip planning, called iTourist, in which the human tourist consultant is substituted by eye-gaze pattern-based interaction algorithms and databases.

A further application of the eye tracking methodology in tourism research concerns the field of visual exploration in the real world. For instance, Wessel, Mayr and Knipfer (2007) combined mobile eye tracking technology with observation and questionnaires to gain a better understanding into mobile learning in science museums. Three students were equipped with mobile eye tracking glasses and asked to visit a small exhibition about nanotechnology. Results of the research show that people tend to fixate successively exhibits that conceptually belong together. The analysis of participants’ gazes was useful also in indicating which exhibits were less likely to receive attention and be explored. Last, a common pattern was identified concerning people’s ways of looking at the exhibition: all participants first scanned the exhibition wall as a whole, and only later focused on single exhibits. The authors of the study concluded that eye tracking methodology was very helpful in providing interesting data about the exhibition itself and about the exploration behaviour of the visitors. Similarly, Kiefer et al. (2014) conducted an empirical outdoor eye tracking study involving tourists visually exploring a city panorama with no time constraints, to investigate the features that have an impact on the duration of the visual exploration, and develop a model to forecast the moment in which tourists lose interest and get bored visiting a place.

To conclude, very little eye tracking research exists in the field of tourism and website evaluation and usability. In fact, although studies in tourism websites evaluation are gaining importance, the eye tracking methodology has not been broadly applied so far. Considering the booking process on travel websites, despite the adoption of the eye tracking methodology during the conduction of user tests
appears to be useful in revealing usability issues, the method did not find application. Specifically, eye tracking has not been applied so far to the usability evaluation of the booking process on individual hotel websites. Given the important role played by usability in ensuring the quality of the booking process on hotel websites and the potential benefits of the eye tracking method, there is still a room for studies within this specific topic.
3. Methodology

The present section describes the methodology adopted for the research. After a brief introduction to the overall methodology, the corpus of analysis is presented and the criteria considered for its selection are discussed. Afterwards, the chapter is divided in two main units, the first dedicated to the data collection, the second to the data analysis. For what concerns the collection of data, the main method adopted, the user testing, is described together with the other methodologies combined during the conduction of the user tests. Furthermore, the development of the user scenario created to guide the user tests is presented. In the section dedicated to the data analysis, instead, the methodologies adopted for the investigation of data collected are described. Particular attention is dedicated to the description of the analysis performed on the eye tracking data, where the functioning of the specific software adopted is also briefly explained.

3.1. Introduction

For the present research, the user testing method was applied to the websites belonging to three individual four-star hotels located in the city of Lugano, Switzerland. More precisely, user tests were conducted with the involvement of ten participants, who were asked to perform the same task on all the three websites. During the user tests, different types of data were collected, through a combination of methodologies, which included the observation, the Think Aloud, the eye tracking method and the distribution of questionnaires. Data received was then analysed to provide a usability evaluation of the three booking processes included in the study, by detecting existing usability issues. Last, results were compared, in order to answer the second research question and to identify the main factors that impacted the usability of the process in the specific case considered. Within these major factors, specific design choices were found to have a negative or positive influence on the usability of the booking process.
3.2. Corpus of analysis

For the study, the websites of three hotels located in the city of Lugano (Switzerland) were taken as examples to be investigated in depth and later compared. Considering the booking process, the three websites are very similar from the informational and functional point of view, but differ in terms of the adopted design. More precisely, the following websites were chosen for the analysis:

- Hotel Lido Seegarten****: www.hotellido-lugano.com
- Hotel Lugano Dante****: www.hotel-luganodante.com
- Villa Sassa Hotel & Residence****: www.villasassa.ch

The websites included in the study were selected according to different criteria. First of all, only the ones belonging to hotels of the same category (four-star hotels) and located in the same city (Lugano, Switzerland) were taken into consideration, in order to allow the design of the user tests to be identical for all the three cases comprised in the study. In this way, the comparison of the results was also facilitated. The selection was further filtered by excluding from the analysis chain hotels of the city. Last, the type of online booking system adopted by the hotels was considered as a major criteria for the inclusion in the analysis. In relation to this aspect, the different systems embraced by the four-star individual hotels in Lugano were first analysed, to facilitate the selection. Results are reported in Table 6, where for each individual four-star hotel of Lugano the corresponding booking system is displayed:

<table>
<thead>
<tr>
<th>HOTEL</th>
<th>BOOKING SYSTEM ADOPTED (COMPANY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel Admiral Lugano</td>
<td>Vertical booking CRS</td>
</tr>
<tr>
<td><a href="http://www.luganohoteladmiral.ch">www.luganohoteladmiral.ch</a></td>
<td></td>
</tr>
<tr>
<td>Suitenhotel Parco Paradiso</td>
<td>iHotelier Reservation Solutions</td>
</tr>
<tr>
<td><a href="http://www.parco-paradiso.com">www.parco-paradiso.com</a></td>
<td></td>
</tr>
<tr>
<td>Hotel Lugano Dante</td>
<td>Vertical booking CRS</td>
</tr>
<tr>
<td><a href="http://www.hotel-luganodante.com">www.hotel-luganodante.com</a></td>
<td></td>
</tr>
<tr>
<td>Hotel City Lugano</td>
<td>Protel Hotel Software</td>
</tr>
</tbody>
</table>
As visible, four main types of booking systems emerged from the analysis. More precisely, the following options were detected: Vertical booking CRS, iHotelier Reservation Solutions, Protel Hotel Software, and GHIX Group AG. In order to perform a comprehensive investigation, one type of each system was included in the case, through the selection of the corresponding websites. As a consequence, the following hotels were included in the study: Hotel Lugano Dante (Vertical booking CRS), Hotel City Lugano (Protel Hotel Software), Villa Sassa Hotel & Residence (iHotelier Reservation Solutions), and Hotel Lido Seegarten (Vertical booking CRS). However, the website of Hotel City Lugano was later excluded from the analysis due to some technical issues raised during the user tests performed with the adoption of the eye tracking technology.

### 3.3. Data collection

#### 3.3.1. Development of the user scenario

The usability evaluation performed on the three websites selected for the case study included the previous development of a user scenario, helpful to guide the conduction of the user tests. For the specific case of the present research, a user scenario was created considering the hypothetical situation of a USI (Università della Svizzera italiana, Lugano, Switzerland) student faced with the necessity of reserving a hotel room in Lugano for his relatives, invited to attend his Master thesis defence. As explained in the section dedicated to the literature review, user scenarios are composed
of three main elements: *user profiles, goals*, and *tasks* (Inversini and Cantoni 2014). The user scenario involved in the research is exhibited in *Table 7*, where its main components are described:

**USER SCENARIO: FRANCESCO’S UNCLE**

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Profile</td>
<td>Francesco, 24, is an Italian student of International Tourism at Università della Svizzera italiana, at the end of the Master program. He is currently writing his master dissertation and he knows that the day of the thesis defence will be Friday, the 10th of April 2015. Being the graduation day a very important event, Francesco would like to invite his uncles, Anna, 62, and Mario, 64, to attend the oral defence and celebrate with him. Anna and Mario would come from Naples (Italy) for this occasion. Francesco thinks that it would be better for them to come a few days before the defence and leave a few days after it. In this way, they would be able to visit the city of Lugano and enjoy great time with their nephew. Moreover, considering that Francesco’s aunt is on a wheelchair, a 4/5 days stay seems to be the best option to avoid every kind of stress. Francesco is used to browse the Internet and has a good experience with online purchasing. He access the hotel websites from his computer at home, using a medium-high speed connection, through the browser Internet Explorer.</td>
</tr>
<tr>
<td>Goal</td>
<td>Francesco wants to book a room for his uncles, from the 8th to the 12th of April 2015. Considering the situation, the room needs to satisfy a specific set of characteristics. More precisely, the accessibility of the room plays a fundamental role, given the condition of Anna. Other essential room’s requirements, specified by Francesco’s uncles, are the following: Wi-Fi, safety box, TV, and balcony.</td>
</tr>
</tbody>
</table>
| Tasks             | **T#1** Locate the booking widget on the website.  
|                   | **T#2** Insert in the booking widget the dates of the stay (from the 8th of April 2015 to the 12th of April 2015) and other required information.  
|                   | **T#3** Compare the different types of rooms. Check if the room satisfies the following requirements: good accessibility, Wi-Fi, safety box, TV, balcony.  
|                   | **T#4** Select the desired room.  
|                   | **T#5** Confirm the reservation. |
The last phase usually involved in the online reservation of a hotel room, when the user is required to insert personal data, was excluded from the scenario’s tasks, due to specific reasons. In fact, considering that user sessions were recorded (screen recording), the measure was intended to minimize any possible source of discomfort for the participants. For privacy-related reasons, the insertion of payment details was excluded as well from the development of the user scenario.

3.3.2. User tests

Considering the aim of the research to gain insights about the features that affect the usability of the online booking process on hotel websites, the necessity to investigate in-depth the point of view of the user emerged to be of primary importance. Therefore, in order to collect data needed to perform the usability evaluation of the websites selected for the research, the empirical testing method was considered as the best option. In fact, although inspection methods represent the most cost-efficient choice if compared to empirical methods, user-based methods allows for the detection of the problems that truly affect the actual users of the application, and depend less on the evaluators’ skills (Jeffries and Desurvire 1992; Matera, Rizzo and Carughi 2006; Nielsen 1994; Scholtz 2004). Furthermore, the lack of barriers concerned with the possibility to set-up a usability laboratory and recruit necessary participants, and the opportunity to adopt the eye tracking technology were also considered as a main reason for the definition of the methodology. More specifically, traditional user testing was combined with observational techniques (observation and Think Aloud) and the monitoring of physiological responses, through the inclusion of the most innovative eye tracking technology.

User tests were conducted within the first week of December 2014 (1st-5th of December) in an equipped laboratory, with the involvement of ten participants, recruited among master students at Università della Svizzera italiana (Lugano, Switzerland). It is important to mention that a pre-test was also conducted on November, 28th, 2014, with one participant, in order to detect possible technical or design-related issues. At the beginning of the sessions, participants were asked to sign a consent form, available in Annex 1. More precisely, the consent agreement defined the purpose of the study,
the users’ tasks and the time required for the conduction of the experiment. Furthermore, the lack of risks associated with the participation, the confidentiality of the experiment, and the right of participants to withdraw from the study were also specified.

Besides this, participants were also asked to compile a questionnaire, developed with the aim of collecting basic demographic and experience related information (Annex 2). Questions asked concerned the age, gender, nationality and educational level of participants, as well as their experience with the use of the Internet and the online purchase of products and services. Results of the survey are available in Annex 3. As visible from the results reported, the sample selected for this study was composed of ten participants, six females and four males. Among these ten, eight reported an age comprised between 18 and 25 years, whereas the age of two users was comprised between 26 and 35 years. Considering the nationality of the users, six participants were Italian and four were Swiss. Furthermore, the highest level of education achieved by all the participants was a Bachelor’s degree. For what concerns their experience with the use of Internet, all the participants reported to use the Internet daily and to have some experience with online purchases. Among the products and services mostly purchased by participants online, the following items were mentioned: airplane tickets (six participants), books (six participants), hotel rooms (three participants), clothes (three participants), train tickets (three participants), shoes (two participants), concert tickets (one participant), technology-related products (one participant), and tobacco (one participant).

The usability laboratory, set-up at Università della Svizzera italiana, consisted of a desk, equipped with a laptop connected to a secondary computer screen. A Tobii X2-60 Eye Tracker was mounted on the screen, whereas Tobii Studio Software was installed on the laptop. Participants involved in the study were asked to sit in front of the screen and navigate the websites by performing the assigned tasks, while the evaluator could guide the procedure from the laptop, sitting next to the user. During the user testing sessions, data was collected through the adoption of four main methodologies: eye tracking, observation, Think Aloud, and the distribution of questionnaires. The four types of methods adopted are described in detail below:

*Eye tracking*
As emerged from the review of the literature, the eye tracking methodology is often adopted in the field of web usability, where it is useful to understand what users pay attention to on web pages. For the present research, eye tracking data was recorded using a Tobii X2-60 Eye Tracker, a small stand-alone device which can be easily mounted on the computer screen. The eye tracker permits users to freely move during the session (up to a certain point), allowing the researcher to obtain accurate and precise recordings by adopting a non-invasive method. The device works as the majority of modern eye trackers, by pointing infrared light in the eyes of participants, aimed at the generation of the corneal reflection (Tobii 2012).

For the collection of the eye tracking data of participants, the eye tracker was used concomitantly to the corresponding software (Tobii Studio Software 3.2), installed on the laptop controlled by the moderator. Tobii Studio is a comprehensive software that allows the design of the project, the recording of the sessions and the analysis of the eye tracking results. The software provides data in the form of visualizations (e.g. gaze plots and heat maps) and metrics (statistics) related to the eye movements and mouse clicks of participants (Tobii 2014). More precisely, during the recordings, the raw eye movements of participants were gathered by the X2-60 eye tracker every 3.3 to 33ms. Each of the points collected was subsequently defined with an X-Y coordinate and sent to the software, which processed it in fixations, to create the visualizations and statistics needed to perform the data analysis (Tobii 2014).

Information in Tobii Studio Software is structured and stored according to three levels of hierarchy: projects, tests, and recordings. Each project includes data related to participants (e.g. name/number) and one or multiple tests. Instead, each test contains different media elements, called stimuli (the elements that the researcher wants to test), arranged into a linear timeline. Different types of stimuli can be included in the tests, such as instructions, images, movies, websites, questionnaires and PDF elements. The test level also includes information about the way the different stimuli are shown to participants (e.g. order and duration of stimuli). Last, each recording is related to a single participant. For every participant, recordings contain gaze data and media presentations events (e.g. mouse clicks), as well as the recording elements. Visualizations are subsequently created on the basis of the recordings included in each test (Tobii 2014).
For the present research, a main project was created. The project contained three different tests, one for each analysed website. The three tests were designed in the same way, in order to allow the comparison of data to be performed later on. In particular, for each test, two main stimuli were included: an initial instruction element, where the task was specified, and a website element (the web address of the interested website, viewed in Microsoft Internet Explorer). It is important to mention that, although the scenario previously developed to guide the sessions included five main tasks to be achieved in order to reach the booking goal, the instruction was presented in the form of a single booking task. The rationale behind this choice resides in the need to simplify the process as much as possible, both for participants and the successful conduction of the experiment. In fact, as emerged from the pre-test conducted, a continuous interruption of the web stimuli, besides being annoying for users, may threaten the correct functioning of the software. More specifically, the instruction was modified as follows:

“Locate the booking widget on the hotel website. Insert the dates of your stay (from the 8th of April 2015 to the 12th of April 2015). Compare different types of rooms and their features. Check the following rooms’ characteristics: accessibility, Wi-Fi, safety box, TV, balcony. Book the best room you can get, for two adults. Consider a maximum budget of CHF 2’500.”

As understandable, a maximum budget was added to the task’s description, in order to induce users pay more attention to the costs of the stay, as they would do in a real-life situation. The maximum budget was set by taking into consideration the real prices displayed by the three hotel websites for the period considered, allowing participants to choose among a broad type of rooms and additional services.

In order to facilitate the comprehension related to the design of the single tests with Tobii Studio Software, a screenshot of the test design has been reported below, in Figure 11. The image displays the timeline, where the two stimuli above mentioned (instruction element and web element) are arranged in sequence:
After the calibration, guided by the evaluator through the software installed on the laptop, the participant started the session with the first test (first website), chosen by the moderator each time. The instruction was displayed on the screen of the user and, when the participant claimed to be ready, the moderator allowed the presentation of the web stimuli. After the first test proposed was completed, the second test was displayed, and so on until the moment all the three tests included in the project were performed by the user. In order to reduce the bias in the results caused by the influence of the previous performance on the following ones, the order in which participants were exposed to the three tests was changed every time.

**Observation and Think Aloud**

As revealed by the literature related to the existing usability testing methodologies, observational techniques are one category of empirical testing methods that implies the observation of the users interacting with a system, usually by performing a series of scheduled tasks. During the sessions, the evaluator observes and keeps track of the actions of users, adopting different types of methodologies. In fact, pure observation may be inadequate to gather insights into the attitude and the real motivations behind the actions of users. As a consequence, it is fundamental to further complement...
the observation with other types of data. One of the most commonly adopted methods in this sense is the Think Aloud, which requires the participant to verbalize his/her experience while being observed, and clarify what he/she thinks is occurring, the reasons of his/her actions and what he/she is trying to achieve. The Think Aloud is considered to be a very simple and efficient method, which provides deep understanding of an interface’s issues, although not requiring a high level of expertise to be implemented (Dix et al. 2004).

In eye tracking studies, the Think Aloud methodology is often adopted in its retrospective variant (Retrospective Think Aloud), which implies the collection of the user’s verbalization after the performance. RTA has proven to be a more efficient solution with respect to the Think Aloud (also called Concurrent Think Aloud), especially if video cued (Olsen, Smolentzov and Strandvall 2010). However, for the present research, a different approach was adopted, which included the combination of the Concurrent Think Aloud with the live observation of the users’ eye movements. In fact, in the recording phase of the experiment, Tobii Studio Software offers the possibility to activate the Live Viewer function, which enables the evaluator to observe in real time the raw eye movements of participants on the screen. The Live Viewer was activated during the sessions’ recordings, in order to anticipate possible issues. Only in the case the evaluator considered it necessary, the behaviour of participants was further investigated through the video cued RTA. To conclude, during the sessions, the reactions of participants toward the websites were collected from three main sources: verbalization (Concurrent Think Aloud), observation of the users’ behaviour, and observation of the eye movements of users on the screen. Data was recorded on a notebook, to be later transcribed and analysed.

**Overall subjective satisfaction (questionnaires)**

In order to measure and evaluate the overall subjective satisfaction of users regarding the completion of the task on the three websites, a questionnaire was developed and administered to participants at the end of each session, following the model adopted by Nielsen and Pernice (2010) in the their most relevant eye tracking study. According to the authors of the research (2010), collecting users’ perspectives about the just completed tasks is important, because it helps evaluators to understand how happy participants are with the completion of a task. In fact, as underlined by the authors (2010,
sometimes a user may complete a task quickly but is unhappy with it, or they might spend a long time on a task but not be bothered by that”. Therefore, the collection of subjective measures was included in the present research. More precisely, the survey, composed of two main questions suggested by the authors above mentioned, gave users the possibility to circle their answer on a six-point Likert Scale. Additionally, above each number of the scale, signpost words were provided, in order to facilitate users in the provision of their answers. The two questions included in the survey are reported below:

**Question 1:** From 1 to 6, how easy or difficult was it to complete the task?

- Very easy
- Easy
- Pretty easy
- Pretty difficult
- Difficult
- Very difficult

**Question 2:** From 1 to 6, how satisfying or unsatisfying was it to work on this task?

- Very satisfying
- Satisfying
- Pretty satisfying
- Pretty Unsatisfying
- Unsatisfying
- Very unsatisfying

As highlighted by Nielsen and Pernice (2010), although the two questions may appear to ask the same thing, they are intended to capture different aspects of the users’ subjective satisfaction. In fact, by answering the question related to the difficulty of a task (question 1), participants had the possibility to report if they encountered any problems in the task completion. On the contrary, the second question allowed users to provide their opinion also on aspects which are not only related to usability. For instance, a user may find a task very difficult to be performed, but he/she is satisfied with its content and features.

### 3.4. Data Analysis

In order to examine the different types of data collected during the user tests, various methodologies were adopted. However, before conducting the data analysis, the booking process on the three websites included in the research was segmented in five main elements, in order to facilitate the analysis and the comparison of the results to be performed later on. More specifically, four main
phases were detected in the booking process: location of the booking widget on the homepage, input of stay requirements, comparison and selection of rooms and rates, and reservation confirmation. The four phases of the booking procedure were included in the analysis, together with a fifth element, represented by the overall structure of the booking process. The elements are briefly described below:

**PHASE 1: Location of the booking widget on the homepage.** In the first phase, the ability of users to locate the booking widget on the website was taken into consideration. In particular, considering that all the three websites displayed the element on the homepage, the focus of the analysis was attributed to this first page of the website. Another main aspect included in the analysis concerned the predisposition of users to correctly start the reservation process by mean of the widget.

**PHASE 2: Input of stay requirements.** In the second phase of the process, the specific design of the booking widget was addressed. More precisely, the ability of users to insert the parameters of their search in the element (e.g. travel dates, number of rooms and guests) represented the main focus of the analysis.

**PHASE 3: Rooms & rates’ comparison and selection.** In the third phase, the capability of participants to correctly understand the rooms’ and rates’ information displayed, compare different types of rooms and rates, and select the desired combination was taken into consideration.

**PHASE 4: Reservation confirmation.** In the last phase of the booking process, the ability of participants to recognize and check the fundamental details related to their reservation represented the most important aspect, together with their capability to correctly identify a way to confirm the reservation. Moreover, in case the possibility to select additional services was provided before the reservation confirmation, this aspect was considered for the analysis as well.

**Overall structure of the booking process:** the aspects considered in relation to the overall structure of the booking process concerned the ability of users to correctly navigate among the different phases involved in the procedure.
For each of the aspects included in the analysis, usability was evaluated taking into consideration the definition of web usability provided by Matera, Rizzo and Carughi (2006), who applied the ISO definition of usability to the specific field of the web. Therefore, the usability of the booking process investigated was considered as the ability of the websites included in the research to assists users in the assigned booking task, in all its phases, with effectiveness, efficiency and satisfaction, considering the specific context of use and the goals that users intended to achieve. It is important to recall the meaning of the usability dimensions considered in the definition, according to which the **effectiveness** relates to the accuracy and completeness of the goal achievement, while the **efficiency** to the amount of resources employed in the process. Instead, the **satisfaction** dimension concerns the attitude of users toward the product (ISO 2010).

**Overall subjective satisfaction (analysis of questionnaires)**

For what concerns the measurement of the subjective satisfaction of users, the answers of the ten participants included in the study, circled on a 1 to 6 Likert Scale, were averaged for each of the two questions included in the analysis, to obtain the mean score (**Question 1**: from 1 to 6, how easy or difficult was it to complete the task? 1= very easy; 6= very difficult; **Question 2**: from 1 to 6, how satisfying or unsatisfying was it to work on this task? 1= very satisfying ; 6= very unsatisfying). Once the mean score for the two attributes (easiness and satisfaction) was gained, the overall subjective satisfaction for the booking task was calculated by averaging each user’s two answers.

**Identification of usability issues**

In order to identify threats to the usability of the process, instead, different types of analyses were performed on data collected during the user tests. First of all, data gained through the observation and the Think Aloud method was transcribed and carefully analysed to gather a first overview of the existing problems. Additionally, the replay of the recordings, which also include the eye tracking data collected, was implemented in order to gain more insights into the behaviour of users and the issues detected and identify further problems. In different cases, when the evaluator considered it appropriate, statistics related to the eye movements and mouse clicks of participants were also calculated. The analysis of the eye tracking data performed is described in detail below.
Eye tracking data

As anticipated, for the eye tracking analysis two main types of data were taken into consideration: visual data and statistical data. For what concerns visual data produced by Tobii Studio Software, the program generates both heat maps and gaze plots, taking into account fixations as basic unit of measure. In particular, heat maps are useful to intuitively condense huge quantities of data, while gaze plots allow to visualize the sequence and the location of fixations of single participants on a media, such as a web page (Tobii 2014). Considering the number of participants included in the study, which allowed the conduction of an in depth analysis of users’ behaviour, gaze plots were chosen over heat maps, which, instead, were excluded from the analysis. In this way, a more qualitative approach was adopted. It is essential to mention that the omission of heat maps from data used to perform the analysis is also due to the high amount of page scrolling detected. In fact, the presence of this issue would have altered the visual results, considering that heat maps are calculated according to the amount or length of fixations detectable on the screen and are based on huge amounts of quantitative data. On the contrary, gaze plots can be used to visualize the specific sequence of fixations of one or more participants in a specific time interval, offering the opportunity to segment the analysis to prevent the alteration of the visual results caused by the page scrolling behaviour. However, although heat maps were excluded from the study, the qualitative analysis performed on participants’ gaze plots was complemented through the calculation of eye and mouse click related metrics and statistics, which allow to easily summarize the behaviour of participants with regard to one or more specific aspects of the website.

In order to generate eye tracking statistics with Tobii Studio Software, Areas Of Interests (AOIs) must be created on the stimuli selected (e.g. an image, a movie, or web page). More precisely, AOIs are drawn by the evaluator on the elements chosen for the conduction of the statistical analysis. An example of a web page, where different Areas Of Interest have been drawn, is exhibited below, in Figure 12:
The image displays the homepage of the website of Villa Sassa Hotel & Residence, where three different Areas Of Interest were drawn to illustrate the concept. More precisely, the areas were designed in the upper left section of the page (logo), in the upper central (booking tool) and in the lower right (news & events information box). It is important to mention that AOIs can be activated and deactivated an unlimited number of times through the replay of the recordings, in order to specify the time intervals when data must be collected for the calculation of statistics. Furthermore, unlike heat maps, AOIs can be adapted to dynamic elements and page scrolling situations, through the use of Keyframes, where each Keyframe corresponds to a precise shape and position of the AOI. This method allows the evaluator to segment recordings and draw the interested Areas Of Interest different times, following the changes that occur on dynamic media (Tobii 2014).

For the present research, gaze plots and Areas Of Interest were created ad hoc for the conduction of the analysis. More specifically, for what concerns eye tracking statistics, based on fixations and mouse clicks, the metrics described below were included in the investigation, depending on the...
various situations encountered. Metrics adopted were chosen according to the different situations and the specific needs of the evaluator in relation to the aspects of the website considered.

- **Time to first fixation (seconds):** the metric calculates how long it takes the user to fixate an Area Of Interest.
- **Fixations before (count):** the metric measures the amount of fixations that the user spend on the website before fixating the Area Of Interest.
- **Fixation count (count):** the metric calculates the amount of times the user fixates and Area Of Interest.
- **Visit duration (seconds):** the metric measures the duration of each individual visit within an Area Of Interest.
- **Visit count (count):** the metric measures the number of visits received by an Area Of Interest.
- **Percentage fixated (%):** the metric measures the amount of recordings in which users have fixated at least one time within an Area Of Interest.
- **Percentage clicked (%):** the metric measures the amount of recordings where users have clicked at least one time within an Area Of Interest.
- **Mouse click count (count):** the metric measures the amount of left-mouse clicks of users within an Area Of Interest.
- **Time from first fixation to next mouse click (seconds):** the metric measures the time from the first fixation within an Area Of Interest until the user left-clicks on the interested area.

**Comparison of the results**

The last step involved in the data analysis, once performed the usability evaluation of the booking process on the three websites included in the research, concerns the results’ comparison. In fact, results obtained for the three websites were carefully compared in order to answer the second research question and identify, for each aspect of the booking process considered, the factors that had an impact on its usability. Within these factors, specific design choices positively and negatively influencing the procedure were recognized.
4. Results

The following section is reserved to the presentation of the results obtained from the usability analysis performed on the websites of the three hotels included in the research: Hotel Lido Seegarten, Hotel Lugano Dante and Villa Sassa Hotel & Residence. As explained in the chapter dedicated to the methodology, different methods were adopted for data collection. Specifically, user tests were conducted in a fully equipped laboratory, with the adoption of the eye tracking technology. During the user tests, data was gained through the careful observation of users’ behaviour and their raw eye movements (*Live Viewer*). The Think Aloud methodology was also applied, in order to better understand people’s reactions to the website. Additionally, participants’ eye movements and mouse clicks on the screen were recorded through Tobii Studio Software, for the creation of visual and statistical data. Last, the overall subjective satisfaction of users with regard to task completion was collected through the distribution of questionnaires at the end of each session.

Data gained through the observation, the Think Aloud method and the replay of the recordings is fully accessible in *Annex 4 (General Results)*. More precisely, for all the three websites analysed and for each participant, a table was compiled, where the most interesting observations were transcribed. Annotations concern the verbalization of participants (TA and, in few cases RTA), their observed behaviour, and the visual data gained through the replay of the recordings. Instead, results reported here below concern the usability flaws detected in the booking process of the three websites, which is the outcome of the adoption of all the methodologies above mentioned.

Results reported are divided by website, according to the different phases of the booking process previously identified. First, for each website, data gained through the collection of the questionnaires relative to the overall subjective satisfaction of users is presented and discussed. Subsequently, for each phase, the main characteristics of the website are first displayed, to facilitate the comprehension of the discussion. Afterwards, problems detected are described and an evaluation of each phase is given. Last, the results of the three websites included in the study are compared, in order to answer the second research question.
As anticipated, results concern different types of data, gained for each user who participated in the user tests. However, due to the low level of precision, some recordings and, consequently, some participants, were not considered. In particular, recordings with a precision below 50% were excluded from the analysis.
4.1. Usability analysis of the website of Hotel Lido Seegarten

The present section is dedicated to results of the analysis performed on the website of Hotel Lido Seegarten. Participants included in the analysis are eight: P01, P02, P03, P05, P06, P08, P09 and P10.

*Overall subjective satisfaction*

As explained in the chapter dedicated to the description of the methodology adopted for the research, the overall subjective satisfaction of participants was measured through the distribution of questionnaires in the final phase of the user testing sessions.

For what concerns the overall subjective satisfaction of users with the completion of the assigned task on the website of Hotel Lido Seegarten, data gained is reported in *Table 8*:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Overall Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>P02</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>P03</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>P05</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>P06</td>
<td>3</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>P08</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>P09</td>
<td>4</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>P10</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*Table 8: Overall subjective satisfaction of participants, Hotel Lido Seegarten.*

As visible from the table, for the first question asked (from 1 to 6, how easy or difficult was it to complete the task? 1=very easy; 6= very difficult), the measured mean score corresponds to 2.6, between “easy” and “pretty easy”. Consequently, it is possible to state that participants did not perceive they faced major troubles in completing the task on the website. Instead, taking into consideration the second question (from 1 to 6, how satisfying or unsatisfying was it to work on this
task? 1=very satisfying; 6=very unsatisfying), the mean score corresponds to 3.25 (pretty satisfying),
which denotes a discrete level of satisfaction. The overall subjective satisfaction for the task was
calculated by averaging each user’s two answers. As visible, the overall mean score corresponds to
2.9.

**Phase 1: Location of the booking widget on the homepage**

The booking widget on the homepage of the website is located in the right top and only occupies a
small portion of the page. The element does not contrast strongly with the background, as similar
colours have been used both for the background and the design of the tool. A screenshot of the
homepage is reported in *Figure 13*, where the widget has been marked in red:

*Figure 13: Homepage and booking widget, Hotel Lido Seegarten (Hotel Lido Seegarten 2015).*
As visible from the image, the homepage of the website is in Italian, instead of English. In fact, it is important to mention that, during the user testing sessions, the homepage of the website was displayed in this language, due to some technical issues related to the functioning of the software. However, the majority of participants claimed to be able to understand Italian language and continued the navigation without facing any problem. The rest of participants spontaneously changed the language in which the website was displayed.

As observed during the user tests, some participants faced difficulties in locating the booking widget on the homepage of the website. More precisely, the booking widget did not emerge as one of the first elements that users noticed on the page. Statistics calculated in this regard are displayed in Table 9:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Time to first fixation (seconds)</th>
<th>Fixations Before (count)</th>
<th>Percentage Fixated (%)</th>
<th>Percentage Clicked (%)</th>
<th>Time from first fixation to next mouse click (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P02</td>
<td>3.32</td>
<td>14.00</td>
<td>100%</td>
<td>100%</td>
<td>17.49</td>
</tr>
<tr>
<td>P03</td>
<td>4.00</td>
<td>20.00</td>
<td>100%</td>
<td>100%</td>
<td>46.38</td>
</tr>
<tr>
<td>P05</td>
<td>2.56</td>
<td>12.00</td>
<td>100%</td>
<td>100%</td>
<td>2.76</td>
</tr>
<tr>
<td>P06</td>
<td>8.87</td>
<td>36.00</td>
<td>100%</td>
<td>100%</td>
<td>1.45</td>
</tr>
<tr>
<td>P08</td>
<td>6.28</td>
<td>24.00</td>
<td>100%</td>
<td>100%</td>
<td>3.60</td>
</tr>
<tr>
<td>P09</td>
<td>2.50</td>
<td>15.00</td>
<td>100%</td>
<td>100%</td>
<td>1.06</td>
</tr>
<tr>
<td>P10</td>
<td>3.64</td>
<td>10.00</td>
<td>100%</td>
<td>100%</td>
<td>13.36</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>4.45</strong></td>
<td><strong>18.71</strong></td>
<td><strong>88%</strong></td>
<td><strong>88%</strong></td>
<td><strong>12.30</strong></td>
</tr>
</tbody>
</table>

*Table 9: Location of the booking widget on the homepage, Hotel Lido Seegarten.*

Numerical data shows that, although almost all the participants fixated the booking widget on the homepage (88%, *percentage fixated*), and clicked on one of the elements composing it (88%, *percentage clicked*), users needed, on average, 4.45 seconds (*time to first fixation*) and 18.71 fixations (*fixations before*) to locate it. Even though 4.45 seconds does not necessarily denote an overly long period of time, the fact that users required 18.71 fixations in order to locate the tool may suggest the presence of one or more issues.
The behaviour of participants was further analysed through the replay of the recordings, in order to better understand what prevented them from noticing the booking widget on the page. From the visual data it is possible to understand that the attention of participants was often caught by other elements, such as the top horizontal global navigation, the hotel’s description, the company’s logo and the huge image located in the centre of the homepage. The behaviour of P08, who required 24 fixations to locate the widget, is reported in Figure 14, as an example:

**Figure 14:** P08, location of the booking widget on the homepage, Hotel Lido Seegarten (Tobii Studio Software).

As visible from the image, which exhibits the accumulation of fixations of P08 from the moment the homepage was displayed to the instant he/she located the widget, different elements caught the attention of the user before the tool. P08 first looked at the company’s logo (first fixation detectable) and at the picture in the central section of the homepage (fixations 2-3). Afterwards, he/she gave few
fixations on the top left and again on the logo (fixations 7-12). Last, P08 scanned the majority of the elements available in the horizontal menu, before noticing the widget on the top right (25th fixation).

Besides the fact that the booking widget does not seem to be one of the elements that mostly capture the attention and the interest of users when the page is displayed, a second issue emerged from the statistics. In fact, as it is possible to see from Table 9 reported above, the first mouse click on the booking widget can be detected after, on average, 12.30 seconds from the first fixation (time from first fixation to next mouse click), which suggests that it took participants a huge amount of time, after having noticed the widget, to start the reservation. Also in this case the gaze replay method was used to get more insights in the behaviour of participants. Data confirms the numbers and shows that, in many cases, a high amount of post-target fixations is detectable. The behaviour of P10 in this regard is reported in the gaze plot below (Figure 15), as an example:

Figure 15: P10, location of the booking widget on the homepage, Hotel Lido Seegarten (Tobii Studio Software).
Although only partially visible from the image due to the great amount of fixations on the same element, statistics demonstrate that P10 required 10 previous fixations to reach the target (the booking widget). However, looking closely at the image, it is possible to notice a high number of post-target fixations. In fact, the 11th and 12th fixations are on the target. However, the next fixation detectable on the widget is the 24th, followed again by different post-target fixations, and so on until the moment P10 started the reservation (50th fixation).

From the gaze plot exhibited above, it is clear that P10 visited the element repeated times before starting the reservation. In order to better understand the behaviour of participants with regard to this issue, further statistics were calculated. In particular, measures concern the number of visits that the element received on the homepage. Results are reported in Table 10:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Visit Count (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>–</td>
</tr>
<tr>
<td>P02</td>
<td>2.00</td>
</tr>
<tr>
<td>P03</td>
<td>5.00</td>
</tr>
<tr>
<td>P05</td>
<td>2.00</td>
</tr>
<tr>
<td>P06</td>
<td>1.00</td>
</tr>
<tr>
<td>P08</td>
<td>4.00</td>
</tr>
<tr>
<td>P09</td>
<td>1.00</td>
</tr>
<tr>
<td>P10</td>
<td>6.00</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>3.00</strong></td>
</tr>
</tbody>
</table>

*Table 10: Booking widget, visit count, Hotel Lido Seegarten.*

As visible from Table 10, which displays the number of visits that participants dedicated to the widget from the moment the homepage was displayed to the beginning of the reservation, it is possible to see that P10 is not the only user who required repeated visits to the widget in order to proceed with the booking. On the contrary, the majority of participants visited the element repeated times (three times, on average) in the considered time interval, which suggests the presence of some issues related to the ability to understand its purpose and relevance.
Phase 2: Input of stay requirements

The design of the booking widget located on the top right of homepage allows to insert two types of information: the date of arrival, from a dedicated calendar available through the selection of an icon, and the total number of nights of the stay, from a drop-down menu, as visible in Figure 16:

![Booking widget on the homepage](image)

*Figure 16: Booking widget on the homepage (Hotel Lido Seegarten 2015).*

As it is possible to see from data gained through observation and the replay of the recordings, half of the participants (P02, P05, P06 and P09) directly clicked on the “booking” button available, without considering the possibility to first select the date of arrival and the number of nights corresponding to their stay. Therefore, the second option available for the booking was considered for the analysis as well. A screenshot representing the second option, provided to participants in a different page of the website, is displayed in Figure 17:

![Booking widget, second option](image)

*Figure 17: Booking widget, second option (Hotel Lido Seegarten 2015).*

For what concerns the first option (booking widget on the homepage), adopted by four participants out of eight (P01, P03, P08 and P10), a main issue can be reported, which was faced by the majority of users (P03, P08 and P10). When the visitor clicks on the icon of the calendar to select the date of arrival, a drop-down menu is available to change the month of stay. However, the widget does not
allow this action if the booking is operated the last month of the year (December) and the month corresponding to the stay is situated in a different year. In this case, the month of stay can only be changed by first selecting the year of stay. The website does not prevent this issue, as the month of stay appears anyway to be the first option to choose from. An example of P08 facing this problem is available in Figure 18:

![Figure 18: P08, booking widget on the homepage, Hotel Lido Seegarten (Tobii Studio Software).](image)

As it is possible to notice from the image, P08 spent a huge amount of fixations in the phase which required him/her to change the month of stay from December 2014 to April 2015. More precisely, P08 spent 26 fixations on the calendar of arrival when facing the above mentioned issue. Furthermore, from the replay of the recording it is possible to see that the user clicked on the element repeated times. Therefore, visual data demonstrates that P08 employed a great amount of resources in understanding how to overcome this problem and did not recognize the logic behind the design choice. Considering the three participants who faced this problem, statistics calculated with regard to the mouse clicks received by the drop-down menu are reported in Table 11:
<table>
<thead>
<tr>
<th>Participant</th>
<th>Mouse Click Count (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P03</td>
<td>3.00</td>
</tr>
<tr>
<td>P08</td>
<td>7.00</td>
</tr>
<tr>
<td>P10</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11.00</strong></td>
</tr>
</tbody>
</table>

Table 11: Drop-down menu, month of stay, mouse click count, Hotel Lido Seegarten.

As visible from the numbers displayed in Table 11, the drop-down menu dedicated to the month of stay collected, in the considered time interval, a total of 11 mouse clicks, divided as follows: P03 clicked on it three times, P08 seven times and P10 only once. As understandable, only one participant (P10) instantly realized how to overcome the issue.

A second problem identified is related to the fact that the booking widget requires the visitor to count the number of nights to insert in the drop-down menu and does not offer the possibility to use two calendars, one for the date of arrival and one for the date of departure. More precisely, this problem was reported by three participants out of the four that chose the first option to start the booking process (P01, P03 and P08).

For what concerns, instead, the second booking option, adopted by P02, P05, P06 and P09, a major issue, related to the calendar, was identified: when the user clicks on the icon of the calendar to choose the date of arrival, two calendars are available for the selection, instead of one. This aspect generated confusion in the behaviour of participants, who repeatedly checked the two possibilities. An example of P09 facing this issue is reported in Figure 19, a gaze plot that shows the accumulation of fixations of P09 selecting the date of his/her arrival:
As visible from Figure 19, P09 started to scan the calendar of April 2015, located on the right (fixations 1-9). However, after 9 fixations he/she checked also the other calendar available on the left (fixations 10-14), before realizing it corresponded to March 2015 (15th fixation).

The same problem can be detected for the departure calendar. For instance, in the case of P06, the presence of two calendars for the selection of the departure date led to the wrong choice of the day, as it is possible to see from Figure 20 reported below:
As visible from the gaze plot, P06 first checked the calendar of April 2015, situated on the left (1\textsuperscript{st} fixation). However, the user immediately directed his/her attention to the calendar on the right, ignoring the names of the months and the label “departure” displayed in bold on the top of the two calendars. As a consequence, P06 selected the wrong date for his/her departure (12\textsuperscript{th} of May 2015).

P09, similarly to P06, selected the wrong departure date (May 2015 instead of April 2015). P09 did not realize the mistake until the moment he/she had to confirm the selection and the website displayed the wrong number of nights (34 nights):
As visible from the gaze plot above, P09 spent a high quantity of fixations on the white box displayed on the right of the page. The box contains few details of the reservation (date of arrival, nights and number of rooms) and gives the user the possibility to further proceed in the booking process, through the selection of the “booking” button, displayed in yellow-red. Looking closely at visual data, it is possible to understand that P09, after having noticed that the number of nights exhibited was wrong, checked again other information reported on the page: the room’s picture (fixations 11-12), the price (14th fixation), the name of the room (fixation 38-39) and the number of rooms selected (35th fixation). Furthermore, from the image it is possible to deduce that P09 visited the information contained in the box on the right repeated times when faced with the considered issue, as he/she was trying to figure out the source of the problem. More precisely, statistics calculated and displayed in Table 12, demonstrate that the element received four visits in the considered time interval:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Visit Count (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P09</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 12: P09, information box, visit count, Hotel Lido Seegarten.
A further problem identified for the second booking option concerns the fact that, as visible in Figure 22, displayed below, the booking widget provides both the option to select the dates of arrival and departure from the calendars and the possibility to select the number of nights for the stay. However, once the user selects the dates of stay using the two calendars, the system does not recognize the selection, and the drop-down menu displays the wrong number of nights. This aspect may lead to confusion, as the behaviour of P06 displayed in the two images below (Figure 22 and Figure 23) demonstrates:

![Figure 22: P06, check-out dates, Hotel Lido Seegarten (Tobii Studio Software).](image)

The first gaze plot reported shows the sequence of fixations of P06, from the moment he/she completed the selection of the dates of stay using the two calendars. As visible, P06 immediately fixated the drop-down menu dedicated to the number of nights on the right (1st fixation detectable). After having noticed that the menu displayed the wrong number of nights (one night instead of four) P06, confused, checked the departure date (5th fixation), the date of arrival (9th fixation) and repeatedly fixated the drop-down menu on the right.

The replay of the recording shows that P06 consequently changed the number of nights using the drop-down menu available, but selected the wrong quantity of nights (three instead of four), as visible in Figure 23, which displays the sequence of fixations of P06 from the moment he/she changed the number of nights:
P06 did not notice he/she had selected the wrong number of nights, although he/she knew the departure date was the 12\textsuperscript{th} of April. Instead, P06 just made sure that the amount of nights in the drop-down menu corresponded to the dates of arrival and departure and proceeded further in the reservation.

**Phase 3: Rooms & rates' comparison and selection**

Once selected the “booking” button, available on the homepage’s booking widget, the user is directed to the page where the rooms’ information is exhibited. A screenshot of the page is reported below, in Figure 24:
As visible, for every type of room the following information is available: the name of the room, which summarizes its main characteristics (e.g. room lake view with balcony), one picture, with the possibility of enlargement, and the price of the room per night (for single and double use). The details related to the rooms are available through the selection of the Information icon, marked in red in Figure 24. A further possible way to reach this information is to click on the name of the rooms displayed in bold, action suggested by the small blue arrow placed next to each room’s name. Additionally, a drop-down menu is available for the choice of the desired quantity of rooms.

The information related to the rooms is displayed in a clear way. In fact, a defined and proportionally suitable space of the page has been dedicated to every room. The sections corresponding to the
different rooms’ types are clearly defined by different colours (white and grey) and the name/type of each room appears in bold in the upper left of each section. Other useful information, such as the price of the rooms, is also included.

Despite the fact the majority of participants did not face any problem in locating the details of the rooms’ characteristics, two participants (P09 and P05) were unable to reach the desired information and consequently proceeded in the process without checking if the rooms’ characteristics satisfied the ones required by the task.

Once the booking button has been selected, the user is directed to the confirmation page, where the details appear anyhow at its top, as visible in Figure 25:

![Figure 25: P09, rooms’ characteristics, Hotel Lido Seegarten (Tobii Studio Software).](image)

As it is possible to understand from the image, P09, who could not identify a way to reach the rooms’ information in the previous phase of the process, carefully checked the characteristics of the selected room. The replay of the recordings reveals that the same behaviour can be identified for P05, who, additionally, repeated the same process in order to check the details for both the rooms available. This aspect suggests that, once P05 reached the desired information through the above mentioned path, he/she considered it as the only option available to accomplish the task.
A second issue detected concerns the pictures of the rooms displayed on the page. More precisely, three participants out of eight (P05, P08 and P09) reported the presence of a single picture as a major problem. These users, who made an extensive use of pictures in order to accomplish the task, showed a low level of satisfaction in this regard. Similarly, one participant (P01) considered that the information about the rooms’ characteristics was poor and represented an obstacle to the comparison and the selection of the room.

As visible in Figure 24, displayed above, the page where the rooms’ information is provided also exhibits the information related to the rates. In particular, rates’ details concern the price of the room per night, both for the single and the double occupancy. The prices among the two options (one occupant/ two occupants) are displayed in bold, under the label “price per night”, and a small icon representing one person or two people helps in identifying which price corresponds to which option.

Despite the fact that participants could easily understand the rates’ differences among the available types of rooms and occupancy possibilities, three participants out of eight (P03, P08 and P09) reported the lack of information about the total price at this point of the process as a major issue. For instance, visual data suggests that P03 expected to discover the total price of his/her stay after having selected the number of rooms from the dedicated drop-down menu. When he/she realized that the total price was not available, P03 set up the desired currency option from the “chose currency” drop-down menu. However, after several failed attempts to gain the desired information, P03 started calculating the total price of his stay. The gaze plot of P03 facing this issue is reported in Figure 26:
As it is possible to understand from the gaze plot, P03 first fixated the icons representing the occupancy of the room (1st fixation) and the price per night (2nd fixation). The replay of the recording shows that he/she then selected the desired amount of rooms using the available drop-down menu. Realizing that the total price of stay was not displayed, P03 repeatedly checked other elements on the page and the area of the page where he/she probably expected to see the total price (the white information box on the right).

**Phase 4: Reservation confirmation**

In order to confirm the booking, users were fist directed to the “guest data” page, exhibited in the two images below (Figure 27 and Figure 28):
Figure 27: Guest data 1 (Hotel Lido Seegarten 2015).
As visible from the two images displayed above, the page is segmented in eight main sections: travel date, room type, price calculation, services, general hotel policy and cancellation rules, client data, payment information, and reservation agreement. The different sections of the page are visibly demarcated by the use of different colours (white and grey) and at the top of each section, a title summarizing its main content is displayed in bold. The total price of the stay, services included, is displayed in big bold characters in the fourth section of the page, on the right side, and a grey button labelled “buy and confirm” is available at its bottom right.
Data gained during the user tests shows that, in general, participants did not face any type of issue in this phase of the process, for what concerns the actions required by the task. In fact, users were able to check and understand all the information they needed and easily locate the button to confirm their reservation.

**Overall structure of the booking process**

From the moment the user leaves the homepage he/she is helped through the procedure by the presence of a horizontal breadcrumb trail, which works as a navigation aid and allows the user to understand and keep track of his/her location on the website. A screenshot of the element is reported in Figure 29:

![Figure 29: Breadcrumb trail (Hotel Lido Seegarten 2015).](image)

As it is possible to understand from the image, the breadcrumb trail indicates the presence of three main phases to be accomplished in order to complete the booking, named, respectively, *choice*, *guest data*, and *confirmation*. The three phases correspond to three distinct pages and the red colour designates the page in which the user is navigating. In order to better understand the importance of this element for the users, statistics were calculated in this regard and reported in Table 13:
<table>
<thead>
<tr>
<th>Participant</th>
<th>Fixation Count (count)</th>
<th>Visit Duration (seconds)</th>
<th>Percentage Fixated (%)</th>
<th>Visit Count (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P02</td>
<td>1.00</td>
<td>0.13</td>
<td>100%</td>
<td>1.00</td>
</tr>
<tr>
<td>P03</td>
<td>9.00</td>
<td>0.23</td>
<td>100%</td>
<td>6.00</td>
</tr>
<tr>
<td>P05</td>
<td>10.00</td>
<td>0.34</td>
<td>100%</td>
<td>6.00</td>
</tr>
<tr>
<td>P06</td>
<td>8.00</td>
<td>0.52</td>
<td>100%</td>
<td>4.00</td>
</tr>
<tr>
<td>P08</td>
<td>2.00</td>
<td>0.18</td>
<td>100%</td>
<td>2.00</td>
</tr>
<tr>
<td>P09</td>
<td>9.00</td>
<td>0.56</td>
<td>100%</td>
<td>5.00</td>
</tr>
<tr>
<td>P10</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>Mean</td>
<td>6.50</td>
<td>0.37</td>
<td>75%</td>
<td>4.00</td>
</tr>
</tbody>
</table>

**Table 13: Use of the breadcrumb trail, Hotel Lido Seegarten.**

As visible from **Table 13**, six participants out of eight noticed the breadcrumb trail on the website (75 %, *percentage fixated*). On average, the element received 6.50 fixations from participants (*fixation count*), who averagely visited it 4 times (*visit count*) for 0.37 seconds (*visit duration*). Therefore, numbers suggest that the majority of participants checked the element repeatedly for a short amount of time. To better understand the reasons behind the importance of the breadcrumb trail and detect possible issues in the overall structure of process, the behaviour of users was further analysed through the replay of the recordings. Results show that the main interesting causes behind the use of the element can be identified in the recording of P06. In this regard, gaze plots displaying the accumulation of fixations of P06 are reported in the two figures below (**Figure 30** and **Figure 31**).

**Figure 30: P06, breadcrumb trail 1, Hotel Lido Seegarten (Tobii Studio Software).**
As visible from the two images, when P06 realized he/she previously selected the wrong date of departure (fixations 3-12), he/she checked the elements of the breadcrumb repeatedly (fixations 13-16 and 22-23), before taking the decision to modify the date selecting the yellow button “change date” available on the right. The behaviour of P06 demonstrates that the breadcrumb trail can be useful to estimate the consequences of a possible action on the website, and that users can profit from it to understand how the process is segmented.

Another moment which deserves particular attention concerns the previous phase of the booking process, reported in Figure 32, which shows the behaviour of P06 in the moment that required him/her to select the dates of arrival and departure of the stay:
As it is possible to understand from the image, one of the elements that caught the attention of P06 is the grey button “My reservation”, located below the breadcrumb, on the right side of the page (fixations 1, 3 and 6). Looking more closely at fixations, it emerges that P06 first gave few fixations on the grey button, and then immediately checked the elements of the breadcrumb before selecting the dates of travel from the calendars available. The behaviour of P06 suggests that he/she did not understand the function of the aforementioned button in the process. As a matter of fact, at this point of the procedure, the reservation was not started yet.

Furthermore, from data collected it emerges that P06 is not the only user who had difficulties in understanding the function of the button. In fact, data gained through observation and the replay of the recordings shows that P02 faced the same problem and tried to overcome the issue through the help of the breadcrumb, similarly to P06. Additionally, P02 selected the button in order to better understand its purpose, as visible in Figure 33:

![Figure 33: P02, “My reservation” button, Hotel Lido Seegarten (Tobii Studio Software).](image)

As understandable from the image, P02 faced the issue in a different moment of the booking procedure. In fact, as the content in the information box located on the right demonstrates, P02 had
already selected the dates of travel and the desired number of rooms. P02 quickly read the message presented but reported confusion and a low level of satisfaction with the content. First, he/she probably expected to find the details of his/her reservation, which would explain also the reason why he/she checked the breadcrumb before selecting the button. Second, according to what reported during the user test, the message is confusing and difficult to understand.

**Conclusions Hotel Lido Seegarten**

Results gained through the distribution of questionnaires, aimed at the measurement and evaluation of the overall subjective satisfaction of users with the task completion, show that participants, overall, were rather satisfied with the achievement of the assigned task on the website of Hotel Lido Seegarten. However, the analysis performed shows that the usability of the process is threatened by a discrete amount of issues, discussed below.

The most significant problems emerged in relation to the first and second phases of the booking process. **First of all**, statistics and visual data suggest that the widget does not represent one of the most attractive elements of the homepage. In fact, the attention of participants on the page was frequently directed to other areas, and in one case the element was ignored. The reasons behind this behaviour may rely in the dimension of the widget and the low importance assigned to the element. In fact, the widget is small, and does not occupy a priority position on the page, compared to other elements displayed.

**Second**, the design of the widget situated on the homepage does not appear to appropriately designate its function, given the fact that participants required repeated visits to start their reservation, and half of the participants involved in the analysis did not use it correctly. The behaviour of the users may be explained by the fact that the design only allows the selection of two basic types of information, which suggests the possibility to further specify the search in a more advanced phase of the process, or by mean of another potential element on the page.

**Third**, the design of the calendars available for the selection of the travel dates does not appear to be efficient and intuitive, in both the options available for the booking. More precisely, for what
concerns the first booking option, the segmentation among the month and the year of travel in two separated drop-down menus emerged as a main problem. In the case of the second booking option, instead, the presence of two calendars available to select one specific day generated confusion in the behaviour of users, who considered the two calendars as playing two different functions: the calendar on the left for the selection of the arrival date, and the calendar on the right for the choice of the departure date. For what concerns the second booking option, another source of confusion relied in the presence of two possibilities for the insertion of the travel dates. In fact, this aspect led participants to double-check their selection and, given the lack of synchronization among the two choices, to commit a mistake in the process.

Fourth, the absence of two calendars for the selection of the travel dates emerged as an important issue, considering the amount of resources that users wasted in the process of calculating the nights to insert in the dedicated drop-down menu.

Another important portion of the issues detected is related to the third phase of the booking procedure. First, results of the analysis performed show that users faced some problems in identifying a way to reach the complete information related to the rooms’ characteristics. In fact, part of this information is not directly displayed, but is only available through the selection of two specific links on the page. As the data collected demonstrates, in some cases, this aspect caused the task to be only partially completed. A second issue identified concerns the low availability of rooms’ pictures to be consulted. In fact, different participants considered the presence of a single picture as an obstacle to take an informed decision. In particular, users expected to find out more details from the images (e.g. pictures of the bathroom), before deciding if a room was likely to satisfy their needs and preferences. Another problem detected concerns the amount of information displayed. In fact, the low quantity of information provided appeared to be a potential obstacle to the choice of the room.

Considering the information related to the rates, the only issued detected concerns the lack of details about the total price. In fact, the absence of this information emerged as an element that led users spend an unnecessary amount of resources in their search. More precisely, a great quantity of fixations and time was allocated both to the search of the information on the page and the calculation of the total price.
Problems were detected also for what concerns the **overall structure of the booking process**. More precisely, data gained about the use of the breadcrumb trail shows that the majority of participants made an intensive use of the element. Despite the fact that the presence of the breadcrumb represents a positive aspect of the website’s design, the frequent and repeated use of the element revealed the presence of **one main problem** in the structure of the process. In particular, from the analysis the following issue emerged: the presence of a misleading button, which suggested the possibility to check the details of the reservation in the first phase of the booking procedure, dedicated to the choice of the rooms. The button strongly contrasted with the breadcrumb trail, which indicated the process to be clearly segmented in three different stages.

Last, despite the huge quantity of information provided on the page dedicated to reservation confirmation, **no issues** were detected for what concerns the **last phase of the booking process**.
4.2. Usability analysis of the website of Hotel Lugano Dante

The present section is dedicated to the results of the usability analysis performed on the website of Hotel Lugano Dante. Participants included in the analysis are ten: P01, P02, P03, P04, P05, P06, P07, P08, P09 and P10.

Overall subjective satisfaction

For what concerns the overall subjective satisfaction of participants with the completion of the assigned booking tasks on the website, data gained through the distribution of questionnaires in the final phase of the user testing sessions is reported below, in Table 14:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Overall Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>4</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>P02</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>P03</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>P04</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>P05</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>P06</td>
<td>4</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>P07</td>
<td>3</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>P08</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>P09</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>P10</td>
<td>4</td>
<td>5</td>
<td>4.5</td>
</tr>
</tbody>
</table>

| Mean score | 3.1 | 3.3 | 3.2 |

Table 14: Overall subjective satisfaction of participants, Hotel Lugano Dante.

As visible from Table 14, for the first question asked (from 1 to 6, how easy or difficult was it to complete the task? 1=very easy; 6= very difficult), the measured mean score corresponds to 3.1 (pretty easy). As a consequence, it is possible to affirm that participants did not perceive that they faced major troubles in completing the task on the website. Instead, taking into consideration the second question asked (from 1 to 6, how satisfying or unsatisfying was it to work on this task? 1=very satisfying; 6=very unsatisfying), the mean score corresponds to 3.3 (pretty satisfying), which denotes a discrete level of satisfaction. The overall subjective satisfaction for the task was calculated by averaging each user’s two answers. As visible, the overall mean score corresponds to 3.2.
Phase 1: Location of the booking widget on the homepage

The booking widget on the homepage of the website is positioned in the lower right section, in a purple box which strongly contrasts with the white background and the other elements available. A screenshot of the homepage is reported below, in Figure 34, where the widget has been marked in red:

Figure 34: Homepage and booking widget (Hotel Lugano Dante 2015).

As observed during the user tests, the majority of participants were able to locate the booking widget on the homepage of the website relatively quickly. However, some participants employed a higher
amount of time in order to notice it. Statistics calculated in this regard are reported below, in Table 15:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Time to first fixation (seconds)</th>
<th>Fixations Before (count)</th>
<th>Percentage Fixated (%)</th>
<th>Percentage Clicked (%)</th>
<th>Time from first fixation to next mouse click (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>4.05</td>
<td>13.00</td>
<td>100%</td>
<td>100%</td>
<td>2.60</td>
</tr>
<tr>
<td>P02</td>
<td>5.64</td>
<td>22.00</td>
<td>100%</td>
<td>100%</td>
<td>1.33</td>
</tr>
<tr>
<td>P03</td>
<td>3.90</td>
<td>17.00</td>
<td>100%</td>
<td>100%</td>
<td>4.00</td>
</tr>
<tr>
<td>P04</td>
<td>2.64</td>
<td>12.00</td>
<td>100%</td>
<td>100%</td>
<td>6.85</td>
</tr>
<tr>
<td>P05</td>
<td>3.93</td>
<td>18.00</td>
<td>100%</td>
<td>100%</td>
<td>1.79</td>
</tr>
<tr>
<td>P06</td>
<td>3.80</td>
<td>16.00</td>
<td>100%</td>
<td>100%</td>
<td>3.66</td>
</tr>
<tr>
<td>P07</td>
<td>9.24</td>
<td>33.00</td>
<td>100%</td>
<td>100%</td>
<td>2.54</td>
</tr>
<tr>
<td>P08</td>
<td>7.86</td>
<td>31.00</td>
<td>100%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P09</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P10</td>
<td>8.71</td>
<td>14.00</td>
<td>100%</td>
<td>100%</td>
<td>4.17</td>
</tr>
<tr>
<td>Mean</td>
<td>5.53</td>
<td>19.56</td>
<td>90%</td>
<td>80%</td>
<td>3.37</td>
</tr>
</tbody>
</table>

Table 15: Location of the booking widget on the homepage, Hotel Lugano Dante.

As it is possible to understand from the numbers displayed in Table 15, although almost all the participants were able to notice the booking widget on the homepage (90%, percentage fixated) and clicked on one of the elements composing it (80%, percentage clicked), users needed, on average 5.53 seconds (time to first fixation) and 19.56 fixations (fixations before) to locate it. Despite the fact that 5.53 seconds does not necessarily represent a long period of time, the fact that users required 19.56 fixations in order to locate the tool may suggest the presence of one or more issues.

In order to better understand what prevented users from noticing the booking widget on the homepage, the performance of participants was further analysed through the replay of the recordings. In this regard, the behaviour of P09, the only user who was not able to notice the booking widget on the homepage, is reported below, in Figure 35:
Figure 35: P09, search on the homepage, Hotel Lugano Dante (Tobii Studio Software).

The image exhibits the fixations’ accumulation of P09 from the moment the page was displayed until the moment he/she selected a different section of the website from the top horizontal menu (20th fixation). From the image it is possible to see that the search of P09 is mainly focused on the top of the page, which explains why the user was completely unable to locate the widget.

From visual data of the other participants, it is possible to understand that their attention was often caught by other elements on the homepage. More precisely, for what concerns the most eye-catching areas, the following elements have to be mentioned: the horizontal navigation at the top of the page, the huge image in the centre, the hotel’s logo, on the top left, and the three information boxes, positioned below the central image. As understandable, the booking widget does not seem to be one of the elements that first capture the attention and the interest of users on the homepage. The behaviour of P02, who required 22 previous fixations to notice the element, is displayed Figure 36, as an example:
Figure 36: P02, location of the booking widget on the homepage, Hotel Lugano Dante (Tobii Studio Software).

As visible from the image, which exhibits the accumulation of fixations of P02 from the moment the homepage was displayed to the instant he/she located the widget (23rd fixation), different elements caught the user’s attention before the tool. In fact, PO2 started the search from the big image in the centre of the page (1st and 2nd fixations), then gave few fixations on the hotels’ logo at the top left (fixations 4-5), before directing his/her attention back to the picture (fixations 6-9). Afterwards, the user scanned few elements of the global navigation at the top of the page (fixations 10-13 and 17-20), as well as the “home” link and the language settings positioned at the very top, on the right. Last, before noticing the booking widget, P02 briefly checked two of the three grey boxes located at its left (fixations 21 and 22).

Despite the fact that the booking widget did not emerge as one of the most attractive elements of the page, statistics calculated also show that, on average, participants clicked on the widget after only
3.37 seconds from the first fixation (time from first fixation to next mouse click), which suggests that the purpose of the widget was easy to be identified.

**Phase 2: Input of stay requirements**

The design of the booking widget located in the lower right section of the homepage allows to insert different types of information, permitting users to start the booking procedure with a highly detailed search. In particular, the following information is required: date of arrival, from a dedicated calendar, total number of nights of the stay, desired number of rooms, number of occupying adults, and number of kids, from the drop-down dedicated menus. Two screenshots of the booking widget are reported below, in Figure 37 and Figure 38:

![Figure 37: Booking widget 1 (Hotel Lugano Dante 2015).](image)

![Figure 38: Booking widget 2 (Hotel Lugano Dante 2015).](image)
As it is possible to see from data gained through the observation and the replay of the recordings, two main issues were detected in this phase of the process. In particular, four participants out of ten (P01, P04, P05, P06) reported the lack of two calendars, one for the date of arrival and one for the date of departure, as a major problem. An example of P01 facing this issue is reported in Figure 39, in a gaze plot which shows the accumulation of fixations of P01 in then moment he/she had to select the correct number of nights from the menu:

![Figure 39: P01, drop-down menu, number of nights, Hotel Lugano Dante (Tobii Studio Software).](image)

As visible, P01 required a huge amount of fixations in order to insert the correct number of nights in the menu. More precisely, the user spent 19 fixations on the drop-down menu dedicated to the number of nights of the stay and on the date of arrival previously inserted (e.g. 14\textsuperscript{th} fixation).

Another issue detected in the input of stay requirements concerns the icon of the calendar available to select the arrival date, marked in red in Figure 40:

![Figure 40: P08, calendar’s icon, Hotel Lugano Dante (Tobii Studio Software).](image)
The image displays the accumulation of fixations of P08 in the moment he/she was required to select the date of arrival. As it is possible to understand from the gaze plot, P08 spent 19 fixations before taking the decision to insert the number of nights in the drop-down dedicated menu. The participant long fixated the window where the current day was displayed (4\textsuperscript{th} of December 2014) but did not select the date of arrival using the calendar, which is available through the selection of the icon. Instead, P08 proceeded further in the process without having selected the check-in date, which suggests that he/she was unable to properly understand the purpose of the available icon.

**Phase 3: Rooms\&rates’ comparison and selection**

Once the “book” button available on the booking widget has been selected, the user is directed to the page where the rooms’ information is exhibited. A screenshot of the page is reported below, in Figure 41:

*Figure 41: Rooms’ information and details’ links (Hotel Lugano Dante 2015).*
As visible, the information related to the rooms is displayed in a clear and ordinate way. More precisely, each type of room has a dedicated space, delimited by a golden box. It is fundamental to mention that, despite the image above exhibits only the first two rooms, the rooms displayed on the page during the user testing sessions were five. More precisely, the following rooms were available for the choice: quality room, comfort room, superior room, executive room and suite.

The boxes where the rooms’ information is displayed occupy a significant portion of the page, and are presented with adequate space between them. In particular, for each room the following type of information is directly available: the name, multiple non-enlargeable pictures, and the different rates and offers related to the room. The name of each room appears in bold in the upper left of each box, together with a small icon, which indicates that the rooms are smoke-free. Furthermore, the section of the box containing the name of the room is clearly defined by the use of a different colour (beige). The portion of the box that appears in beige also contains a small red link to the details of the rooms’ characteristics, marked in red in Figure 41. Additionally, this information can be reached through the selection of the rooms’ names displayed in bold. Similarly, the details concerning the rates can only be visualized through the selection of another link, marked in blue in Figure 41.

Figure 42, reported below, shows how the details of the rooms’ characteristics and of the rates are displayed in the case the correct links have been chosen:
As visible from the image, for what concerns the rooms’ characteristics, available information consists of a general description of the room (e.g. dimension of the bed, bathroom) and a list of services (e.g. breakfast, free Wi-Fi), exhibited under the title in bold “complementary services”.

Data gained through observation during the user tests shows that participants faced important difficulties in the comparison and selection of the rooms. In particular, the main issue detected concerns the details of the rooms’ characteristics, which are not directly displayed on the page. In fact, only three participants out of ten (P02, P04, and P06) were able to reach the information related
to the amenities of the rooms without particular problems. Instead, 50% of the participants (P01, P05, P07, P08, and P10) were unable to reach the information for the whole process, and two participants (P03 and P09) could reach it only after different minutes of navigation.

In order to better understand what prevented users from achieving the desired information, the behaviour of participants was further analysed through the replay of the recordings. From the analysis, the inability of participants to notice the red link to rooms’ information displayed on the right top of each box emerged as one of the main causes of the considered behaviour. As an example, the search of P05 on the page is partially reported in the screenshots below (Figure 43, Figure 44, Figure 45 and Figure 46).

![Figure 43: P05, quality room, Hotel Lugano Dante (Tobii Studio Software).](image-url)
Figure 44: P05, comfort room, Hotel Lugano Dante (Tobii Studio Software).

Figure 45: P05, superior room, Hotel Lugano Dante (Tobii Studio Software).

Figure 46: P05, executive room, Hotel Lugano Dante (Tobii Studio Software).
As it is possible to see from the gaze plots exhibited above, P05 ignored the links to the rooms’ details. Instead, the search of P05 appears particularly focused on the pictures of the rooms exhibited in the boxes. It is fundamental to mention that the huge amount of fixations in the areas corresponding to the rooms’ pictures is also due to the possibility to change the pictures displayed, by selecting the different numbers from the dedicated menu. In fact, the replay of the recording of P05 demonstrates that the user repeatedly checked different pictures for each room proposed. From the behaviour of P05 it is also possible to identify another main element of interest: the rates’ information. For instance, the second picture displayed shows that P05 checked the rates’ details of the comfort room, through the selection of the appropriate link.

The last mentioned aspect of P05’s behaviour reveals the presence of a second reason why users faced difficulties in reaching the rooms’ information. In fact, the majority of users checked the details of the rates/offers (marked in blue in Figure 41) to find out more about the rooms’ characteristics, which suggests that participants confounded the two types of information/links. In particular, only three people (P04, P06 and P09) did not confuse the two types of details and directly reached the rooms’ ones. Other two users (P02 and P03) checked the rates’ information before the rooms’ details and four participants (P01, P05, P07 and P10) only checked the rates’ information. Last, one person (P08) did not check in detail neither one nor the other type of information. The behaviour of P02 in this regard is reported in Figure 47, as an example:

Figure 47: P02, link to rooms’ information (Tobii Studio Software).
The image shows the accumulation of fixations of P02 approaching for the first time the page where the rooms’ information is displayed. As it is possible to see, for the quality room, P02 initially checked the details of the first available rate, before realizing the presence of a further link to the room’s details and taking the decision to select it (83rd fixation).

Another problem identified with regard to the choice of the rooms is related to the amount of the information provided. For instance, P02 reported a lack of information for the first room proposed in the list (quality room, fully displayed in Figure 42). On the contrary, P06 considered the information for the last rooms exhibited as too detailed. Figure 48 reported below shows the sequence of fixations of P06 checking the characteristics of the last room displayed (suite):

Figure 48: P06, suite, Hotel Lugano Dante (Tobii Studio Software).
As it is possible to understand from the image, only part of the written information was checked by P06, as many elements included in the lists did not receive any fixations. More precisely, the first two rows of the section, as well as large portions of longest sentences and the majority of the elements listed under the title “complementary services” were ignored. Similarly, the title related to the exclusive personalization services was not noticed by P06, although displayed in bold. Moreover, P02 reported difficulties in understanding the denotation of “complementary services”, underlying a lack of clarity for what concerns the inclusion/exclusion of these services in the prices displayed.

A further issue detected concerns the pictures of the rooms displayed in every box. More precisely, two participants (P04 and P05) faced difficulties in understanding the difference among two of the rooms presented: comfort room and superior room. First of all, as noticed by P04, for the same room two different pictures of the bathroom are displayed, in sequence. This aspect may cause confusion, given the fact that the two types of bathrooms exhibited are noticeably different in terms of dimension, elegance and comfort, as shown in Figure 49 and Figure 50:

![Figure 49: Bathroom 1, comfort room (Hotel Lugano Dante 2015).](image)
Second, from the pictures of the bathrooms it emerges that the comfort room and the superior room may have a very similar type of bathroom, as visible in Figure 51 and Figure 52, which display the gaze plots of P05 checking the images of the two rooms:
However, from the descriptions of the rooms’ characteristics, the bathroom appears to be one of the main elements of differentiation among the two rooms, as the screenshots reported below (Figure 53 and Figure 54) demonstrate, where the sentences describing the bathrooms’ characteristics have been underlined in red:

![Figure 53: Comfort room, description (Hotel Lugano Dante 2015).](image-url)
As visible from the two pictures, the superior room mainly differs from the comfort room because of the quantity of complementary services offered and the characteristics of the bathroom, which has been described as “spacious and very well lighted with a shower or bathtub available”, against a simple “equipped with a shower and a bathtub” (comfort room). However, from the pictures the difference does not properly emerge.

A last flaw detected in the way pictures are displayed is related to the dimension of the images. In fact, although for the majority of the rooms a good number of pictures is available, the images are reduced in size, and the possibility of enlargement is not provided. This problem was mainly noticed in the session of P05, who faced difficulties in understanding the content of the rooms’ pictures.

As visible from the figures previously displayed and as already anticipated, each information box also contains the information related to the rates. In particular, different rates exist for each type of room. For each rate, the following information is provided: name of the rate, details of the rate (through the selection of the appropriate link) and the total price of the stay. Once a user selects the link to the rates’ details, he/she is confronted with the following information: a brief description of the offer, a list of the services included, the prices’ details (e.g. daily rates and additional taxes not included), the details about the available payment methods and the cancellation policy (Figure 42).
For what concerns the rates’ information, only few problems were identified. In particular, four participants (P01, P07, P08 and P09) reported difficulties in understanding the names of the different rates proposed. For instance, P01 stated that he/she could not understand the reason why the “best rate” appeared as more expensive than the rate “the more you stay, the more you save!” A screenshot, showing P01 checking the rates of the first room, is reported below, in Figure 55:

![Figure 55: P01, rates’ names, Hotel Lugano Dante (Tobii Studio Software).](image)

As it is possible to understand from the gaze plot of P01 displayed above, although the user’s search appears ordered and suggests that he/she correctly understood the association among each rate and the corresponding price, it is clear that P01 repeatedly checked the names and the total prices corresponding to the first two rates available for the quality room (“the more you stay, the more you save” and “best rate”).

Given the fact that different participants showed and reported confusion during the acquisition of the information related to the rates (P01, P07, P08 and P09), visual data gained during the sessions was further investigated through the replay of the recordings, in order to find out the presence of additional sources of confusion. Data shows that participants could understand well the association among each rate type and the corresponding total price. In fact, their sequence of fixations is very similar to the one of P01, displayed above. Furthermore, for what concerns the details of the rates, no particular issues were detected. As a consequence, the main hypothesis is that, as signalled by P01, the major source of confusion relied in the names of the rates.
Phase 4: Reservation confirmation

Once clicked on the golden-coloured “reserve” button available for each rate type/room, the user, before confirming the booking, is asked to specify his/her request with regard to the additional services available, on the page reported below, in Figure 56:

![Figure 56: Additional services (Hotel Lugano Dante 2015).](image)

The page offers the users the possibility to include in the reservation some additional services. In particular, two main types of services are available: the possibility to reserve a late checkout (three
options) and the services related to transportation (parking or shuttle bus from the Airport Lugano-Agno). The two types of services are displayed in two different boxes, similarly to the rooms’ information previously presented, and each type of the two categories is labelled under a title (e.g. additional services). For each option, the unit price is shown, and the user has the possibility to select the desired amount of each service from a drop-down menu. Once the visitor selects a service, the total price for each service changes accordingly, as well as the total price of the services, which is displayed on the lower right and on the upper right, next to the buttons “continue”.

As it is possible to see from data gained through the observation and the Think Aloud method, four participants (P02, P04, P06, and P07) appeared to be very confused when approaching the page of the website dedicated to the additional services. The replay of the recordings demonstrates that, in two cases (P04 and P07), the confusion led participants to spend very little time and efforts on the page. The same behaviour can be identified for other participants (P03, P05, and P10), who left it after a brief visit. Instead, P02 and P06 spent more time on the page, checking different possibilities.

One of the main sources of confusion was identified in the presence of the three very similar images (the clocks) in the box of the “additional services”. In particular, this issue was reported by P02, whose gaze plot is exhibited in Figure 57:
As visible from the image, P02 spent 119 fixations on the box containing the additional services related to the late check-out (the last detectable fixation, on the lower right, is the 120th). The search of P02 appears confused and disordered. In fact, it is possible to notice that he/she repeatedly checked all the elements in the box: the description of the services, the prices, and the first two images. Furthermore, few fixations are wasted also outside the box (e.g. fixations 28-29).

From the replay of the recording of P02, another main issue emerged, in relation to the drop-down menus available for the services’ selection. In fact, the presence of three possibilities for the late check-out can be considered misleading, given the fact that the website allows users to add to their selection one type of each of the three options, as Figure 58 demonstrates:
As it is possible to understand from the image, the website does not prevent visitors to wrongly select one type of each late check-out proposed, from the drop-down dedicated menus (marked in red in the figure), thus permitting the selection of mutually-exclusive elements. On the contrary, the total price of the services added is calculated and displayed.

Similarly, users have the possibility to add to their selection, for the same days, both the parking and the shuttle bus from the Airport Lugano-Agno, which can also be considered as mutually-exclusive items. Moreover, the website allows the shuttle bus to be selected for all the days of the stay, and in amounts greater than the quantity of people occupying the selected room, as visible in Figure 59, where the interested drop-down menus have been marked in red:
After having visited the page of the additional services and having selected the button “continue” users are directed to the confirmation page. A screenshot of the page is exhibited in Figure 60:

Figure 59: Transport-related additional services (Hotel Lugano Dante 2015).

Figure 60:
As visible, a summary of the booking is presented in a golden box, where the information is available to be consulted, before proceeding with the reservation’s confirmation. In particular, the summary contains the following elements: period of the stay, number and type of guests, hotel, type of room/rate, number and type of additional services, payment method, cancellation policy, and the price details displayed in bold (room, additional services, taxes and total price). Additionally, at the end of the information list, a golden button for the confirmation of the reservation is available. Overall, participants did not encounter any issue. In fact, all the users could easily check the details of their reservation and locate the button dedicated to the confirmation.

**Overall structure of the booking process**

The process is clearly segmented in five main phases: input of stay requirements, selection of the desired room and rate, optional enhancement of the stay, reservation confirmation, and insertion of
the guest information and payment details. It is important to remind that the last phase of the booking process was not taken into consideration for the present research. Each of the following steps is available in a different page, in the order just presented. In general, no issues were detected for what concerns the structure of the overall booking procedure on the website.

**Conclusions Hotel Lugano Dante**

Results gained through the distribution of questionnaires, aimed at the measurement and evaluation of the overall subjective satisfaction of users with the booking process, show that participants were rather satisfied with the completion of the assigned task on the website of Hotel Lugano Dante. Despite the discrete level of satisfaction expressed by users, the analysis performed reveals the presence of different usability issues, discussed below.

More precisely, the main problems emerged in relation to the **rooms.&rates’ comparison and selection**, where different factors were identified as major obstacles. **First**, information regarding the rooms’ characteristics appeared difficult to be reached, due to two main reasons. The first cause relies in the difficulty of users in locating the link to the rooms’ details. In fact, a great amount of participants was unable to identify the appropriate link for the whole process and, among the ones who were able to locate it, only few users did not face particular problems in reaching the desired information. This aspect of participants’ behaviour suggests that the link did not own the necessary visibility on the page. Furthermore, the presence of another link, named “details”, to access rates’ information, can be considered misleading, as it encouraged users to direct their attention to the details of the rates when searching for rooms’ information. The last mentioned issue represents the second reason why users had troubles with regard to their ability to gain information about the rooms.

The **second problem** identified concerns the rooms’ information displayed. In fact, data gained during the user tests shows that some participants expressed dissatisfaction with the amount of information provided. In particular, the details about the first room displayed (quality room) emerged as poor, while the information presented for the last types of rooms proposed was considered too detailed.
Moreover, in the rooms’ descriptions, the labelling adopted for the categorization of the services included appeared unclear, considering the confusion generated by the word “complementary”.

Further issues detected in the rooms’ selection are due to the pictures exhibited. In fact, despite the significant presence of highly detailed rooms’ pictures, the lack of differentiation among the rooms emerged as a main problem. Similarly, the impossibility to enlarge the pictures displayed undermined the ability of participants to properly understand and differentiate among the rooms proposed.

Taking into consideration the information related to the rates, the only issue detected concerns the rates’ names displayed. More specifically, the labelling adopted for the rates’ did not emerge as appropriate, given the fact that different participants faced confusion in properly understanding the different rates proposed.

The location of the booking widget and the input of stay requirements also involved the presence of few usability flaws, detected during the analysis. First of all, statistics and visual data gathered demonstrated that the booking widget did not represent one of the most eye-catching items of the homepage. Considering also the fact that no issues emerged in relation to the ability of users to effortlessly start the process, once identified the widget, the main reasons behind this appear to rely in its position and low-priority with respect to the other (many) elements of the page. Second, problems arose also for what concerns the specific calendar’s design. In particular, the absence of two calendars for the selection of the travel dates emerged as a cause of resources’ waste. Moreover, the representativeness of the icon dedicated to the calendar of arrival should be questioned, considering the fact that not all the participants were able to recognize its purpose.

Problems were detected also in relation to the possibility provided to users to enhance their stay through the selection of some additional services, before confirming the reservation. First of all, the presence of three very similar images appeared confusing, being one of the main reasons why the majority of users did not spend much time on the page. Furthermore, participants were misled by the drop-down menus dedicated to the choice of the additional services, considering that the website did not prevent users to add to their selection mutually-exclusive features and non-realistic amounts of services.
Last, for what concerns the **reservation confirmation**, no issues were detected. In fact, participants were able to check all the details of the booking summary displayed and easily locate the button dedicated to the booking confirmation, placed at the end of the resume. Similarly, no problems were identified with regard to the **overall structure** of the booking process.
4.3. Usability analysis of the website of Villa Sassa Hotel & Residence

The following section is dedicated to results of the usability analysis performed on the website of Villa Sassa Hotel & Residence. Participants included in the analysis are eight: P01, P02, P03, P05, P06, P07, P09 and P10.

Overall subjective satisfaction

For what concerns the overall subjective satisfaction of participants with the completion of the assigned booking tasks on the website, data gained through the distribution of the questionnaires in the final phase of the user testing sessions is reported in Table 16:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Overall satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P02</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>P03</td>
<td>5</td>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>P05</td>
<td>5</td>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>P06</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>P07</td>
<td>4</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>P09</td>
<td>4</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>P10</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Mean score</td>
<td>4.00</td>
<td>4.125</td>
<td>4.062</td>
</tr>
</tbody>
</table>

Table 16: Overall subjective satisfaction of participants, Villa Sassa Hotel & Residence.

As visible, for first question asked (from 1 to 6, how easy or difficult was it to complete the task? 1=very easy; 6= very difficult), the measured mean score corresponds to 4.00 (pretty difficult). Therefore, it is possible to affirm that participants perceived that they faced major troubles in completing the task on the website. Instead, taking into consideration the second question (from 1 to 6, how satisfying or unsatisfying was it to work on this task? 1=very satisfying; 6=very unsatisfying), the mean score corresponds to 4.12 (pretty unsatisfying), which denotes a rather low level of satisfaction. The overall subjective satisfaction for the task was calculated by averaging each user’s two answers. As visible, the overall mean score corresponds to 4.06.
Phase 1: Location of the booking widget on the homepage

The booking widget on the homepage of the website is positioned in the upper central area and is contained within a blue box which represents, together with other elements, one of the main priority spots on the page. The box additionally includes other essential features, such as the horizontal global navigation and the hotel’s logo. However, the components of the booking widget contained in the box are displayed in white and strongly contrast with the surrounding elements. At the same manner, the blue box adequately contrasts with the background picture. A screenshot of the homepage is reported in Figure 61, where the widget has been marked in red:

![Homepage and booking widget](image)

*Figure 61: Homepage and booking widget (Villa Sassa Hotel & Residence 2015)*

As observed during the user tests, participants were able to locate the booking widget on the homepage of the website very quickly. Statistics calculated in this regard are displayed in *Table 17:*
<table>
<thead>
<tr>
<th>Participant</th>
<th>Time to first fixation (seconds)</th>
<th>Fixations before (count)</th>
<th>Percentage Fixated (%)</th>
<th>Percentage Clicked (%)</th>
<th>Time from first fixation to next mouse click (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>0.04</td>
<td>0.00</td>
<td>100%</td>
<td>100%</td>
<td>5.01</td>
</tr>
<tr>
<td>P02</td>
<td>1.50</td>
<td>7.00</td>
<td>100%</td>
<td>100%</td>
<td>1.47</td>
</tr>
<tr>
<td>P03</td>
<td>1.53</td>
<td>8.00</td>
<td>100%</td>
<td>100%</td>
<td>2.81</td>
</tr>
<tr>
<td>P05</td>
<td>4.60</td>
<td>21.00</td>
<td>100%</td>
<td>100%</td>
<td>5.72</td>
</tr>
<tr>
<td>P06</td>
<td>0.00</td>
<td>0.00</td>
<td>100%</td>
<td>100%</td>
<td>9.78</td>
</tr>
<tr>
<td>P07</td>
<td>0.57</td>
<td>2.00</td>
<td>100%</td>
<td>100%</td>
<td>3.06</td>
</tr>
<tr>
<td>P09</td>
<td>1.86</td>
<td>7.00</td>
<td>100%</td>
<td>100%</td>
<td>2.69</td>
</tr>
<tr>
<td>P10</td>
<td>0.69</td>
<td>2.00</td>
<td>100%</td>
<td>100%</td>
<td>9.87</td>
</tr>
<tr>
<td>Mean</td>
<td>1.35</td>
<td>5.88</td>
<td>100%</td>
<td>100%</td>
<td>5.05</td>
</tr>
</tbody>
</table>

*Table 17: Location of the booking widget on the homepage, Villa Sassa Hotel & Residence.*

As visible from the table, all eight participants fixated the booking widget on the homepage (100%, *percentage fixated*) and all of them clicked on one of the elements that compose it (100%, *percentage clicked*). Numbers also show that, on average, users fixated the widget after only 1.35 seconds from the moment the homepage was displayed (*time to first fixation*) and 5.88 previous fixations (*fixations before*). In this regard, the behaviour of P09, who required seven previous fixations in order to locate the widget, is reported in *Figure 62*, as an example:
As visible from the gaze plot of P09 displayed above, the user spent a very low amount of fixations on other elements of the page, before noticing the widget (8th fixation). More precisely, two previous fixations are detectable on the image located in the central section of the page (fixations 2-3) and on the “news and events” box positioned in the lower right (fixations 4-5). Additionally, one previous fixation (fixation 6) is identifiable on the “special offers” box, in the lower central area of the homepage.

From the numbers displayed in Table 17, P05 confirmed to be the only participant who faced some difficulties in noticing the booking widget on the homepage, if compared to the other users. In fact, data shows that P05 required 21 fixations and 4.60 seconds to see the element. The performance of P05 was further investigated through the replay of the recording, in order to better understand the reasons behind this behaviour. Two gaze plots, which exhibit the accumulation of fixations of P05 in the considered time interval are reported below, in Figure 63 and Figure 64:

*Figure 62: P09, location of the booking widget on the homepage, Villa Sassa Hotel & Residence (Tobii Studio Software).*
Figure 63: P05, location of the booking widget on the homepage 1, Villa Sassa Hotel & Residence (Tobii Studio Software).

Figure 64: P05, location of the booking widget on the homepage 2, Villa Sassa Hotel & Residence (Tobii Studio Software).
As visible from Figure 63, P05 started his/her search from the lower right section of the homepage, where the “news and events” box is located (first fixations detectable). Afterwards, the user quickly looked at the middle-left section of the page, where the slogan “a heaven of well-being” was placed (3rd and 4th fixations), before scanning the horizontal menu and the other elements placed at the top right (e.g. language settings). The first fixation detectable on the booking widget is the 22nd, which is however followed by various post-target fixations, as it is possible to better understand from the second image exhibited (Figure 64).

The gaze plots of P05 displayed above show that the user mainly scanned the elements positioned around the widget before noticing it and, once noticed, he/she checked other areas of the page, before starting the reservation process. For what concerns the post-target fixations, a similar behaviour was observed also for participants who were able to locate the element more quickly. As an instance, the gaze plot of P06 is displayed below, in Figure 65:

![Figure 65: P06, location of the booking widget on the homepage, Villa Sassa Hotel & Residence (Tobii Studio Software).](image)

As visible, although the widget was located very easily by P06 (first fixation), a significant number of post-target fixations is detectable. In particular, after the first fixation, the next one on the target is
the 36th. The behaviour of P06 and P05 in this regard suggests that, once identified the widget, these users were not encouraged to immediately input the stay requirements. This issue also arose from the statistical results relative to the mouse clicks, reported in Table 17. In fact, numbers demonstrate that, on average, participants clicked on the interested element after 5.05 seconds from the first fixation (*time from first fixation to next mouse click*). Looking more closely at fixations displayed in Figure 65, it is possible to notice that P06 only spent the first/first two fixations on the widget, before checking the other elements of the page. In particular, fixations concern the fourth element of the widget displayed, the drop-down menu dedicated to the selection of the amount of occupying adults.

Taking into consideration visual data of P03, who only required 2.82 seconds, from the first fixation, to start the reservation process, it is possible to observe a remarkably different type of performance. The gaze plot of P03 in this regard is reported in Figure 66:

As it is possible to understand, P03, after having fixated the widget for the first time (8th fixation, third element), immediately fixated the drop-down menu dedicated to the selection of the nights’ number (fixation 9-10) and the calendar of arrival (12th fixation), before proceeding.
From the comparison of the gaze plots of P05 and P03, one aspect emerges in relation to the booking widget on the website of Villa Sassa Hotel & Residence. The central upper position of the widget and its segmentation in multiple elements, horizontally distributed, make it easy for users to locate one of its components. However, this aspect of the widget’s design requires users to spend more fixations on its constituents in order to properly understand its purpose and importance.

**Phase 2: Input of stay requirements**

The design of the booking widget located on the top of the homepage allows the selection of four main types of information: the date of arrival, from a dedicated calendar, the total number of nights of the stay, the number of occupying adults and the desired amount of rooms, from the available drop-down menus. A screenshot of the booking widget on the homepage of the website is reported in Figure 67:

![Figure 67: Booking widget on the homepage (Villa Sassa Hotel & Residence 2015).](image)

As it is possible to see from data gained through the observation and the replay of the recordings, two participants (P06 and P09) directly clicked on the “booking” button available, without considering the possibility to first insert the required information corresponding to their stay. These users were directed to another page, where a second option for booking is available. The second option, displayed in Figure 68 reported below, was included in the analysis as well.
As it is possible to understand from the image, users that do not fully profit of the booking widget on the homepage can use the one displayed on the left. This widget offers the possibility to select the dates of the stay from two separated calendars (one for the check-in and one for the check-out), by clicking on the dedicated icons, or to select the number of nights, from a drop-down menu. Additionally, for the selection of the travel dates, other two calendars are available on the right side of the tool.

For what concerns the first booking option (on the homepage), data gained through the observation and the Think Aloud method shows that all the participants had troubles in this phase of the booking process. Analysing better the recordings, two main problems emerge. First, when the user clicks on the icon of the calendar to select the date of arrival, a drop-down menu is available to change the month of stay. However, the widget does not allow this operation in case the booking is operated the last month of the year (December) and the month corresponding to the stay is situated in a different year. In this case, the month of stay can only be changed by first selecting the year of stay. The system does not prevent this issue, as the month of stay appears anyway to be the first option to choose.
from. In particular, this problem was encountered by two participants out of eight (P01 and P03). An example of P03 facing this issue is available in Figure 69:

As it emerges from the gaze plot, P03 spent a high amount of fixations when required to select the month of stay from the drop-down menu. More precisely, P03 spent a total of 28 fixations on the page when facing the above mentioned issue, the vast majority on the calendar of arrival. However, as the gaze plot demonstrates, eight fixations are detectable out of the target (fixations 8-9 and 10-15), which suggests that the participant faced confusion when trying to identify a solution to the problem. The replay of the recording also shows that P03 clicked on the element repeated times, which indicates that he/she did not recognize the logic behind the design choice. Considering the two participants who faced this issue, further statistics calculated are reported in Table 18:
### Table 18: Drop-down menu, mouse click count, Villa Sassa Hotel & Residence.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Mouse Click Count (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>2</td>
</tr>
<tr>
<td>P03</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>

As visible from the table, in this phase, the drop-down menu dedicated to the month of stay collected, in total, eight mouse clicks, divided as follows: P01 clicked on it twice and P03 six times. As understandable, participants selected the element repeated times and none of them immediately realized how to overcome the problem.

A further issue identified in this second phase of the process concerns the fact that four participants (P02, P03, P05 and P10) reported the lack of a departure calendar as a major problem. Looking more closely at visual data of these users in the moment that required them to select the correct number of nights from the drop-down menu, it is possible to notice a high number of wasted fixations, as the example of P10 reported in Figure 70 demonstrates:

![Figure 70: P10, number of nights, drop-down menu, Villa Sassa Hotel & Residence (Tobii Studio Software).](image)

As visible from the image, P10 required 22 fixations to realize the correct amount of nights to select. In fact, the first fixation detectable on the “4” of the menu is the 22\(^{nd}\). The image shows that P10
wasted many fixations on other numbers displayed in the menu (e.g. fixations 3-5 and 8) and on other elements of the page, such as the date of arrival visible in the window on the left. Additionally, few fixations are detectable even outside the page (e.g. the 16th).

For what concerns, instead, the second booking option, adopted by P06 and P09, it is important to mention that the two participants chose different ways to insert the dates of stay. In fact, P06 preferred to use the check-in and check-out calendars provided by the booking widget displayed on the left, while P09 used the calendars available at the right of the booking widget.

From the analysis of visual data of P06, the presence of the calendar displayed on the right emerged as a possible source of confusion. The gaze plot of P06 in this regard is visible in Figure 71:

As it is possible to understand from the image, once identified the booking widget on the left of the page (first fixations detectable), P06 also checked the calendar displayed on the right (fixations 4-7) before directing his/her attention back to the widget and starting the reservation (fixations 8-11). The gaze plot shows that P06 faced a moment of hesitation, which suggests that the presence of two opportunities for the insertion of the travel dates may appear confusing.
Considering the two calendars displayed on the right of the widget, it is important to mention that, in the case of P09 (the only participant who adopted this option for the booking) no confusion was noticed for what concerns the existence of two calendars available to insert the period corresponding to the stay. In fact, the entire period of the trip must be selected in one single calendar, despite the fact that two different calendars are available. However, the visitor is helped through the process by the presence of specific tags, which clarify the consequences of users’ actions. Although tags appear to be a helpful element, the replay of the recording shows that P09 faced few difficulties in using the calendar. In particular, visualizations demonstrate that the website displayed the wrong date of departure under the tag “check-out date”, as it is possible to understand from Figure 72:

![Calendar with incorrect check-out date](image)

*Figure 72: Check-out tag (Villa Sassa Hotel & Residence 2015).*

As visible, although P09 had already selected the period of stay (displayed in yellow in the calendar), a tag, designating the wrong date of departure, appeared. The tag indicated as departure day the 26th of April 2015, despite the fact that the period selected for the stay corresponded to the 8th-12th of April. The element appeared as confusing for P09, who repeatedly checked the dates in the calendar, as visible in Figure 73, which shows the accumulation of fixations of P09 in the moment he/she was faced with the issue:
As it is possible to notice, P09 long fixated the area where the tag and the date of departure suggested by the website (26th of April) were displayed. He/she additionally looked again at the period corresponding to his/her stay (previously selected), other dates of the calendar, and the month corresponding to the stay (22nd fixation). Afterwards, the user checked if the number of nights and the check-out date corresponded to the period selected (fixations 23-27), before proceeding further in the reservation.

**Phase 3: Rooms & rates’ comparison and selection**

Once inserted the stay requirements in one of the two available widgets, the user is directed to the page where he/she has the possibility to compare the different types of rooms and rates and select the desired combination. On the page, the room information is not directly displayed, but a list of the available rooms is obtainable only through the selection of a link. A screenshot of the page is reported in Figure 74, where the link is marked in red:
As visible in the image above exhibited, the priority on the page has been assigned to the list of available rates and packages, displayed on the left, in a blue-white information box. On the contrary, no information about the rooms is directly available.

Once users select the aforementioned link, the page correctly displays the list of the available rooms, as shown in Figure 75:
As it is possible to see from the image, the rooms available for the choice are presented and listed in a box, in which the information concerning each type of room occupies the same portion of space. The space dedicated to each room is visually defined by the use of lines, which segment the box in four major sections. In each section, the following information is provided: a small picture of the room, the name of the room and the average daily rate. Furthermore, the details of the rooms are available through the selection of the orange link “view details”, available for each type of room. Once this link has been selected, the details are displayed on the right, in a separate box. More precisely, information provided includes a brief description of the room and a bullet-point list of the room’s amenities, as Figure 76 demonstrates:
Data gained through the observation and the Think Aloud method shows that the great majority of users had difficulties in this phase of the booking process. More precisely, participants faced problems in locating the section where the available rooms were listed. Looking more closely at data, it is possible to understand that users were challenged by one element in particular: the link to rooms’ information (select your room/ view all), marked in red in Figure 74. Statistics calculated in this regard are reported in Table 19:
<table>
<thead>
<tr>
<th>Participant</th>
<th>Percentage Fixated (%)</th>
<th>Percentage Clicked (%)</th>
<th>Time from first fixation to next mouse click (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>100%</td>
<td>100%</td>
<td>0.49</td>
</tr>
<tr>
<td>P02</td>
<td>100%</td>
<td>100%</td>
<td>1.07</td>
</tr>
<tr>
<td>P03</td>
<td>100%</td>
<td>100%</td>
<td>15.11</td>
</tr>
<tr>
<td>P05</td>
<td>100%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P06</td>
<td>100%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P07</td>
<td>100%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P09</td>
<td>100%</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>P10</td>
<td>100%</td>
<td>100%</td>
<td>24.18</td>
</tr>
<tr>
<td>Mean</td>
<td>100%</td>
<td>50%</td>
<td>10.21</td>
</tr>
</tbody>
</table>

Table 19: Link to the rooms’ list, Villa Sassa Hotel & Residence.

As visible from Table 19, although all the users were able to locate the link (100%, percentage fixated), only 50% of the participants (P01, P02, P03, and P10) clicked on it. This aspect can be explained by the fact that users who did not click on the link (P05, P06, P07, and P09) reached the rooms’ list “by mistake”, through other buttons/links. For instance, P06, P07, and P09 through the golden button “select” displayed next to one of the available rates. Moreover, data gained through the recordings also shows that the great majority of participants required a huge amount of time to locate the link (minutes).

Furthermore, statistics demonstrate that participants required, on average 10.21 seconds to select the link after having noticed it (time form first fixation to next mouse click). In order to better understand what prevented people from selecting the correct link to rooms’ details, visual data of P03 and P10, who required the highest amount of time to click on it, was further analysed. The behaviour of P10 in this regard is reported in Figure 77, in a gaze plot that shows the accumulation of fixations from the moment he/she first noticed the link:
As visible from the image, after having seen the link, P10 fixated the “package” label displayed in the box dedicated to the selection of the rates/packages (4th fixation). He/she consequently looked at the pictures available on the right (fixations 5-6 and 8-9), the rates’ information in the blue box and other elements of the page. Once reached the top of the page, the user checked the elements of the breadcrumb trail, before directing his/her attention back to the rates’ information. In particular, P10 controlled the actual, the previous and the next phases of the process (fixations 16-19).

The behaviour of P10 suggests that he/she did not consider the possibility to click on the link. The fact that the user, after having noticed it, checked the “package” label may also indicate that he/she considered the link as part of the information related to the packages, given the physical proximity of the two elements. Furthermore, a huge amount of fixations is detectable on the rates’ information.

It is important to mention that this last aspect of P10’s behaviour was observed in the majority of participants. In fact, users, given the absence of the desired information (rooms’ information), tended to check the details of the rates, probably expecting to find more information about the rooms.
Similarly to P10, P03, although having noticed the link to the rooms’ list (2\textsuperscript{nd} and 3\textsuperscript{rd} fixations), continued the search of the desired information in another area of the page. In particular, he/she checked the details of the first rate available, as visible in Figure 78, which displays the accumulation of fixations of P03 in the considered time interval:

*Figure 78: P03, rates’ information, Villa Sassa Hotel & Residence (Tobii Studio Software).*

Considering the information related to the rates, as visible from Figure 74 previously displayed, once the user inserts the stay requirements in the booking widget, the page directly displays a list of the available rates and packages, in a blue and white box, named “select a rate or a package”. For each rate/package, the average daily price is reported in bold in the corresponding section, under the label “Avg. daily rate”. Instead, in the upper right of the page, a grey box suggests the possibility to see the total price of the stay and to change the currency in which the amount is reported, from a drop-down menu. Additionally, the details of the rates are accessible through the selection of the orange link “view details”, available for each type of rate. Once the link has been selected, the details are displayed on the right, in a separate box, as it is possible to understand from Figure 79:
Data gained during the user tests shows that participants faced some issues in the comprehension of the information related to the rates. First of all, four participants (P01, P03, P05, and P09) reported difficulties in understanding the rates’ names and the differences among the rates and packages proposed. More precisely, problems emerged in relation to the “best available rate” and the “best restricted rate”. Although P06 is not among the users who explicitly stated the problem, his/her behaviour is representative of the considered issue, as it is visible in Figure 80:
As it is possible to notice from the gaze plot, which displays the accumulation of fixations of P06 checking the rates’ information, the user repeatedly fixated the names of the two available rates and the relative prices, before selecting the orange link to the first rate’s details. This behaviour suggests that also P06 faced difficulties in understanding the names of the two rates proposed.

Furthermore, it is fundamental to mention that, according to what reported by P01, once the link to rates’ details is selected, the information does not appear adequately clear. Figure 81, displayed below shows the details of the “best restricted rate” how exhibited on the page of the website:
As understandable from the image, the rate per day is exhibited on the right, in the form of a calendar. In the calendar, the days in which the rate is applied are underlined in yellow, according to the dates selected for the stay. However, in the specific case, only three days were directly displayed, although a total of four nights had been selected. Despite the fact that the possibility to extend the visualization is suggested by the presence of two arrows, to the sides of the three yellow boxes, this aspect of the calendar’s design emerged as confusing. More precisely, P01 reported that he/she could not understand the reason behind the lack of one day (Sunday 11) in the calendar.

Another problem related to the rates’ information was revealed by P01 and P07, who faced difficulties in understanding if the price displayed concerned the total stay or the single nights. Additionally, one user (P09) reported that he/she was not sure about the meaning of “average daily rate”.

Last, two participants (P03 and P06) mentioned the lack of the total price as a major issue. In fact, once the desired room/rate combination has been selected, the total price is displayed in the box positioned in the upper right, under the label “subtotal” (marked in red in Figure 82, displayed below). The replay of the recordings of P03 and P06 shows that, however, these participants were unable to notice the element, which explains their dissatisfaction in relation to this aspect. For instance, the search of P06 appeared focused on the two boxes where the information related to the rates and the
rooms was exhibited, and no fixations are detectable on the upper area. The gaze plot of P06 in this regard is reported below, in Figure 82:

**Figure 82: P06, subtotal, Villa Sassa Hotel & Residence (Tobii Studio Software).**

The image shows the accumulation of fixations of P06 in the moment he/she took the decision to book the “standard room” (fixations 18-19), after having selected the desired rate and having checked all the details of the available rooms. As it is possible to notice, P06 ignored the box in the upper right, where the subtotal is displayed (marked in red in the figure). In order to better understand the ability of users to locate the subtotal, statistics were calculated. In particular, calculations concern the visits received by the element during the sessions. Results are reported in Table 20:
As it is possible to understand from the table displayed above, only three participants (P02, P09 and P10) were able to notice the subtotal displayed in the upper right (38%, *percentage fixated*). Among these participants, P02 and P09 visited it once, for, respectively, 0.37 and 0.27 seconds, while P10 fixated it four times, for 0.25 seconds, on average (*visit count* and *visit duration*). Numbers show that, not only P03 and P06 were unable to locate the subtotal, but the majority of participants was, which suggests that the element owns a low visibility on the page.

**Phase 4: Reservation confirmation**

In order to confirm the reservation, users are directed to the page exhibited in *Figure 83*:
As visible from the screenshot reported above, the page is segmented in two main sections: the form for personal and payment details on the left, and the booking summary on the right. The section on the right is further subdivided in six main areas, each corresponding to a blue information box. In the first box, the room and rate type chosen are displayed, while in the second, the details related to the stay are reported. Instead, the third, fourth and last box are dedicated to the prices’ information. More precisely, the third box exhibits the room subtotal, the fourth shows the enhancement subtotal and the last box displays the total. It is important to mention that the possibility to enhance the stay through the selection of additional services is provided only to users who have previously selected the “tailor made package” from the list of available rates. In case the mentioned package has been chosen, the user is directed the following page:
As visible, the additional services proposed are orderly listed in orange, together with a brief description. Each type of additional service has a dedicated space reserved in the area where the stay’s enhancements are displayed. As a consequence, the area appears visually segmented in a number of sections corresponding to the amount of available services. Each section, besides containing the name and the description of the service, also includes its price (per person) and a golden button dedicate to its selection. Once the golden “continue” button has been clicked, the user is confronted with the page exhibited in Figure 85:
As it is possible to understand from the image, the website provides the possibility to select the desired amount of services, both for adults and children, from the dedicated menus. Once the desired quantity has been chosen, the subtotal related to the enhancements is displayed on the lower right, in bold. During the user tests conducted, one single participant (P01) had the possibility to enhance his/her stay through the choice of the available additional services. Data gained shows that P01 did not face any issue in the addition of further services to his/her stay.

For what concerns the confirmation page exhibited in Figure 83, data gained through the observation and the Think Aloud method reveals the presence of one main issue. In fact, different participants (P01, P03 and P05) had difficulties in locating the total price, exhibited in the lower right, in the last available box. The investigation performed through the replay of the recordings shows that the attention of users was mainly directed to other elements of the page. In particular, participants tended to check first the room subtotal and the enhancement subtotal, displayed in large black bold text, in the third and fourth information boxes. An example of P01 facing this issue is reported in Figure 86 and Figure 87:
As understandable from the gaze plots above exposed, which partially exhibit the search of P01 on the considered page, the user basically ignored the total price of the stay displayed in the lower right (visible in Figure 87). Instead, as it is possible to better understand from Figure 86, P01 checked in detail the room subtotal and the enhancement subtotal, before confirming his/her reservation.
This aspect of users’ behaviour suggests that the total price of the stay owns less priority on the page, with respect to the other elements displayed in the previous information boxes, such as the subtotals related to the room and the additional services.

**Overall structure of the booking process**

From the moment the user leaves the homepage he/she is helped through the booking process by the existence of a horizontal breadcrumb trail, which functions as a navigation aid and permits the user to understand and keep track of his/her location on the website. A screenshot of the element is reported in *Figure 88*:

![Figure 88: Breadcrumb trail (Villa Sassa Hotel & Residence 2015).](image)

As it is possible to understand from the image, the breadcrumb trail indicates the presence of four main phases to be accomplished in order to complete the booking on the website, named, respectively, “select dates”, “select rooms”, “add enhancements” and “confirm reservation”. The four phases correspond to four distinct pages and the blue colour designates the page in which the user is navigating. Despite the fact that the trail indicates the presence of four main phases, the third phase is available only if certain conditions are satisfied.

In order to better understand the importance of this element for participants, statistics were calculated in this regard and reported in *Table 21*:
As visible from Table 21, seven participants out of eight noticed the breadcrumb trail displayed on the website (88%, percentage fixated). On average, the element received 4.86 fixations from participants (fixation count), who visited it 2.14 times (visit count) for 0.40 seconds (visit duration). Therefore, numbers suggest that the majority of participants checked the element repeatedly and for a short amount of time. Furthermore, statistics show that only one participant (P09) clicked on the trail, despite the fact that the website offers the possibility to navigate by means of this element. The behaviour of P09 in this regard is reported in Figure 89:

<table>
<thead>
<tr>
<th>Participant</th>
<th>Fixation Count (count)</th>
<th>Visit Duration (seconds)</th>
<th>Percentage Fixated (%)</th>
<th>Visit Count (count)</th>
<th>Percentage Clicked (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>5.00</td>
<td>0.09</td>
<td>100%</td>
<td>4.00</td>
<td>0%</td>
</tr>
<tr>
<td>P02</td>
<td>1.00</td>
<td>0.08</td>
<td>100%</td>
<td>1.00</td>
<td>0%</td>
</tr>
<tr>
<td>P03</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>P05</td>
<td>4.00</td>
<td>0.27</td>
<td>100%</td>
<td>3.00</td>
<td>0%</td>
</tr>
<tr>
<td>P06</td>
<td>3.00</td>
<td>0.70</td>
<td>100%</td>
<td>1.00</td>
<td>0%</td>
</tr>
<tr>
<td>P07</td>
<td>2.00</td>
<td>0.28</td>
<td>100%</td>
<td>1.00</td>
<td>0%</td>
</tr>
<tr>
<td>P09</td>
<td>15.00</td>
<td>0.87</td>
<td>100%</td>
<td>4.00</td>
<td>100%</td>
</tr>
<tr>
<td>P10</td>
<td>4.00</td>
<td>0.28</td>
<td>100%</td>
<td>1.00</td>
<td>0%</td>
</tr>
<tr>
<td>Mean</td>
<td>4.86</td>
<td>0.40</td>
<td>88%</td>
<td>2.14</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 21: Use of the breadcrumb trail, Villa Sassa Hotel & Residence.
As it is possible to understand from the image exhibited above, P09 checked all the elements of the breadcrumb trail available at the top of the page dedicated to the reservation confirmation (fixations 1-10). When he/she reached the second section of the trail (“select room”) with the mouse cursor, the name of the page suddenly appeared underlined, and P09 took the decision to go back to the rooms’ selection page, in order to modify his/her request. The image just presented demonstrates that the only way to discover the direct navigational opportunities provided by the breadcrumb is to reach it with the mouse cursor, considering that, otherwise, the names displayed in the trail do not suggest the possibility of selection.

To better understand the reasons behind the importance of the breadcrumb trail and detect possible issues of the overall process, the behaviour of users was further analysed through the replay of the recordings. Results show that the main interesting causes behind the use of the element can be identified in the recordings of P05 and P06. The behaviour of P05 in this regard is reported in Figure 90:
Figure 90: P05, breadcrumb trail, Villa Sassa Hotel & Residence (Tobii Studio Software).

The image shows the accumulation of fixations of P05 faced with the search of the information related to the rooms. As visible, after having checked the rates’ information repeatedly, P05 controlled the phases displayed in the breadcrumb trail before and after the actual one (fixations 31-34). Subsequently, P05 chose the first rate proposed, through the selection of the golden button available. The behaviour of P05 suggests that he/she used the breadcrumb trail in order to better understand his/her location in the website, when challenged by the difficulty in finding rooms’ information. The same performance was observed in the recording of P06, who, similarly to P05, fixated the actual and subsequent phases of the breadcrumb trail when faced with the lack of information related to the rooms. The gaze plot of P06 in this regard is displayed in Figure 91:
The behaviour observed in P05 and P06 suggests that participants, challenged by the absence of the desired information, questioned the segmentation of the booking process. In fact, the main hypothesis in relation to the performance observed is that users expected the information related to the rooms to be displayed on the actual page, and consulted the breadcrumb in order to obtain a confirmation of the way in which the procedure was subdivided.

**Conclusions Villa Sassa Hotel & Residence**

Results gained through the distribution of questionnaires, aimed at the measurement and evaluation of the overall subjective satisfaction of users with the task completion, show that participants were rather unsatisfied. Moreover, the analysis performed on the website reveals the existence of various usability issues, discussed below.
In particular, the majority of problems was identified with regard to the phase of the booking process related to the **comparison and selection of rooms and rates**. In fact, the analysis shows the presence of one major issue, related to the difficulty of users to reach the list of available rooms. In fact, this information is not directly displayed on the page, but is only available through the choice of a specific link (or after having selected the type of rate, through the appropriate button). Despite the fact that all the participants were able to notice the link on the page, users did not click it, or required a huge amount of time to select it. Moreover, participants also needed different minutes of navigation in order to identify it. These aspects of users’ behaviour suggest that the purpose of the link is difficult to be recognized. The reasons behind this issue may rely in its position on the page and with respect to the other elements available or in the fact that the link does not appear to be clickable, but also in the confusing presence of the rates’ information.

The acquisition of information related to the **rates** also revealed the presence of different flaws. **First**, the names used for the rates emerged to be inappropriate, given the troubles faced by participants in understanding the difference among the rates proposed in the list. **Second**, the design of the calendar displaying the rates’ details has proven not to be intuitive. **Another problem** identified concerns the comprehension of the designation “average daily rate”, used to label the price displayed next to each rate type. **Last**, a major issue detected is related to the difficulty faced by participants in understanding and locating the subtotal of their stay, placed in the upper right of the page, which suggests that the element is barely noticeable, probably due to its position.

For what concerns the **first phase of the booking process**, results suggest that, despite the position of the widget makes its components easily noticeable, its horizontal and dispersive design may cause visitors to initially ignore its purpose and importance. Furthermore, the **input of stay requirements** did not appear free of defects. More precisely, for the first type of booking widget available, the segmentation of the arrival’s calendar in two separated drop-down menus, one for the month and one for the year of travel, emerged as a main problem. **Additionally**, the absence of two calendars for the selection of the travel dates was detected as an important issue, taking into consideration the amount of resources that participants wasted in the process of calculating the nights to select from the dedicated drop-down menu. For the **second booking option**, instead, the presence of two
different opportunities for the selection of the travel dates emerged as a possible element of confusion, as well as the incorrect display of the tags in the calendar.

Problems were detected also for what concerns the reservation confirmation (fourth phase). More precisely, one major issue emerged from the analysis, in relation to the way the information was displayed in the booking summary. In fact, whereas the “room subtotal” and the “enhancement subtotal” owned a high level of visibility on the page, the total price appeared barely visible, resulting more difficult to be noticed by participants.

Last, considering the overall structure of the booking process, data gained in relation to the breadcrumb trail shows that the vast majority of participants repeatedly fixated it, which suggests that the trail is a useful element. However, one main issue emerged in relation to its design. In fact, the website offers users the possibility to adopt the breadcrumb in order to navigate among the different phases of the process. However, this action is not properly suggested, as the different elements of the breadcrumb do not have the appearance of links. Additionally, the detailed analysis of the trail’s usage revealed the presence of a main problem in relation to the structure of the process. In fact, from the analysis it is possible to deduce that participants faced confusion with regard to the segmentation of the procedure when confronted with the absence of the information related to the rooms.
4.4. Comparison of results

As previously mentioned, the results of the usability analysis conducted on the websites of Hotel Lido Seegarten, Hotel Lugano Dante and Villa Sassa Hotel & Residence have been compared. The aim of the comparison was to identify the relevant factors that influenced the usability of the booking process in the specific case considered for the study, allowing to answer the second research question. In order to facilitate the comparison, results were summarized in Table 22, where, for each phase of the booking process and each website, the main usability issues detected are listed:

<table>
<thead>
<tr>
<th></th>
<th>Hotel Lido Seegarten</th>
<th>Hotel Lugano Dante</th>
<th>Villa Sassa Hotel &amp; Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td><strong>UI#1</strong>: visibility of the booking widget on the homepage.</td>
<td><strong>UI#1</strong>: visibility of the booking widget on the homepage.</td>
<td><strong>UI#1</strong>: purpose/importance of the booking widget difficult to be identified.</td>
</tr>
<tr>
<td></td>
<td><strong>UI#2</strong>: purpose/importance of the booking widget difficult to be identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Input of stay requirements</strong></td>
<td><strong>UI#3</strong>: calendar’s design (separation of month and year of travel in two drop-down menus) in the first booking option.</td>
<td><strong>UI#2</strong>: absence of two calendars for the selection of the travel dates (check-in and check-out).</td>
<td><strong>UI#2</strong>: absence of two calendars for the selection of the travel dates (check-in and check-out, first booking option).</td>
</tr>
<tr>
<td></td>
<td><strong>UI#4</strong>: presence of two calendars for the selection of one specific travel date (second booking option).</td>
<td><strong>UI#3</strong>: low representativeness of the calendar’s icon.</td>
<td><strong>UI#3</strong>: presence of two possibilities for the selection of the travel dates (second booking option).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
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<td></td>
</tr>
<tr>
<td><strong>UI#5</strong>: presence of two possibilities for the selection of the travel dates (second booking option).</td>
<td><strong>UI#4</strong>: incorrect display of the calendar’s tags.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UI#6</strong>: absence of two calendars for the selection of the travel dates (check-in and check-out, first booking option).</td>
<td><strong>UI#5</strong>: calendar’s design (separation of month and year of travel in two drop-down menus) in the first booking option.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Rooms &amp; Rates’ comparison and selection</strong></td>
<td><strong>UI#7</strong>: lack of direct display of rooms’ information.</td>
<td><strong>UI#4</strong>: lack of direct display of rooms’ information.</td>
<td></td>
</tr>
<tr>
<td><strong>UI#8</strong>: low availability of rooms’ pictures (one single picture).</td>
<td><strong>UI#5</strong>: presence of two similar links (details) and confusing presence of rates’ information.</td>
<td><strong>UI#6</strong>: lack of direct display of rooms’ information.</td>
<td></td>
</tr>
<tr>
<td><strong>UI#9</strong>: low availability of rooms’ information.</td>
<td><strong>UI#7</strong>: purpose of the link to rooms’ selection difficult to be recognized.</td>
<td><strong>UI#6</strong>: low availability of rooms’ information (quality room)</td>
<td></td>
</tr>
<tr>
<td><strong>UI#10</strong>: lack of information about the total price.</td>
<td><strong>UI#8</strong>: confusing presence of rates’ information.</td>
<td><strong>UI#9</strong>: unclear labelling adopted for the rates’ names.</td>
<td></td>
</tr>
<tr>
<td><strong>UI#7</strong>: information overload (last rooms displayed)</td>
<td><strong>UI#9</strong>: unclear labelling “complementary services”.</td>
<td><strong>UI#10</strong>: low intuitiveness of the calendar displaying the rates.</td>
<td></td>
</tr>
<tr>
<td><strong>UI#8</strong>: unclear labelling “average daily rate”.</td>
<td><strong>UI#11</strong>: unclear meaning of the labelling “average daily rate”.</td>
<td><strong>UI#12</strong>: total price difficult to be located.</td>
<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
<td>No issues detected.</td>
<td><strong>UI#11</strong>: unclear labelling adopted for the rates’ names.</td>
<td><strong>UI#12</strong>: confounding presence of three very similar images.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>UI#13</strong>: possibility of selection of mutually-exclusive elements and display of unrealistic amount of services to be selected.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Overall structure of the booking process</th>
<th><strong>UI#11</strong>: presence of the misleading button “my reservation”.</th>
<th>No issues detected.</th>
<th><strong>UI#14</strong>: lack of clarity about the possibilities of usage of the breadcrumb trail as a navigational element.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>UI#15</strong>: lack of clarity about the process’ segmentation (absence of rooms’ information under the dedicated page).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 22: Main usability issues detected for the three booking processes analysed.**

For what concerns the **location of the booking widget on the homepage** (first phase of the booking process) the analysis performed reveals that the ability of users to easily locate the widget on the homepage of the website was influenced by two main factors. The first was represented by the **visibility of the element on the homepage**. More precisely, the position and dimension of the booking widget on the page and with respect to the other elements displayed emerged as essential for its distinguishability. In fact, considering the efforts required by users to notice it, the best outcome was obtained for the website of Villa Sassa Hotel & Residence. In this case, the components of the widget were located in the upper central section and appeared as one of the three main priority spots on the page. On the contrary, less importance was attributed to the widget on the homepages of the other
two websites analysed, where it was placed in less priority areas (upper right and lower right) and its visibility was challenged by the presence of other more eye-catching elements.

In the first phase of the process, the **specific design of the widget in the context of the homepage** also played a fundamental role. Results gained for the website of Hotel Lido Seegarten demonstrate that an incomplete and weak design caused users not to allocate the necessary weight to the element. Similarly, a visually dispersive design emerged as an obstacle in this sense. In fact, as the analysis of the website of Villa Sassa Hotel & Residence shows, despite the element was placed in the ideal position to be easily and quickly noticed, users required to scan its different components before correctly understanding its purpose and importance. Accordingly, the option offered on the website of Hotel Lugano Dante, where the design of the widget appeared as more powerful and inviting, emerged to be the best one in this regard.

The **input of the stay requirements** (second phase of the process), instead, emerged to be highly influenced by the **specific design and intuitiveness of the calendar(s) available for the selection of the travel dates**. More precisely, the absence of two calendars, one for the selection of the check-in date, and one for the choice of the departure date, appeared to negatively influence the process, as the analysis performed on all the three websites demonstrates. Indeed, this factor has proven to be a cause of resources’ waste. Similarly, the provision of two drop-down menus to separately select the year of travel and the month of travel was found to negatively influence the procedure in this sense, as shown by the analysis of the websites of Hotel Lido Seegarten and Villa Sassa Hotel & Residence. On the contrary, the much simpler option offered on the website of Hotel Lugano Dante emerged as more efficient.

Another key aspect in relation to the selection of the travel dates concerns the presence of sources of confusion, which led users make various mistakes. This was for instance the case in which multiple calendars were provided for the choice of one single travel date or the entire period of stay, such as on the websites of Hotel Lido Seegarten and Villa Sassa Hotel & Residence. However, the analysis performed on the website of Villa Sassa Hotel & Residence also shows that the use of tags, if correct, positively influenced the usability of the process. Confusion and errors were generated also by the presence of multiple options for the achievement of the same goal, as the examples of the just mentioned websites demonstrate. This was true especially in the case the different options provided
were not synchronized among each other, such as in the case of the two possibilities offered for the selection of the travel dates displayed on the website of Hotel Lido Seegarten.

The calendar itself, however, is not the only element whose intuitiveness has proven to be relevant for the usability of the process. In fact, the analysis performed reveals the importance of the representativeness of the icons used to designate it. In particular, the more conventional icons adopted to designate the calendars on the website of Villa Sassa Hotel & Residence and Hotel Lido Seegarten facilitated the calendar’s selection. In contrast, the non-conventional icon displayed on the website of Hotel Dante emerged as less representative.

In relation to the rooms' comparison and selection (third phase of the process), considering the way rooms’ information was presented on the website, the most relevant factor was recognized regarding its accessibility. Indeed, in all the three cases considered, the lack of the direct display of the rooms’ information was identified as a major threat to the usability of the process. Results show that users expected to find a great portion of this information directly displayed on the page, and faced difficulties in identifying a way to reach it in case this condition was not satisfied. Accordingly, offering users an easy access to the considered information, if necessary through the provision of links that are highly visible and easy recognizable, emerged as fundamental. A further barrier to the comparison and selection of the rooms was detected in the confounding presence of the rates’ information, as the analysis performed on the websites of Villa Sassa Hotel & Residence and Hotel Lugano Dante demonstrates.

The amount and quality of rooms’ information provided also played a relevant role in the ability of users to complete the third phase of the process. In fact, as the results of the analysis performed on the websites of Hotel Lugano Dante and Hotel Lido Seegarten show, poor information has proven to be a main obstacle to the choice of the room. Similarly, an excessive amount of information led users ignore a large portion of the information provided, the alternative being the one of spending a disproportionate quantity of resources in its acquisition. The clarity of the rooms’ information also arose as important, from the analysis of the website of Hotel Lugano Dante. In fact, the presence of confounding labels (e.g. complementary services) appeared to be another impediment to the correct acquisition of information. Indeed, short, clear, but detailed bullet-point lists emerged as the best
option, considering that no problems were detected in relation to the description of rooms on the website of Villa Sassa Hotel & Residence.

A further relevant factor with regard to the rooms’ comparison and the selection was identified in relation to the quantity, dimension and quality of the rooms’ pictures displayed. First of all, as the analysis performed on the website of Hotel Lido Seegarten shows, the low availability of pictures was recognized as a main obstacle in this phase of the process. Similarly, a negative influence on the process was due to the lack of the possibility to enlarge the pictures displayed and the low differentiation in the pictures (Hotel Dante). On the contrary, no problems emerged for the website of Villa Sassa Hotel & Residence, where the pictures displayed were multiple, representative, detailed and of appropriate size.

For what concerns the way in which rates’ information was presented, the clarity of rates’ information displayed emerged as a key factor influencing the usability of the process. More precisely, the importance of providing users with the possibility of directly and easily access the information related to the total price appeared fundamental. In fact, results related to the websites of Hotel Lido Seegarten and Villa Sassa Hotel & Residence show that the lack of the information about the total price represented a major threat for the process, considering the amount of resources that users wasted in the search and calculation of the total price of their stay. On the contrary, no issues were detected in relation to this aspect on the website of Hotel Lugano Dante, where this information was easily accessible. Moreover, the importance of adopting an appropriate labelling, in order to represent and differentiate among the various rates available, was also identified as essential, taking into consideration the confusion faced by users in understanding the rates’ names on the websites of Hotel Lugano Dante and Villa Sassa Hotel & Residence.

Considering the reservation confirmation (last phase), the most relevant factor affecting the usability of the booking process can be identified in the prioritization of the information related to the total price in the booking summary. The main problems emerged in relation to the website of Villa Sassa Hotel & Residence, where the way in which the information about the prices was displayed in the booking summary has proven to be inefficient. In fact, the total price displayed in the resume appeared particularly difficult to be located. More precisely, the wrong use of bold and the characters’ dimension penalized the priority of this essential information, whereas the “room
subtotal” and the “enhancement subtotal” appeared more visible on the page. On the contrary, no issues emerged in the other two cases analysed, where the same weight was given to all the prices displayed (Hotel Dante), or the total price was properly highlighted, such as in the website of Hotel Lido Seegarten.

In case the selection of additional services before confirming the reservation was provided to users, the specific design of the drop-down menus available for the selection was identified as a relevant factor influencing the usability of the process. More precisely, results obtained from the analysis of the website of Hotel Lugano Dante emphasized the negative influence caused by the possibility of selecting mutually exclusive elements and amounts of services and the display of unrealistic amount of services.

Last, taking into consideration the overall structure of the booking process, one fundamental factor correlated to the usability of the booking process emerged to be the clarity of the process’ segmentation. More precisely, in the case of Hotel Lido Seegarten, the presence of ambiguous elements, such as a button that did not coincide with the subdivision of the process, was recognized as misleading. Additionally, the importance, for the breadcrumb trail, to adequately represent the way in which the process is structured, was found to be significant. This was the case of the third website analysed (Villa Sassa Hotel & Residence), where in the phase of the process designated as “select rooms”, the information related to the rooms was barely visible. Furthermore, despite the fact that breadcrumb trail has proven to be an important and helpful element for the correct understanding of process, the necessity to guide users in its proper usage was identified to be important, as the analysis performed on the website of Villa Sassa Hotel & Residence demonstrates.
5. Conclusion, limitations and further research

5.1. Conclusion

The aim of the present research was to explore the relevant factors that influence the usability of the booking process on individual hotel websites. For the purpose, a specific case, comprising the websites of three individual four-star hotels located in the city of Lugano (Switzerland) was taken as an example to be investigated in depth. More precisely, the three hotels included in the study were the following: Hotel Lido Seegarten, Hotel Lugano Dante, and Villa Sassa Hotel & Residence. In order to reach the aim of the research, two essential objectives were formulated, corresponding to two main research questions.

For the purpose of the research, the empirical testing method was adopted, to assume a point of view very close to the users’ perspective. User tests were conducted on the booking process of the three websites, with the adoption of a combination of methodologies, in order to answer the first research question (RQ1: which are the main issues that threaten the usability of the booking process on each of the three websites included in the study?). Afterwards, the results obtained for the three websites were compared, to answer the second research question (RQ2: which are the relevant factors that influenced the usability of the booking process in the specific case studied?).

The usability analysis performed on the three websites revealed a discrete number of issues in relation to all the phases of the booking process, as well as to its overall structure. More precisely, for the website of Hotel Lido Seegarten, the majority of problems was identified with regard to the second and third phases, related to the input of stay requirements and the comparison and selection of rooms and rates. Less complications were instead detected in the location of the booking widget on the homepage (first phase) and no flaws were recognized in the reservation confirmation (fourth phase). Last, one main problem emerged for what concerns the overall structure of the process. Taking into consideration the second website analysed, the one of Hotel Lugano Dante, a great amount of issues detected concerns the third phase, whereas few problems arose in the other phases of the booking process, and no flaws were detected in its overall structure. Similarly, considering the
third website analysed, the one of Villa Sassa Hotel & Residence, the majority of issues was detected in the third phase. Multiple problems were also found in the second phase and in the overall structure of the booking procedure. Instead, one main flaw was identified in the first and last phases.

The comparison of the usability issues detected through the analysis performed on the three websites allowed for the identification of the factors that influenced the usability of the booking process. As the results of the comparison demonstrate, overall, the usability of the procedure was influenced in all its phases, likewise in its overall structure. According to what observed during the comparison, ten major factors were recognized as playing a role in influencing the usability of the process in the specific case considered:

1. Visibility of the booking widget on the homepage
2. Design of the widget within the context of the homepage
3. Specific design and intuitiveness of the calendar(s) available for the selection of the travel dates
4. Accessibility of rooms’ information
5. Amount and quality of rooms’ information provided
6. Quantity, dimension and quality of the rooms’ pictures displayed
7. Clarity of the rates’ information displayed
8. Prioritization of the information related to the total price in the booking summary
9. Specific design of the drop-down menus available for the selection of additional services
10. Clarity of the process’ segmentation

Within these ten factors, specific design choices were found to have a negative or positive influence on the usability of the booking process. On the basis of the results obtained, a series of final guidelines can be developed, which allow to draw conclusions in relation to the lessons learned throughout the conduction of the research. The guidelines (reported below) concern the design of the booking process and the aspects that should be implemented or avoided in order to guarantee the good usability of the procedure. Nevertheless, it is fundamental to bear in mind that the strategies formulated mainly apply to the specific case studied and only represent a first step in the definition of major usability principles to be implemented in the design of the booking procedure on individual hotel websites.
1. **Visibility of the booking widget on the homepage:**

✓ In order to make the booking widget one of the first features that users notice on the homepage, the element should be located in the upper central area. On the contrary, the placement of the widget in the upper and lower right sections of the page may negatively influence the ability of users to identify it. Furthermore, it is fundamental to attribute the widget high priority on the page also with respect to the other elements. In this sense, the widget should appear as one of the few main priority spots. In this regard, the dimension of the widget plays a fundamental role.

2. **Design of the widget within the context of the homepage:**

✓ The design of the booking widget within the homepage should appear powerful, complete and non-dispersive. On the contrary, a weak, incomplete and dispersive design may cause users, once noticed the widget, to ignore its purpose and relevance, directing their attention to other areas of the page.

3. **Specific design and intuitiveness of the calendar(s) available for the selection of the travel dates:**

✓ Users should have the opportunity to select the travel dates from two separate calendars. More precisely, one calendar should be available for the selection of the date of arrival, and another calendar for the choice of the departure date. On the contrary, the provision of a drop-down menu displaying the number of nights, as an alternative to the check-out calendar, should be avoided, considering that it may cause users spend unnecessary resources in the process. However, it is important to underline that the two calendars should play two separate functions (check-in and check-out). In fact, the presence of multiple calendars available for the choice of one single travel date may appear confusing and lead to a wrong selection of days.
 ✓ Calendars which display the month and the year of stay in one single option should be provided to users. On the contrary, the segmentation of these two elements, to be selected from two different drop-down menus, may represent a less efficient design choice.

 ✓ In case that one single calendar is available for the selection of the entire period of stay, the provision of specific tags, which suggest users’ actions, could be useful to avoid confusion and errors. However, tags should always be correctly displayed.

 ✓ Conventional icons should be adopted to designate the calendars for the selection of the travel dates. On the contrary, the use of non-conventional icons should be avoided.

 ✓ One single possibility should be offered to users for the selection of the travel dates, in order to avoid confusion. However, in case that multiple possibilities are provided (e.g. both the two calendars and the drop-down menu displaying the number of nights), it is fundamental for the two options to be correctly synchronized.

4. **Accessibility of rooms’ information:**

 ✓ The majority of the information related to the rooms should be directly displayed on the page dedicated to the rooms’ comparison and selection. In fact, the extended search of this type of information may lead users spend an excessive amount of resources in the process. In case that a portion of this information is accessible only through a link, it is essential for the link to be highly visible on the page. Furthermore, the purpose and the referent of the link should be easily identifiable.

 ✓ The information related to the rooms and the information concerning the rates should be properly segmented, if both displayed on one single page, in order to avoid confusion. In case that both types of information are accessible through the provision of links, it is important to properly differentiate the two links by making their purpose appear adequately clear.

5. **Amount and quality of rooms’ information provided:**

 ✓ The specific information provided about the rooms should not appear poor neither excessive. In this regard, long lists (e.g. 24-30 lines) and complicated sentences should be avoided. Similarly,
few words may be not enough to exhaustively describe the rooms. The best option seems to be the provision of short (max 15 items), clear, but complete bullet-point lists, in order to permit users the quick and efficient acquisition of the desired information.

6. **Quantity, dimension and quality of the rooms’ pictures displayed:**

✔ The pictures of the available rooms displayed on the website should be multiple, enlargeable and representative. In fact, the provision of one single picture does not appear to facilitate the rooms’ comparison and selection. More precisely, users may expect to understand the specific characteristics of rooms (e.g. the bathroom and the balcony) from the available pictures. Additionally, small and non-enlargeable pictures may have the same negative effect as the low availability of images.

✔ Images may represent a powerful instrument to anticipate the tourism experience in the hospitality sector, by providing guests with a visual anticipation of the products and services they will consume. However, rooms’ pictures should be adequately used to differentiate among the various types of rooms proposed. Under no circumstances, the same (or very similar) pictures should be used to represent rooms which have been differently described. Similarly, no doubts should arise with regard to the characteristics and amenities of one single room. In this sense, the use of multiple pictures to represent one single room should be avoided, especially if the images suggest the presence of two different levels of the service for the same price/room (e.g. two very different types of bathrooms). In case the same room type may differ in one aspect (e.g. the bathroom), it is essential to explicitly state the issue.

7. **Clarity of the rates’ information displayed:**

✔ Users should be provided with the possibility to understand the total price of their stay before proceeding with the selection of the room. In this regard, the price displayed for each combination should concern the total stay, and not the single nights.

✔ It should be always clear whether the price displayed refers to single nights or to the total stay.
If the total price is provided separately on the page once the desired room and rate combination has been selected, the element should be easily accessible. In this sense, it is essential to assign the total price the necessary visibility on the page.

If rates are displayed in form of a calendar, the days to which rates are applicable should be easily identifiable.

If multiple rates are available, the names of the rates should be clear and representative. Despite the fact that, for hoteliers and professionals in the hospitality industry, commonly adopted names such as “best restricted rate” and “best available rate” appear intuitive, potential guests may face troubles in understanding these terms. As an instance, users may expect the “best available rate” to represent the most convenient option among the ones displayed. Therefore, it could be the case to re-think the conventional names adopted in this regard, considering the point of view of the users instead of focusing on terms which are well-known only from practitioners in the industry. In this sense, more targeted and specific names may have a better effect on the ability of users to correctly differentiate among the existing rates.

8. Prioritization of the information related to the total price in the booking summary:

For what concerns the final booking summary displayed in the confirmation page, in case that different levels of importance are assigned to different pieces of information (e.g. through the position or the dimension of the elements), the essential information related to the total price should be prioritized with respect to other price-related information such as the “room subtotal” or the “enhancements subtotal”. An alternative could be the one of allocating the same weight to all the elements reported, leaving to the users the choice of the priority information.

9. Specific design of the drop-down menus available for the selection of additional services:

In case that drop-down menus are provided for the choice of additional services, the selection of mutually-exclusive elements and non-realistic quantities should be avoided. In particular, the design of the menus should allow the synchronization of the drop-down menus, in order to avoid mutually exclusive elements to be chosen (e.g. three different late-checkouts or the shuttle bus
from the airport for each of the days included in stay). Similarly, the menu should display only realistic amount of services. As an instance, in case the quantity is intended per person, the maximum amount of selectable services should correspond to the one of the room’s occupants previously specified. Obviously, the guideline applies also in the case the amount is intended per room, and not per person.

10. Clarity of the process’ segmentation:

✔ The provision of confusing elements, which may undermine the correct navigation among the different phases of the booking process, should be carefully avoided. This is particularly the case of links and buttons that do not coincide with the segmentation of the procedure. As an instance, the presence of a button that recalls the possibility to check the details of the reservation may be acceptable only in the final phases of the booking process (after the selection has been completed), and only in the case the purpose of the button anticipated by its name corresponds to its real function.

✔ The breadcrumb trail may be a very useful element to help users understand their position throughout the booking process. However, the trail should be representative of the way in which the procedure is segmented. As an instance, it is important to avoid the display of stages in the breadcrumb which are available only under specific conditions. Moreover, it is fundamental that each phase signalled in the breadcrumb trail correctly corresponds to one or more pages which are easily recognizable to be part of the considered phase. For example, if the phase is signalled as “room choice”, the room information should be directly displayed on the page or easily accessible.

✔ If the breadcrumb offers the possibility to directly navigate among the different stages of the process, this action should be properly suggested by its design. For instance, the different elements of the trail should appear clickable.
5.2. Limitations and further research

Although the research questions formulated were successfully and exhaustively answered, and the main purpose of the research was reached, the study includes a series of limitations, described below.

The main limits of the research concern the adoption of the empirical testing method. In fact, during the user tests, participants, being influenced by the presence of the evaluator and the artificial environment of the laboratory, may have adopted a slightly different behaviour compared to the one that they would have assumed in a real-life environment (e.g. at home or in the office). Therefore, it is essential to consider that the validity of data collected may have been affected by this particular aspect of the methodology adopted. Furthermore, the lack of real motivations in the completion of the tasks may also have impacted data in this sense. In fact, when asking participants to simulate an online purchase, it is imperative to take into consideration the lower level of attention paid to the task, if compared with a situation of real purchase.

Another limit detectable in the adoption of the empirical testing method is related to the difficulty of simulating the real navigational patterns of users on the websites included in the research, when developing the user scenarios intended to guide the conduction of the user tests. The necessity to analyse and compare data collected through required the assignment of very specific tasks, proposed to participants in a pre-established order. However, the order and typology of the tasks assigned during usability testing may not always perfectly reflect reality for all the users included in a study. As a matter of fact, in real-life environments, users may adopt different paths in order to accomplish their goals on the websites they navigate.

Considering, in particular, the eye tracking methodology, a main limit is recognizable in the subjectivity to which the analysis of the eye tracking data is exposed. Indeed, although this problem can be partially prevented thorough the implementation of the Think Aloud method and the adoption of a theoretical framework, such as the one developed for the present research, the risk associated with the conduction of a subjective analysis can only be reduced, but not fully avoided.
A further limitation can be identified in the variety of the scenarios tested. In fact, for the present research, one major user scenario was developed, consisting of one user profile and goal and few very specific tasks. However, the presence of multiple scenarios may increase the probability of identifying usability issues. As a consequence, a higher number of problems could have been detected through the assignment of different booking tasks, based on several user scenarios. Similarly, the low variety in the sample of participants included in the study may have played a role in this sense, especially if considering the high level of familiarity with the Internet and the online purchase detectable in the demographics of participants. Indeed, a higher number of usability issues could have been identified by employing participants with different backgrounds.

In relation to the tasks assigned to participants during the user tests, it is also essential to consider that the phase of the procedure related to the input of personal and payment information was excluded from the user scenario developed due to the privacy-related reasons previously mentioned. In this sense, the research could have generated more comprehensive results if the aforementioned stage of the booking process would have been included. As an instance, interesting insights could have been gained for what concerns the usability of the fill-in forms dedicated to the acquisition of these types of data.

Last, it is important to mention that, due to the fact that one specific case, composed of three websites, was taken as an example to be studied, results are not broadly generalizable. However, as previously clarified, the outcome of the present research represents a first step in the comprehensive identification of the factors that influence the usability of the online booking process on individual hotel websites and the consequent formulation of major usability principles related to its design.

In this regard, suggestions for further research concern the investigation of a larger number of individual hotel websites, considering as a starting point the results obtained in the present study. First of all, by analysing a higher quantity of cases, future research would contribute to the broad generalization of the results gained. Second, the inclusion of a broader selection of websites and booking processes would allow the topic to be explored more in depth. As a consequence, more comprehensive results would be obtained in relation to the subject investigated. Similarly, future studies should take into consideration the development and adoption of a wide variety of user
scenarios and booking tasks and the employment of a sample of participants more diverse from the point of view of demographics. Last but not least, in order to reach a more complete understanding of the topic, further research should also comprise the phase of the booking process related to the final check-out and the input of personal and payment details, excluded from the present study.
6. Bibliography


Tobii Studio Software (version 3.2). Available at: http://www.tobii.com/.


7. Annexes

Annex 1: Informed consent form

Please read this consent agreement carefully before agreeing to participate in this experiment.

Purpose of the study: to study the usability of the booking process on individual hotel websites.

What you will do in this experiment: you will be asked to complete a booking task on different hotel websites. Please notice that you are not required to insert your credit card and personal data and proceed with the payment.

Time required: the experiment will take approximately 60 minutes to complete.

Risks: there are no anticipated risks associated with participating in this study.

Confidentiality: your participation in this experiment will remain confidential. Your responses and the list connecting your name with the responses will be kept in a locked file.

Participation and withdrawal: your participation in this experiment is completely voluntary, and you may withdraw from the experiment at any time without penalty by informing the experimenter.

Contact: if you have questions about this study, please contact Federica Aldi: federica.aldi@usi.ch

Agreement: the purpose and nature of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time without incurring any penalty.
Name:
Signature:
Date:
Annex 2: Usability testing entry questionnaire

1. How old are you?
   - 18-25
   - 26-35
   - Over 35

2. What is your gender?
   - Female
   - Male

3. What is your nationality?
   - Enter here:

4. What is the highest level of education you have completed?
   - Bachelor’s degree
   - Master’s degree
   - Doctoral degree
   - Others

5. How often do you use the Internet?
   - Daily
6. Do you purchase online?
   - Yes
   - No

7. If yes, what do you buy online?
   - Enter here: ___________
Annex 3: Results of the usability testing entry questionnaire

<table>
<thead>
<tr>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your age?</td>
<td>What is your gender?</td>
<td>What is your nationality?</td>
</tr>
<tr>
<td>26-35</td>
<td>Male</td>
<td>Swiss</td>
</tr>
<tr>
<td>18-25</td>
<td>Male</td>
<td>Italian</td>
</tr>
<tr>
<td>18-25</td>
<td>Female</td>
<td>Italian</td>
</tr>
<tr>
<td>18-25</td>
<td>Female</td>
<td>Italian</td>
</tr>
<tr>
<td>18-25</td>
<td>Female</td>
<td>Swiss</td>
</tr>
<tr>
<td>18-25</td>
<td>Male</td>
<td>Swiss</td>
</tr>
<tr>
<td>18-25</td>
<td>Female</td>
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</tr>
<tr>
<td>26-35</td>
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<td>18-25</td>
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<td>18-25</td>
<td>Female</td>
<td>Italian</td>
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<td>18-25</td>
<td>Male</td>
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<td>18-25</td>
<td>Female</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Question 4</th>
<th>Question 5</th>
<th>Question 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the highest level of education you have completed?</td>
<td>How often do you use the Internet?</td>
<td>Do you purchase online?</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>Daily</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| Bachelor's degree | Daily | Yes | 10 |
**Question 7**

If yes, what do you buy online?

<table>
<thead>
<tr>
<th>Books</th>
<th>Train Tickets</th>
<th>Airplane Tickets</th>
<th>Hotel Rooms</th>
<th>Clothes</th>
<th>Shoes</th>
<th>Technology</th>
<th>Concert Tickets</th>
<th>Tobacco</th>
</tr>
</thead>
</table>

![Table with counts]

| Train Tickets | Airplane Tickets | Clothes | | | | | |
|---------------|------------------|---------| | | | | |
| 6             | 3                | 6       | | | | | |

![Counts]
Annex 4: General results

Hotel Lido Seegarten

<table>
<thead>
<tr>
<th>P01</th>
<th>Phase of the booking process</th>
<th>Observation/Live Viewer (raw data)</th>
<th>Think Aloud &amp; RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>1. Location of the booking widget on the homepage</em></td>
<td>P01 does not notice the booking widget on homepage.</td>
<td>RTA: The booking widget is really small, it should be bigger, like this it’s not visible. And also the position is bad.</td>
<td>P01 did not notice the booking widget located on the right top of the page. Instead, he/she selected the section dedicated to the rooms from the horizontal top navigational menu. P01 consequently started the booking process from the page selected, where the widget is anyhow displayed in the top right.</td>
</tr>
<tr>
<td></td>
<td><em>2. Input of stay requirements</em></td>
<td>-</td>
<td>TA: I don’t like counting nights RTA: it’s better to have two calendars: one for the check-in and one for the check-out!</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><em>3. Rooms &amp; Rates’ comparison and selection</em></td>
<td>P01 looks unsatisfied</td>
<td>TA: The information about the rooms is poor!</td>
<td>P01 found quickly the details of rooms’ amenities, clicking on the name of the rooms displayed in bold.</td>
</tr>
<tr>
<td></td>
<td><em>4. Reservation confirmation</em></td>
<td>-</td>
<td>-</td>
<td>P01 checked the information available on the page and found the button for the confirmation of the reservation without facing any type of issue.</td>
</tr>
<tr>
<td></td>
<td><em>Overall structure of the booking process</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P02</td>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------</td>
<td>-----------------------------------</td>
<td>---------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>1. Location of the booking widget on the homepage</td>
<td>P02 notices the booking widget on the right top of the homepage relatively quickly.</td>
<td>-</td>
<td>P02 first noticed the horizontal top navigational menu and briefly checked the section dedicated to rooms’ descriptions.</td>
</tr>
<tr>
<td></td>
<td>2. Input of stay requirements</td>
<td>P02 looks confused.</td>
<td>RTA: these two calendars are really confusing.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P02 found quickly the details of rooms’ amenities.</td>
<td>-</td>
<td>P02 found quickly the details of rooms’ amenities, clicking on the “Info” icons positioned at the right lower corner of the rooms’ pictures.</td>
</tr>
<tr>
<td></td>
<td>4. Reservation confirmation</td>
<td>-</td>
<td>-</td>
<td>P02 checked the information available on the page and found the button for the confirmation of the reservation without facing any type of issue.</td>
</tr>
<tr>
<td></td>
<td>Overall structure of the booking process</td>
<td>P02 looks confused</td>
<td>TA: What is this message? I don’t understand, I am confused.</td>
<td>Use of the breadcrumb: P02 used the breadcrumb to understand the purpose of the button “my reservation”, located at the top of the page. Additionally P02 clicked on the button and quickly read the message presented.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P03</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Location of the booking widget on the homepage</td>
<td>P03 notices the booking widget on the right top of the homepage relatively quickly.</td>
<td>-</td>
<td>P03 first checked the description of the hotel, the big image located in the central section of the homepage and the top horizontal navigational menu.</td>
</tr>
<tr>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------</td>
<td>---------------------</td>
<td>-------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Location of the booking widget on the homepage</strong></td>
<td>P05 notices the booking widget on the right top of the homepage quickly.</td>
<td>-</td>
<td>P05 first checked the top horizontal navigational menu and the big image located in the central section of the homepage.</td>
<td></td>
</tr>
<tr>
<td><strong>Input of stay requirements</strong></td>
<td>P05 looks confused.</td>
<td>TA: Why should I select now the nr. of rooms?</td>
<td>- P05 directly clicked on the “booking” button, without inserting first the information required (date of arrival and nr. of nights). - The search of P05 appears confused: he/she repeatedly checked the two calendars available to select the date of arrival.</td>
<td></td>
</tr>
<tr>
<td><strong>Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P05 looks confused</td>
<td>TA: It’s confusing, where is the information I need? TA: Only one picture? I don’t like this, I don’t understand!</td>
<td>P05 did not find a way to see the details related to the rooms’ amenities. He/she continued the process by selecting the “booking” button, saw that the information he/she was looking for was displayed in the next page and thought this was the only way to find out more about the rooms’ amenities. P05, in fact, repeated the process in order to find</td>
<td></td>
</tr>
<tr>
<td>Phase of the booking process</td>
<td>Observations/ Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P06 does not notice the booking widget on the right top of the homepage quickly.</td>
<td>RTA: I did not notice the link to rooms’ details (icon), it’s small.</td>
<td>P06 first checked other elements on the homepage: the top horizontal navigational menu and the big image in the central section of the page.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Input of stay requirements</strong></td>
<td>P06 looks confused.</td>
<td>TA: I already inserted the dates! RTA: It’s a mess, I didn’t see that I selected the wrong date there in the calendar, the calendar is really confusing.</td>
<td>- P06 directly clicked on the “booking” button, without inserting first the information required (date of arrival and nr. of nights). - The search of P06 appears confused: he/she repeatedly checked the two calendars available to select the date of arrival. - P06 selected the wrong month of stay. - P06 changed the nr. of nights displayed in the drop-down menu and selected the wrong nr. of nights.</td>
<td></td>
</tr>
<tr>
<td><strong>3. Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P06 found quickly the details of rooms’ amenities.</td>
<td>-</td>
<td>P06 found quickly the details of rooms’ amenities, clicking on the name of the room displayed in bold.</td>
<td></td>
</tr>
<tr>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P08 does not notice the booking widget on the right top of the homepage quickly.</td>
<td>-</td>
<td>P08 first checked other elements on the homepage: the top horizontal navigational menu, the big image in the center of the page, and the company’s logo, located in the top middle section.</td>
<td></td>
</tr>
</tbody>
</table>
| 2. Input of stay requirements | - The booking widget does not work properly.  
- P08 looks confused. | TA: I don’t want to count the nights!  
TA: Why I did not have the possibility to insert the nr. of people before? | P08 tried to insert the month of his/her stay by clicking on the arrow of the drop down-menu dedicated to months. However, it did not work. P08 spent a high amount of fixations when faced with this issue. |
| 3. Rooms & Rates’ comparison and selection | P08 found quickly the details of rooms’ amenities. | TA: There is only one picture? I cannot understand!  
TA: I don’t want to calculate the total price! | P08 found quickly the details of rooms’ amenities, clicking on the “Info” icons positioned at the right lower corner of the rooms’ pictures. |
<p>| 4. Reservation confirmation | - | - | P08 checked the information available on the page and found the button for the confirmation of the reservation without facing any type of issue. |</p>
<table>
<thead>
<tr>
<th>P09</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall structure of the booking process</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
| 1. Location of the booking widget on the homepage | P09 notices the booking widget on the right top of the homepage quickly. | TA: *Should I choose this one (calendar)?*  
TA: *34 nights? What happened?*  
RTA: *The double calendar is very confusing, it does not make sense!* | P09 saw the booking widget quicker than the majority of participants. However, he/she first checked the top horizontal navigational menu. |
| 2. Input of stay requirements | P09 looks confused. | TA: *I want the total price!*  
TA: *What is average price?* | P09 directly clicked on the “booking” button, without inserting first the information required (date of arrival and nr. of nights).  
- The search of P09 appears confused: he/she repeatedly checked the two calendars available to select the date of arrival.  
- P09, confused by the two calendars, selected the wrong month of departure (May 2015).  
- P09 repeatedly checked the wrong number of nights displayed on the page. |
| 3. Rooms & Rates’ comparison and selection | P09 looks unsatisfied  
P09 cannot find a way to display the details related to rooms’ amenities. | TA: *There is only one picture available, it’s not enough! How is the bathroom? I cannot see! And the balcony?*  
TA: *I want the total price!*  
TA: *What is average price?* | P09 did not find a way to see the details related to the rooms’ amenities and continued the process selecting the “booking” button. |
<table>
<thead>
<tr>
<th>4. Reservation confirmation</th>
<th>-</th>
<th>-</th>
<th>P09 checked the information available on the page and found the button for the confirmation of the reservation without facing any type of issue.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Overall structure of the booking process</th>
<th>-</th>
<th>-</th>
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<table>
<thead>
<tr>
<th>P10</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Location of the booking widget on the homepage</td>
<td>P10 notices the booking widget on the right top of the homepage relatively quickly.</td>
<td>TA: The booking widget is too small!!</td>
<td>P10 first checked other elements on the homepage: the big image in the central section of the homepage, the language settings on the top left section, the top horizontal navigational menu, and the company’s logo. Moreover, from the replay it is possible to notice a high number of post-target fixations.</td>
</tr>
<tr>
<td></td>
<td>2. Input of stay requirements</td>
<td>- The booking widget does not work properly. - P10 looks confused.</td>
<td>-</td>
<td>P10 tried to insert the month of his/her stay by clicking on the arrow of the drop down-menu dedicated to months. However, it did not work.</td>
</tr>
<tr>
<td></td>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P10 found quickly the details of rooms’ amenities.</td>
<td>-</td>
<td>P10 found quickly the details of rooms’ amenities, clicking on the “Info” icons positioned at the right lower corner of the rooms’ pictures.</td>
</tr>
<tr>
<td></td>
<td>4. Reservation confirmation</td>
<td>-</td>
<td>-</td>
<td>P10 checked the information available on the page and found the button for the confirmation of the reservation without facing any type of issue.</td>
</tr>
<tr>
<td></td>
<td>Overall structure of the booking process</td>
<td>-</td>
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</tr>
<tr>
<td>P01</td>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
</tr>
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</tr>
<tr>
<td></td>
<td>1. Location of the booking widget on the homepage</td>
<td>P01 notices the booking widget on the lower right section of homepage relatively quickly.</td>
<td>-</td>
<td>P01 first noticed the horizontal top navigational menu and gave few fixations on the big image located in the central section of the page.</td>
</tr>
<tr>
<td></td>
<td>2. Input of stay requirements</td>
<td>-</td>
<td>TA &amp; RTA: I don’t like counting nights, better to have two calendars!</td>
<td>P01 spent a high number of fixations in the calculation of the number of nights to insert in the drop-down menu.</td>
</tr>
</tbody>
</table>
|     | 3. Rooms & Rates’ comparison and selection | P01 looks confused. | TA: Why is the “best rate” more expensive?  
TA: I don’t understand the rates!  
RTA: I did not see that link to rooms’ characteristics, I checked the other link. | -  
P01 was unable to reach the information of rooms’ amenities for the whole process. Instead, he/she checked the details of the rates/offers.  
P01 repeatedly checked the names and prices of the different rates, especially for the “best available rate” and the rate “the more you stay, the more you save”. |
<p>|     | 4. Reservation confirmation | - | - | - |
|     | Overall structure of the | - | - | - |</p>
<table>
<thead>
<tr>
<th>P02</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Location of the booking widget on the homepage</strong></td>
<td>P02 does not notice the booking widget on the lower right of the homepage quickly.</td>
<td>-</td>
<td>-</td>
<td>P02 first noticed the horizontal top navigational menu, the company’s logo, the big image located in the central section of the page, the grey boxes on the lower left and other small elements.</td>
</tr>
<tr>
<td>2. <strong>Input of stay requirements</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. <strong>Rooms&amp;Rates’ comparison and selection</strong></td>
<td>P02 looks unsatisfied by the low amount of information provided about the rooms’ amenities.</td>
<td>TA: <em>What are complementary services? Are they included in the price?</em> &lt;br&gt; TA: <em>The information about the first rooms is poor! Let’s check another room!</em></td>
<td>-</td>
<td>P02 was able to locate the link to rooms’ details. However, he/she first checked the details of the rates, and only later noticed the presence of a link to reach the information about rooms’ amenities. &lt;br&gt; P02 tried to add some services to his/her stay. The drop-down menus available for the selection of additional services allowed to choose mutually exclusive elements.</td>
</tr>
<tr>
<td>4. <strong>Reservation confirmation</strong></td>
<td>P02 looks very confused.</td>
<td>TA: <em>What is this? (clocks)</em></td>
<td>The search of P02 appears very confused.</td>
<td>-</td>
</tr>
</tbody>
</table>
### Overall structure of the booking process

<table>
<thead>
<tr>
<th>P03</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P03 first noticed the horizontal top navigational menu, the big image located in the central section of the page, and the grey boxes on the lower left.</td>
</tr>
<tr>
<td>1.</td>
<td>Location of the booking widget on the homepage</td>
<td>P03 notices the booking widget on the lower right section of homepage relatively quickly.</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Input of stay requirements</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Rooms &amp; Rates’ comparison and selection</td>
<td>P03 looks confused.</td>
<td>TA: Where is the info about rooms? I can't find it!</td>
<td>P03 was unable to reach the information of rooms’ characteristics for the first minute of navigation. Instead, he/she checked the details of the rates/offers.</td>
</tr>
<tr>
<td>4.</td>
<td>Reservation confirmation</td>
<td>-</td>
<td>-</td>
<td>P03 did not spend much time/efforts in checking the page related to the additional services.</td>
</tr>
<tr>
<td></td>
<td>Overall structure of the booking process</td>
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</tr>
<tr>
<td></td>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
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</tr>
<tr>
<td>P04</td>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P04 notices the booking widget on the lower right section of homepage quickly.</td>
<td>-</td>
<td>P04 first noticed the horizontal top navigational menu, the big image located in the central section of the page, and the company’s logo on the top left.</td>
</tr>
<tr>
<td></td>
<td><strong>2. Input of stay requirements</strong></td>
<td>-</td>
<td>TA: I don’t like counting nights!</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>3. Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P04 looks confused.</td>
<td>TA: The comfort room can have two different bathrooms? One is much better! RTA: Comfort room and superior room look the same!</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>P04 was able to locate the link to rooms’ details relatively quickly. - P04 repeatedly checked the pictures of the rooms.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4. Reservation confirmation</strong></td>
<td>P04 looks very confused.</td>
<td>TA: What is this? I don’t need.</td>
<td>P04 did not spend much time/efforts in checking the page related to the additional services.</td>
</tr>
<tr>
<td></td>
<td><strong>Overall structure of the booking process</strong></td>
<td>-</td>
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</tr>
<tr>
<td>P05</td>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>1.</td>
<td>Location of the booking widget on the homepage</td>
<td>P05 notices the booking widget on the lower right section of homepage relatively quickly.</td>
<td></td>
<td>P05 first noticed the horizontal top navigational menu, the company’s logo on the top left, the slogan, and other small elements on the page.</td>
</tr>
<tr>
<td>2.</td>
<td>Input of stay requirements</td>
<td>P05 is not sure about the number of nights he/she inserted and goes back to the drop-down menu dedicated to the number of nights before clicking on the booking button.</td>
<td>TA: don’t like counting nights!</td>
<td>P05 went back to the drop-down menu dedicated to the number of nights before clicking on the booking button (not sure about the number of nights inserted).</td>
</tr>
</tbody>
</table>
| 3.  | Rooms&Rates’ comparison and selection | P05 looks confused. | TA: Comfort room and superior room look the same!  
TA: The bathroom looks the same!  
TA: It’s confusing, I don’t understand well the differences!  
TA: Pictures are too small and I cannot understand very well.  
RTA: Ah, there is the link! | - P05 was unable to reach the information of rooms’ amenities for the whole process. Instead, he/she checked the details of the rates/offers.  
- The search of P05 was focused on the pictures. |
| 4. Reservation confirmation | - | - | P05 did not spend much time/efforts in checking the page related to the additional services. |

| Overall structure of the booking process | - | - | - |

<table>
<thead>
<tr>
<th>P06</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P06 notices the booking widget on the lower right section of homepage relatively quickly.</td>
<td>-</td>
<td>P06 first noticed the horizontal top navigational menu, the big image located in the central section of the page, the grey boxes in the lower left and other small elements.</td>
<td></td>
</tr>
<tr>
<td>2. Input of stay requirements</td>
<td>-</td>
<td>I don’t want to count the nights!</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P05 looks confused.</td>
<td>TA: Too much information for the last rooms but not what I need! It’s confusing! The list is too long!</td>
<td>P06 was able to reach the information of rooms’ characteristics, clicking on the name of the rooms displayed in bold.</td>
<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
<td>P06 looks very confused.</td>
<td>TA: I don’t understand the additional services here, the page is confusing!</td>
<td>The search of P06 appears confused, he/she looked everywhere on the page.</td>
<td></td>
</tr>
<tr>
<td>Overall structure of the booking process</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>P07</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P07 does not notice the booking widget on the lower right of the homepage quickly.</td>
<td>-</td>
<td>-</td>
<td>P07 spent many fixations on other elements of the homepage: the big image located in the central section, the company's logo and other elements in the upper section.</td>
</tr>
<tr>
<td><strong>2. Input of stay requirements</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>3. Rooms &amp; Rates' comparison and selection</strong></td>
<td>P07 looks confused</td>
<td>TA: I don’t understand well the differences among these rates, it's confusing!</td>
<td>-</td>
<td>P07 was unable to reach the information of rooms' amenities for the whole process. Instead, he/she checked the details of the rates/offers.</td>
</tr>
<tr>
<td><strong>4. Reservation confirmation</strong></td>
<td>P07 looks very confused.</td>
<td>TA: I don’t understand this!</td>
<td>-</td>
<td>P07 did not spend much time/efforts in checking the page related to the additional services.</td>
</tr>
<tr>
<td>Overall structure of the booking process</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>P08</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P08 does not notice the booking widget on the lower right of the homepage quickly.</td>
<td>-</td>
<td>-</td>
<td>- P08 spent many fixations on other elements of the homepage: the big image located in the central section, the company’s logo and on the upper section of the page and, especially, the top horizontal navigational menu. - P08 did not start the booking process from the homepage. In fact, the first detectable click on the booking tool corresponds to the page “rooms”.</td>
</tr>
<tr>
<td><strong>2. Input of stay requirements</strong></td>
<td>P08 does not start the process from the homepage.</td>
<td>-</td>
<td>-</td>
<td>- P08 did not start the process from the homepage, but from the page dedicated to rooms, where the booking widget is anyhow displayed in the same position. - P08 fixated the icon of the calendar repeatedly. However, he/she did not click on it. As a consequence, P08 did not select the date of arrival of his/her stay.</td>
</tr>
</tbody>
</table>
| 3. Rooms\&Rates' comparison and selection | P08 looks very confused. | TA: *How can I choose the room? I have no information!*  
TA: *I don’t understand the rates, I'm confused, I take the less expensive one because I don’t understand!*  
RTA: *oops, I didn’t see these links!* | P08 was unable to reach the information of rooms’ amenities for the whole process. Additionally, P08 did not check, as the other participants, the details of the rates/offers. |
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>4. Reservation confirmation</td>
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<tr>
<td>Overall structure of the booking process</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>P09</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P09 does not notice the booking widget on the homepage of the website.</td>
<td>-</td>
<td>P09 did not notice the booking widget on the homepage of the website. Instead he/she started the booking procedure from another page.</td>
<td></td>
</tr>
<tr>
<td>2. Input of stay</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
### Requirements

| 3. Rooms & Rates’ comparison and selection | P09 looks confused. | TA: All these rates... I don’t understand them!  
RTA: It would be better to reduce the number of rates and just present the most convenient option. But maybe if you check more... | P09 was unable to reach the information of rooms’ amenities for more than two minutes of navigation. Additionally, P09 did not check, as the other participants, the details of the rates/offers. |

| 4. Reservation confirmation | - | - | - |

| Overall structure of the booking process | - | - | - |

### Observations/Live Viewer (Raw Data) vs. Think Aloud and RTA vs. Replay of the Recording (Fixations/Mouse Clicks)

<table>
<thead>
<tr>
<th>P10</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P10 does not notice quickly the booking widget on the lower right section of homepage</td>
<td>-</td>
<td>P10 spent many fixations on other elements of the homepage and outside the browser’s window.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Input of stay requirements</td>
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</tr>
<tr>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P10 looks confused.</td>
<td>-</td>
<td>P10 was unable to reach the information of rooms’ amenities for the whole process. Instead, he/she checked the details of the rates/offers.</td>
<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
<td>-</td>
<td>-</td>
<td>P10 did not spend much time/efforts in checking the page related to the additional services.</td>
<td></td>
</tr>
<tr>
<td>Overall structure of the booking process</td>
<td>-</td>
<td>-</td>
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<td></td>
</tr>
</tbody>
</table>
# Villa Sassa Hotel & Residence

<table>
<thead>
<tr>
<th>P01</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. <strong>Location of the booking widget on the homepage</strong></td>
<td>P01 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P01 noticed the booking widget on the upper central section of homepage very quickly.</td>
</tr>
<tr>
<td></td>
<td>2. <strong>Input of stay requirements</strong></td>
<td>P01 faces some difficulties in using the calendar of arrival.</td>
<td><strong>TA:</strong> <em>I cannot change month of stay!</em></td>
<td>P01 tried to insert the month of his/her stay by clicking on the arrow of the drop down-menu dedicated to months. However, it did not work.</td>
</tr>
<tr>
<td></td>
<td>3. <strong>Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P01 looks confused</td>
<td><strong>TA:</strong> <em>Where are the rooms’ descriptions?</em>  &lt;br&gt; <strong>TA:</strong> <em>What are best restricted rate/ best available rate and tailor made package? I don’t understand them!</em> &lt;br&gt; <strong>TA:</strong> <em>Is the total price per night or per stay?</em> &lt;br&gt; <strong>TA:</strong> <em>Why is the rate only for three days if I selected four?</em></td>
<td>- P01 did not notice the link to rooms’ information quickly  &lt;br&gt; - P01 checked the details of the tailor made package, trying to find the rooms’ information in that section.  &lt;br&gt; - P01 repeatedly checked the box containing the three items “best restricted rate”, “best available rate” and “tailor made package”.</td>
</tr>
<tr>
<td>Overall structure of the booking process</td>
<td>P01 repeatedly checked the “room subtotal” and the “enhancement subtotal” but he/she ignored the total price, displayed below.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 4. Reservation confirmation | - |

<table>
<thead>
<tr>
<th><strong>P02</strong></th>
<th>Phase of the booking process</th>
<th>Observations during the session/ Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P02 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P02 noticed the booking widget on the upper central section of homepage very quickly.</td>
<td></td>
</tr>
<tr>
<td>2. Input of stay requirements</td>
<td>TA: Counting the nights is annoying!</td>
<td>-</td>
<td>P02 did not face particular problems in finding the rooms’ list.</td>
<td></td>
</tr>
<tr>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>-</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
<td>-</td>
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<tr>
<td>Overall structure of the booking process</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>P03</strong></th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P03 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>TA: Oh no! It’s with nights!</td>
<td>P03 noticed the booking widget on the upper central section of homepage very quickly.</td>
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</tr>
<tr>
<td>2. Input of stay requirements</td>
<td>P03 faces some difficulties in using the calendar of arrival.</td>
<td>TA: I don’t see the rooms now!</td>
<td>P03 tried to insert the month of his/her stay by clicking on the arrow of the drop down-menu dedicated to months. However, it did not work. P03 spent a lot of fixations and mouse-clicks on this specific issue.</td>
<td></td>
</tr>
<tr>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P03 looks confused.</td>
<td>TA: What is the best restricted rate? I don’t understand</td>
<td>P03, after having noticed the link, checked many other elements on the page, instead of directly clicking on it. In particular, P03 repeatedly checked the rates’ details. P03 spent a high number of fixations on the list of the rates. P03 was unable to notice the total price displayed on the upper right.</td>
<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
<td></td>
<td>TA: I want the see the total price, not the price per night!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall structure of the booking process</td>
<td></td>
<td>TA: the location of the total price is bad, you don’t notice it. And it’s small! Even more: it’s better to have the total price and not the price per night.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>P03 checked the “room subtotal” and the “enhancement subtotal” but he/she ignored the total price, displayed below.</td>
<td></td>
</tr>
<tr>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
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</tr>
<tr>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P05 notices the booking widget on the upper central section of homepage relatively quickly.</td>
<td>-</td>
<td>P05 noticed the booking widget on the upper central section of homepage relatively quickly. However, P05 started his/her search from the lower right section of the homepage (news and events information box) and subsequently fixated other elements on the page, before locating the widget (e.g. slogan and horizontal menu). Additionally, many post-target fixations are detectable.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Input of stay requirements</strong></td>
<td>I don’t like counting nights!</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>3. Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P05 looks very confused.</td>
<td>TA: <em>I don’t know how to go on! What is this?</em> TA: <em>I don’t understand these rates!</em> RTA: <em>this website is really bad. It’s messy! You don’t see that link to rooms’ details and the rates are difficult to understand. You search for one thing and you find another one.</em></td>
<td>- P05 did not click on the link to rooms’ details for the whole process, but reached the section “by mistake”, clicking on the “select rate of package” link. - P05 repeatedly checked the box containing the three items “best restricted rate”, “best available rate” and “tailor made package”.</td>
<td></td>
</tr>
<tr>
<td><strong>4. Reservation confirmation</strong></td>
<td>-</td>
<td>-</td>
<td>P05 checked the “room subtotal” and the “enhancement subtotal” but he/she ignored the total price, displayed below.</td>
<td></td>
</tr>
<tr>
<td><strong>Overall structure of the booking process</strong></td>
<td>-</td>
<td>-</td>
<td>P05 checked the elements of the breadcrumb trail when faced with the absence of rooms’ information.</td>
<td></td>
</tr>
<tr>
<td>P06</td>
<td>Phase of the booking process</td>
<td>Observations/Live Viewer (raw data)</td>
<td>Think Aloud and RTA</td>
<td>Replay of the recording (fixations/mouse clicks)</td>
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<tr>
<td></td>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P06 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P06 noticed the booking widget on the upper central section of homepage very quickly. However, a significant number of post-target fixations is detectable.</td>
</tr>
<tr>
<td></td>
<td><strong>2. Input of stay requirements</strong></td>
<td>P06 directly clicked on the “booking” button.</td>
<td>-</td>
<td>- P06 directly clicked on the “booking” button, without inserting first the required information. - P06 used the check-in and check-out calendars provided on the booking widget in the left section of the page. - Once identified the booking widget on the left, P06 also checked the calendar displayed on the right, before starting the reservation.</td>
</tr>
<tr>
<td></td>
<td><strong>3. Rooms &amp; Rates’ comparison and selection</strong></td>
<td>P06 looks very confused.</td>
<td><strong>TA:</strong> Where are the rooms’ details? <strong>TA:</strong> I want the total price!</td>
<td>- P06 did not click on the link to rooms’ details for the whole process, but reached the section “by mistake”. - P06 repeatedly fixated the names and prices of the first two rates proposed. - P06 was unable to notice the total price displayed on the upper right.</td>
</tr>
<tr>
<td></td>
<td><strong>4. Reservation confirmation</strong></td>
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<tr>
<th>P07</th>
<th>Phase of the booking process</th>
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<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
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<tbody>
<tr>
<td></td>
<td><strong>1. Location of the booking widget on the homepage</strong></td>
<td>P07 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P07 noticed the booking widget on the upper central section of homepage very quickly.</td>
</tr>
<tr>
<td>2. Input of stay requirements</td>
<td>-</td>
<td>TA: the calendar is a bit difficult to use!</td>
<td>The calendar disappeared for few seconds while P07 was inserting the dates of his/her stay.</td>
<td></td>
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<td>---------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>- P07 looks very confused.</td>
<td>TA: It’s messy! I don’t know what to do! TA: Is it the price per night or stay?</td>
<td>P07 did not click on the link to rooms’ details for the whole process, but reached the section “by mistake”, clicking on the button “select”.</td>
<td></td>
</tr>
<tr>
<td>4. Reservation confirmation</td>
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<th>P09</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
<th>Think Aloud and RTA</th>
<th>Replay of the recording (fixations/mouse clicks)</th>
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<tbody>
<tr>
<td>1. Location of the booking widget on the homepage</td>
<td>P09 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P09 noticed the booking widget on the upper central section of homepage very quickly.</td>
<td></td>
</tr>
<tr>
<td>2. Input of stay requirements</td>
<td>- P09 directly clicks on the “booking” button. - P09 faces some problems with the use of the calendar.</td>
<td>RTA: I had problems with this calendar here, it suggested the wrong things!</td>
<td>- P09 directly clicked on the “booking” button, without inserting first the required information. - P09 used the calendars available on the right of the booking widget to select the period of stay. - P09 long fixated the area where the tag was wrongly displayed. He/she also checked again the period and the month corresponding to the stay.</td>
<td></td>
</tr>
</tbody>
</table>
## 3. Rooms & Rates’ comparison and selection

P09 looks very confused. **TA: What is the meaning of average daily rate?**

- P09 did not click on the link to rooms’ details for the whole process, but reached the section “by mistake”, clicking on the button “select”.
- P09 spent a high number of fixations on the list of rates.

### 4. Reservation confirmation

- - -

### Overall structure of the booking process

- - -

- P09 is the only participant who clicked on the breadcrumb trail.
- P09 checked all the elements of the breadcrumb trail when faced with the absence of rooms’ information.

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<table>
<thead>
<tr>
<th>P10</th>
<th>Phase of the booking process</th>
<th>Observations/Live Viewer (raw data)</th>
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<td></td>
<td>1. Location of the booking widget on the homepage</td>
<td>P10 notices the booking widget on the upper central section of homepage very quickly.</td>
<td>-</td>
<td>P10 noticed the booking widget on the upper central section of homepage very quickly.</td>
</tr>
<tr>
<td></td>
<td>2. Input of stay requirements</td>
<td>-</td>
<td>TA: <em>I don’t like counting the nights!</em></td>
<td>P10 wasted many fixations in realizing the correct number of nights to select.</td>
</tr>
<tr>
<td></td>
<td>3. Rooms &amp; Rates’ comparison and selection</td>
<td>P10 looks confused.</td>
<td>-</td>
<td>P10, after having noticed the link, checked many other elements on the page, instead of directly clicking on it. In particular, P10 fixated the rates’ information and the breadcrumb trail.</td>
</tr>
<tr>
<td></td>
<td>4. Reservation confirmation</td>
<td>-</td>
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