Investigating Website usability and behavioural intention for online hotel reservations: a cognitive perspective

A Thesis Submitted for the Degree of Doctor of Philosophy

By

Drousiotou Vryona

School of Information Systems Computing and Mathematics

Brunel University

London, United Kingdom

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Abstract

The problem area identified for this research is to define the cognitive factors and Customers' Critical Information Requirements (CCIRs) that affect the customer decision making process when they book their hotel reservations online. The purpose of this study is to define the CCIRs and the (re)design specifications of the website which will be noticed by the users through to completing the booking, without losing them during the decision making process.

A combination of various cognitive analysis and eyetracking techniques were applied in order to understand in real time the customer's decision making process during their online hotel booking process. This includes methods that identify user's online previous and present experiences, methods that assess and result in the specification of usability and (re)design guidelines. Techniques for eliciting CCIRs in real time are facilitated through the simultaneous usage of eye tracking technology, think aloud expression and video recording. Finally, a validation study was conducted in order to confirm the research findings.

A key outcome of this research is a novel, robust and precision approach that (i) combines cognitive task analysis, eye tracking techniques, statistical and clustering methods in order to facilitate the precise identification of both explicit and tacit CCIRs; (ii) for the first time provides a time frame analysis of CCIRs across each stage of the customer's decision making process and identifies the concomitant decision points where the customer is most likely to abandon the web site; (iii) elicits the mental model of the customer together with the CCIRs and uses this knowledge as the basis for generating the re-design specification for the website; and, (iv) evaluates whether there is a significant improvement in the usability and cognitive utility of the redesigned website that is of practical value to hotels.

A further theoretical contribution is the "CCIRs informed decision making process model" for the (re)design of hotel websites as a result of applying our novel and innovative approach. Moreover, I have demonstrated for the first time how our approach can be applied to theory building of CCIRs-based cognitive task models that explicitly define the customer's decision making process.

The above mentioned methodology and theoretical outputs of this research are generally applicable to other industry sectors beyond the hotel industry. For example, financial trading decision support systems, air traffic control displays, mobile phone apps, i.e. to name a few from the myriad of possible applications.

Declaration of authenticity

This thesis and the work to which it refers are the results of my own efforts. Any ideas, data, images or text resulting from the work of others (whether published or unpublished) are fully identified as such within the work and attributed to their originator in the text, bibliography or in footnotes. This thesis has not been submitted in whole or in part for any other academic degree or professional qualification. I agree that the Brunel University has the right to submit my work to the plagiarism detection service for originality checks. The University reserves the right to require the submission of an electronic version of your thesis, which will be subject to checks for originality and plagiarism.

31st April, 2014

_____ _____

Signature of candidate Date

Dedication

To my son, Demetris

"When you smile, the world smiles with you"

Acknowledgements

I knew from the beginning that being a PhD candidate is not going to be an easy task; however, there are some very important people in my life that made this easier and more challenging.

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My deepest appreciation goes especially to my beloved husband, father of my son and best friend Elias, who was always there for me encouraging me to continue and finalize this study. My dear parents Kyriacos and Mary and sister, Stalo for their endless love and enthusiasm all these years. Their unconditional support, absolute faith in my ability, and constant encouragement made it possible for me to complete this study.

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Special thanks to my little cousin Fanos and his friend Antonia for all these hours spent at my house redesigning the hotels' webpages for the validity process; without their valuable help I would have never been able to validate my research.

The entire research is dedicated to my precious son, Demetris.

Without all of you, I could not have overcome this challenging task.

Thank you.

Rona

Table of Contents

Chapter 5: Methodological Review

Appendices

List of Tables

List of Figures

1

Introduction

1.1 Background, aim and objectives of the study

The 21st century has been qualified as an "e" generation era. The rapid acceptance of the Internet phenomenon has generated an excitement from all its elements starting from email, e-Commerce, e-Business, e-CRM, e-Shopping, e-Payment, e-Ticketing, e-Learning to e-Government. According to Singh et al (2001) and Cales (2000), the Internet has been widely used in many sales and marketing activities, giving the opportunity to almost anyone to purchase goods and services twenty-four hours a day, seven days a week without worrying about store hours, weekends, time zones or traffic jams (Li and Gery, 2000; Waldo, 2000). However, Cohen (1999), in his research show that *67% of transactions on the Web are never completed*; a CBS News Technology Analyst, Larry Magid, cited in Francie Grace (2006), states that for many people shopping online is still too cumbersome that is the reason why majority of online transactions that are started are actually never completed; consequently, the need to investigate the reasons that online users leave a webpage is fundamental.

Hence it is important to understand this online user population and take full advantage of the Internet and its facilities. It is vital to understand what keeps them on a website and what makes them leave and go somewhere else; what are ***users' information needs*** during their Decision Making Process; the poor usability of the websites is not accepted from users who will simply leave and go elsewhere.

European Union constitutes the 20% of the internet users worldwide; according to statistics taken in 2012, Cyprus population is 1,138,071 while 656,439 is internet users (internetworldstats.com). This represents 57.7% of the population. The trend of Internet

users is increasing every year. In 2000, only the 14.7% of the population were using the internet, whereas 57.7% of the population are using the web in 2012 (Table 1).

Table 1: Internet Usage in Cyprus and Population Statistics

YEAR	Users	Population	% Pop.
2000	120,000	814,200	14.7 %
2004	250,000	950,947	26.3 %
2007	356,600	971,391	36.7 %
2010	433,800	1,102,677	36,7%
2011	553,860	1,120,489	49.4%
2012	656,439	1,138,071	57.7%

Source: internetworldstats.com (2013)

According to Bitner et al. (2000), the benefits of the growth and development of information technology for the tourism industry has been substantial, but there is room for further improvements. The area of online booking was not investigated in the past for the Cypriot tourist and it constitutes an interesting online purchasing sector and worth investigating deeper. It is a very challenging area and undoubtedly important to the development of the hotel industry. It is important that the novel approach applied on Cypriot tourist in order to extract the results is unique and never applied in previous studies. Furthermore, due to the financial crisis on the island since March, 2013, investing in domestic tourism is vital; it is expected that Cypriots will seek less expensive holidays and local hotels are going to be preferable.

According to the Statistical Service of the Republic of Cyprus (mof.gov.cy/mof), "on the basis of the results of the Passengers Survey, 173.062 residents of Cyprus returned from a trip abroad in August 2008 compared to 156.194 in the corresponding month last year recording an increase of 10.8%, 98.348 residents of Cyprus returned from a trip abroad in October 2009 compared to 98.527 in the corresponding month last year recording a decrease of 0.2%, 73.541 residents of Cyprus returned from a trip abroad in November 2010 compared to 72.612 in the corresponding month last year recording an increase of 1.3%, 81.890 residents of Cyprus returned from a trip abroad in December 2011 compared to 89.228 in the corresponding month last year recording a decrease of 8.2%, 82.352 residents of Cyprus returned from a trip abroad in December 2012 compared to 81.890 in the corresponding month last year recording an increase of 0.6%. In 2013 due to the crisis, "on the basis of the results of the Passengers Survey, 75.892

residents of Cyprus returned from a trip abroad in March 2013 compared to 80.700 in the corresponding month last year, recording a decrease of 6%". Conclusionary these statistics show that Cypriots have a propensity to travel a lot and this trend is increasing every year. Additionally, Cypriots tend to travel not only abroad, but they choose to use inland hotels as well.

Hotel organizations have to make sure that they differentiate themselves from other hotel websites and also make sure that the design and structure of their website is covering all customers' critical information requirements so as user to book from its website and return again in the future. Due to huge local and international competition the step between gaining a customer and losing him is very close. The website should offer all this information that a user may seek as keeping him happy will stay on the website and proceed with the booking. Unfortunately, a website has only some seconds to impress the potential buyer (for the purposes of this study booker), satisfy his CCIRs and take the money.

Additionally, online reservation booking is a high involvement service, requiring online users to conduct an extensive information search (part of the customer decision making process) on service quality and benefits before committing to an online booking decision. This makes online reservations one of the top services to promote and sell via the Internet. In the same way the reception is the most important interface at a hotel because it is the first point of contact so is the hotel website.

Cypriot, as a European Union Citizen is travelling more hence the understanding of his booking intention will enable hotels in Cyprus and abroad to target these travelers. Cyprus just entered in this so called 'global era', hence the acceptance of online booking is the most crucial service that the tourism industry should focus. It is important to be added that Cypriots represent many citizens of the new members of the E.U. Therefore the results of the research will be more than a useful tool in order to come to various conclusions for many sectors (i.e. online banking, online ticketing, online purchasing, selling etc) and countries.

1.2 Related research

Previous studies have focused primarily on Web advertising and screen presentation rather than the issues relating to Customers Critical Information Requirements that affect users online decision making and why consumers make a decision to buy products via the internet or to book online (Kargaonkar and Wolin, 1999). These studies were focused on internet user demographics, reasons for shopping online, respondent's preferred products when comes to buying online and online satisfaction or dissatisfaction (Tan, 1999; Fram and Grady, 1995; Henrichs, 1995; Mehta and Sivadas, 1995; Szymanski and Hise, 2000; Ferle, 2000; Phau and Poon, 2000; Teo, 2001;). Many academics and practitioners agree that demographic, social, economic, cultural, cognitive and other personal factors, largely beyond the control and influence of the marketer, have a major effect on consumer behaviour and purchasing decisions (Harrell and Frazier, 1999; Czinkota et al., 2000; Czinkota and Kotabe; 2001; Dibb et al., 2001; Jobber, 2001; Boyd et al., 2002; Solomon and Stuart, 2003). Cowen et al (2002) investigated eye movements in the evaluation of website usability. Their research was based on four websites and they compared performance measures against different eye movement metrics in order to search for usability between the pages. Goldenberg et al (2002), investigated eye tracking in web search tasks, design implications.

Increasing hotel's awareness about CCIRs during the decision making process is fundamental. The web experience comprised of elements like booking, searching, browsing, selecting, comparing and evaluating information and alternatives as well as transacting, communicating and paying online. According to Cho and Park (2001), an online customer is not simply a shopper, but also an information technology user one can argue that the online experience is a more complicated issue than the physical shopping experience. The Web experience can be defined as the consumer's total impression about the online company (Watchfire Whitepaper Series, 2000), this makes this research very interesting and challenging. Recent studies as Bednarik and Kovats (2010) studied furniture purchasing behaviour model. The study describes the behaviour model and characteristics of decision making and the environmental factors affecting the individuals besides emphasizing the family character of furniture purchase. Bing and Lixuan (2009) studied the effects of images and number of options; they found that the inclusion of images that present a positive image of the hotel help to improve the consumers degree of interest. Simola (2011) found that attention was directed more to

the right than to the left, vertical text was read at a slower rate than a standard horizontal text and the mean fixation duration (i.e. eye tracking metric) was longer for vertical formats than in horizontal text. Another researcher who used eye tracking metrics, Elbert (2013) concluded that website elements that contained pictorials attracted more attention as opposed to the textual website elements. Finally, Khachatryon et al (2013) found that consumers gazed longer at higher priced products, meaning they thought about the price longer before reaching a purchase decision.

1.3 Research problem and Objectives

In light of the discussion above, this research synthesises prior literature focusing on Customer Decision Making Process and Online behaviour as well as the cognitive factors behind consumers' willingness to book online their hotel reservations. The purpose of this study is to identify the cognitive factors and Critical Customers Information Requirements that influence Cypriots decision making process when they come to book online their hotel reservations and make their entire decision making process explicit. The research problem addressed in this thesis is to ***identify the cognitive factors and Critical Customers Information Requirements that influence Cypriot's online booking intention and propose website alterations and redesign guidelines***

The specific objectives of this thesis are:

1. Define the Customers Critical Information Requirements (CCIRs) during their online decision making process when using a hotel website.
2. Investigate previous experiences of participants and how these are influenced present decision making process
3. Establish theoretical underpinning and develop an approach for capturing CCIRs during the customer's decision making process.
4. Develop method for specifying website design improvements based on CCIRs and its subsequent assessment
5. Determine the implications of the findings for the hotel sector.

As this research problem has not previously been investigated in Cyprus, the research starts with a literature review of previous studies on related topics in order to establish

the theoretical underpinnings and the novel approach for determining CCIRs, specifying and evaluating website redesign for hotels.

In this research, my first action was to explored the variables leading to customer concerns about online hotel reservations (customers' critical information requirements). Previous good or bad experiences will be taken into consideration as well in order to have a broad picture of the customer's internet experience.

1.4 Why Hotel Reservations?

At present the hotel industry has undergone one of the fastest growth online industries (Kangogo et al, 2013) . A potential user looking to book his/her next vacation excursion or business trip is more likely to do so online. As a result, due to dramatically internet expansion these potential customers are exposed to a huge and easy wealth of information and up to the second pricing information so they can compare and evaluate the best rates and options within a single click.

According to Chung and Law (2003), "hospitality companies still do not have adequate knowledge to build a useful site, and many hotels have placed a lot of information onto their websites but do not include relevant information or arrange the information in an appropriate order" (p. 121). Additionally, same researchers state that outdated information provided by hotels may play a negative role on hotel's image. Websites should satisfy all this information – all customers' critical information requirements so as to reach their goals – booking. Huizingh (2000), states that information provision is the basic goal of a website and this is getting more critical when the website offers products and services.

For the purpose of this research, online hotel reservation booking has intentionally chosen as the target internet service and several reasons justify this selection. Cyprus economy is tourism oriented because of the unique geographic location and island's morphology; Cyprus is an ideal destination for tourists all over the world and the majority of the tourists (both dominant and foreign) use the web for their hotel reservations. The combination of a Cyprus wide range of archaeological attractions and the Mediterranean climate has made the island a highly popular destination among all age groups. Cyprus hotels invest a lot of online reservation systems in order to meet

nowadays clients' expectations and be compatible with the world's technological trends. However the investigation of the factors that influence online intention of Cypriots when they come to book their hotel reservations online is vital. Understanding the factors influencing booking intention will enable the tourism industry to predict customers' needs, overcome potential problems and promote online reservation systems.

1.5 Thesis Structure

The thesis is divided into 9 chapters and it tries to cover as much literature as possible. It focuses on Human Computer Interaction in accordance with the use of eye tracking as a usability evaluation technique.

Chapter 1: Introduction Introduces the background, aims and objectives of the study, clear demonstration of how the research question has been derived from the extant literature, the research problem of the study

Chapters 2, 3 and 4: Literature Review chapters are dedicated to the literature review of the study; it examines existing theory regarding the decision making process, the factors that affect the process, human – computer interaction, web design and usability. All these factors influence to a great extent Customers Critical Information Requirements that drive users' final decisions. Further CCIRs are investigated in thesis research part.

Chapter 5: Literature Review: Methods Used this chapter is a literature review of the methodology used for this thesis. In this chapter is presented from a theory point of view and in full detail what each and every method used for the research is doing and what it reveals. It is provided in a "chronological order", i.e. starting from Critical Decision Method that uncovers past experiences to the methods that are taking place in real time i.e. Applied Cognitive Task Analysis. This chapter identifies the gaps in the methods employed in the literature for eliciting mental models and CCIRs. The entire approach used for the study is presented and analysed following study's targets. Additionally, this chapter informs how the data is conducted and collected in Chapter 6.

Chapter 6: Research Methodology This chapter provides the testing procedure, participants and how the collected data was analysed.

Chapter 7: Analysis of Findings This chapter presents the analysis of the findings of the main study. The chapter starts with the description of the participants and then the findings of each method used. From this chapter the results of the main study were extracted and the entire chapter constitutes the base for the website redesign and the additional validation studies.

Chapter 8: Validation Study This chapter presents the studies conducted in order to validate the results of the original research. Validation study was part of the planned methodology in order to confirm study's findings. Two validation studies were conducted in order to ensure that main study's findings were valid and applicable. First study used same eye tracking process with the re-designed websites this time. The second validation study examined the behaviour of 50 participants seeing each hotel website, answer a set of questions and a week later same participants answer same questions but seeing the re-designed websites this time.

Chapter 9: Conclusions and Contribution Finally, chapter 9 provides the Conclusions and Contribution of the study.

Appendices

2

Literature Review: Decision Making Process

2.1 Introduction

The consumer decision making process is usually represented as a cognitive process (Foxall et al, 1998). According to Bettman et al. (1998), the consumer decision process is constructed by the decision maker himself / herself and by the context of the particular external environments (i.e., information presentation format, time pressure) in which the decisions are made (Bettman et al. 1993; Coupey, 1994). The online decision-making environment has changed the amount, type, and format of information available to consumers (Alba et al., 1997; Bakos, 1997); hence customers take the advantage of more information, convenient purchasing and payment methods. Customers become aware of a need or want after an announcement or advertisement for a new service, product or brand. They call mentally on the information they have at hand to evaluate the service or product proposed and when that proves insufficient, they search for further information (second step of the decision making process) from other websites and friends.

The decision making process may involve logical analysis in situations of certainty or in situations of uncertainty, it may take the form of a cost-benefit analysis. Thus, the type of decision making process may lead to different outcomes and different cognitive operations (Lamar, 2006). According to Gazzaniga et al (2002), "decision making involves a series of cognitive operations that cascade from a judgment about familiarity". In this study, the decision making involves a series of various operations that cascade from CCIRs. Consequently, the understanding of consumer choice needs is

customized in three ways; the level of involvement consumer shows in the decisions he/she makes; the personal interest and the engagement in the process. In the present research, all these three ways will be considered so as to evaluate online users' needs (i.e. the more involved an online user is in the web hotel reservation decision, the more engaged will feel with the outcome of this).

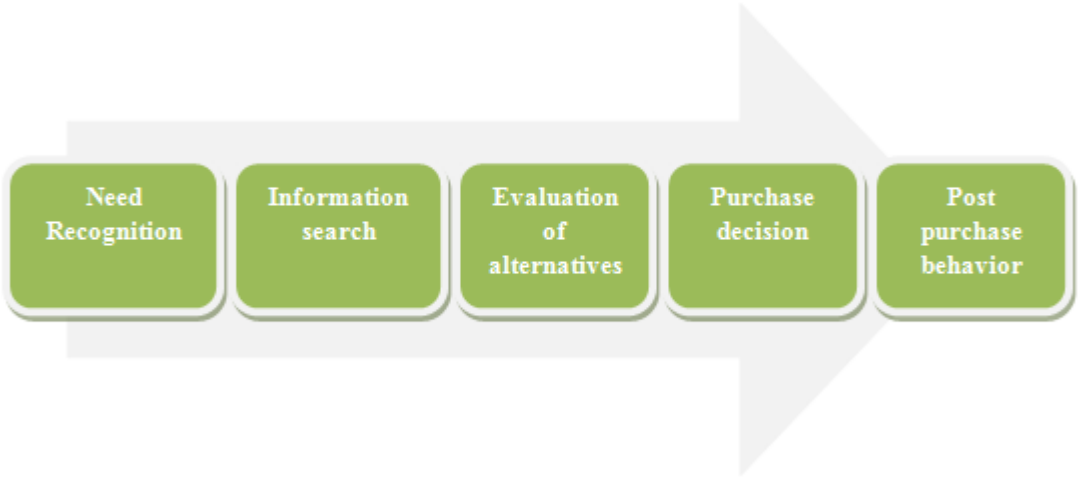
As a result, the purpose of this chapter is to study the decision making process, evaluate the existing theory and examine whether the decision making process stages are applied (or not) when users come to book online. Each and every stage of the decision making process (i.e. information search, evaluation of alternatives, purchasing) extracts various CCIRs.

2.2 Decision making process

Decision making is a process of making a choice from a number of alternatives to achieve a desired result (Eisenfuhr, 2011). When users are online they simultaneously evaluate many different alternatives (i.e. they evaluate different room types, room location, meal and price combinations, facilities and the same time they compare all these in terms of other hotels. This model was first developed by Engel et al (1995), but as that model has not been applied in its full form to the practice of online consumption Brown et al (2007) considered Lamb et al (2000) simplified version of this model (Figure below). Additionally, Shin (2007) proposes that Engel et al (1990) suggested a consumer decision process model called Engel – Blackwell – Miniard Model of Consumer Decision Process Behaviour "EBM model". At this point an overall picture of each step of the decision making process is analysed.

Huang and Christopher (2003), in comparison, focus upon each stage of the consumer decision process and how it is supported, or otherwise, by the design features of online retail stores. They found that most online stores catered well for the 'search for information' and the 'evaluation of the alternative' stages of the consumer decision process. Huang and Christopher recommend that web designers should seek to understand the consumer decision process more thoroughly and design websites accordingly. As mentioned above, during stages, various concurrent and real time actions are applied and website designers should take all these CCIRs that derive from customers' decision making process.

Figure 1: How Consumers Make Decisions for Goods and Services



Source: Developed for the purposes of this thesis (original of Blackwell et al., 2006)

1. *Need recognition* – realization of the difference between a desired situation and the current situation that serves as a trigger for the entire consumption process.
2. *Search for information* - search for data relevant to the purchasing decision, both from internal sources (one's memory) and/or external sources.
3. *Pre-purchase alternative evaluation* - evaluation of available choices that can fulfil the realised need by evaluating benefits they may deliver and reduction of the number of options to the one (or several) preferred.
4. *Purchase* - attainment of the chosen option of product or service.
5. *Post-purchase alternative re-evaluation* - evaluation of whether or not and to what degree the consumption of the alternative produced satisfaction.

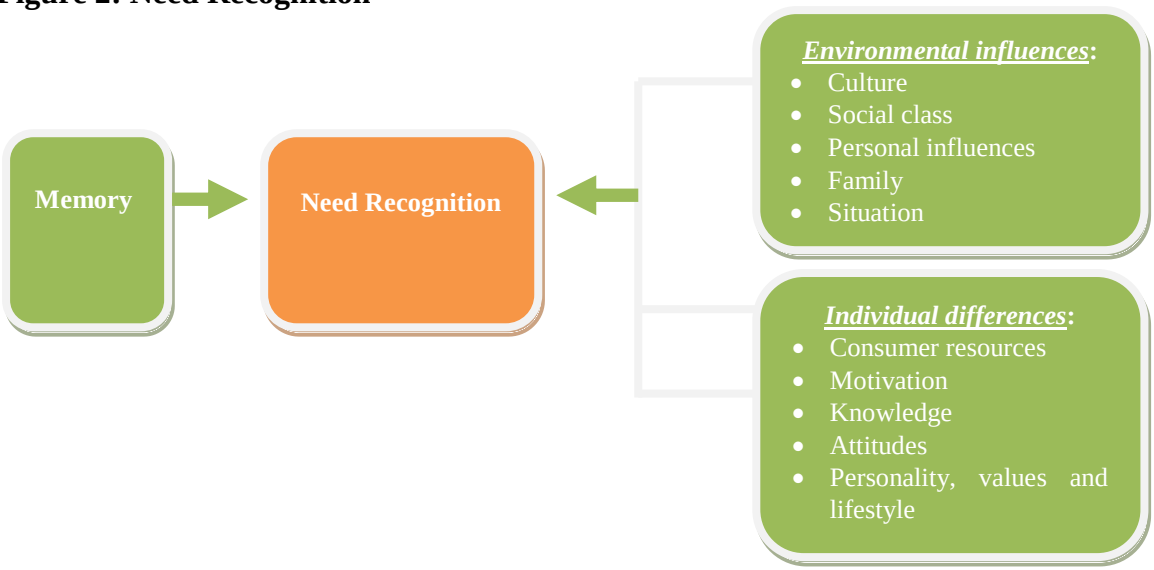
The most important use of the decision making process is to listen the voice of the customer, to get inside their heads and uncover these considerations (Critical customer's information requirements) that will drive and create demand for the hotel sector. The purpose of the chapter is to try to understand customers, to identify and analyse these CCIRs that influence their choices and satisfy them if a company wants to sell a service to a client.

2.2.1 Decision Making Process: Need Recognition

The consumer decision process begins with problem recognition (Douglas et al, 2000). Problem recognition can be information on past experiences stored in memory, basic motives or cues from reference groups. According to Brown et al (2007), problem

recognition, arises from the identification of an unsatisfied want or need. Once the problem is recognized he/she will seek for information from external and internal sources. The process of identifying problems requires surveillance of the internal and external environment for issues that merit attention (Verschaffel, 2011). The Figure 2 shows that some important external factors influence the need recognition of a customer. Majority of these external factors are captured through the methods used in the methods used in order to identify the CCIRs.

Figure 2: Need Recognition



Source: Blackwell et al., (2006)

2.2.2 Sources of Need Recognition

Problem recognition may be caused by various reasons. Some of them can be very simple and some of them very complex. These reasons are influenced by internal and external factors.

- Out of stock: according to Belch and Belch (2003), this is an easy process for the customers. Problem recognition occurs when consumers use their existing supply and must top up their stock. The purchase decision is usually simple and routine and is often resolved by choosing a familiar brand or one to which the consumer feels loyal.
- Dissatisfaction: at this source of problem recognition is created by the consumer's dissatisfaction with the current product or service being used.
- New needs / wants: Changes in consumers' lives, often result in new needs and wants. Belch and Belch (2003), state that not all product purchases are based on the needs. Some products or services sought by consumers are not essential, but are

nonetheless desired. “A want has been defined as a felt need that is shaped by a person’s knowledge, culture, and personality”. (Belch and Belch, 2003),

- Related Products/Purchases: Problem recognition can also be stimulated by the purchase of a product.
- Marketer-Induced Problem Recognition: Another source of problem recognition is marketers’ actions that encourage consumers not to be content with their current state or situation.
- New Products: Problem recognition can also occur when innovative products are introduced and brought to the attention of consumers.

For the purposes of this study, additional sources of need can be identified, derived from hotel booking need:

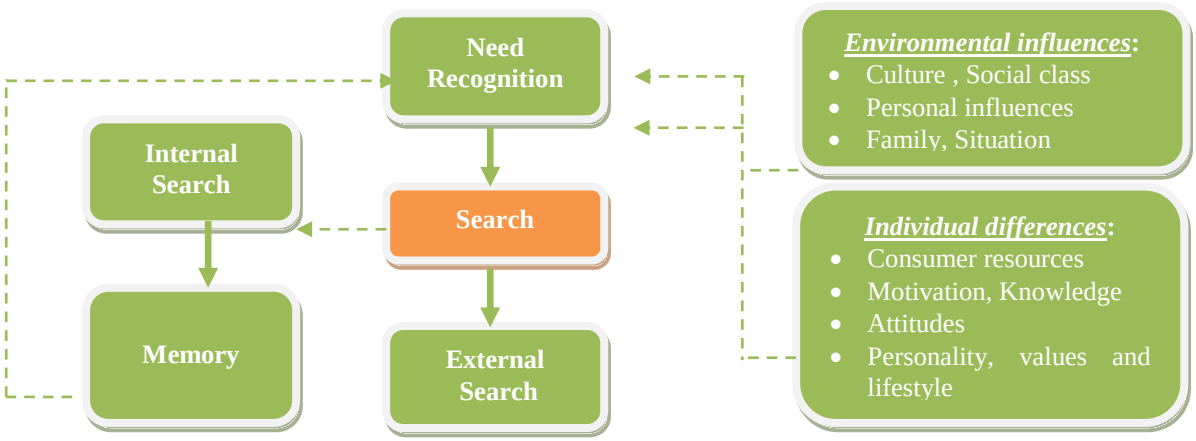
- Need for holidays or business trip, family get together time
- Need for hotel’s facilities. Even if a customer does not seek to book a room to stay he may use the hotel facilities on a regular base (i.e. gym, spa, coffee shop, restaurant etc).
- Wedding cocktail and dinner
- Event organization or seminar

2.2.3 Decision Making Process - Information Search

Engel et al (1990, p: 464), state that the second stage of the consumer decision making process – the search process is defined as “the motivated activation for knowledge stored in memory or acquisition of information from his/her environment”. According to Solomon and Rabolt (2004, p: 357) information search is “the process in which the consumer surveys environment for the appropriate data to make a reasonable decision”. At the Problem / Need Recognition stage, the consumer goes on to Search, which will consist of both an internal search (through memory) and an external search (outside information sources, including recommendations from family and friends). As a result, the information search will begin internally (from memory) and then from the environment – external search in order to have better decisions among alternatives. In an attempt to come to the correct decision, consumers engage in internal and external information search. Engel at al (1990) state that there are two types of information: internal (stored memories of consumer’s experiences and knowledge) and external sources (information acquired from the consumer’s environment and

marketplace).Consumers' pre-purchase information search is an essential part of consumers´ online buying and decision making process (Lauraéus-Niinivaara, 2010). According to Foxall (1998), internal search takes place within the consumer's memory system; this is an effort to locate information in the form of pre-existing knowledge (beliefs and attitudes about the product/service), the likely sources and alternatives. On the other hand, external search can be an active seeking of information from friends, family or colleagues, salespersons or other advertisements, newspapers or magazines. Taking this literature and applying it on study's topic, internal information is examined by Critical Decision Method (more information regarding the method is on methodology chapter) in which the previous experiences are uncovered. External information is analysed by applying a combination of techniques, such as Applied Cognitive Task Analysis, Think Aloud, Usability etc. (more information on methodology chapter).

Figure 3: Search for Information



Source: Blackwell et al., (2006)

Following Figure 3, the outcome of the information search is the development of attitudes, beliefs and positive or negative intentions towards the searched product or service. According to Alba et al (1997), a key difference between online and offline shopping is the ability of online consumers to obtain more information. In the online environment, technology helps consumers find information more easily, thereby reducing the problems of imperfect information (Bakos, 1997; Kulviwat et al, 2004). In order to capture all these elements that actually influence information search process, an interview regarding previous experiences – via Critical Decision Method (CDM) and questions regarding family/friends influence were used. This method will provide

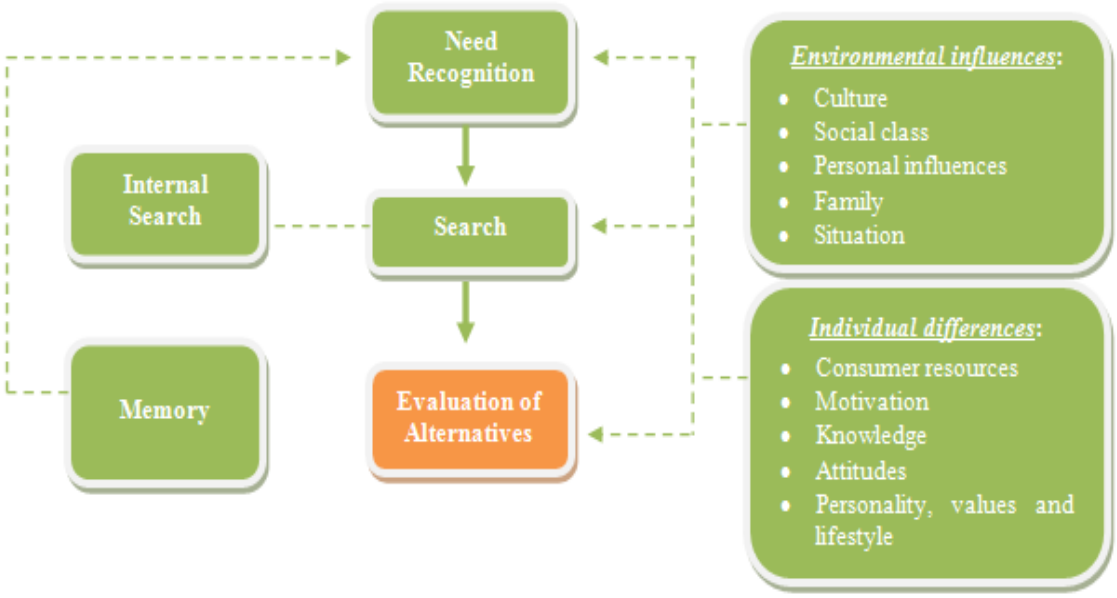
deeper information regarding participants' previous experiences. CDM provides information only regarding the past.

The present study's main target was to identify CCIRs both happened in the past and real time. Search for information is the most critical part of the decision making process. CCIRs influence users to proceed with a hotel booking or leave the website and look somewhere else. The time that a hotel webpage has to satisfy all these CCIRs and gain the booking is limited, consequently all information should be provided in full and placed in striking positions on the screen.

2.2.4 Decision Making Process: Evaluation of Alternatives

Once sufficient information has been collected the consumer will be in the position to evaluate the alternative options. According to Douglas et al (2000), the evaluation phase of the customer decision making process constitutes the most complex and the least understood part of the process. It is difficult to identify the factors that influence the process as it is a complex task to observe what is going on inside the buyer's head. At the first stage of the evaluation process, the consumer will compare the data collected from the information search stage. The outcome of this process is a set of beliefs about the services / brands available for purchase (booking). These beliefs are stored in memory and used for the final purchase decision. The degree of the search for alternatives is influenced by the importance of the decision, the cost and the value of additional information needed to evaluate alternatives, and the number of people affected by the decision (Zopounidis, 2011a, b). The more important the decision, the more attention is directed to developing alternatives (Lunenburg, 2010). Online hotel reservation is a complex, important, expensive in many cases and usually team process (i.e. family holidays). As a result, the degree of the search of alternatives is influenced by many determinants, called for the purposes of this study CCIRs. In order to ensure that all missing information is captured and satisfied with (re)design step, real time online decision making process was applied using eye tracking hardware and software.

Figure 4: Evaluation of Alternatives



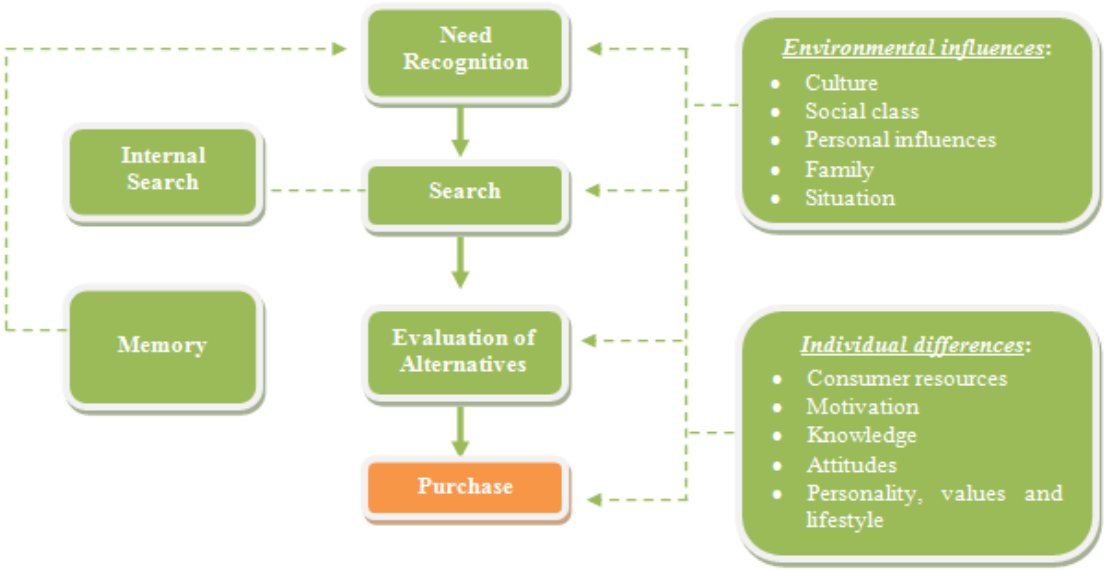
Source: Blackwell et al., (2001)

Figure 4 shows the factors that influence the third stage of the decision making process – evaluation of alternatives. It is important the model is applicable for both online and offline decision processes. At the first stage of the evaluation process, the consumer will compare the data that he / she collect from the information search stage. The outcome of this process is a set of beliefs about the services available for purchase (booking). These beliefs are stored in memory and used for the final purchase decision. At this stage, the hotel webpage is going to take or lose the booking. All these CCIRs will be mobilized and play the final and most determinant role in evaluation processing and booking decision.

2.2.5 Decision Making Process: Purchase Stage

Once an alternative evaluation has been achieved, the consumer will book or leave the webpage. At this stage many major issues must be taken into consideration: (a) whether to buy, (b) when to buy, (c) what to buy, (d) where to buy, (e) how to pay (Engel et al, 1995). This stage constitutes the outcome of CCIRs satisfaction or not. If CCIRs are satisfied, then users will proceed to this stage and book the room, if not, they will leave. For the purposes of this research, I didn't proceed with the investigation of this step; however, I had the intention of the participants from which website they are willing to book, why and how they evaluate it.

Figure 5: Purchase Stage



Source: Blackwell et al., (2001)

2.3 Limitations of customer decision making process

The decision making process is a model that consumer behavior research has relied for more than half a century (Karimi, 2013) and many ways of deciding and behaviours have changed since then. Many studies show that consumer the decision making process is biased. Eisner and Shapiro (1997), state that the behaviour called as bounded is due to limitations in data availability, data gathering and time constraints (hardware problems).Erasmus et al (2001) have criticized the decision making process model at the emphasis given to details and that customers may spend very little time to formulate a decision and do not engage to all these steps. It is very critical that decision making process (and similar models) provide an out-of reality positivistic approach to its development instead of looking what actually drive the users' decision making process (i.e. CCIRs). This model considers the process as logical, standard and predictable approach (Karimi, 2013). However, in real time online process, everything is depending on information provided. Users and their specific (depend on time) needs direct the flow of the process. The usage of heuristics and CCIRs were not part of decision making process model(s). It is very common during the online decision making process, users to go back to previous stages and then again to next stage (i.e. during evaluation of other hotels, go back to other websites to look for more information and then return back again to compare rates and facilities). The online shopper will be in a dilemma if their decision was the correct one; a state between fear and hope. The online shopper will

want to gain further information if the decision / action was correct or in many cases will avoid this as he / she fears the worst (Shani and Zeelenberg, 2007; Shani et al, 2008). After online booking action, online shopper might feel happy, surprised, disappointed etc (Mellers, 2000; Zeelenberg et al, 1998). Bettman et al (1998); Sproule and Archer (2000) state that another important issue that was reglected in the early decision making process models is that consumers do not always have known preferences but "construct" them during the process. This confirms the importance of CCIRs as these will formulate users' decisions whatever service or product is supposed to be purchased.

2.4 Internet – based decision models

Many recent studies discuss the influence of the Internet on the consumer decision making process. According to Karimi (2013), like the majority of researchers in the area, they have developed hypotheses and conceptual models rather than providing sufficient empirical evidence (McGaughey and Mason, 1998; Moon, 2004). Researchers like Lee, (2002); Smith and Rupp, (2003) propose a model that is concentrated on individual characteristics and environmental factors, Chen and Chang, (2003) investigated technical components that affect the decision making process and Darley et al (2010) have adapted the model proposed by Engel, Blackwell and Miniard (1968).

2.4.1 Smith and Rupp's model (2003)

This is an Internet-based model that considers external influences of website marketing efforts and the socio-cultural environment, as well as psychological issues on the online consumer tasks which lead to purchase and postpurchase behavior (Karimi, 2013). According to this model, online decision processes are made up of different interconnected decisions, it is over-simplistic and does not analyse CCIRs and actions taken by users.

2.4.2 Lee's model (2002)

Lee's (2002) model is based on the classification of factors that influence online purchase, rather than on the stages of decision making. According to Lee's model there are three phases of online purchase: building trust and confidence (reliability of the website and company), online purchase experience (purchasing process), and after-purchase (delivery, guarantee, return policy) needs. However, no investigation is made on Customers Critical Information Requirements that influence the entire decision making

process of the users. The model is too general and does not give a "decision making" flow. Additionally, trust constitutes an "old fashion" influential factor of the decision making process. Karimi (2013) states that trust is an issue before the transaction stage, but it will not stop consumers from carrying out purchase activities such as search and comparison.

2.4.3 Darley, Blankson and Luethge's model (2010)

Darley et al model (2010) is a variation of the original model proposed by Engel, Blackwell and Miniard (1968). Darley et al (2010) used the main five stages of this model and added the impact of beliefs, attitudes and intentions in the process. They provide additional influential factors, but again their model is too strict and cannot apply in online decision making process.

2.5 Summary

This chapter gives an insight into the customer decision making process model. It provides details for each decision making process step so as to have a clear picture of all actions taken. It is important that hotel websites satisfy all Customer Critical Information Requirements during the information search process so as when the customer comes to evaluate the alternatives to have a clear picture which hotel offers exactly what he is looking for. All goals should be achieved so as when the customer enters the decision point to continue and book via this website. Additionally, transacting with a customer online, an organization has the opportunity to build a strong relationship for future booking and as a result, repeating and loyal customers who will spread the word to friends and relatives.

Many recent online decision making processes were made, but none of them concentrate its importance on the Customer Critical Information Requirements during each decision making stage. Previous models adapt the contextual factors for the Internet context while using the sequential models of traditional purchase. Karimi (2013), states that the rigid structure of these general models is another limitation that should be addressed. A decision making process model should be adaptable and more flexible to different situations. Solomon (2002) states that generalization of the process is not applicable where consumers change their strategy based on the product, service, situation, context and previous experiences. Additionally, all these models are not concerned with the actual information needs of users. At the end of the day, these information pieces will influence

the entire process and post-purchase behaviour (that is the start point of next decision making process). Online purchase is more complicated than searching for a product to satisfy your needs. The online environment is a huge place of information and the time a website has to keep the customer is limited. Online decision making process cannot be standardised, as a user can go back from one stage to another many times before the final formulation of decision.

3

Literature Review: Cognition and Factors Affecting Decision Making

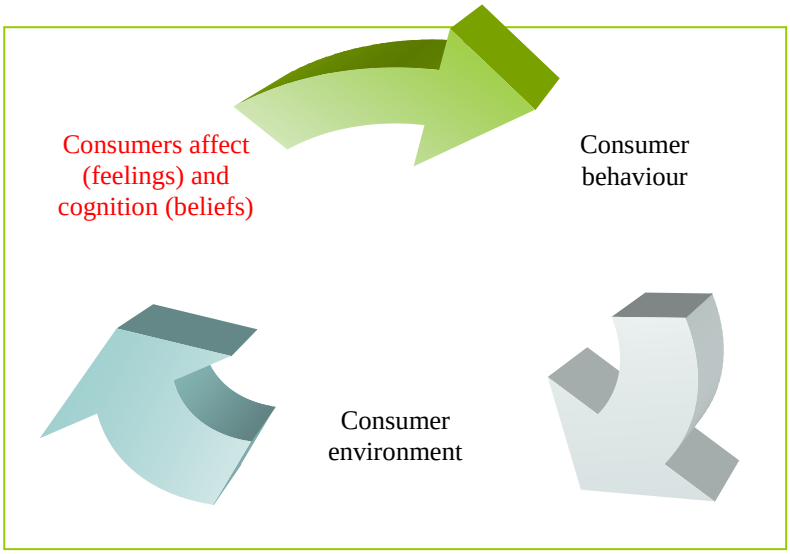
3.1 Introduction

Cognitive system constitutes a major influence on the customer's decision making process. Product / Service knowledge is retrieved from memory for use in interpreting and finally deciding if the user is going to buy or not the product / service. It is important that this service / product knowledge in customer's memories can be activated in various ways. According to Peter et al (1999), the most common way is by exposure to objects or events in the environment. Many other factors play a vital role here: customers' internal, affective states may activate this knowledge.

3.2 Affect and Cognition

Peter et al (1999) distinguishes three elements of consumer analysis: the affect and cognition, the consumer behaviour and the consumer environment. According to the authors, affect refers to customers' feelings where cognition refers to consumers' beliefs. Affect (Figure 6) includes emotions like love or anger, like or dislike, satisfaction or dissatisfaction. On the other hand, cognition refers to the mental processes involved in thinking, understanding and interpreting stimuli and events – when people are exposed to information. This part includes the knowledge and beliefs that consumers have developed from their experience and stored in their memories (Peter et al, 1999). Additionally, past events and experiences are included in the cognition part, affecting the decision making process of a customer; key points are these customers critical information cues and what they have in their minds during the decision making process.

Figure 6: Three Elements of Consumer Analysis



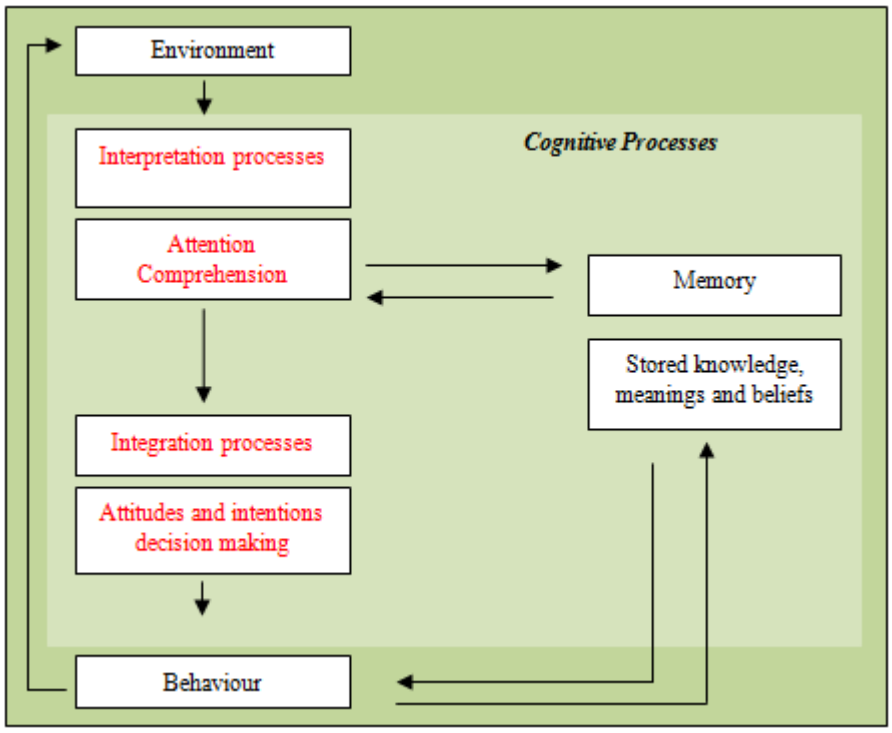
Source: Peter et al (1999)

3.3 Cognition and Decision Making Process

Consumer decision making process involves three major cognitive processes: [1] Online users may interpret information concerning the hotel online booking from their environment in order to create personal meanings and knowledge [2] Online users must combine this knowledge in order to evaluate among other online services and select among alternative behaviours [3] Online users have to retrieve product / service knowledge from memory to use in integration and interpretation processes (Peter et al, 1999).

According to Figure 7, the online user will follow interpretation processes; according to this, the user will require information and two related cognitive processes will be involved – attention and comprehension (Peter et al, 1999). Attention leads user's information search procedure and evaluates which information is useful and which should be ignored. On the other hand, comprehension is the part where personal knowledge and beliefs are created. In brief, attention leads the Critical Customers Information Requirements, as a result their search behaviour so as to book online.

Figure 7: Cognitive Process in Consumer Decision Making



Source: Peter et al (1999)

According to Figure 7 above, users must understand information in the environment around them in order to create new knowledge, meanings and beliefs. User interpretation processes involve two cognitive processes; a. interpretation processes that involve two related cognitive processes: attention and comprehension and b. integration processes that concern how users combine different types of knowledge. It is important that service / product knowledge, meanings and beliefs in memory influence interpretation and integration processes. Stored knowledge, meanings and beliefs on a later stage they activated from memory and used in integration processes. Integration processes involve how users combine different types of knowledge in order to form overall evaluations and to make choices among alternatives. As a result the perspective for the online user before he / she proceeds with an online reservation, will be influenced by his/her previous experiences, this knowledge stored in the memory will play a vital role in the entire decision making process. Consumers' knowledge is stored in memory and influences the cognitive processes involved in the decision making process. Consumers create general knowledge about product categories, information provided (i.e. from hotel websites), other people (he is my best friend and if he was happy with the hotel's website service I will book my holidays from there too) and even themselves (i.e. I can't find the information I am looking for, I will leave the website).

3.4 Online shopping experience

Online shopping experience is found to correlate positively with consumers' likelihood to purchase online. The more experienced consumers are with online shopping and the more satisfied they are with past online transaction experiences, the higher their purchase amounts and the more likely they are to be repeated purchasers (Devaraj et al. 2002; Moe and Pader 2004; Brown et al. 2003; Pires et al. 2004; Foucault and Scheufele 2002; Koivumi 2001; Park and Jun 2003; Yang and Lester 2004) and the lower likelihood of them aborting an intended online transaction (Cho 2004). This parameter is crucial for the purposes of this research. Critical Decision Method can be conducted to uncover this previous online experience (good / bad). As a result, the more experienced a user is, the more Critical Customer Information Requirements will be uncovered. As referred in Chapter 2, CCIRs drive users' decision, the more of them are identified and satisfied, the less failure of the website's ability to service the information needs of the customers.

3.5 Factors that affect user's willingness to disclose information

Many researchers in the past investigated the complicated issue of customer's decision making process and the factors affecting this knotty – mainly psychology theory. Hoffman et al (1999) and Jarvenpaa et al (2000) mentioned that the *exchanged risk* is divided into fraud risk (goods or services in return of other goods or services) and the personal privacy risk (exchange of information of value). The same researchers pointed out *trust* (attitude towards online technology, uncertainty, online shopping risk attitude) as another factor that influence user's willingness to disclose information. Metzger (2004), proposed that *information disclosed in the past* (history of disclosure) plays a fundamental role on this process as well. Dommeyer and Gross (2003) state *internet experience* "improves the fear of the unknown" as an important factor. This is directly linked with research objectives. As main target is to uncover Critical Customer Information Requirements during their decision making process, customers during their information search stage they are looking for information regarding payment terms, conditions and credit card safety policies. For the purpose of this study I am investigating what exactly is going on in their minds during the decision making process, I am capturing these informational cues and finally I am investigating the usability of the present website. Previous experiences are very important CCIRs as they

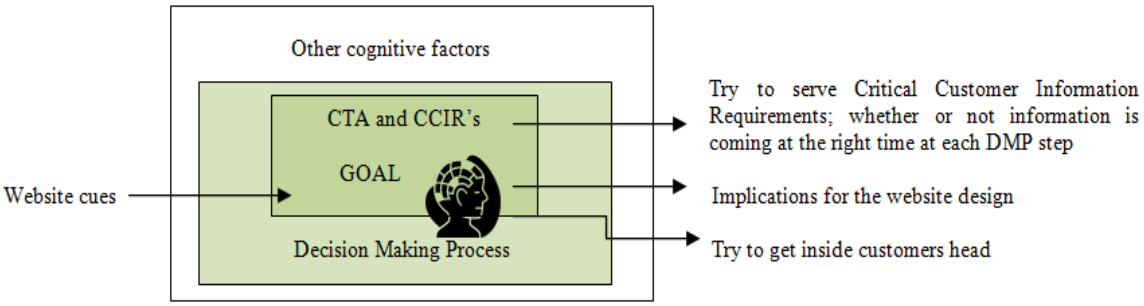
constitute the end and the beginning of a new decision making process, they are stored in memory and (pre)formulate (negatively or positively) a decision.

3.6 Conclusion / Hypothesized Model

As referred above, cognitive system constitutes a major influence on the customer's decision making process. Service knowledge is retrieved from memory (Figure 7) for use in interpreting and finally deciding. Consumer decision making process involves three cognitive processes: interpret information from their environment; evaluation among other online services; retrieve service knowledge from memory.

For the purposes of this research both types of consumers' knowledge were used. General knowledge about service categories and procedural knowledge that is stored in memory (i.e. dissatisfied with the service).

Figure 8: Hypothesized Model



Source: Author, 2013

All cognitive processes mentioned above play an important and determinant role in the entire decision making process. Cognitive processes involve information taken from the user's environment, combination and evaluation of this knowledge and finally usage of this knowledge in order to use it in integration and interpretation processes (attention and comprehension). Attention refers to user's information search procedure and evaluation of what is useful and what is not. Comprehension refers when personal knowledge and beliefs are created.

4

Human – Computer Interaction, Web-Design and Usability

4.1 Introduction

During the online hotel reservation process, there are several tasks to be completed using various clickable areas so as the user finds his/her customer critical information requirements in order to make a decision. Human computer interaction (HCI) is all about understanding this sort of requirements and applies methods in order to avoid potential problems. This chapter is split into three main parts; Human Computer Interaction and its affect on web design, Web design and Usability. Since 1950 many usability studies tried to get a deeper and more accurate picture using the eye tracking method. The importance of eye tracking research the usage of special equipment to detect exactly where the users' eyes are focused when they look at a computer screen (ideal method to uncover CCIRs). This kind of usability evaluation provides a deeper and clearer understanding of which part of the screen user is more attracted, which is ignored and which is overlooked.

4.2 Human – Computer Interaction (HCI)

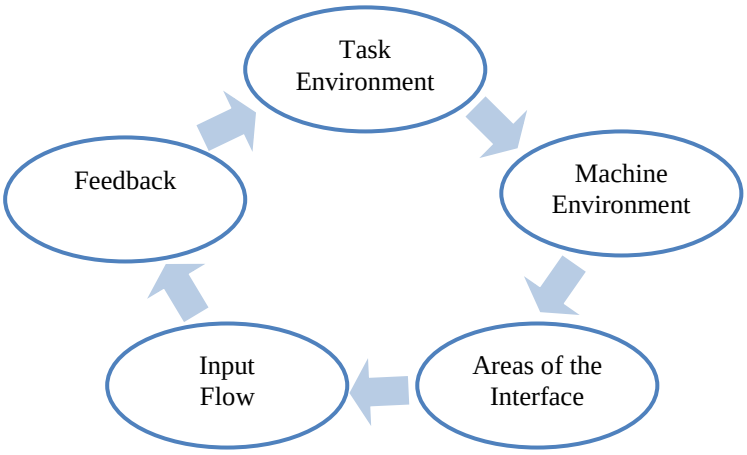
Human-Computer Interaction (HCI) is a term mainly used to provide information regarding the understanding and designing of different relationships between people and computers. At the outset, in the late 1970s, the main concern of HCI was 'usability'. Since then, HCI has established an impressive track record for developing and applying all manner of design and evaluation methods to ensure that technologies are easy to learn and easy to use (Microsoft, 2008). Turban and Aronson (2003), state that the flow of information between the human and computer is defined as the loop of interaction. The HCI's Loop of Interaction begins at the Task Environment and the Machine

Environment. According to Hung (2012), the ***Task Environment*** includes the conditions and goals which set upon the user, while ***Machine Environment*** is the environment that the computer is connected to. For instance, a laptop is connected in a college student's dorm room.

Additionally, in order for the user to communicate with the computer, a point of interaction is required (Figure 9). It locates in ***Areas of the Interface***. By definition, it is "the non-overlapping areas involve processes of the human and computer, and not pertaining to their interaction" (Singh, G. et al. (2001) cited in Nguyen, 2012). Then, according to the same researcher, ***Input Flow*** is the flow of information that begins in the task environment, when the user has some task that requires using his or her computer. Secondly, Output is the flow of information that originates in the machine environment.

More importantly, it is essential for every communication to have a ***Feedback*** which will loop through the interface that evaluates, moderates, and confirms processes as it pass from the human through the interface to the computer and back. (Singh, G. et al. cited in Nguyen, 2012)

Figure 9: The HCI's Loop of Interaction



Source: Singh, G. et al (2001), cited in Nguyen (2012)

4.3 Human computer interaction goals

The main goal of Human Computer Interaction is to improve the interactions between users and computers by making computers more functional to the user's needs. According to Tripathi (2011) HCI is concerned with:

1. Methodologies and processes for designing interfaces (i.e., redesigning a hotel website).
2. Methods for implementing interfaces
3. Techniques for evaluating and comparing interfaces
4. Developing new interfaces and interaction techniques
5. Developing descriptive and predictive models and theories of interaction

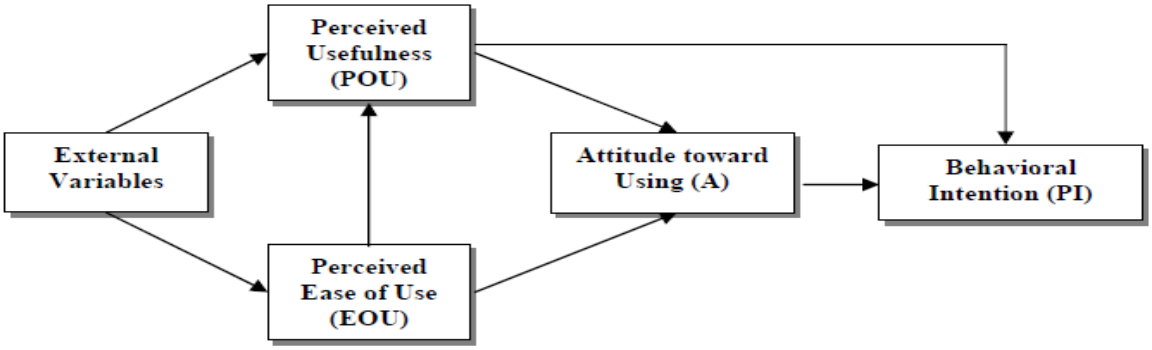
4.4 Human – Computer Interaction and Hotel Web Design

One of the primary goals of this research is to investigate and propose re-design tips for hotel websites. It is important to distinguish the nature of hotel website as it is a service sector business. As a result, I am emphasizing on service-oriented human computer interaction. In the hotel sector, information systems support every step of the user's online decision making process, providing support in information search, in the evaluation of alternatives, in purchase and in post-purchase stages. Whether taking a reservation, or searching for facilities, photos, offers, organizing the hotel alternatives replacing the human service provider. The entire service and decision making process are entirely between the computer and the user.

4.5 Technology Acceptance Model

Technology acceptance model (TAM) constitutes an important extension of Ajzen and Fishbein's Theory of Reasoned Action (TRA). It was introduced by Fred Davis in 1986 (Davis et al., 1989). TAM theory addresses the issue of how customers come to accept and use a particular technology. According to the model, when users are presented with a new technology, a number of variables influence their decisions about how and when they will use it. The model introduces two specific variables - perceived usefulness and perceived ease of use, which are hypothesized to be fundamental determinants of user acceptance. (Davis and Arbor, 1989).

Figure 10: Technology Acceptance Model (TAM)



Source: Developed from Davis et al, (1989)

According to Monsuwe et al (2004), there are two principle determinants of a person's attitude toward using technology and online facilities; perceived usefulness and perceived ease of use. According to Davies et al, (1989), ***perceived usefulness*** is defined as the degree to which a person believes that using a particular technology will enhance his or her job performance (Figure 10). People tend to use or not to use an application to the extent they believe it will help them perform their job better. Perceived usefulness explains the user's perception to the extent that the technology will improve the user's workplace performance (Davis et al. 1989). Same reseachers state that ***perceived ease of use*** refers to the degree to which a person believes that using a particular technology will be free of effort. Perceived ease of use explains the user's perception of the amount of effort required to utilize the system or the extent to which a user believes that using a particular technology will be effortless.In general, the technology acceptance model (TAM) is tailored-made for modelling user acceptance of information technology.

4.6 Web-Design and Hotel Website

For a company that depends a lot on its webpage (i.e. a hotel), first impressions are critical; especially today that there are thousands of hotels websites that all of them target to gain more of the online market pie. Thilmany (2003) states that web users make online decisions based on initial impressions and usually decide whether they want to stay or leave the website within the first couple of minutes. It is important that the homepage of the hotel's website is the face of the hotel (organization) and it plays a vital role on users' returning or not in the future (Basso et al. 2001, Yoo et al. 2004, Yoo et al. 2006).

It is of utmost importance when hoteliers design their website to understand, meet and exceed customer's critical information requirements and not provide any obstacles in the decision making process of achieving them. When a hotel website provides simple navigation, easy functionality, less mouse clicks and attractive presentation, perspective online buyers will stay longer and is likely to book and return to the website (loyalty). A website should have various characteristics in order to satisfy customers' critical information requirements –source Starkov and Stekalov (2010).

4.6.1 User Friendly: this refers to the quality of the user experience on the website – website usability. Some important user-friendliness is summarized below:

4.6.1.1. Site Architecture and Page Layout: due to high-speed internet access, wide-screens and better and bigger monitors currently available nowadays, featuring large landscape photography and videos is easier and more eye catching (Starkov and Sterkalov, 2010a).

4.6.1.2 Golden Triangle Rule: according to Hotchkiss et al (2005), areas of maximum interest create a "golden triangle". The eyes of the respondents scan through the website to find requested information; however, the top-left part of the website attracts more attention and as a result most important information should be presented on this part of the screen. Eye tracking is very useful as it shows the immediate reactions of the participants and the distribution of their attendance. This is extremely important as hot areas are identified, ignored areas are unobserved, what is clicked what does the decision making progress look like and identification of usability problems. Following these eye tracking provisions, CCIRs are captured.

4.6.1.3 Website Navigation: ease of use constitutes one of the most important website features. Poor website navigation will not satisfy customers' critical information requirements and consequently will result in poor user experience and customers will leave. According to Vikram (2010), a clear and simple top (left or right) navigation bar is fundamental to a good user experience. A simple rule is if it takes more than three words it should not be in the top navigation.

4.6.1.4 Links should be blue: according to Vikram (2010), blue says "click me"; this tested method ensures that users will visit the pages hotel designers try to promote.

4.6.1.5 Rich media and imagery: hotel services are all about selling holidays, relaxation, business facilities, comforts, sun (in many cases), quality etc. Rich media's role is to transfer all these qualities at the screen (i.e. photos, videos, e-postcards, interactive maps etc). Rich media have to make all this 'tangible' and real through the web (Starkov and Sterkalov, 2010b).

4.6.1.6 Website copy and descriptions: the website copy describes the hotel, the hotel features, accommodation, services, facilities and local destination information. It is important the copy to be accurate and descriptive. The website copy must contain relevant target keywords and phrases (related to both the product and the destination) that can be found throughout the website (Starkov and Sterkalov, 2010b). Website copy plus the site's link popularity (i.e. the number of recognized inbound links), are the two most important factors for getting high rankings on the search engines.

4.6.2 Booker-friendliness: The booker-friendliness of a hospitality website is a direct result of how well the hotel website handles a whole range of complex issues that can influence the purchasing behaviour of the website users (i.e. it should build Trust and Credibility, ease-of-use of the booking engine and smoothness of the booking process, reservation widget as part of the global navigation of the site, with customized look-and-feel design that "mimics" the website design, availability of bookable unique special offers, packages and promotions with excellent perceived value proposition, assurance of best rate and rate parity for non-bundled hotel rates, "Book with Confidence" marketing messages at the point of sale, perceived good security and privacy policies on the site (Starkov and Sterkalov, 2010a).

4.6.3 Web 2.0–Friendliness of the Hotel Website: today's 'spoilt' customer, who now expect to interact with the hotel website in exactly the same manner as on any of the social networks: Facebook, Twitter, LinkedIn, etc. Some of the Web 2.0 features and functionality consumers expect on the hotel website (Starkov and Sterkalov, 2010a):

4.6.3.1 Blog on the hotel website to share the latest news, happenings and photos at the property and the destination, and solicit customer comments and input.
4.6.3.2 Customer reviews on the hotel website to enable hotel guests to leave comments and ratings of your hotel thus providing valuable reviews for their peers right on the hotel website.

4.6.3.3 Interactive Competitions for getting people excited about your hotel and for building buzz, as well as to build your opt-in email and mobile list.

4.6.3.4 Interactive Calendar of Events to keep your website visitors updated on all the latest events happening in and around the hotel, as well as to keep your website content fresh with a constant flow of new information.

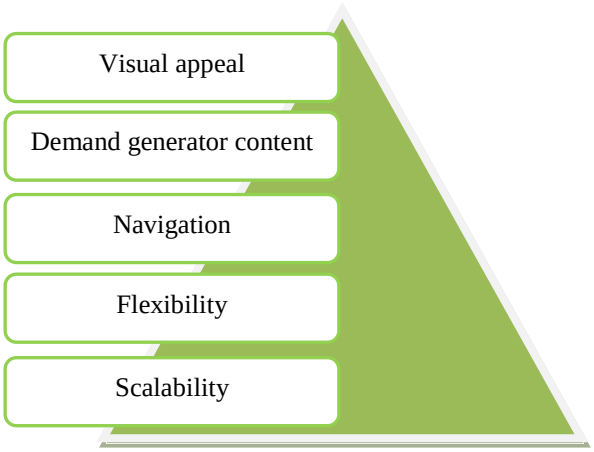
4.6.3.5 The hotel's social media initiatives easily found on the website: from Facebook's "I Like" button and links to your social media profiles on Facebook, Twitter, LinkedIn, and YouTube.

***4.6.4 Website Accessibility**:* in this design is included crucial elements of website design. *Site loading time* should not take longer than 4 seconds. If it does, then the user will leave and look somewhere else for his/her booking. *Unnecessary flash* is important to avoided; flash increase the load time and annoys the user during his decision making process (Starkov and Sterkalov, 2010b).

***4.6.5 Brand Image – Hotel Logo**:* according to Vikram (2010), the top left corner of the webpage should be dedicated to the hotel's logo; and the logo should be linked to the home page, users expect this. 'About us' and 'Contact us' page is important to be provided in a striking position as users search for it, they want to know to whom they are dealing with.

***4.6.6 Usable Conten*t**: some fundamentals of the usable content are to use headers to capture customers' attention. It is important the critical information (i.e. facilities, offers, location, map etc) to be placed above the fold; users do not need to scroll down to find what they are looking for. In other words, all customers' critical information requirements should placed above the fold. Additionally, consistency in colors and fonts is critical in order not to confuse users and provide an 'ugly' website. Caps should be avoided; when users see caps they think that someone is shouting. Caps are a popular way in chat rooms to show someone that you are shouting. Additionally, it is important to avoid 'pop ups', these can lose the credibility of the webpage and gets users frustrated. Cullen (1998) summarizes five general elements that must be included in every hotel's website; she is presenting them in a pyramid from top to bottom, starting from the visual appeal, demand generator content, navigation, flexibility and scalability.

Figure 11: Five elements should be included in every hotel website design



Source: Cullen (1998)

Visual appeal includes the selection of the correct color; color should be simple and should be in line with the overall brand or image of the hotel. In visual appeal, photos, videos and virtual tools are included. *Demand generator content* includes information about the area, local attractions, business events and location of the hotel. *Navigation* deals with website's functionality and ease of use. *Flexibility* concerns with the website platform that should be flexible enough to keep up with the most updated techniques that offered from technology. Finally, *scalability* deals with the proper programming of future trends and ensuring that the hotel's platform is up-to-date and grows alongside with hotel's grow and needs.

4.6.7 Site search: as a rule of thumb, websites should offer search machine; majority of usability studies showed that more than half of users are search-dominant, a smaller percentage is link-dominant and another percentage apply mixed behaviour; consequently, search-dominant users seek for the search machine when they enter a website. According to Nielsen's and Tahir's (2002), search box colour should be white, upper part of the webpage, preferable in left or right corner.

4.6.8 Banner blindness*:* users almost never look at anything looks like an advertisement whether or not is actually an ad (Nielsen's and Tahir's, 2002). Consequently, it is important that hotel's page designer should present information in a non-banner-like style.

4.6.9 Priority Tasks*:* it is important that a hotel's designer should categorize core tasks and keep them small per page (Nielsen's and Tahir's, 2002). Additionally, the area around the core tasks should be clear in order to attract users' attention faster.

4.6.10 High quality photos*:* due to the type of online service, high quality, attractive and real photos are deemed necessary. Proper lighting and angles are fundamental for a nice photo that will be able to attract booker's attention.

4.6.11 Access to the Homepage*:* many users in order to start a new task they return to the homepage. Consequently is essential to enable users' access to the homepage from any other page of the website.

4.7 Website design and Customer-Centered policy

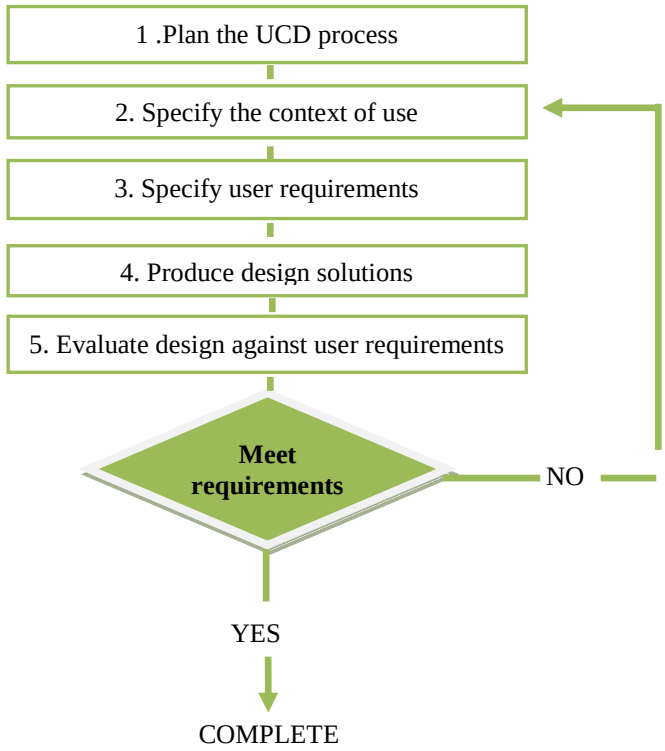
Many researchers like Van Duyne et al. (2003), Fang and Salvendy (2003), Henderson et al (1998), Hodkinson et al (2000), Kim and Moon (2000), acknowledge the importance of understanding peoples' information needs but they do not offer any method or solution as how to determine them. Van Duyne (2003) states that when visitors give e-commerce site high marks for content, ease of use, performance, trustworthiness and overall satisfaction, we call it a customer-centered website. Same researcher suggests a list of the elements on which a customer centered design should focus: [1] Ease of use, [2] Content, [3] Performance, [4] Brand value, [5] Satisfaction. According to Van Duyne et al. (2003) theory, a customer-centered design strategy: [i] Focuses on understanding people needs, consequently it focuses on customers' critical information requirements, [ii] Keeps the customer involved in the design process and [iii] Elicits from visitors to a website consistently high marks for content, ease of use, performance, trustworthiness and overall satisfaction, it provides a positive experience for all customers, whether they are there to find information, to be part of a community, to purchase items or to be entertained.

Fang and Salvendy (2003) list nineteen most important design rules of customers' concerns. They interview 50 participants in order to conclude on this list. The most accurate approach which is proposed and advocated in this study is through eliciting CCIRs.

4.8 User – Centered Hotel Website Design

Human – Computer Interaction theory proposes that user-centered design (UCD) is the most recognized approach to design successful hotel websites. UCD is ideal to design hotel websites following customers' critical information requirements. UCD considers the user's needs and involves the user throughout the design process (Dix, et al, 2004).

Figure 12: The principles and activities of UCD detailed in ISO 13407



Source: Harrison, 2008

Figure 12 provides a step by step UCD process, with the first step being to plan the UCD process, step two is specifying the context of use, step three involves specifying the user characteristics, step four is to produce the design with step five being evaluation. If requirements are met then the user will proceed with the booking / checkout; if not designers are directed back to step two. Similarly, the online decision making process for a hotel booking, the user at the step of the "meet requirements" YES / NO, the user will stay or leave the webpage.

For the purposes of this study will be as follows:

1. Plan the User – Centered Hotel Website Design process
2. Specify CCIRs

3. Specify website design
4. Produce a website design
5. Evaluate website design against CCIRs
6. If CCIRs are met, then the hotel will take the booking
7. If CCIRs are not met, then the hotel website should be (re)designed

4.9 Usability

According to Abran et al., (2003), usability is "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in the specified context of use". An interesting definition comes from Quesenbery (2004), who states that usability means that people who use the product or service can achieve their tasks easily and quickly. Consequently, users who wish to book online should be provided by all these customers' critical information requirements so as to successfully proceed with the booking.

Chappel and Huang (2007) differentiate the definition of usability of web-usability; they state that web-usability is "a quality attribute that assesses how easy user interfaces are to use". Therefore, usability is a critical factor for a successful and smooth online decision making process. According to Roach (2007), usability describes the degree of ease in using a website to achieve a particular task by allowing users access and the ability to navigate smoothly. Following Lehtinen (2007) study, usability research focuses on users: how users find their way to use a product, do they find using it easy, and if the product can help them to achieve their preset goals. Usability studies focus on how the product can be more usable for users and not on the product itself.

According to Nielsen (1993), usability consists of five components: *easy to learn* (The system should be easy to learn and understand. It should be easy for the user to get their job or task executed using the software system), *efficient to use* (Efficiency of the system is directly related to its productivity. The more efficient a system is its throughput is correspondingly high), *easy to remember* (It is best suited for intermittent users. The user can return to the system's previous state without starting away from the beginning), *few errors* (the prevention of catastrophic errors is relevant for applications such as process control or medical applications), and *pleasant to use task* (It is the

pleasant feeling that user gets while or after using the system. It can be observed as likeability for the system and fulfilment of specified).

The international organization of standardization (ISO 9214-11, 1998) gave a model consisting of three basic sub attributes, namely *effectiveness* (It is the performance measure of a system to complete a specified task or goal successfully within time), *efficiency* (It is the successful completion of a task by a system. It relates to accuracy and completeness of the specified goal), *and satisfaction* (It is acceptability of a system by the users, in a specified context of use). Then, ISO 9126 (2001) suggest the following sub attributes of usability namely understandability (The capability of the software product to enable the user to understand whether the software is suitable, and how it can be used for particular tasks and conditions of use), *learnability* (The capability of the software product to enable the user to learn its application), *operability* (The capability of the software product to enable the user to operate and control it), *attractiveness* (The capability of the software product to be attractive to the user), *usability compliance* (The capability of the software product to adhere to standards, conventions, style guides, or regulations related to usability).

4.9.1 Usability Testing and Eye Tracking Approach

Eye tracking is not a new method for usability testing. It is being used since 1950 (table below). However, nowadays it has become a key method for usability testing, especially of webpages. It is used in many areas of research as it provides indisputable, valid, objective and accurate data presenting usability problems and the user's behaviour. For quantitative eye tracking analysis, Goldberg and Kotval (1999) summarize methods for analysing eye tracking data for computer-based usability studies, such as assessing the length of a scan path and comparing fixation durations. The below table is a summary of various usability studies incorporating eye tracking in chronological order from 1950 to 2012. It provides information about users recruited for the study, main tasks and eye tracking metrics observed and analyzed.

Table 2: Usability Studies incorporating eye tracking in chronological order

Authors / Date	Users and Tasks	Eye Tracking Related Metrics
Fitts, Jones and Milton, 1950	40 Military pilots. Aircraft landing approach	• Gaze rate (# of gazes / minute) on each area of interest • Gaze duration mean, on each area of interest • Gaze % (proportion of time) on each area of interest • Transition probability between areas of interest
Harris and Christhilf,	4 instrument-rated pilots. Flying maneuvers in a	• Gaze % (proportion of time) on each area of interest • Gaze duration mean, on each area of interest

1980	simulator	
Kolers, Duchnicky and Ferguson, 1981	20 university students. Reading text on a CRT in various formats and with various scroll rates	• Number of fixations, overall • Number of fixations on each area of interest (line of text) • Number of words per fixation • Fixation rate overall (fixations / S) • Fixation duration mean, overall
Card, 1984	3 PC users. Searching for and selecting specified item from computer pull-down menu	• Scan path direction (up / down) • Number of fixations, overall
Hendrickson, 1989	36 PC users. Selecting 1 to 3 items in various styles of computer menus.	• Number of fixations, overall • Fixation rate overall (fixations / S) • Fixation duration mean, overall • Number of fixations on each area of interest • Fixation rate on each area of interest • Fixation duration mean, on each area of interest • Gaze duration mean, on each area of interest • Gaze % (proportion of time) on each area of interest • Transition probability between areas of interest
Graf and Kruger, 1989	6 participants. Search for information to answer questions on screens of varying organization.	• Number of voluntary (>320 mS) fixations, overall • Number of involuntary (<240 mS) fixations, overall • Number of fixations on target
Benel, Ottens and Horst, 1991	7 PC users. Viewing web pages	• Gaze % (proportion of time) on each area of interest • Scan path
Backs and Walrath, 1992	8 engineers. Symbol search and counting tasks on color or monochrome displays	• Number of fixations, overall • Fixation duration mean, overall • Fixation rate overall (fixations / S)
Yamamoto and Kuto, 1992	7 young adults. Confirm sales receipts (unit price, quantity, etc.) on various screen layouts	• Scan path direction • Number of instances of backtracking
Svensson, et al., 1997	18 Military pilots. Fly and monitor threat display containing varying number of symbols	• Gaze duration mean, on each area of interest • Frequencies of long duration dwells on area of interest
Altonen, et al., 1998	20 PC users. Select menu item specified directly or by concept definition	• Scan path direction • Sweep –scan path progressing in the same direction • Number of fixations per sweep
Ellis et al., 1998	16 PC users with web experience. Directed web search and judgment	• Number of fixations, overall • Fixation duration mean, overall • Number of fixations on each area of interest • Time to 1st fixation on target area of interest • Gaze % (proportion of time) on each area of interest
Kotval and Goldberg, 1998	12 university students. Select command button specified directly from buttons grouped with various strategies.	• Scan path duration • Scan path length • Scan path area (convex hull) • Fixation spatial density • Transition density • Number of fixations, overall • Fixation duration mean, overall • Fixation/saccade time ratio • Saccade length
Byrne et al., 1999	11 university students. Choosing menu items specified directly from computer pull-down menus of varying length.	• Number of fixations, overall • First area of interest fixated • Number of fixations on each area of interest

Flemisch and Onken, 2000	6 military pilots. Low-level flight and navigation in a flight simulator using different display formats	• Gaze % (proportion of time) on each area of interest
Redline and Lankford, 2001	25 adults. Fill out a 4-page questionnaire (of various forms) about lifestyle.	• Scan path
Cowen, 2001	17 PC users with web experience. Search / extract information from web pages	• Fixation duration total • Number of fixations, overall • Fixation duration mean, overall • Fixation spatial density
Josephson and Holmes, 2002	8 university students with web experience. Passively view web pages.	• Scan path
Goldberg, Stimson, Lewenstein, Scott and Wichansky, 2002	7 adult PC users with web experience. Search /extract information from web pages.	• Number of fixations on each area of interest • Fixation duration mean, on each area of interest • Saccade length • Fixation duration total, on each area of interest • Number of areas of interest fixated • Scan path length • Scan path direction • Transition probability between areas of interest
Albert, 2002	24 intermediate to advanced web users. Web search for purchase and travel arrangements on sites with varying banner ad placement.	• Number of fixations on area of interest (banner ad) • Gaze % (proportion of time) on each area of interest • Participant % fixating on each area of interest
Cooke, 2006	10 people from Department of Technical Communication	• Fixation duration • Mouse clicks
Orbist et al 2007	16 participants	• Gaze plot • Time per task • Hot spots
Coltekin et al , 2009	30 participants	• Mean response time • Fixation filter values (radius of 50 pixels) • Fixation duration (min 100ms) • Fixation counts • Number of fixations • AOI (for usability issues)
Romano et al , 2009	9 participants	• Time per task • Hot spots • Gaze plot
Romano and Chen, 2011	30 participants	• Gaze plot • Time per task • Hot spots
Ashenfelter et al 2012	30 participants	• Heat maps • Gaze capacity maps • AOI • Visits • Fixation Duration

Following Table 2, most commonly used eye tracking metrics are number of fixations overall, the proportion of time (Gaze %) on every area of interest, fixation and gaze duration on each area of interest, and fixation rate overall. All eye tracking statistics metrics are discussed in Chapter 5, Methodological Review under the 5.14 Eye tracking metrics.

4.10 The Usability Evaluation Process

Since the the very beginning of the Internet era, researchers have been proposing new and refined methodologies for usability evaluation (Alexander and Baravalle, 2011) . Beirekdar et al, (2003) state that usability is a major factor in the quality and success of a web site. However, a large amount of data is not reachable to all users, due to usability and accessibility problems in web sites and for this reason the development of usability standards and guidelines was necessary (Jasselette et al, 2007). Several literature sources informed this discussion, including (Nielsen 1992; Shneiderman 1998, Brooke).

4.10.1 Nielsen's Usability Heurustics for User Interface Design

According to Nielsen (1992), heuristic evaluation is a method for finding usability problems in a user interface design by having a small set of evaluators examine the interface and judge its compliance with recognized usability principles. The ten most general principles for interaction design (the "heuristics"):

1.Visibility of system status: The website always keeps the user's informed about what is going on, through appropriate feedback within reasonable time

2. Match between system and the real world: The website speaks the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms.

3. User control and freedom: Users have the flexibility to stop the process and leave any time they wish

4. Recognition rather than recall: The website provides the user with all booking information already filled by the user in order not have to remember information from one part to another

5. Flexibility and efficiency of use: Accelerators -- unseen by the novice user – websites allows users to tailor frequent actions (i.e. go to checkout without giving all details)

6. Careful use of colour: colour used in the website is balanced.

7. Symmetry and Style: website's layout is symmetric

8. Depth of field: website uses layers in images

9. Consistent visual style: website targets older and economic independent clients/users and uses more restful, natural images

10. Visibility of identity and brand: the brand name of the hotel is visible in a consistent manner

According to Yatsenko et al (2002), this list is based on personal observations of J. Nielsen and is not supported by any empirical evidence.

4.10.2 Shneiderman's Eight Golden Rules of Interface

Shneiderman's theory is very similar to Nielsen's and is based on a very general set of eight rules that include:

1. Strive for consistency: Consistent sequences of actions should be required in similar situations
2. Enable frequent users to use shortcuts: Abbreviations, function keys, hidden commands, and macro facilities are very helpful to an expert user
3. Offer informative feedback: For every operator action, there should be some system feedback
4. Design dialogue to yield closure: Sequences of actions should be organized into groups with a beginning, middle, and end
5. Offer simple error handling: As much as possible, design the system so the user cannot make a serious error
6. Permit easy reversal of actions: This feature relieves anxiety, since the user knows that errors can be undone; it thus encourages exploration of unfamiliar options
7. Support internal locus of control: Design the system to make users the initiators of actions rather than the responders.
8. Reduce short-term memory load: The limitation of human information processing in short-term memory requires that displays be kept simple

Both Nielsen heuristics and Shneiderman Eight Golden Rules of Interface, are too general and do not actually reveal what is going on during the customers' decision making process when they come to apply online booking. By applying these theories to this study, the requested customers' critical information requirements will not be addressed and will not identify whether these customers' critical information requirements are met and as a result the hotel website really supports customers' decision making.

4.10.3 System Usability Scale (SUS)

The System Usability Scale (SUS) is the most popular standardized usability questionnaire. SUS was developed at Digital Equipment Corporation by John Brooke in the 1980′s. It is popular for two reasons: it's free and short (at only 10 questions). SUS is used by many researchers and it has been found to be a remarkable, strong measure of system usability (Katsanos et al, 2012; Tullis and Stetson 2004; Bangor et al 2008; Sauro and Lewis 2009; Lewis and Sauro 2009). Sauro in (2011) examined the influence of prior experience with a website on the users' SUS scores. Using a large dataset from 62 websites he found that "repeat users rated the websites as 11% more usable than first-time users". Simoes and de Moraes in (2012) applied SUS to evaluate the usability

of the virtual learning environment adopted by the Distance Education Center of the Federal Institute of Espírito Santo – Brazil, which has the Moodle platform as a basis. They found that "the SUS questionnaire is an objective and efficient tool to have a notion about the usability and users' satisfaction". Granic and Cukusic in (2011) used SUS among other usability evaluation techniques to evaluate UNITE, an e-learning platform to support education in European secondary schools. Students' average satisfaction was59.36. They also found that there was a significant negative correlation (r=-0.467) between the SUS score and age. Katsanos et al (2012) investigated the validity and reliability of a Greek version of SUS. Analysis of the results showed that the Greek SUS questionnaire is both reliable and valid.

The survey then provided the following 10 standard statements with 5 response options (5-point Likert scale with anchors for Strongly agree and Strongly disagree):

4.10.3.1 The 10 SUS statements

a) I think that I would like to use this system frequently.
b) I found the system unnecessarily complex.
c) I thought the system was easy to use.
d) I think that I would need the support of a technical person to be able to use this system.
e) I found the various functions in this system were well integrated.
f) I thought there was too much inconsistency in this system.
g) I would imagine that most people would learn to use this system very quickly.
h) I found the system very cumbersome to use.
i) I felt very confident using the system.
j) I needed to learn a lot of things before I could get going with this system.

4.10.3.2 Advantages of System Usability Scale (SUS)

One of the primary advantages of SUS is that it has been effectively applied on a variety of software and devices and it is characterized as "technology agnostic" (Katsanos et al 2012, Bangor et al 2008). According to Brooke (1996), SUS is: [i] reliable: if you use it on different occasions on the same system with similar users, you'll likely get approximately the same result, [ii] valid: it does actually measure approximately what it claims to measure, that is whether or not the users perceive a system to be usable or not and [iii]comparable: you can compare your results from SUS with other people's results

to establish whether your system is more or less usable. Tullis and Stetson (2004) state that a sample of 12 users provides the correct findings, same as larger sample 90-100% of the time and a sample of 10 users 75-80% of the time. According to Jokela et al (2006), SUS is proposed to be used as a means for a system's quantitative usability requirements. For the purposes of this study, SUS is used to assess whether the original design is effective and whether the (re)design of the webpages has improved usability.

4.11 Conclusion

The website for a hotel constitutes not only a vital tool for revenue generation but also the most critical marketing tool for the appropriate presentation of the hotel image and reputation. Consequently, it has to meet and exceed customers' critical information requirements and should be a top priority for all hoteliers. It is reasonable that a hotel website that provides the customers with all customers' critical information requirements, it is more likely to achieve the booking and attain returning customers.

Various website characteristics should be applied in accordance to CCIRs. The Golden Triangle rule is a proved and tested theory of customers' observation at a screen. The website navigation, friendliness of the webpage, striking photos, search, navigation and many other aspects should be the base for the hotel website construction.

User-centered flow was followed in order to set up a hotel website user-centered model. According to this model, all hotel webpage construction has to be CCIRs oriented and try to alter lookers into bookers.

It is of utmost importance for hoteliers to invest in turning "lookers into bookers". Web design, website usability, customer-centered web design will play a fundamental role in targeting CCIRs, satisfying them. This is essential for delivering hotel website success.

5

Methodological Review

5.1 Introduction

This chapter presents the theory of the methods used for the purposed of this research. This methodological review is focused on: Critical Decision Method (CDM), Applied Cognitive Task Analysis (ACTA), think aloud technique and finally website usability – System Usability Scale (SUS). In order to investigate previous online experiences Critical Decision Method (CDM) was applied. Real time online decision making process in combination with Applied Cognitive Task Analysis (ACTA) with eye tracking, think aloud, video recording and System Usability Scale (SUS) was applied to uncover present CCIRs. The proper combination of all these methods extracts the customers' critical information requirements that influence users' online hotel booking decision making process. According to Krausman et al (2007), critical information requirements are the pieces of information customers need to make appropriate decisions and constitute an important part of this research. It will provide a deeper view of customer's expectations during their decision making process and will assist in re-designing hotels websites.

5.2 Research via Direct Observation

According to Dishion and Granic (2004: 143), direct observation is considered one of the most effective ways of collecting ecologically valid data on behaviour. On the contrary, with participant observation, the "direct observer" does not try to become part of the phenomena being observed. Instead, the researcher aims at reducing the degree of invasiveness "so as not to bias the observations" (Trochim 2001: 161). However, this does not mean that direct observation method is entirely bias-free. In order these biases to be covered to a certain extent, the researcher is advised to take some notes during the process and video recording if possible.

5.3 Research Approach

Research approach refers to the way the study is going to be addressed. The research approach may be quantitative or qualitative, deductive or inductive.

5.3.1 Deductive Vs Inductive Approach: Zikmund (2000) identifies the inductive research as "the logical process of establishing a general proposition on the basis of observation of particular facts". According to Saunders et al (2000), in the inductive approach, data is collected and then theory is developed based on the data findings. On the other hand, the deductive research approach is defined as "the logic process of deriving a conclusion from a known premise or something known to be true" (Zikmund, 2000).

***5.3.2 Qualitative Vs Quantitative Approach*:** Guba and Lincoln (2005) report two methods available to researchers: qualitative and quantitative. It is important that a qualitative approach provides deeper understanding of the phenomenon within its context. Silverman (2001), states that "the strength of a qualitative research is that it focuses on actual practice and looks at how social interactions are performed". Travers (2001) identifies five qualitative research methods: observation, interviewing, ethnographic fieldwork, discourse analysis and textual analysis. In contrast to qualitative research, quantitative research tends to be more structured and formalized. In quantitative research, results are presented into numbers and figures. The primary objective of this research is to identify the factors that influence online decision making process when Cypriots come to book online. As a result, both qualitative and quantitative approaches were used in order to extract more valid results.

There were three major requirements when selecting the most suitable research approach for the purpose of this research. Firstly, due to the exploratory and the correlational nature of the thesis, respondents should report their own previous experiences with online booking, purchasing, banking, etc. Secondly the thesis focuses specifically on exploring what actually happens in practice during the online booking process, rather than on simply reporting what participants thought they are going to do in practice. Thirdly, in eliciting the respondents' replies to their previous and presents experiences it is important to recognize that it might be difficult for them to express and explain the tacit aspects of their knowledge and interpretation of their actions and

responses (Sternberg et al, 2000). As a result, it is important to use a research method that has the ability to prompt and assist recall of the underlying tacit knowledge and previous experiences.

5.3.3Positivism*:* According to the philosopher Auguste Comte (1978-1857) who was the inspirator of the positivism, true knowledge is based on the experience of the senses and can be obtained by observation and experiment (Cohen et al 2003; Ssemaluulu, 2012). Positivist studies generally attempt to explain and predict what happens in the social world by searching for regulatories and casual relationships between its constituent elements (Ssemaluulu, 2012; Iivari and Venable 2009). However, positivism was criticized due to its lack of regard for the subjective states of individuals (Ssemaluulu, 2012; Dash, 2005). Dash (2005) reports that this theory regards human behaviour as passive, controlled and determined by external environment. However, this research proposal analyses human online behaviour using the eye tracking device, leaving the participants freely to explore and search the hotel websites and having the opportunity to make their decisions naturally without any driven directions.

***5.3.4 Intepretivism (or anti-positivism)*:** According to Livesey (2006) interpretivist methodology supports towards the collection of qualitative data and uses methods such as unstructured interviews and participant observation that provides this type of data. Interpretivists analyse how humans take activities and how this can be achieved through methods other than those employed by the positivist approach (Fitzpatrick, 2012). According to Goldkuhl (2012), the core idea of interpretivism is to work with these subjective meanings already there in the social world (i.e. to acknowledge their existence, to reconstruct them, to understand them, to avoid distorting them, to use them as building blocks in theorizing). In this study the CCIRs are these subjective meanings.

5.3.5Design Science*:* Hevner et al. (2004) have presented a set of guidelines for design science research within the discipline of Information Systems. They argue that the design science seeks to create "what is effective". According to the researchers design science research requires the creation of an innovative, purposeful artifact (i.e. according to March and Smith (1995), constructs or concepts: they constitute a conceptualization used to describe problems within the domain and to specify their solutions, instantiation is the realization of an artifact in its environment. IT research instantiates both specific information systems and tools that address various aspects of

designing information systems) for a special problem domain. The artefacts can be constructs, models, methods, and instantiations. The artifact must be evaluated in order to ensure its utility (via eye tracking device) for the specified problem. In order to form a novel research contribution, the artifact must either solve a problem that has not yet been solved, or provide a more effective solution. For this purpose as referred above a proposal for website re-designing is presented in the validation chapter nine.

5.4 Critical Decision Method

Critical Decision Method (CDM) constitutes one of the Cognitive Task Analysis methods. Klein, et al (1989), developed the CDM for their naturalistic researches (Klein, 1989; Klein and Brezovic, 1986; Klein, Calderwood and Cirocco (1986). Cognitive Task Analysis: the purpose of the methods is to systematically uncover the decision making requirements and psychological processes used by expert individuals – for the purpose of this research experienced online users, in accomplishing results (mentamodels.mitre.org). Cognitive Task Analysis defines the actions of individuals so as to come to decisions. Critical Decision Method is based on Flanagan's (1954) critical incident technique. According to Flanagan (1954), the critical incident technique consists of a set of procedures for collecting direct observations of human behaviour in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles. These are important for identifying anomalies and states of mental unease in the decision making process.

The CDM as developed by Klein *et al*. (1989) is a descendent of the critical incident technique developed by Flanagan (1954). In common with Flanagan' s technique, the CDM explores decision-making in previously experienced non-routine cases. Participants are requested to bring to mind an incident in which their expertise made a difference to the outcome. This incident is recalled in detail and a time-line constructed to establish the precise sequence of events (O'Hare et al, 2000).

5.4.1 First Sweep: Incident identification and selection*:* At this stage, the participants will report an event where they use decision making process in order to book online. Once the participant will identify the incident, he/she will be asked to recount the episode in its entirety. Once the participant complete his/her initial recounting, the analyst will retell the story.

5.4.2 Second Sweep: Timeline verification and decision point identification*:* In this phase of the interview, the participant will asked for a second time to go back through the incident in order to structure and organize the incident into ordered segments. It is important to construct an accurate timeline of the incident under analysis. The aim of this is to give the analyst a clear picture of the incident and its associated events.

5.4.3 Third Sweep: Progressive, Deeping and the Story Behind the Story: During this sweep the analyst will let the participant back over each identified segment (decision making process) the incident, while employing probes designed to focus attention on particular cognitive aspects of the incident. Each selected decisions of interest would then be probed or analysed further (Table 3: using probes of O'Hare et al, 2000).

5.4.4 Fourth Sweep: "What If" Queries: This sweep helps to uncover where the decision process might break down. According to Hann et al (2003), it points out vulnerabilities of a process, but also highlights where expertise is required.
Originally, these Critical Decision Method probes were developed by O'Hare et al (2000), but for the purposes of this research this was revised and expanded.

5.4.5 Critical Decision Method Probes*:* The Critical Decision Method (CDM) Klein et al, 1989) is a cognitive task analysis approach that uses semi-structured interviews and cognitive probes in order to analyze the cognitive processes underlying decision making in complex environments. Using this approach, critical incidents are decomposed into decision points, and so-called 'cognitive probes' (targeted interview probes focusing on cognition and decision making) are used to identify the cognitive processes underlying operator performance at each decision point.

Table 3: Critical Decision Method Probes

Cognitive Cue	Sample Question
Goal specification	What were your specific goals at the various decision points?
Goal identification	What features were you looking at when your formulated your decision? How did you know that you needed to make the decision? How did you know when to make the decision?
Expectancy	Were you expecting to make this type of decision during the course of the event? Describe how this affected your decision-making process?
Conceptual model	Are there situations in which your decision would have turned out differently? Describe the nature of these situations and the characteristics that would have changed the outcome of your decision?

Influence of uncertainty	At any stage, were you uncertain about either the reliability or the relevance of information that you had available? At any stage, were you uncertain about the appropriateness of the decision?
Information integration	What was the most important piece of information that you used to formulate the decision?
Situation awareness	What information did you have available to you when formulating the decision?
Situation assessment	Did you use all the information available to you when formulating the decision? Was there any additional information that you might have used to assist in the formulation the decision?
Options	Were there any other alternatives available to you other than the decision that you made? Why were these alternatives considered inappropriate?
Decision blocking	Was there any stage during the decision making process in which you found it difficult to process and integrate the information available? Describe precisely the nature of the situation
Basis of choice	Do you think that you could develop a rule, based on your experience, which could assist another person to make the same decision successfully? Do you think that anyone else would be able to use this rule successfully? Why /. Why not?
Generalisation	Were you at any time reminded of previous experiences in which a similar decision was made? Were you at any time reminded of previous experiences in which a different decision was made?

Source: O'Hare et al (2000)

The difference between what people think at the time of the experience and after the experience is important. One is a perception by reflecting on the past; the other is based on actual behavior at that time. Eye gaze does not lie but answers can misrepresent the truth.

5.5 Advantages of Critical Decision Method

According to Weitzenfeld et al (1990), Critical Decision Method has several important advantages as a knowledge elicitation method for training and human factors purposes. Moreover CDM allows the informant to define the range of the problem; define which problems are most challenging; identify where experience makes most difference; and the timeline facilitates identifications of relatively difficult operations. According to Salmon et al (2003) summarized the advantages of the Critical Decision Method as below:

- The CDM can be used to elicit specific information regarding decision making in complex systems. For the purpose of this research, as the online booking constitutes a complex environment, the CDM will provide useful information when users come to book online.

- CDM uses real life incidents, ensuring a more realistic analysis. Online hotel reservation is a real life function and the analysis will be authentic and very useful for the tourism sector.
- Provides experts in articulating cognitive elements (CCIRs) that are difficult to capture
- Provides information about decision making, problem solving (i.e. website redesign) and judgements from the perspective of the user
- Useful in identifying cognitive elements that are central to proficient performance

A significant advantage of the Critical Decision Method is its psychological validity. Furthermore, CDM has an open-ended process that it easily uncovers CCIRs and it also offers several practical benefits: it uses expert time efficiently and economically. It is important that the interviews serve both as data and product.

5.6 Limitations of Critical Decision Method

While using the Critical Decision Method, some options are difficult and time consuming to execute that in many cases will not take them into consideration and they will not surface as decision points in the Critical Decision Method interviews. Behavioural differences are noticeable from Critical Decision Method interviews, but their cause is not. According to Salmon et al (2003) and Militello and Crandall (2004) summarized the disadvantages of the Critical Decision Method as below:

- CDM will never be an exact description of an incident
- The CDM relies upon interviewee verbal reports in order to reconstruct incidents
- Requires considerable skill on the part of the interviewer
- Only useful in domains in which expertise exists
- Often obtaining access to experts is difficult
- Data analysis is highly qualitative; few guidelines exist for analyzing this type of data
- Interviews focus on challenging events to aid in identifying key cognitive elements;
- Knowledge representation is not straightforward

5.7 Cognitive Task Analysis

"Cognitive Task Analysis is the extension of traditional task analysis techniques to yield information about the knowledge, through processes and goal structures that underlie observable task performance" (Chipman et al, 2000). According to Merriënboer et al (2002), Cognitive Task Analysis (CTA) uses a variety of interview and observation

strategies to capture a description of the knowledge that experts use to perform complex tasks. Following numerous sources, researchers have identified over a hundred types of Cognitive Task Analysis methods currently in use (i.e. Critical Decision Method) which makes it very challenging and difficult for a researcher to choose the appropriate method for their study (Cooke, 1994). The goal of Cognitive Task Analysis is to discover the cognitive activities that are required for performing a task in a particular domain to identify opportunities to improve performance by providing improved support of these activities (Potter, et al 2000). As a result, Cognitive Task Analysis is a problem-solving process where the questions posed to the subject matter experts, and the data collected are tailored to produce answers to the research questions (Dubois and Shalin, 2000).

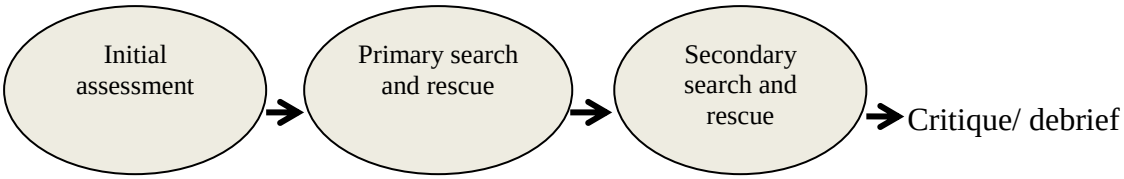
5.8 Applied Cognitive Task Analysis

The purpose of the methods is to systematically uncover the decision making requirements and psychological processes used by expert individuals. In this approach the researcher conducts three structured interviews. Each interview generates different outcome:

5.8.1 Task Diagram

The task diagram provides a high level overview of the task and identifies the most difficult cognitive elements. The respondent (also identified as experts or Subject Matter Experts –SMEs) is asked to decompose the task into steps or subtasks with a question such as, `Think about what you do when you (task of interest). Can you break this task down into less than six, but more than three steps?' The goal is to get the expert to walk through the task in his/her mind, verbalizing major steps (Militello and Hutton, 1998).

Figure 13: Task Diagram Example



Source: Militello and Hutton (1998)

The above sample diagram serves as a road map for future interviews, providing an overview of the major steps involved in the task and the sequence in which the steps are carried out, as well as which of the steps require the most cognitive skill.

5.8.2 Knowledge Audit Table

According to Militello and Hutton (1998), the knowledge audit identifies ways in which respondents provide examples based on actual experience. The knowledge audit draws directly from the research literature on expert-novice differences (Hoffman 1992, Klein and Hoffman 1993) and critical decision method studies (Klein et al. 1989, Crandall and Getchell- Reiter 1993, Klinger and Gomes 1993, Militello and Lim 1995, Kaempf et al. 1996) of expert decision-making. As a result, the second interview yields a Knowledge Audit Table which probes the respondent on the skills and knowledge applied to the online decision making process for a hotel reservation.

The knowledge audit employs a set of probes designed to describe types of domain knowledge or skill and elicit appropriate examples (Table 1 in appendix 10). The list of probes is the starting point for conducting this interview. Then, the interviewer asks for specifics about the example in terms of critical cues and strategies of decision making. This is followed by a discussion of potential errors that a novice, less-experienced person might have done in this situation (Militello and Hutton, 1998).

5.8.2.1 Basic Probes:

- Past and Future: experts can figure out how a situation developed, and they can think into the future to see where the situation is going. Among other things, this can allow experts to head off problems before they developed.
- Big Picture: novices may only see bits and pieces. Experts are able to quickly build an understanding of the whole situation-the Big Picture view. This allows the expert to think about how the different elements fit together and affect each other.
- Noticing: Experts are able to detect cues and see meaningful patterns that less-experienced personnel may miss altogether.
- Job Smarts: Experts learn how to combine procedures and work the task in the most efficient way possible. They don't cut corners, but they don't waste time and resources either.
- Opportunities / improvising: experts are comfortable improvising – seeing what will work in this particular situation; they are able to shift directions to take advantage of opportunities.

- Self Monitoring: experts are aware of their performance; they check how they are doing and make adjustments. Experts notice when their performance is not what it should be (stress, high workload, etc) and are able to adjust so that the job gets done.

5.8.3 Alternative Interview Table / Simulation Interview

The third and last interview (Table 2 in appendix 10) involves presenting the expert with a specific and relevant scenario designed to elicit insight into the cognitive processes used by the expert in the scenario context (cogtech.usc.edu). This interview allows the researcher to better understand the respondent's cognitive processes within an online decision making process for a hotel reservation. The simulation interview is based on presentation of a challenging scenario to the respondents. Then the respondent is asked to identify major events, including judgments and decisions, with a question such as, `As you experience the online booking decision making process, I am going to ask you a series of questions about how you would think and act in this situation'.

5.8.4 Cognitive demands table After conducting ACTA interviews with multiple SMEs (Subject Matter Experts), Militello and Hutton (1998), recommend the use of a cognitive demands table (Table 3 in appendix 10). The cognitive demands table is intended to provide a format for the practitioner to use in focusing the analysis on project goals (Militello and Hutton, 1998).

5.9 Why Study Eye Movements in Human Computer Interaction Research?

Simply stated, Human-computer interaction" (HCI) is the study of interaction between people (users) and computers. It is important that till today, the main research instrument of Human Computer Interaction was the questionnaire or the interview; as referred above this lead to many 'grey' areas, uninvestigated and as a result leaving a gap in results. Even though there are large numbers of studies on Human Computer Interaction, the behavioural aspects are still ignored. Since few studies have explored the area of online decision making, and none about online decision making about hotels, very little is known about the cognitive factors (i.e. Critical Customers' Information Requirements / behavioural factors) that actually influence and impact on customers' decision making process when they come to book their hotels online.

5.10 Eye-Movement Metrics

One advantage of using an eye tracker is that you can extract objective data from the recordings by using metrics such as time to first fixation, observation count, etc. The eye tracker allows you to generate heat maps that can be used to demonstrate problem areas, specific areas of interest or gaze plots that illustrate typical behaviors displayed by the participants (www.tobii.com). The main measurements used in eye-tracking research are fixations (moments when the eyes are relatively stationary, taking in or "encoding" information) and "saccades", which are quick eye movements occurring between fixations.

5.10.1 Saccades

As stated above, saccades are the lines from one fixation to another. It is important that no encoding takes place during saccades, so they cannot tell anything about the complexity or salience of an object in the interface (Poole and Ball, 2004).

Table 4: Saccade-derived metrics and how they can be interpreted in the context of interface design and usability evaluation

Eye-Movement Metric	What it Measures	Reference
Number of saccades	More saccades indicate more searching.	Goldberg and Kotval (1999)
Saccade Amplitude	Larger saccades indicate more meaningful cues, as attention is drawn from a distance.	Goldberg et al. (2002)
Regressive saccades (regressions)	Regressions indicate the presence of less meaningful cues.	Sibert et al. (2000)
Saccades revealing marked directional shifts	Any saccade larger than 90 degrees from the saccade that preceded it shows a rapid change in direction. This could mean that the user's goals have changed or the interface layout does not match the user's expectations.	Cowen et al. (2002)

Source: Poole and Ball (2004)

5.10.2 Fixation is the main metric of eye tracking studies. In general, fixation is the moment that the eye is focused and stabilized on a particular area or point. According to Tobii Technology Paper (2009), longer fixations can mean a participant found a particular area interesting, *but it can also mean that he or she found the area difficult to interpret*. Hence, it is important to supplement eye tracking data with additional information gained from the participants about their experiences. Eye fixations are the most informative metric for evaluating information processing (Rayner, 1998).

According to (Jacob and Karn, 2003), higher *fixation frequency* on a particular area can be indicative of greater interest in the target, such as a photograph in the news report, or it can be a sign that the target is complex in some way and more difficult to encode.

Rayner (1998), states that ***high frequencies and long durations of fixations expose the difficulty of the searching tasks***. Armitage (2006) suggested some possible interpretations when she looks at the eye-tracking data (cited in Ehmke and Wilson, 2007):

a) Long fixations. (Interest or confusion)
b) Scanning behavior rather than reading behavior, that is, fixations and saccades not in left to right order with sweeps. (What was the user looking for?)
c) Back and forth between two objects. (Trying to make a choice or comparison?)
d) First place the user looks. (Why did this draw their attention?)
e) Last place the user looks. (Why did this lose their interest?)
f) When making a choice, fixations back to one item, then final scan before making a choice.
g) Reading headings or subheadings, but no more. (Boring?)

5.10.3 Areas of Interest (AOI): Visual attention of participants is quantified by the numbers of fixations within a region, which is defined as the Areas of Interest (AOI). Eye-tracking software records the eye gaze by determining the fixation locations and the saccades between these fixations (Harrison, 2008). Determining the location and length of fixations from the data can be problematic as these are the result of algorithmic processing of eye gaze data. Areas of Interest (AOI) also known as "lookzone" in some software applications is a quantitative tool used for comparative analysis of certain features on a web page. From that data I was able to confidently select AOIs that would provide the most robust and meaningful comparisons.

5.10.4 Gaze Plot or Scan path: A scanpath describes a complete saccade-fixate-saccade sequence. In a search task, an optimal scan path is viewed as being a straight line to a desired target, with relatively short fixation duration at the target (Goldberg and Kotval, 1999).

Table 5: Scanpath-derived metrics and how they can be interpreted in the context of interface design and usability evaluation

Eye-Movement Metric	What it Measures	Reference
Scanpath duration	A longer-lasting scanpath indicates less efficient scanning	Goldberg and Kotval (1999)
Scanpath length	A longer scanpath indicates less efficient searching (perhaps due to a sub-optimal layout).	Goldberg et al. (2002)
Spatial density	Smaller spatial density indicates more direct search.	Goldberg and Kotval (1999);
Transition matrix	The transition matrix reveals search order in terms of transitions from one area to another. Scanpaths with an identical spatial density and convex hull area can have completely different transition values – one is efficient and direct whilst the other goes back and forth between areas, indicating uncertainty.	Goldberg and Kotval (1999);
Scanpath regularity	Once "cyclic scanning behaviour" is defined, deviation from a "normal" scanpath can indicate search problems due to lack of user training or bad interface layout.	Goldberg and Kotval (1999)
Scanpath Direction	This can determine a participant's search strategy with menus, lists and other interface elements (e.g. top-down vs. bottom-up scanpaths). "Sweep" denotes a scanpath progressing in the same direction.	Altonen et al. (1998)

Source: Poole and Ball (2004)

The Gaze Plot visualization shows the movement sequence and position of fixations (dots) and saccades (lines) on the observed image or visual scene. The size of the dots indicates the fixation duration, whereas the number in the dots represents the order of the fixation. A snapshot of 12.41 seconds of a participant viewing the search results for Pepsi on YouTube. The participant begins scanning the description of the first video search result (gazes 1-6). In this case, the participant spent more time viewing the sponsored videos than the first video search result (Source: oneupweb.com). According to Tzanidou (2006), there are four representative scan paths:

a) *Processing scanning* (Figure 14) was defined quantitatively as ten or more successive fixations on one single design element, such as a menu bar or web content.

Figure 14: Representative Scan path, classified as processing, superimposed on a stimulus web page in the icon-based condition

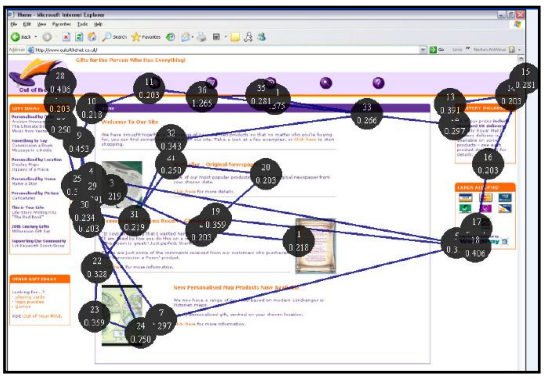
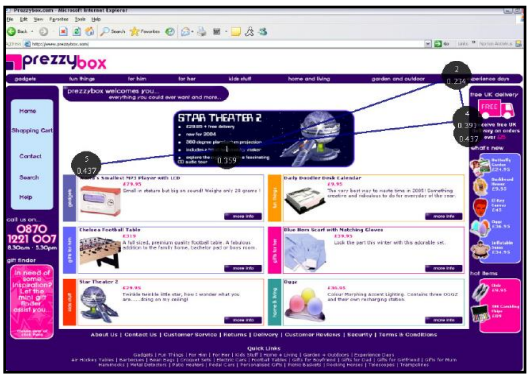


Figure 15: Representative Scan path classified as *focused scanning* superimposed on a stimulus Web page in the *text and icon-based* condition



Source: Tzanidou (2006, p: 184)

b) Focused scanning (Figure 15) was defined quantitatively as very small total numbers of fixations fewer than five fixations for a task. These fixations were often related to the task target, the CCIRs in the decision making process.

c) Random scanning (Figure 16): was defined as single fixations on different and non-related design elements. For example, a fixation on text in area A followed on an unrelated image in area C

Figure 16 (left): Representative scan path classified as *random scanning* superimposed on a stimulus web page in the *text-based* condition

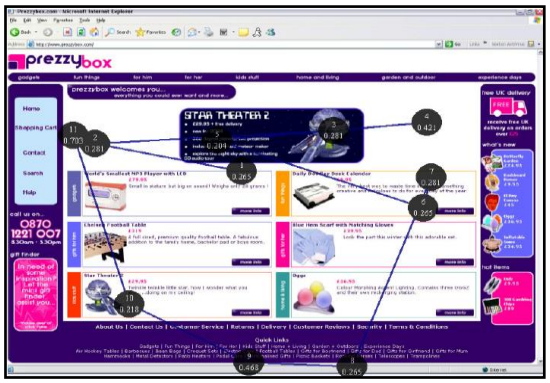
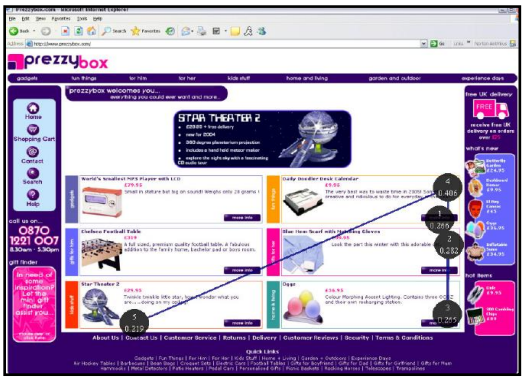


Figure 17 (right): Representative scan path classified as *peripheral* super-imposed on a stimulus web page in the *text and icon-based* condition

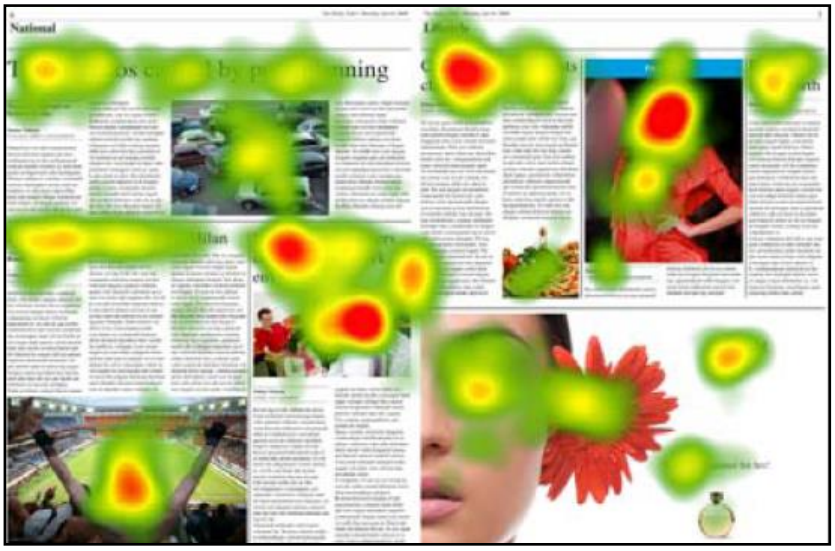


Source: Tzanidou (2006, p: 185)

d)Peripheral scanning (Figure 17): identifying the target link without the scan path 'passing' by it.

5.10.5 Heat maps*:* The Heat Map plot is a powerful way to visualize the gaze behavior of an entire group of recordings. A heat map uses different colors to show the amount of fixations participants made in certain areas of the image or for how long they fixated within that area. Red usually indicates a higher number of fixations or the longest time and green the least, with varying levels in between. An area with no color on a heat map signifies that the participants did not fixate in the area.

Figure 18: Heatmap

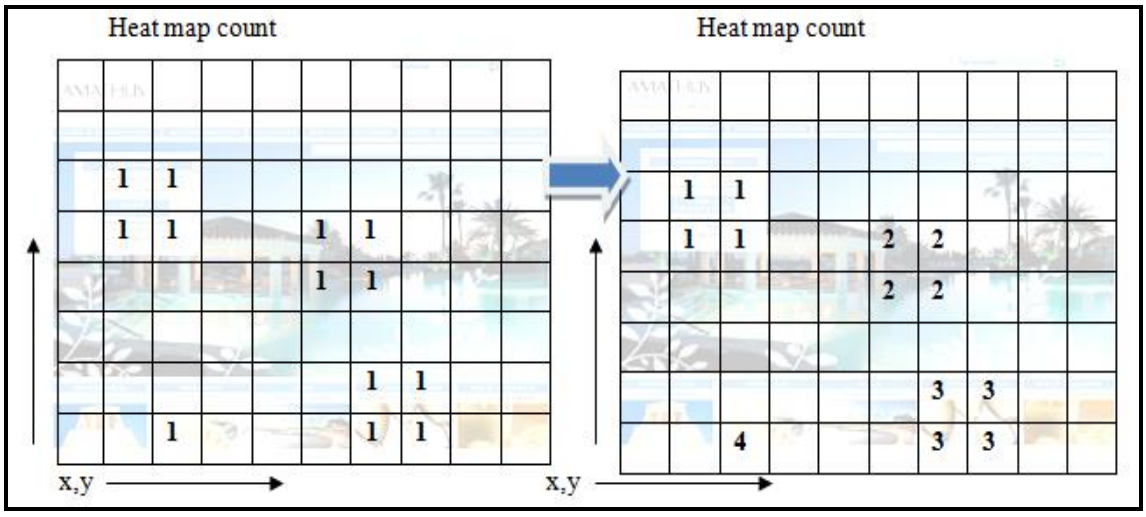


Source: tobii.com

The Heatmap visualization highlights the areas of the image where the participants fixated. Warm colors indicate areas where the participants either fixated for a long time or at many occasions. Heatmaps can be used to illustrate the combined gaze activity of several participants on an image or webpage.

5.10.6 How the heat maps are created by the Eye Tracker The basic idea behind heat maps is to map the fixation on the webpage. This was done by going through all the fixations in all the participants one – by – one and their values were added every time a fixation shared the same X and Y pixel location (as per example figure below).

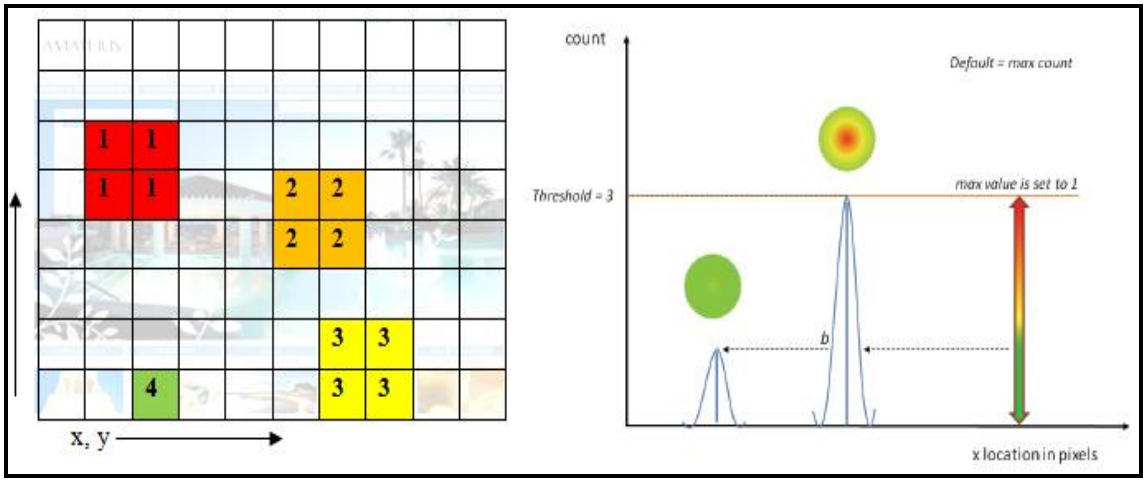
Figure 19: Heat Map Calculations



Source: Author, 2013

Once all fixations have been added together colour values are added to all the points (warmest colours present highest value): i.e.:

Figure 20: Heat map count



Source: Prepared for the purposes of this research

In order to apply the color values, the peak of the highest distribution is set from the eye tracker to 1and all the other distributions peaks are recalculated in reference to that distribution. The color is then linearly mapped along the distribution with the highest value 1= red, middle value 0.5 = yellow and low value 0=green.

5.10.7 Cluster Analysis*:* clustering of fixation data produced additional Areas of Interest; cluster provided areas with a high concentration of fixation points. Like heat maps and gaze plots, clusters are based on fixations. But how are clusters calculated? Simple clustering algorithms calculate the distance between two points in the data and

allocate them to the same cluster. The algorithm behind the Tobii Cluster visualization is based on the robust clustering algorithm suggested by Santella and DeCarlo (2004) for eye movement data analysis. Basically, the cluster algorithm tries to find spatial patterns in the distribution of the gaze data. It does so by first moving the gaze points into denser configurations until the points are collected around mode values, and then after a number of iterations when the distances between the mode values are larger than the distance threshold, it assigns each gaze point located around the same mode value to the same cluster. The first step in the algorithm defined by Santella and DeCarlo (2004) is called the mean shift procedure. According to Heminghous (2005), the process starts with a set of n points:

$$\{x \mid j\ 1..n\},$$

and repeatedly relocates each point xj to a new locality s(xj) which is the weighted mean of nearby data points.

$$s(x) = \frac{\sum_j k(x - x_j)x_j}{\sum_j k(x - x_j)}$$

Source: Heminghous (2005)

The symbol k is the kernel function that defines the effects of data points on each other. The parameter σs defines the spatial extent of the kernel. Specifically, it guarantees that no clusters exist closer in locality than σs.

$$k_{spatial}([x_i, y_i]) = \exp\left(-\frac{x_i^2 + y_i^2}{\sigma_s^2}\right)$$

Source: Heminghous (2005)

This method of cluster determination ensures that the determination of the clusters is not heavily influenced by noise and outliers. Additionally, distant outliers will be represented as small clusters, or discarded if no other neighbouring point is present at the current threshold distance. Large regions of uniform density of gaze data points will display one cluster (A. Santella and D. DeCarlo. 2004, cited in Tobii user manual, 2010).

5.11 Eye Tracking Metrics

5.11.1 Time to first fixation are the Areas of Interest able to pull attention quickly: is the time in seconds from when the stimulus was shown until the start of the first fixation within an AOI. More detailed, the time measurement starts when the media containing the AOI is are first displayed and it stops when the participant fixates on the AOI. When Time to first fixation compared to other areas of interest, it can show which elements of the page are drawing a user's attention in the context of the task they are asked to perform (Strandvall, 2008).

5.11.2 Fixation length refers to how much attention did the Areas of Interest got compared to other areas? Or How long was the Area of Interest considered?: is the length of the fixations in seconds within an AOI, if during the recording, the participant returns to the same media element, the new fixations on the media will also be included in the calculations of the metric (Strandvall, 2008).

5.11.3 Observation length refers to how many times did the participants look at the Areas of Interests?: is the total time in seconds for every time a person has looked within an AOI, starting with a fixation inside the AOI and ending with a fixation outside the AOI. Using this statistic, research may notice a block of text receives less than a second of total observations, indicating users have not read the messaging in full. Or researcher may notice in combination with the percentage fixated metric that while an element of a page may not have been seen by a lot of participants, when it was seen, it received a lot of attention (Strandvall, 2008).

5.11.4 Participant % refers to how quickly did the Areas of Interest manage to pull attention? Or how many of the Areas of Interest noticed? *:* is the percentage of participants that have fixated at least once within an AOI, It is calculated by dividing the total number of recordings in which participants have fixated within the AOI by the total number of recordings in the test (Strandvall, 2008)..

5.11.5 Mouse click count is the number of mouse clicks within the same AOI

5.11.6 Observation count is the number of visits and re-visits to an AOI. Each individual visit is defined as the interval of time between the first fixation on the AOI and the next fixation outside the AOI (Strandvall, 2008)..

Table 6: Fixation-derived metrics and how they can be interpreted in the context of interface design and usability evaluation

Eye-Movement Metric	What it Measures	Reference
Number of fixations overall	More overall fixations indicate less efficient search (perhaps due to sub-optimal layout of the interface).	Goldberg and Kotval (1999)
Fixations per area of interest	More fixations on a particular area indicate that it is more noticeable, or more important, to the viewer than other areas.	Poole et al. (2004)
Fixations per area of interest and adjusted for text length	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. This is necessary to separate out: (i) a higher fixation count simply because there are more words to read, from (ii) a higher fixation count because an item is actually harder to recognise.	Poole et al. (2004)
Gaze (also referred to as "dwell, fixation cluster" and "fixation cycle")	Gaze is usually the sum of all fixation durations within a prescribed area. It is best used to compare attention distributed between targets. It can also be used as a measure of anticipation in situation awareness if longer gazes fall on an area of interest before a possible event occurring.	Mello-Thoms et al. (2004); Hauland (2003)
Time to first fixation on-target	Faster times to first-fixation on an object or area mean that it has better attention-getting properties.	Byrne et al. (1999)
Percentage of participants fixating an area of interest	If a low proportion of participants is fixating an area that is important to the task, it may need to be highlighted or moved.	Albert (2002)
On-target (all target fixations)	Fixations on-target divided by total number of fixations. A lower ratio indicates lower search efficiency.	Goldberg and Kotval (1999)

Source: Poole and Ball (2004)

5.12 Think Aloud Technique and Eye Tracking

According to Hyrskykari et al (2008), for usability research, eye tracking data should be combined with additional qualitative data because eye movements cannot always be clearly interpreted without the participant providing context to the data. As referred above, longer fixations can mean a user found a particular area interesting (Cowen et al, 2002), but on the other hand it can also mean that they found the area difficult to interpret (Hyrskykari et al, 2008). Hence, it is important to attempt to supplement eye tracking data with additional information gained from the participants about their experiences (uncover previous experiences – critical decision method and video recording the entire process). The participants are encouraged to speak or think out loud while performing the tasks.

Video cued Think Aloud Method [i] Stimulated participants to produce 'manipulative' and 'visual' comments, [ii] Stimulated participants to comment on usability problems regarding 'layout' and 'navigation'[iii] Produced less data (comments and words) than eye movement cued Think Aloud method (Strandvall, 2008).

5.13 Eye tracking for web design

According to Granka et al. (2004), only a small number of studies have been conducted on eye movement behaviour on web pages. Visual preferences of text and images have been explored by two studies: Ellis et al. (1998). According to Ellis et al. (1998) study, they conducted a pilot study of web page design to assess the value of eye tracking as a usability evaluation technique. The results of this study indicated that users completed the task more quickly on text-based screens; overall text was more powerful than images.

Lewenstein et al. (2002) examined how users read on-line and off-line news. The results of the study were that text was viewed more than images by readers who read on-line news, whereas the opposite applied for readers who read off-line news. This study demonstrates the usefulness of eye tracking in detecting fine user behaviour such as visual search strategies.

Recent studies (i.e. Outing and Ruel, 2004, Pan et al. 2004) aim to understand the factors that influence user's visual-search behaviour. According to Pan et al. (2004) study, some of these factors, such as individual differences, design characteristics of the web pages, the order in which web pages are viewed and different tasks that were given to the users to complete. Outing and Ruel (2004), extended their previous work (Lewenstein et al. 2000) on how users read news websites. The results of their study indicate that users navigate more on the upper part of news websites rather than on the left or right of the page. Text size was found to be influential in terms of encouraging focused viewing behaviour; smaller text drew more fixations while larger sizes promoted lighter scanning. The users fixated more on headlines with large text rather than headlines with small text. Above studies underline this need for the usage of eye tracking in usability studies.

5.14 Summary

In this chapter a brief discussion of the methodology was presented. The research aims to provide new knowledge to the Hotel Industry concerning Cypriots online booking behavior and the effect of this on customer retention. The underline research methodology is based on an experimental evaluation of online behaviors using Applied Cognitive Task Analysis (ACTA), Critical Decision Method (CDM) and Tobii Eye Tracking Device. The main research target is to uncover customers' during the decision making process and their associated Customers Critical Information Requirements (CCIRs).

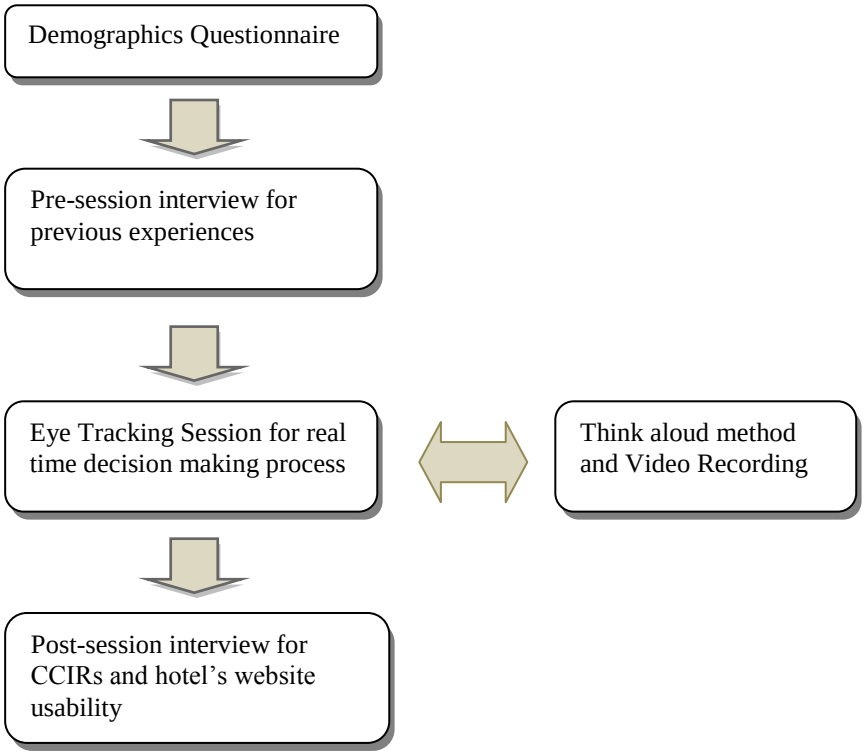
6

Research Methodology

6.1 Introduction

The objectives of this research are directed towards improving the design of online hotel reservation systems through the analysis of the cognitive aspects that influence the decision making patterns of online customers. Specifically, I am investigating the cognitive aspects of online customers with the intention to improve the design to better support their needs. For this purpose, *this research aims to apply cognitive task analysis techniques to identify and investigate the impact of critical cues of a web interface on the efficacy of the customer decision making processes*. Cognitive science and human-computer interaction (HCI) researchers have been developing increasingly powerful analysis methods. The purpose of these techniques was to analyze and model the cognitive processes that gave rise to human task performance in specific domains, as the basis for design and evaluation of computer-based systems and their user interfaces. In accordance with the HCI perspective, Cognitive Task Analysis methods such as the Applied Cognitive Task Analysis and the Critical Decision Method were employed to make explicit the cognitive tasks, cues and decision points encountered as they are manifested when the consumer is interacting with the online booking service. As part of a multi-method research approach, the technological objectives concern the direct measurement of eye movement patterns that inform the overall assessment of the consumer's attention to specific cues generated from informational features on a webpage. Additionally, verbal protocols were collected – think aloud method and observational data (Eye tracking) so as to recognize usability problems and identify customer's critical information requirements. The process followed as to collect all data is presented in the below figure.

Figure 21: Collection of data

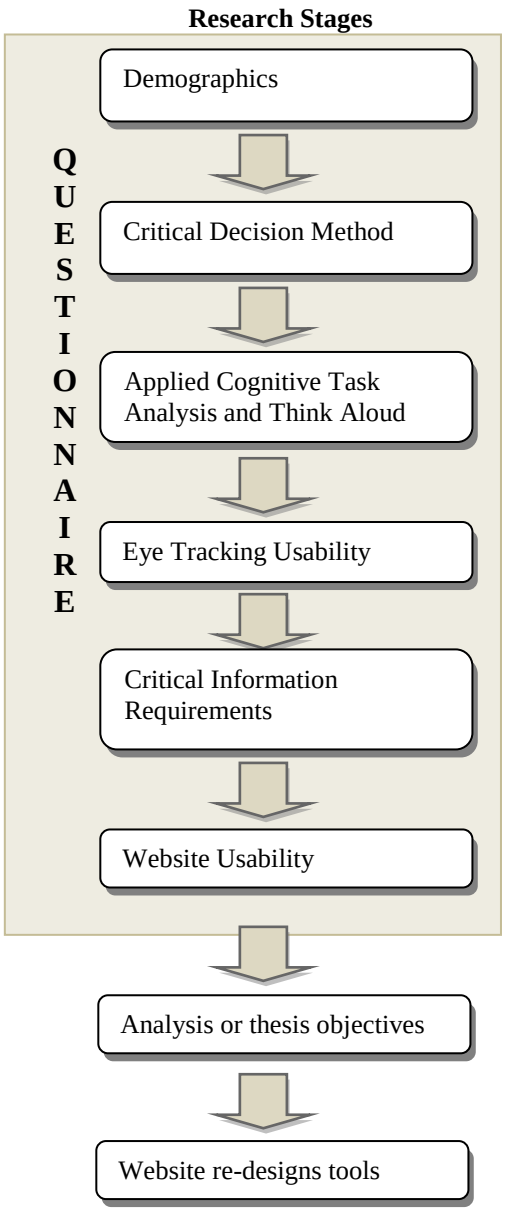


Source: Developed for the purposes of this study

The results from these methods will inform the (re) design of online booking interfaces that capture and convert customer intentions into concrete bookings. Clearly, the value of such a socio-technical approach is to pinpoint decision points and resolve decision problems during the customer's execution of their cognitive tasks during an online booking session.

The above approach and its associated methods guide to the *redesign of the online interface to achieve cognitive compatibility thereby avoiding customer dissonance causing the prospective customer to click onto a competitor's website*. The below figure outlines the thesis research stages through the experiment.

Figure 22: Thesis research stages diagram



Source: Author

6.2 Hotel Websites (case studies)

As referred above, the main task of this research was to investigate the customer's critical information requirements during the decision making process and usability problems of the case study websites for the main hotels located in Cyprus. Additionally, as the process was time-consuming it was impossible to search more than three websites. In the European Union, similar hotel classes coding is used (1 star hotel: tourist, 2 stars hotel: standard, 3 stars hotel: comfort, 4 stars hotel: superior and 5 stars hotel: luxury). For this reason, three different hotel websites of same class range (different locations) were randomly selected (from website of the Cyprus Tourism Organization) for use in the research:

- Golden Bay (www.goldenbay.com.cy) Larnaca
- Paphos Amathus Hotel (www.amathus-hotels.com/paphos) Paphos
- Limassol Amathus Hotel (www.amathus-hotels.com/ limassol) Limassol

European countries adopt a formal system of classification that is a coded form of summary of the level of comfort and range of services provided from hotels in the European Union (EU). According to the European Consumer Centers' Network (2009), hotels websites across the EU share a common facilities language that include quality of services provided , general condition of the building, reception hall, accommodation, toilets, food premises and the attitude and professionalism of the staff.

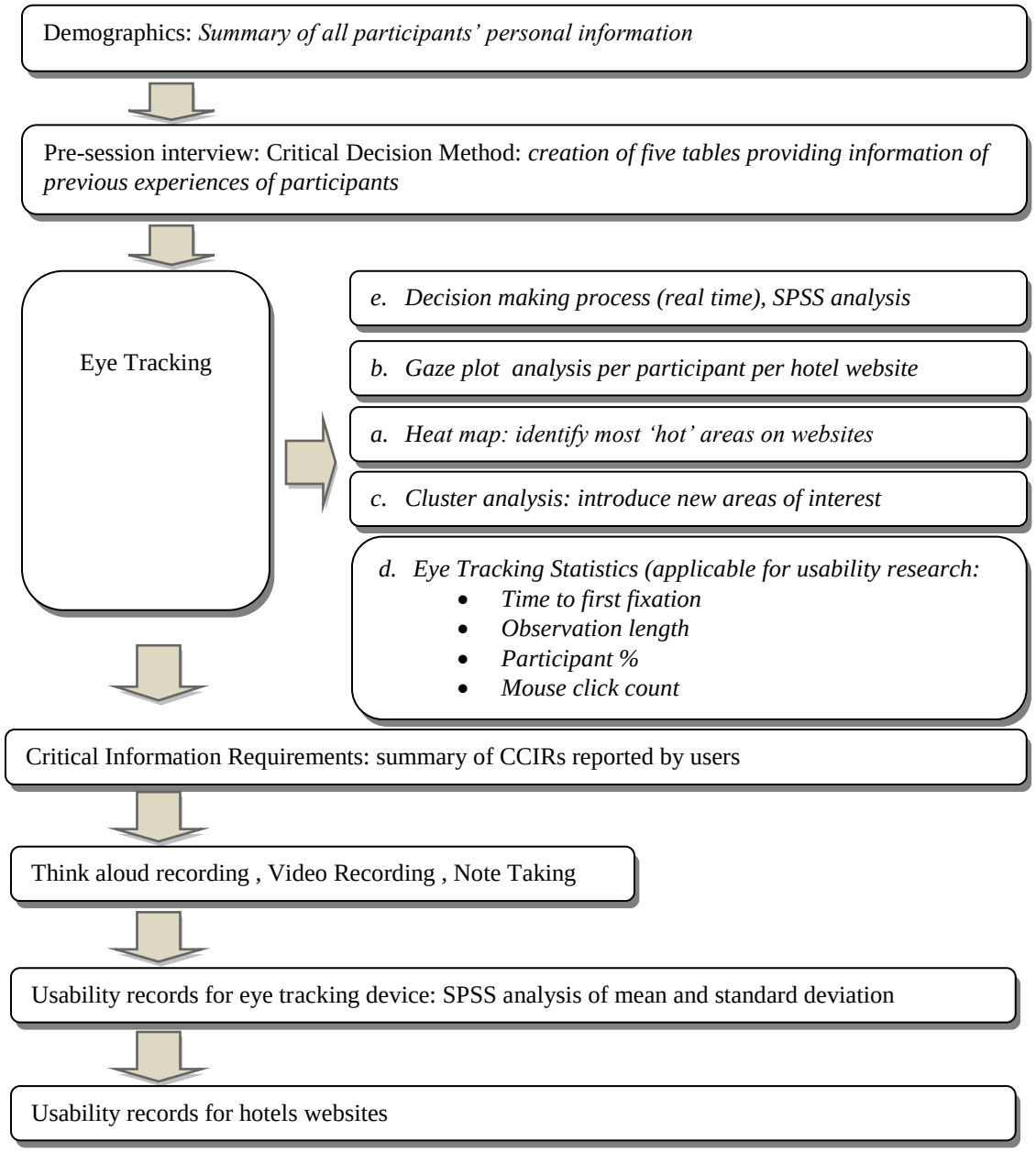
6.3 Participants

Although opinions vary about the optimal number of participants in a qualitative usability study, usually 5-15 participants (depending on the test) are needed (Tobii, 2009). For the purposes of this doctoral thesis, 25 participants were recruited for the Eye tracking survey, which were composed of Bachelor Degree Students and Master Level Students. Some participants had glasses or contact lenses but this was not an obstacle to tracking their eye movements. It is important that all participants had never seen the tested hotel websites before and it was their first experience with an eye-tracking study and device. All participants reported that they used the Internet daily.

6.4 Testing Procedure

The session began explaining the respondents the procedure, the interview part and what they have to do during the eye tracking process. The participants were explained that the questionnaire was divided into five parts; demographics, critical decision method interview, applied cognitive task analysis questionnaire in combination with eye tracker, critical information requirements and website usability evaluation.

Figure 23: Testing Procedure



Source: Author

6.5 Calibration

Before starting our experiment with the proposed hotel websites the respondent is asked to look at specific points on the screen, also known as calibration dots. During this period several images of the eyes are collected and analyzed. The resulting information is then integrated in the eye model and the gaze point for each image sample is calculated. When the procedure is finished the quality of the calibration is illustrated by green lines of varying length.

6.6 Description and Coding of the qualitative data

Critical Decision Method Interviews were examined using a qualitative analysis technique known as coding. According to Gibbs (2002), the coding is a way to organize data by applying labels to portions of text from interview transcripts. The general analysis processes follow two stages: ***description*** (summarize what happens during the online decision method) and ***coding*** (systematically identifying key factors and relationships). During description stage, a table was created with all respondents' replies and then a summary table. For the coding stage, it is going to set some possible replies from the beginning as below (i.e.) *Can you tell me a previous online experience during the last two years? What was the purpose you went online? Online booking, Online banking, Online purchasing, Online ticketing (e-ticketing), Other.*

6.7 Testing Goodness of Data – Reliability

Cronbach's Alpha is a reliability coefficient that indicates how well the items in a set are positively correlated to one another. The closer Cronbach's Alpha is to 1, the higher the internal consistency reliability (Sekaran, 2000). Following the Reliability Statistics Table as presented below, Cronbach's Alpha is .880, thus the internal consistency reliability of the measures used in the present research is considered good.

6.7.1 Calculation

For the purposes of this research I estimate to have a margin of error equal to 0.05 with 95% confidence.

Case Processing Summary

		N	%
Cases	Valid	25	100,0
	Excluded[a]	0	,0
	Total	25	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,880	,905	106

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
302,68	1315,560	36,271	106

Levels of confidence and associated z values

Level of confidence	z values [K]
90% certain	1.65
95% certain	1.96
99% certain	2.57

Source: Saunders et al (2003, p: 466)

According to Sekaran (2003) the population mean can be estimated using the formula. From a pilot sample of 25 respondents the sample mean found was (see Scale Statistics Table) $\bar{x}$ =302.68 and Standard Deviation (SD) = 36.271. The sample mean $\bar{x}$ is a point estimate of μ, the populations mean.

$\mu = X \pm KS \underset{x}{\Rightarrow} \mu = 302.68 \pm 1.96 \times 0.05 \Rightarrow \mu = 302.5$

$S_{\bar{x}}$ = Standard Error

$S_{\bar{x}} = S/\sqrt{n} \Rightarrow 36.271 / \sqrt{25} \Rightarrow S_{\bar{x}} = 7.25$

$S_{\bar{x}} = S/\sqrt{n} \Rightarrow 7.25 = 36.271/\sqrt{n}$

The same process has been followed to find the sample:

n=25 to achieve a 95% confidence, the sample size needed is 25 respondents for interviews and Eye tracking research part.

6.8 Eye Tracking Web Usability

This research seeks to obtain a deep understanding of the cognitive factors and the CCIRs in the customer's DMP that influence online hotel reservations. Ocular indices (i.e. MyTobii Eye Tracking Device) enable researchers to determine what abstracts a computer user is indeed reading and viewing, for how long and in what order. This gives the researcher the opportunity to extract more accurate conclusions regarding hotel websites and what actually a potential client sees and what makes him to go to another hotel website for his booking.Eye tracking is possible to trace a lot of CCIRs used and required during the decision making process of any task (i.e. hotel booking). It is a useful tool in order to open the 'black box' of online decision making and to study the computational processes used by participants to make these decisions (Willemsen and Johnson 2009).

Rayner (1998), cited in Granka et al (2004), states that eye fixations are defined as a spatially stable gaze lasting for approximately 200-300 milliseconds, during which visual attention is directed to a specific area of the visual display. Fixations represent the instances in which information acquisition and processing is able to occur and thus, fixations are the indices for the evaluation of this research.

According to Ofcom Research Document (Ofcom, 2009), decision making can be the result of two separate mental processes:

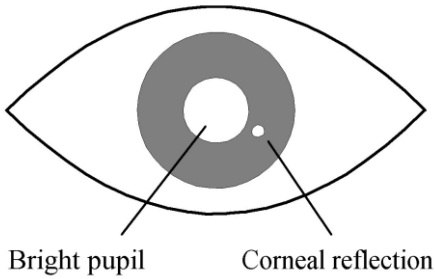
a. Reasoned decision making: bring to mind previous experiences and their conscious evaluation. For the purposes of the research, Critical Decision Method is going to be used.

b. Heuristic decision making: in order to analyze the heuristic part, Applied Cognitive Task Analysis in combination with Eye Tracking Device (MyTobii) is going to be used.

Following, Kominkova (2008); Haddioui and Khaldi (2011) eye tracking is the process of measuring either the point of gaze ("where we are looking") or the motion of an eye relative to the head. According to MyTobii user manual, MyTobii eye control system allows a research respondent to interact directly with objects (i.e. websites) on a computer screen simply by looking at them. MyTobii is based on an eye tracking technology, which keeps track of the user's gaze as well as the location of objects on the screen and estimates what actions the user intends to initiate based on the eye movements.

Tracking people's eye movements *benefit Human – Computer Interaction and researchers to understand visual based information processing and the factors impact the whole process*. According to Goldberg and Wichansky (2003), most commercial eye-tracking systems available today measure point-of-regard by the "corneal- reflection /pupil-centre" method. Poole and Ball (2005), eye trackers usually consist of a standard desktop computer with an infrared camera mounted beneath (or next to) a display monitor, with image processing software to locate and identify the features of the eye used for tracking. In operation, infrared light from an LED embedded in the infrared camera is first directed into the eye to create strong reflections in target eye features to make them easier to track. The light enters the retina and a large proportion of it is reflected back, making the pupil appear as a bright, well defined disc (known as the "bright pupil" effect). The corneal reflection (or first Purkinje image) is also generated by the infrared light, appearing as a small, but sharp, glint (Figure below).

Figure 24: Corneal reflection and bright pupil as seen in the infrared camera image

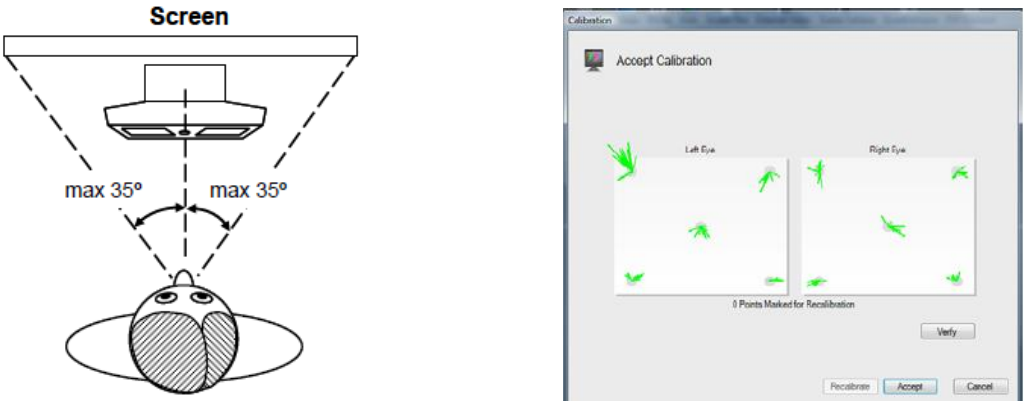


Source: Haddioui and Khaldi (2011)

Calibration of the equipment is necessary because there are differences in the size and shape of individuals' eyes. It is proposed that calibration should be repeated throughout testing to maintain an accurate record (Poole and Ball, 2005, Haddioui and Khaldi 2011).

Large offsets (long green lines, Figure below) can be caused by various factors such as, the user not actually focusing on the point, the user being distracted during the calibration or the eye tracker not being set up correctly. It is important that a video camera was recording the entire process of the participants in order to give control to the researcher and in order to capture any un-said cues.

Figure 25: The Tobii x50 can do eye tracking at gaze angle up to 35º out from the center of the built in camera

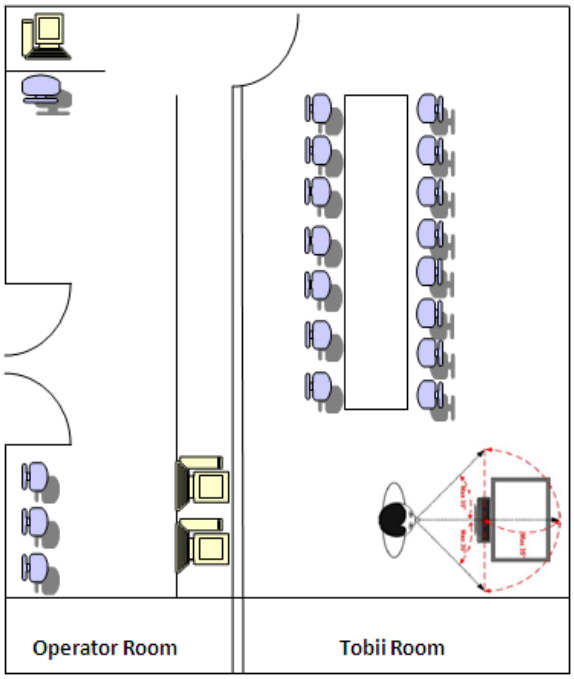


Source: www.tobii.com

6.8.1 Apparatus: The research was performed with a Tobii x50 eye tracker that should be placed below the screen (or the surface that is to be studied), vertically aligned with the center of the screen, horizontally aligned with the screen in two directions (thereby leaving only one angle of rotation allowed), placed as close below the screen as possible, placed so that the person sitting in front of the eye tracker will sit at an approximate distance of 61 cm (or 24 inches) from the eye tracker, placed so that the gaze angle of the person being eye tracked never will exceed 35º as long as he looks at the screen, this allows for eye tracking on a 21" TFT screen if the Tobii x50 is set up right in front of this screen (tobii.com). As a result, the participants could move freely in the limited area that the tracking system can record their eye movements.

Eye Tracking tests were performed in Psychology Laboratory of European University, Nicosia (Figure 26). The Laboratory is divided into two rooms with a window in the middle. One of them is the Tobii Room, having a computer with an eye tracker device and screen recording capabilities (Model Tobiix50), a conference table that interviews, brain storming and other surveys are prepared. The other room is the operator room, where the participants and the screen of the Tobii test are observed. Additionally, this room has microphones, amplifiers and computers for further analysis. It is important that Tobii room is soundproof. Moreover, a video camera was used so as to capture as much information as possible during recording and to capture all think aloud data from respondents.

Figure 26: Psychology Laboratory of European University, 2010



6.9 Eye Tracking Limitations

According to Duchowski (2003), one of the main limitations of eye-tracking is the sampling rate, which can reduce the accuracy by ignoring the micro saccades. Though, the micro saccades are unlikely to be of use in usability (Harrison, 2008). Another problem when using eye-tracking for dynamic stimuli such as websites is the problem caused by scrolling of screens and the recording of xy coordinates. However, current software compensates for scrolling activity to ensure the gaze plot is on the appropriate area of the website (Tobii, 2007). Eye data can also be missed because of blinks, resulting in invalid entries (Renshaw, 2004). As with any type of software, system errors can also result in incomplete data sets (Harrison, 2008). There are still questions about eye-tracking that remain largely unanswered such as how can be determined whether someone is attending to or processing the information in their foveal focus (Renshaw et al, 2006). For this study, in order to overcome this limitation, think aloud method and video recordings were applied. Participants were asked to say whatever they are thinking, looking, doing and feeling as they go about their decision making process for the hotel reservation.

6.10 Research Approach Used / Design Science

As discussed above in Chapter 5, Literature Review, design science seeks to create what is effective. Additionally, the artefact must either solve a problem or provide a more effective solution. Design science is all about design, build and evaluate. As a result, for the purposes of this study I had to design an approach in order to get CCIRs, redesign the websites and evaluate them. Artefacts can be constructed, models, methods and installations. In this research, the artefact is the method developed in order to get CCIRs. A method defines process and guidance on how to identify the CCIRs, redesign them and keep the users engaged.

6.11 Data Analysis

Due to huge collected data, the entire data analysis was designed so that to analyze it following interview's structure. The main purpose of the data analysis was to identify the Customer's Critical Information Requirements that influence online decision making process of the participants. Various analyses were performed so as to capture as much information as possible from different aspects and different time periods of participants.

6.11.1 Primarily, the critical decision method was used to gain a picture of the previous online experiences of the participants. Six tables were created representing the six steps of the CDM process. Qualitative analysis was undertaken to determine the findings. During the interview, the participants were requested to think back to an incident (previous online experience) that occurred in the last two years in which they had to make critical decisions regarding online booking (not necessarily hotel reservation, booking can be for tickets, online banking, online purchasing etc). Critical Decision Method data analysis into 4 steps:

1. Transcription of the (voice or video) recorded information into a text-based format.
2. Coding.
3. Once coding is completed, is planned to organize the data from the transcripts into a format that summarizes and categorizes the data.
4. Compare the formatted results for each of the expert knowledge elicitations into a summary table and verify that the formatted results reflect the knowledge representation of the task area.

Table 7: Critical Decision Method Probes

Cognitive Cue	Question
Goal specification	What did you expect to find during the information search for a hotel booking?
Goal identification	During the information search process for a hotel, did you search for specific facilities?
Expectancy	Were you expecting to use the Internet for your Information Search Process?
Influence of uncertainty	At Information Search stage were you uncertain about either the reliability of information you had available?
Information integration	What was the most important piece of information earned that you used to formulate the decision?
Situation awareness	Did you use all the information available to you when formulating the decision?
Missing Information	Was there any information missing that you need it to proceed?
Decision blocking	Was there any stage during the Information Search process in which you found it difficult to process?

6.11.2 Secondly, analysis of the real-time decision making (ACTA) process was performed using both statistical methods of means and standard deviations and eye tracker results; the questions of the ACTA focused on initial impressions, searching and scanning of hotels homepages, reservation pages and booking pages.

During this part the respondents had to follow some tasks – real-time decision making process (via eye tracker) to search, evaluate and decide to book a hotel and then after they decide from which hotel they want to book, they have to state it and then answer nineteen 5-point Likert questions; divided to three-following decision making process stages. Then they had to answer 5 questions concerning the usability of the eye tracking technique. The tasks were the same for all websites; search among the three 5* hotels located in Cyprus (Larnaca Golden Bay, Paphos Amathus Beach Hotel and Limassol Amathus Beach Hotel) and book vacations for you and your partner (or family) for the period 1-8/12/2010. For each hotel website they visit they were requested to follow the below process:

"a. Go to online booking section offered from the hotel, b. Enter the booking period 1-8/12/2010, c. Search availability, d. Search availability in bedrooms, e. Search availability in meals, f. If hotel meets your expectations, please proceed to booking check out, g. If you decide to leave the hotel's website, please report the reason and proceed to the next hotel. For each hotel, please answer the below questionnaire-rate from 1-5 where is 1 is strongly disagree and 5 is strongly agree. During the process participants were kindly requested to talk aloud and the entire process is video recorded, i.e. what they are trying to do, why they took an action."

These tasks covered different kinds of online users interactions during their online decision making process; searching, usage of navigation from one page of the website to the other, scanning of hotel's photos, scanning text and information provided, reading etc., that expected to demonstrate various customer's critical information requirements and usability problems.

6.11.2.1 Think Aloud A small monitor on the bottom left hand side of the screen was used in order to ensure that the eyes were recorded correctly during the entire process and as a result avoid any biases. Additionally, during the entire process a video camera was used in order to record what the participants were doing and why, what they thought of the website, if they were searching for something specific, if they found something missing or unclear (think aloud). Identified usability problems and comments were picked out and finally compared. In previous usability research on website interface design [Eger et al, 2007; Van den Haak, 2003], six usability problem categories were identified – *Table 8: Categories used for categorizing usability comments*. Three of them were selected and used to categorize usability comments in the study presented in this research.

Table 8: Categories used for categorizing usability comments

Layout	Inability to detect something in the screen that they need to find
Feedback	The user does not receive relevant feedback or it is inconsistent with what the user expects
Data Entry	Problems with entering information

Source: Tobii Manual (2009)

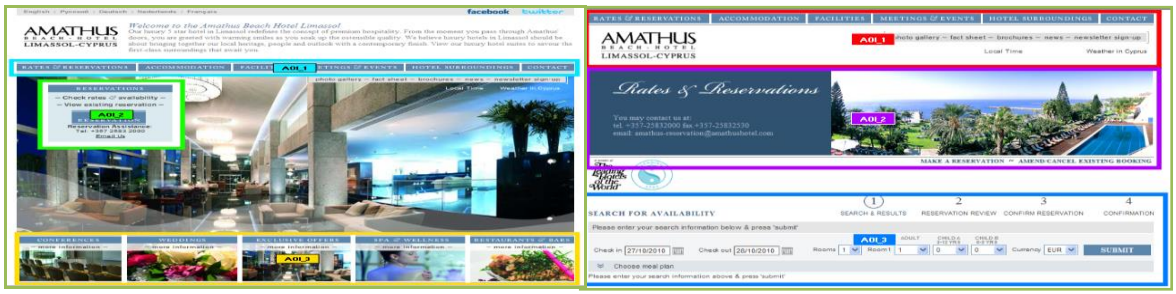
6.11.3 Eye Tracking Method and Analysis Metrics: Applied Cognitive Task Analysis of the three selected hotel websites was tested with an eye tracking device; this methodology measures and evaluates the eye movements and examines the visual attention of the users.

6.11.3.1 Areas of Interest (AOI) The four top areas in the search results are defined as AOI 2, AOI 3 and AOI 4, respectively. The ability to define specific AOIs gives the researcher ability to analyze the percentage of users fixating on a particular element and the length of their stay on that feature. Time to first fixation and fixation duration are powerful metrics to begin to understand how viewers distribute their attention across a webpage (www.oneupweb.com).

Figure 27: AOI - Golden Bay Hotel – Larnaca

Home page: AOI1 Horizontal Bar: Area, rooms, location etc, AOI2 Book now, AOI3 Promotional rates, AOI4 Important notice "The hotel will be closed for extensive renovations from 8/11/2010 until 13/02/2011". *Reservation page* AOI1 Booking dates, AOI2 Calendar, AOI3 Notice from Hotel "We regret we cannot offer you any rooms for the requested search criteria. Please modify your search.

Figure 28: AOI - Limassol Amathus Hotel

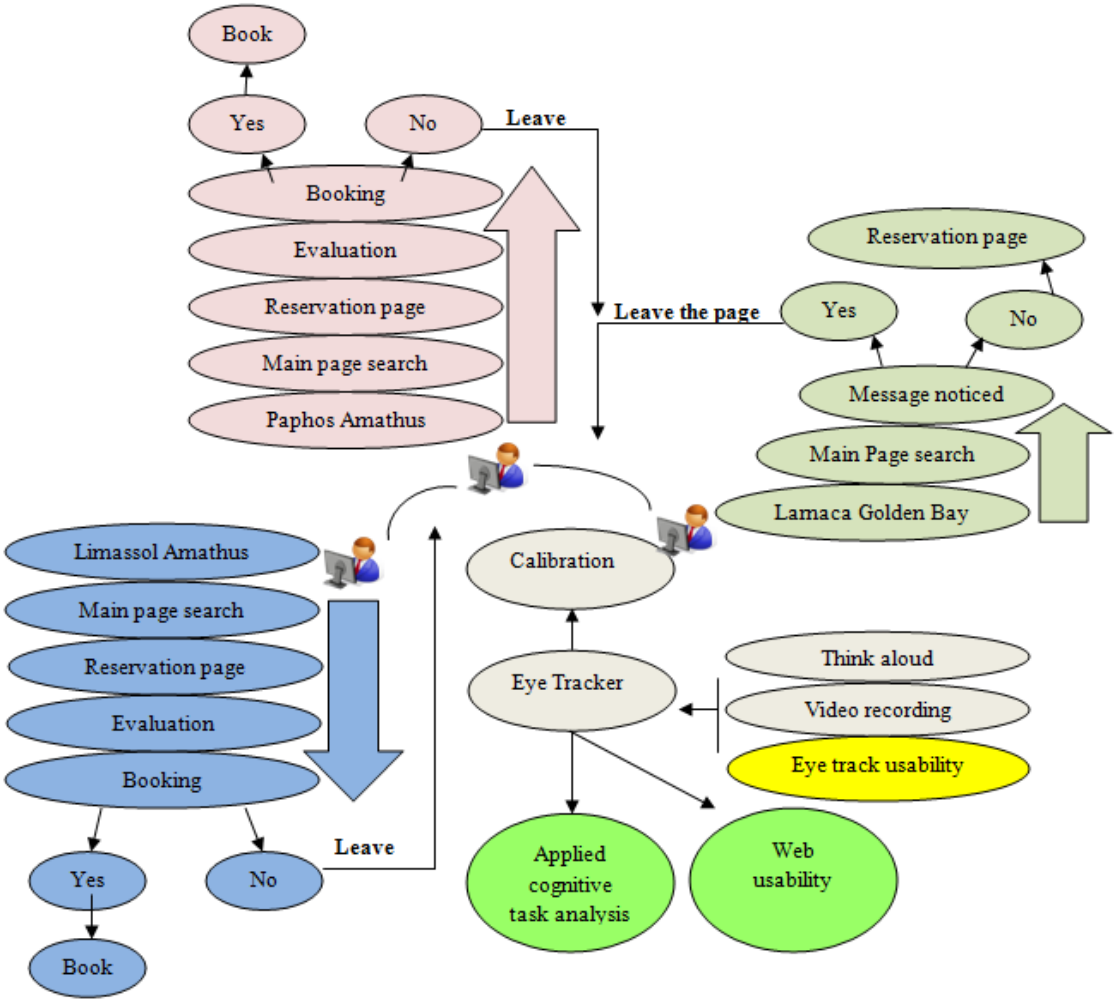


Home page: AOI1 Horizontal Bar Area, rooms, location etc, AOI2 Book now, AOI3 Facilities etc. *Reservation page* AOI1 Rates and Reservations, Facilities, Logo etc, AOI2 Photo, Amend/Cancel reservation AOI3 Booking Process

Figure 29: AOI -Paphos Amathus Beach Hotel

Home page AOI1 Horizontal Bar: Area, rooms, location, AOI2 Book now, AOI3 Hotel Facilities etc. *Reservation page* AOI1 Rates and Reservations, Facilities, Logo, AOI2 Photo, Amend/Cancel reservation, AOI3 Booking Process

Figure 30: Schematic representation of eye tracking process



Source: Author

Presented below are the many eye-movement based metrics used to meet the study's objectives:

6.11.3.2 Gaze plots of scanpath image fixations were represented by dots; larger dots mean longer fixation time (fixation duration) whereas the number in the dots represents the order of the fixation. It is important that during this phase, additional gaze plots were performed in order to identify where respondents' eye stopped first; this showed the attention of the participants during the first five seconds.

6.11.3.3 Heat maps were performed in order to identify more clearly the amount of fixations participants made in certain areas of the webpage or for how long they fixated in the specific area. Red showed the highest number of fixations or longer time and green the least. The areas with no colour on the heat maps showed that the participants did not fixate in the area.

6.11.3.4 Clusters this eye tracking metric produced very interesting results; clustering of fixation data produced additional Areas of Interest; cluster provided areas with a high concentration of fixation points.

6.11.3.5 Eye tracking metrics Then, eye tracking metrics were performed included in Tobii Studio. These were produced due to participants' fixations. The following metrics were produced for the purposes of this study (average was presented as well):

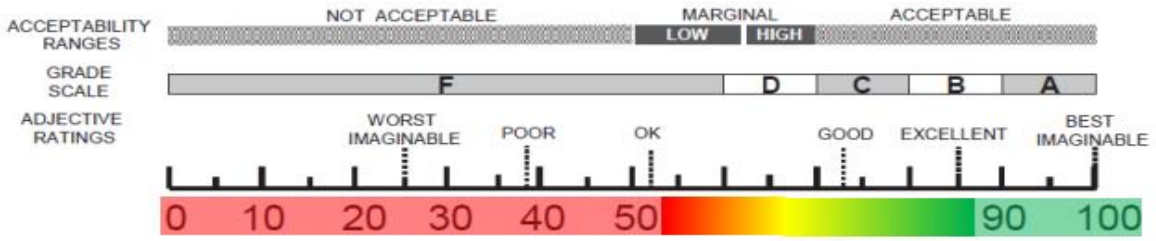
(a) Time to first fixation – are the Areas of Interest able to pull attention quickly: is the time in seconds from when the stimulus was shown until the start of the first fixation within an AOI.
(b) Fixation length – How much attention did the Areas of Interest got compared to other areas? Or How long was the Areas of Interest considered? is the length of the fixations in seconds within an AOI, if during the recording, the participant returns to the same media element, the new fixations on the media will also be included in the calculations of the metric.
(c) Observation length – How many times did the participants look at the Areas of Interests? Is the total time in seconds for every time a person has looked within an AOI, starting with a fixation inside the AOI and ending with a fixation outside the AOI.
(d) Participant % - How quickly did the Areas of Interest manage to pull attention? Or how many of the Areas of Interest noticed? Is the percentage of participants that have fixated at least once within an AOI?
(e) Mouse click count is the number of mouse clicks within the same AOI and
(f) Observation count is the number of visits and re-visits to an AOI. Each individual visit is defined as the interval of time between the first fixation on the AOI and the next fixation outside the AOI.

6.11.4 Thirdly, the Critical Information Requirements table was produced following next part of the questionnaire; the table was prepared in order to provide what participants asked regarding 'required info', 'missing info in information search stage', 'expectations', 'missing information in the evaluation of alternatives', 'identify key information' and 'missing information on booking stage'. Three questions were used for each decision making process step asking for any missing information and in case respondent left the website at this stage, to state the reason.

6.11.5 Finally, usability means and standard deviations – tests performed via SPSS statistical program were performed for websites usability per hotel. Participants were asked to *evaluate each website* (not only the one they wish to book) using a 5-point Likert concerning its usability. Participants spent on average 30-45 minutes performing the tasks and answering the questionnaire. Analysis of website usability was as referred above a set of 10 SUS questions that were used after participants' real time search of websites. This procedure was repeated for the three websites visited.

Scoring is simple and normalized to a 100 point scale (Figure 31). There is a possible score per question of either 0, 1, 2, 3, or 4. In order to ensure no bias towards any of the statements with respect to agreement or disagreement, questions 1, 3, 5, 7, and 9 give more points to Strong Agreement (ie Strong Agreement = 4 points), while questions 2, 4, 6, 8, and 10 give more points to Strong Disagreement (ie Strong Disagreement = 4 points).of SUS. To calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. For items 1,3,5,7,and 9 the score contribution is the scale position minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. Multiply the sum of the scores by 2.5 to obtain the overall value of SUS. The total score should be between 0 and 100. The higher the score, the more usable the website is. Any value around 60 and above is considered as good usability. Any value from 0-50, is grade scale F-E, the acceptability range is not acceptable and poor, between 51-74 (D-C) usability is ok to good and from 74-100 (B-A) is excellent to best imaginable.

Figure 31: SUS Schematic Score



Source: Brooke, J. (1996)

6.12 Pilot Study

Initially two pilot studies were performed to test the validity of the research instrument and the experiment prior to proceeding with the actual data collection. The original idea was the participant to freely search the internet to find a hotel in Cyprus for his holidays; however when this was tried in pilot, there was a mass of webs impossible to cross check them via Eye tracking. Then it was proposed to use 10 hotels, but it took participant too much time to search them all and as a result forget the information provided for each hotel; this influence the decision making process of the users as they got bored and to stop the process earlier. Then it has been decided to use three similar star rated hotels (Five Star Hotels), one from Limassol (Amathus Limassol), one from Paphos (Paphos Amathus Beach Hotel) and one from Larnaca (Golden Bay); cities in Cyprus on the coast, same star rating category and similar facilities.

6.12.1 Pilot Study 1(Participant 1)

Pilot Study 1, took place in Nicosia, European University, where the Eye Detector Device is located. The pilot was on the 5th of May, 2010 and the participant was a University Student, Master Level, 23 years old. He was an experienced user of computers and he had previous experiences with online booking, online banking and online purchasing. Participant 1 main responses after pilot he has his own Tourist Office hence very familiar with the online booking procedure and experience. He is using both offline (agents, hotels brochure and front office) and online channels and he uses his own visa to pay online. He prefers online booking because is cheaper, faster and more convenient. The search machine he repeatedly uses is google.com and he mentioned that information provided is reliable. During the information search he is mainly looking for better deals and the facilities he seeks in a hotel is spa, gym, swimming pool, room service, double beds, bed and breakfast

package and satisfactory star rating. His main concern during information search, evaluation of alternatives and the final decision is the price. He preferred to book his holidays in the Amathus Beech Hotel. A lot of questions were changed in the interview so as to make it smaller and easier. At the beginning the interview was too big repeating similar questions again and again; hence many of them were taken out making the questionnaire smaller, easier and more convenient. In total twenty questions were taken out. Three questions were kept and used to analyze the CCIRs. There was no problem in language and eye tracker usage. However, there was a problem with the Eye Detector Device in relation to the respondent's position. In many cases the eye tracker could not detect respondent's eyes and as a result did not detect all hotel websites. In order to overcome this problem, Eye tracking offers a small screen that shows all the time, whether the eye movements are detected or not.

6.12.2 Pilot Study 2 (Participants 2)

Pilot Study 2, took place in Nicosia, European University where the Eye Detector Device is located. The pilot was on the 18th of June, 2010 and the participants were Physics Professor 28 years old, Master Degree holder and a General Manager of a private company, 29 years old, and holder of two Master Degrees. Both respondents are experienced users of computers and they had previous experiences with online booking and online purchasing. The respondents advised that the questionnaire should be friendlier and make more of the open questions close; as a result new tables were created (see Questionnaire in appendices 3 and 5 Critical Decision Method Interview Questions step five) making the questionnaire more users – friendly and convenient. At this stage the design of the questionnaire was revised, not the questions. There was no problem in language and eye tracker usage. After Pilot I, the eye-detector has been used during the whole process; in order not to miss respondents' eye movements.

The first respondent of the pilot II, uses the internet to buy air tickets, to purchase clothes and to book hotels. He uses telephone catalogues to find hotels contact details and cross internet information. He prefers offline booking before of personal communication, additional information and service. He uses ebay very often because of reliable sellers and information. Price pays a vital role in his final decision and he never had a bad experience

with internet. He feels nervous when he uses online payment methods because of fraud. During the information search and evaluation of alternatives he always double check the other websites and offline channels so as to be 100% sure that he took the right decision. He chose Amathus Beach Hotel to book his vacation because of the information available from the hotel, facilities and availability. He is asking for a hotel that gives package that includes bed and breakfast and in many cases half or full board. Second respondent reported same concerns as Participant 1, however, he provided an additional stage in his online decision making process: information search via the internet, evaluation of alternatives, booking, check with her bank for the correct charge; in case of fraud immediate response to the bank.

6.13 Summary

The critical incident technique consists of a set of procedures for collecting direct observations of human behaviour in such a way as to facilitate their potential usefulness in solving practical problems and developing broad psychological principles. The Critical Decision Method (see chapter 4 for additional literature) used for the purposes of the research was prepared in order to facilitate the research with these 'probes' that are behind of the decision making process steps. In order to investigate the present decision making process, Applied Cognitive Task Analysis was developed and investigated using Eye Tracking Device so as to investigate in depth the real behaviour of participants when they come to book online.

Finally, customer's critical information requirements were analyzed in order to facilitate hotel websites providing the factors that customer pay attention when they surf online and keep the interest of their potential customers. Critical information requirements are the pieces of information customers need to make appropriate decisions. The implementation of this information will be used to upgrade the hotel's website presentation and the information provided.

Proper combination of eye tracking with other techniques (i.e. Critical decision Method, Applied Cognitive Task Analysis that were used for the purposes of this study), richer data

was captured in order to understand in a deeper level the critical customer information requirements that influence users during their online decision making process. This will provide records for future studies and useful redesigning criteria for hotel – and not only webpages.

Semi-structured questionnaires, interviews and Eye Tracking Device (Tobii) were used as the primary instrument for collecting the primary data. This was performed after a series of experimental evaluations of the interaction of users with a number of online hotel booking systems. For the identification of the cognitive aspects of the customers it was used a specialized Eye Tracking Device. The purpose of the Eye Tracking Device was to identify eye fixations of participants on features of the online hotel reservation systems.

Initially two pilot studies were performed to test the validity of the research instrument and the experiment prior to proceeding with the actual data collection.

The data collection was based on experiments using a number of different online hotel reservation systems (three hotel websites) in Cyprus. Results from the experiment inform the redesign of the interface by refining the information requirements of the online reservation system.

The researcher selected participants from all areas of Cyprus. During the experiments, it was investigated both external and internal aspects and the relationship between them. All factors that influence customers' decision are identified- through the combination of subjective and objective data collection that emerge from the questionnaires and the behavioural analysis through the eye tracking.

7

Analysis of Data

7.1 Introduction

This chapter reviews and analyzes the data received from the twenty five participants. Main target is from the results to identify these customers critical information requirements that influence their decision making process when they come to use online systems for their hotel booking. Twenty-five participants answered the demographics part of the questionnaire, the interview part of the critical decision method, used the Tobii Eye Tracking Device so as to decide which hotel they wish to book for their vacations in combination with an applied cognitive task analysis questionnaire, answered some open questions regarding additional customers critical information requirements and finally evaluated websites' usability. During Eye Tracking process, they were video recorded and the 'think aloud' method was used to capture any additional data not captured by the tracking device and questionnaires.

As referred in previous chapters three hotels were selected for the research. One of them, the Golden Bay Larnaca, was closed during the requested booking period, as a result main target for the participants was to capture this message from the hotel but in case they were attracted from the webpage to proceed with information search. As a result only the two remaining hotels were selected from participants for booking; all three hotels were rated in terms of their usability.

Analysis of data starts with the demographics of participants participated in the study. Their age, education status, gender, income, marital status and occupation can show in

further research if these demographics influence customers' online decision making process. In this study, an analysis was made on customers' critical information requirements independent of any demographic factor. Critical Decision Method is the next method analysed in order to identify previous experiences of the participants. Past experiences influence present and future customers' critical information requirements and can lead their present decision making process. A bad previous experience will make them more cautious when they come to use any purchase on the Web. Then real time decision making process was analysed via various ways. Applied Cognitive Task Analysis in combination with eye tracking provides a deeper picture of how users behave when they come to book online a hotel, present critical customers' information requirements that formulate their final decision. What they are looking for, is the information available or not, is it placed in an expected area on the webpage? Think aloud method and video recording were applied the same time in order to capture additional CCIRs that are in customers' head during the process. The eye tracking provided information regarding areas of interest, gaze plot in terms of the sequence followed by each participant during their process, heat maps that clearly demonstrate the hottest areas on the screen and various statistics in terms of time spent or not spent in each area of interest. Usability analysis followed in order to take CCIRs in terms of websites present usability and design. All these analyses of data synthesizes the base for the websites' redesign. After the analysis of the data, discussion of the results is provided in order to give a logical explanation about the findings derived from the analysis.

7.2 Demographics of the Participants

Users of the study are a representative sample of the population, as they are people coming from different environments. Different ages, education and marital status, different income levels and from various work backgrounds comprise the team of the participants used for the study. Table 9 is a summary of the demographics of the participants.

Table 9: Participants Demographics Summary

Age	Under 15	15-24	25-34	35-44	45-54	55 +
Education	Primary School	Secondary School	High School	College / Technical School	Bachelors Degree	Masters Degree or higher
Gender	Male	Female				
Income	Less than 1000 Euros	1000-2000 Euros	2000-4000 Euros	More than 4000 Euros		
Marital Status	Single	Married	Other			
Occupation	Government officer	Staff in private company	Student	Housewife	Other	

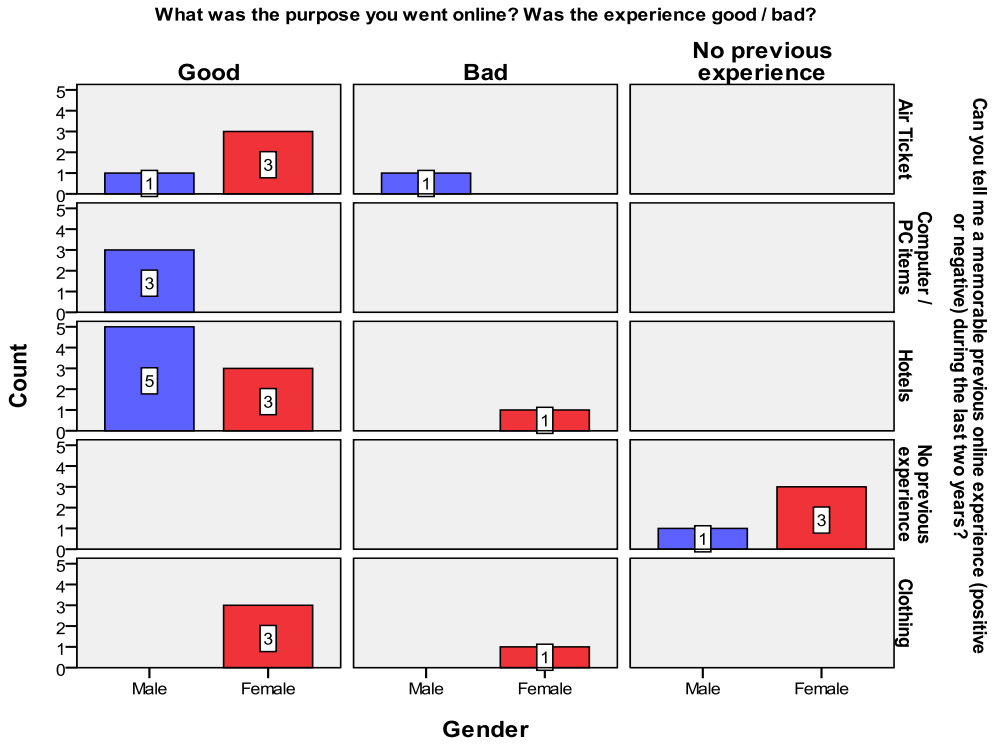
The majority of the participants are females (14) compared to 11 males. Seventeen participants are single and majority of them have age 15-24 years old. Eight participants are married and seventeen are single. Many of the respondents (11) hold Bachelors Degree and four respondents hold a Masters Degree.

The majority of the respondents is University Students (16), some of them, staff in private company (7), one housewife and one professor. Income of 16 participants is less then €1.000, six of them have income €1.000-€2.000 and one respondent €2.000-€4.000.

7.3 Critical Decision Method (CDM)

The purpose of the CDM is to systematically uncover the decision making requirements and cognitive processes used by the respondents. The analysis follows the steps of the CDM outlined in Chapter 6, the Methodology chapter. First Sweep (Table in Appendix 5) Incident identification and selection: following the results of step one of critical decision method, 21 participants had previous online experience where 3 of them had a bad previous experience. According to Figure 32, five participants' previous experiences were on air-ticketing, three on computer / pc software, nine on hotel reservation and four of them on clothing purchasing. Seventeen out twenty-one participants who had previous online experience needed no assistance during their online transaction, while two of them took assistance from their friends and two from their family.

Figure 32: Critical Decision Method: previous online purchasing experience



Having established the most memorable (best and worst) experiences, then it was outlined the associated decision making process undertaken by the respondents. The following results are extracted from Appendix 5. Sixteen participants followed the same sequence of cognitive actions during their booking process: information search, evaluation of alternatives, purchase. Three of them followed the same sequence, but included an extra one: information search, evaluation of alternatives, purchase, confirm with the bank. One participant followed an immediate search of the brand and booking and one participant search for information, evaluate the alternatives, discuss with his family and then book. Eighteen participants used as their main information source the internet and only three used agents. Fourteen participants paid with internet visa (i.e. paypal) their transaction, six with visa and one with his debit card. Participants' decision making process behaviour in their previous experiences verbally mentioned during the CDM interview is the same as the original decision making process model presented in Chapter 2, Literature Review of Blackwell et al., 2006.

Eight participants that had previous online experience reported that main offline benefit was the personal communication, four of them stated the safety, personal communication and cash payment, five of them reported safety, three users reported safety and cash payment, one reported the safety and personal communication. Fourteen participants reported as main online benefits the easy and fast, two participants state that is fast, three of them state that is fast, easy and convenient, two of them reported as the main online benefit the fast and convenient. Previous customers' critical information requirements that drive participants' decision and caused a good or a bad experience are the piece of information that formulate the base for the website redesign.

Second Sweep, *Timeline verification and decision point identification*

The participants were asked for a second time to go back through the incident in order to structure and organize the incident into ordered segments. The aim of this is to give us a clear picture of the incident and its associated events. Twenty participants used the Google as their main search machine while only one used the Internet Explorer. Twenty participants found the information provided as reliable; only one found it unreliable. Sixteen participants confirmed the information while five did not confirm it. The majority of participants (16), referred as their first action to discuss with their family while five reported that they decide their own. Finally, sixteen participants reported that they did not have any concerns for their decisions while five replied that they had concerns for their decision. The second sweep of CDM gave optimistic results regarding participants' behaviour in their past online purchases. Almost all participants found the online information reliable and most of them confirm it, indeed the information was reliable as it was cross checked. Additionally, due to culturalistic characteristics of Cypriots, family plays an important role in their decisions.

Third Sweep, *Progressive, Deeping and the Story Behind the Story*

During this sweep the analyst lets the participant back over each identified segment (decision making process) of the incident, while employing probes designed to focus attention on particular cognitive aspects of the incident. According to this step, participants provided different information search concerns; evaluation of alternatives concerns and purchase concerns. Nine participants reported 'availability' as their main information

search concern, three of them stated the 'offers', two users reported the 'validity', one participant was uncertain for the 'information provided' and one user was concerned about 'risk'. As main evaluation of alternative concern, the majority of users reported if their choice was 'good enough'. Three participants reported the 'price and quality'. Finally, the majority of respondents reported as their main purchase concern the 'SSL', six respondents the risk and four participants the payment / credit card. All these past experience customers' critical information requirements are taken into consideration in (re)design procedure.

Fourth Sweep, *"What If" Queries*

This sweep helps to uncover where the decision process might break down. According to Hann et al (2003), it points out vulnerabilities of a process, but also highlights where expertise is required. All participants were happy with their final decision and they believed that via online booking they saved time and money. All tables of CDM that are in Appendix 5 gave valuable information regarding the previous online decision making process of the respondents. Participants in information search stage expect to find price, facilities, quality, location, availability, positive customers' reviews and nice website presentation. In evaluation of alternatives, users' stated availability, cost, price, quality, better alternative option, bedroom information and positive customers' reviews. The majority of the respondent request as main hotel facility *the bed and breakfast in both decision making stages, they expect to use the internet for their information search and evaluation of alternatives process and they were uncertain about either the reliability of information and alternatives provided.* All this information taken from this part constitute customers critical information requirements and need to be taken into serious consideration from hoteliers as these influence users final decisions. For the majority of them most important information at all stages of their decision making process so as to formulate a decision was *the price and they used all available information so as to formulate a decision and to evaluate alternatives.* The majority of the respondents replied that they *did not find any missing information* at all stages and that they did not find any difficulties in processing. The only missing information stated from some participants was location information. Sixteen participants reported that they had considered other alternatives (i.e. agents, direct booking etc) during their online decision making process while only five users did not. Nineteen users considered other hotel websites during their evaluation of

alternatives process compared to only two participants who did not. Twelve users believe that someone else in the same position would do the process differently and twelve participants believe that they could have taken different action i.e. offline booking. All participants replied that they were confident with the decision they have made. This sweep gives additional information where a website loses a potential booker (leave the webpage) or keeping him happy by serving all his critical information requirements and gains the booking (lookers into bookers).

7.4 Applied Cognitive Task Analysis – Present Decision Making Process

This constitutes the main research part as for the analysis, eye tracking device has been used. The purpose of the methods is to systematically uncover the customers' critical information requirements and cognitive processes used by participants during their online decision making process to book a hotel. As explained in the Methodology Part, at this stage each participant used the eye tracking device in order to search and formulate a booking decision among the three randomly chosen hotels and then they had to state from which hotel is more likely to book their vacations. Participants *were not obliged* to visit all hotel websites. Then they were requested to reply to a series of questions (divided into information search, evaluation of alternatives and online booking). As referred in the methodology part, participants initially search all three websites and then were asked to select one hotel for their vacations booking (Table 10).

Table 10: Participants' hotel decision to book their vacations

Part.	**Hotel Chosen to Book**	**13**	Limassol Amathus Hotel
1	Limassol Amathus Hotel	**14**	Limassol Amathus Hotel
2	Paphos Amathus Beach Hotel	**15**	Limassol Amathus Hotel
3	Limassol Amathus Hotel	**16**	Limassol Amathus Hotel
4	Paphos Amathus Beach Hotel	**17**	Limassol Amathus Hotel
5	Limassol Amathus Hotel	**18**	Paphos Amathus Beach Hotel
6	Paphos Amathus Beach Hotel	**19**	Limassol Amathus Hotel
7	Paphos Amathus Beach Hotel	**20**	Limassol Amathus Hotel
8	Paphos Amathus Beach Hotel	**21**	Limassol Amathus Hotel
9	Limassol Amathus Hotel	**22**	Limassol Amathus Hotel
10	Limassol Amathus Hotel	**23**	Limassol Amathus Hotel
11	Limassol Amathus Hotel	**24**	Paphos Amathus Beach Hotel
12	Limassol Amathus Hotel	**25**	Paphos Amathus Beach Hotel

Following Table 10, the majority of the participants (17) had chosen Limassol Amathus Hotel to book their vacations. Eight participants had chosen Paphos Amathus Hotel for their vacations; it was expected from the beginning that due to non-availability, Golden Bay was not selected by participants.

7.4.1 Step One: Information Search

Two descriptive statistics tables (Table 11a and Table 11b) were produced in terms of participant's information search evaluation. Participants were asked after the experiment they implement with the eye tracking to decide which hotel they are willing to book for their accommodation and rate it in terms of all decision making process steps.

Table 11a: ACTA: Step One: Paphos Amathus Information Search

Descriptive Statistics	N	Min	Max	Mean	S. D
Before you decide to book a hotel you search all alternatives.	8	4	5	**4,62**	,518
The site gives you information about credit card security and personal data?	8	1	5	**3,25**	1,165
The site gives you the opportunity to search for various information regarding hotel bedrooms	8	2	5	**4,13**	1,126
The site gives you the opportunity to search for various information regarding hotel facilities	8	2	5	**4,13**	1,126
The site gives you the opportunity to search for various information regarding better packages and offers	8	1	5	**3,88**	1,356
The site gives you the opportunity to search for various information regarding hotel location	8	1	4	**3,25**	1,035
The site allows you a refund in the event of cancellation	8	1	4	**3,00**	,926
Valid N (listwise)	8				

Table 11b: ACTA: Step One: Limassol Amathus Information Search

Descriptive Statistics	N	Min	Max	Mean	S. D
Before you decide to book a hotel you search all alternatives.	17	1	5	**4,53**	1,007
The site gives you information about credit card security and personal data?	17	2	5	**3,94**	1,029
The site gives you the opportunity to search for various information regarding hotel bedrooms	17	4	5	**4,47**	,514
The site gives you the opportunity to search for various information regarding hotel facilities	17	3	5	**4,47**	,624
The site gives you the opportunity to search for various information regarding better packages and offers	17	4	5	**4,24**	,437
The site gives you the opportunity to search for various information regarding hotel location	17	2	5	**4,00**	,866
The site allows you a refund in the event of cancellation	17	2	5	**3,59**	,939
Valid N (listwise)	17				

With reference to the mean data, participants found that in Paphos Amathus there was missing information in four variables "The site gives you information about credit card

security and personal data", "The site gives you the opportunity to search for various information regarding better packages and offers", "The site gives you the opportunity to search for various information regarding hotel location" and "The site allows you a refund in the event of cancellation". Scoring on these variables varies between 3-3.88 showing that information requirements were not met. For Limassol Amathus , two variables were between 3.59-3.94, "The site gives you information about credit card security and personal data" and "The site allows you a refund in the event of cancellation" again showing that there was missing information there. These were taken into consideration in redesigning procedure.

7.4.2 Step Two: Evaluation of Alternatives

Table 12a: ACTA: Step Two:Paphos Amathus Evaluation of Alternatives

Descriptive Statistics	N	Min	Max	Mean	S.D
This site allows you alternative options for room type	8	3	5	**4,38**	,744
This site allows you alternative options for room location (inland, side, sea view)	8	3	5	**3,88**	,835
This site allows you alternative options for meal	8	3	5	**4,13**	,991
This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	8	3	5	**4,25**	,886
Valid N (listwise)	8				

Table 12b: ACTA: Step Two:Limassol Amathus Evaluation of Alternatives

Descriptive Statistics	N	Min	Max	Mean	S.D
This site allows you alternative options for room type	17	3	5	**4,47**	,717
This site allows you alternative options for room location (inland, side, sea view)	17	3	5	**4,59**	,712
This site allows you alternative options for meal	17	3	5	**4,24**	,831
This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	17	2	5	**3,94**	,899
Valid N (listwise)	17				

During the evaluation of alternatives (Tables 12a and 12b) descriptive statistics analysis, additional critical customer information requirements were identified. In Paphos Amathus variable "This site allows you alternative options for room location" M=3.88 and at Limassol Amathus, variable "This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)", M=3.94. Both of them were redesigned and confirmed via validity study.

7.4.3 Step Three: Online Booking

Table 13a: ACTA: Step Three: Paphos Amathus Online Booking

Descriptive Statistics	N	Min	Max	Mean	S.D
Remember the process you followed when you book through the Internet in the past. It is the same with the existing one	8	1	5	**3,50**	1,195
It is easy to fill in the reservation form	8	3	5	**4,00**	,926
The instructions are simple to be followed	8	3	5	**4,50**	,756
Online booking provides the opportunity to save time and money	8	3	5	**4,25**	,707
You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	8	1	5	**3,75**	1,488
You trust the Internet to provide personal information.	8	1	5	**3,13**	1,458
There are some other factors that influence your final decision [i.e family, friends].	8	3	5	**4,25**	,707
Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	8	2	5	**4,00**	,926
Valid N (listwise)	8				

During the final stage of the decision making process (Tables 13a and 13b), participants found gap in information in three variables for Paphos Amathus "Remember the process you followed when you book through the Internet in the past. It is the same with the

Table 13b: ACTA: Step Three: Limassol Amathus Online Booking

Descriptive Statistics	N	Min	Max	Mean	S.D
Remember the process you followed when you book through the Internet in the past. It is the same with the existing one	17	2	5	**3,41**	1,372
It is easy to fill in the reservation form	17	1	5	**4,24**	,970
The instructions are simple to be followed	17	1	5	**4,12**	,928
Online booking provides the opportunity to save time and money	17	1	5	**4,41**	1,064
You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	17	1	5	**2,35**	1,320
You trust the Internet to provide personal information.	17	2	5	**2,82**	1,015
There are some other factors that influence your final decision [i.e family, friends].	17	2	5	**3,76**	,664
Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	17	2	5	**3,94**	,899
Valid N (listwise)	17				

existing one", "You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there"and " You trust the Internet to provide personal information". Same variables were scored low in Limassol Amathus and another two "There are some other factors that influence your final decision [i.e family, friends]" and "Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation", again showing gap in

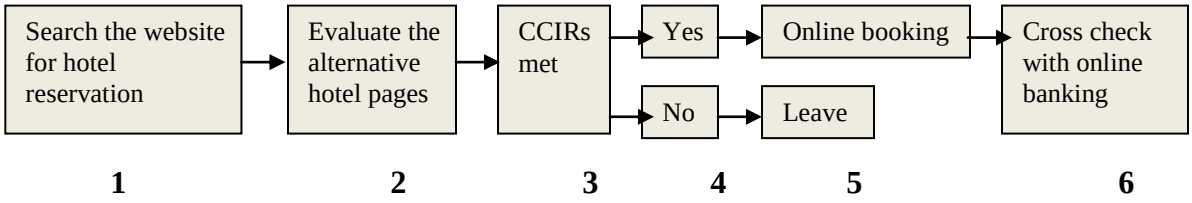
the information provided. All missing customers' critical information requirements were applied to the redesign of the hotel websites and were confirmed in the validation study.

7.4.4 ACTA: Task Diagram

Through the first interview, it was developed a Task Diagram (Figure 33) that presents the tasks (in a very broad manner) that specifically allows us to hone in on complex cognitive processes that result to further consideration and further in-depth interviews. The respondents (also identified as experts or Subject Matter Experts –SMEs) are asked to decompose the online decision making process for a hotel reservation into steps or subtasks with the question *"Think about what you do when you come to book a hotel reservation. Can you break this task down into less than six, but more than three steps?"* According to Militello and Hutton (1998), the goal is to get the researcher to walk through the task in the respondent's mind, verbalizing major steps.

Then the respondents are asked to identify which of the steps mentioned require cognitive skill with the question *"Of the steps you have just identified which require difficult cognitive skills?" According to Militello and Hutton (1998), by cognitive skills we mean judgments, assessments, and problem solving-thinking skills.* The outcome of this interview is the Task Diagram that serves as a road map for future interviews.

Figure 33: Task Diagram



Source: Author 2013

Table 14: Results of Knowledge Audit Table

Decision Making Process Step	Aspect of Expertise	Cues and Strategies	Why Difficult?
Information Search	Past and future	Before you decide to book a hotel you search all alternatives.	-user may not be able to use internet -user does not trust the internet for online booking and purchasing -user cannot find requested information
		The site gives you information about credit card security and personal data?	
		The site gives you the opportunity to search for various information regarding hotel bedrooms	
		The site gives you the opportunity to search for various information regarding hotel facilities	
	Job Smarts	The site gives you the opportunity to search for various information regarding better packages and offers	-users cannot find the information on the webpage
		The site gives you the opportunity to search for various information regarding hotel location	
Evaluation of Alternatives	Noticing	The site allows you a refund in the event of cancellation	-users cannot find refund policy
	Big Picture	This site allows you alternative options for room type	-due to scroll down results, users cannot see all available rooms , meals and rates
		This site allows you alternative options for room location (inland, side, sea view)	
		This site allows you alternative options for meal	
		This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	
Online Booking	Past and future	Remember the process you followed when you book through the Internet in the past. It is the same with the existing one	-users do not trust the internet to provide personal information
		You trust the Internet to provide personal information.	
	Job Smarts	It is easy to fill in the reservation form	-users may find too time consuming the reservation form
		The instructions are simple to be followed	
	Opportunities	Online booking provides the opportunity to save time and money	-user may not have the skills to use the internet
	Self Monitoring	You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	-users don't know the brand and they are not willing to change their booking dates
	Big Picture	There are some other factors that influence your final decision [i.e family, friends].	-users are influenced by their environment to formulate a decision -users don't have a fast internet connection
		Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	

Source: Author 2013

7.4.5 ACTA: Simulation interview table

Each event is probed for situation assessment, actions, critical cues, and potential errors surrounding that event: "During your online decision making process, what actions if any would you take at this point in time? What is your assessment of the situation at this point in time? What pieces of information led you to these actions? What errors would an inexperienced person be likely to do in this situation?"

Table 15: Results of Simulation Summary Table

Events	Actions	Assessment	Critical cues	Potential errors
Information Search	-search various hotel websites -ask friends and relatives	-need to make sure that information provided is reliable	-satisfy all CCIRs	-not familiar with the Internet and how to use it
Evaluation of Alternatives	- initial search (online, direct from hotel's webpage or other booking.com pages)	-info regarding rooms, rates, meals, hotel's surroundings, payment methods, safety of credit card information, offers etc)	-willingness to provide additional information, satisfy CCIRs -refund/ cancellation policy	-not scanning around more to find all CCIRs and leave -take the wrong decision
Decision to go online for hotel reservation booking	-use the hotel's website -evaluate time frame between booking and check out	-is website useful and provides all necessary info? -online booking problems/fears security -refund/cancellation policy	-appearance of website -booking process -payment process -satisfaction of all CCIRs	-take the wrong decision -not familiar with online payment

Source: Author, 2013

Eight participants state that the process they followed when taking the experiment was different from their previous experiences, investigated in Critical Decision Method part in this Chapter. On the contrary, with other three participants who agree that they followed same online booking process. Four participants were undecided regarding the process followed. Twenty - one participants found it easy to fill in the reservation form of the hotels they have chosen. Only one user (Limassol Amathus) strongly disagrees that it was easy to fill the reservation form.

The majority of participants overall agree that their chosen websites have simple instructions, easy to follow and that online booking provides the opportunity to save time and money. Only one participant strongly disagrees that booking process had simple instructions and it is time saving. Twelve participants scored 1-2 (Strongly Disagree –

Disagree) that they were very positive to book at this hotel because of the brand name that they would change their booking period in order to spend their vacations there. Three of them were undecided. However, ten participants scored 4-5 (Agree-Strongly Agree) that the brand name plays a role in their final decision making process. Twelve participants do not trust the Internet to provide personal information. Five of them were undecided. Eight participants scored 4-5 (Agree-Strongly Agree) showing that they trust the Internet to provide their personal information. Additionally, overall all participants agree that some other factors (i.e. family, friends etc) influence their final decision.

Finally, difficulties in online booking process (i.e. low connection, not acceptable bank card, etc) have the ability to change the plans to proceed with a reservation for all participants except two participants who will still find a way to book even with these obstacles. During the (re) designing procedure not all parts of webpage were amended as participants were happy with them. Design part such as booking process instructions and reservation forms remain as it was.

Customers' critical information requirements that encourage / discourage Cypriots to use online hotel reservation: search for alternatives, credit card safety information, information regarding hotel bedrooms, hotel facilities, packages / offers, hotel location and refund policy factors play a fundamental role on information search stage of the decision making process. These factors are important for all participants.

In Evaluation of Alternatives stage, room type, room location and meal alternative factors influence participants' decision at this stage. A less important factor seems to be an alternative payment method. Majority of respondents had internet visa cards or debit cards (i.e. visa electron), with some money in order to avoid fraud.

Finally, at the online booking stage for participants it is very important the hotel to offer an easy to fill reservation form, with simple instructions and short so as to be time saving and user friendly.

7.5 Eye Tracking Recordings – Gaze Plot Analysis of Participants

A qualitative analysis of the gaze plots (scan paths) was applied in order to investigate how users search for information, uncover customers' critical information requirements and identify redesign tips and users visual search patterns. All scanpaths are in Appendix 7, two of them are presented below as a sample of all the scanpaths collected (Figure 34).

Figure 34: Sample scan paths

Many interesting findings derived from the second by second recording and analysis of the participants; majority of the participants leaves the hotel websites for the same reasons, followed a similar webpage reading way – mainly left to right booking reading style. It is fundamental that the average total decision making process time is 00:04:00 minutes; consequently the designers should take this information into account. Specifically, the average time spent in Limassol Amathus Hotel was 00:01:43 seconds, for Paphos Amathus Beach Hotel 00:01:28 seconds and for Golden Bay only 00:55:00 seconds due to closing period. This is the average time a hotelier has to gain a potential online customers and get the booking.

The total average moves (from point to point) a participant applied before he / she finalize his / her decision making process are 30. Then the participant gets bored and leaves. Again, following this finding, hotel's website designers should make the online process as simple as possible, providing all necessary information in obvious and striking locations and as fas as possible.

Complicated processes and requirements play a negative role in the online decision making process. The average moves per minute per participant are calculated to be 8, as a result users tend to look fast and if the critical information requirement is not there, then will leave and search somewhere else.

Due to the online nature of the service (hotel booking) it is important to take into consideration the mouse clicks; the total average clicks a user is willing to do are 13 mouse clicks; specifically, average 6 clicks participants made in Limassol Amathus beach hotel, 7 clicks made at Paphos Amathus Beach Hotel and 5 clicks made in Golden Bay. As a result the total booking process in a hotel webpage should be made within 4-5 mouse clicks.

One of the main concerns during the analysis of the findings was to identify the point at which the participants leave the web page; following the participants recordings majority of the participants leaves the Paphos Amathus website after room photos; 4 after room facilities; 5 after room rates; 1 after meal rates; 1 after reservation information and 1 after booking information. On Limassol Amathus webpage, 11 participants leave after room photos; 5 after room rates; 3 after room facilities; 1 after meal rates; 1 after reservation information; 1 after Amathus rewards; 1 after hotel's surroundings.

Finally, on Golden Bay the reasons for leaving the webpage were for 14 participants leave after home page unavailability message; 8 leave after reservation page unavailability message and 1 after date entry process. As the sample participates was the same for all hotels, unsatisfied critical information requirements were the reason for leaving the websites. Main reasons reported were the missing information regarding refund or cancellation policy, credit card information, safety information and dates-entry design; it was too complicated and time consuming. As a result, redesigning on this was made.

7.6 Think Aloud Recordings

The number of unique comments and usability problems mentioned from various participants were analyzed using the categorization model previously discussed. The tables below illustrate the comments and usability problems mentioned by participants.

Table 16: Coding system used for categorizing usability problems mentioned by the participants

Limassol Amathus	**Layout**	Could not locate 'make a reservation' – because of website colors [same with photos]
	Feedback	Could not find room photos, Website did not mention if price is per night/per person etc, can't find if rooms have verandas or not
	Data Entry	Problems entering the date, changed to 2011 instead of change the month
Paphos Amathus	**Layout**	Complicated, Could not locate 'make a reservation' – because of website colors [same with photos]
	Feedback	Could not find room photos, Website did not mention if price is per night/per person etc, Could not find special offers, can't find if rooms have verandas or not
	Data Entry	Problems entering the date, changed to 2011 instead of change the month
Larnaca Golden	**Layout**	Did not notice message from the hotel that will be closed for a period, did not see 'online booking'
	Feedback	-
	Data Entry	-

Source: Developed for the purposes of this thesis

Table 17: Total number of unique comments and usability problems identified

Limassol Amathus Hotel				**Paphos Amathus Hotel**				**Golden Bay Hotel**			
Lay out	**Feedback**	**Data Entry**	**Total**	**Lay out**	**Feedback**	**Data Entry**	**Total**	**Lay out**	**Feed back**	**Data Entry**	**Total**
0	0	0	0	1	0	0	1	1	0	0	1
1	0	0	1	1	0	0	1	1	0	0	1
1	0	0	1	1	0	0	1	1	0	0	1
0	0	0	0	0	0	0	1	1	0	0	1
1	0	1	2	1	0	1	2	1	0	0	1
1	1	1	3	1	1	1	3	1	0	0	1
1	0	0	1	1	0	0	1	1	0	0	1
1	0	0	1	1	0	0	1	1	0	0	1
1	0	0	1	1	1	0	2	1	0	0	1
0	0	0	0	0	0	0	0	1	0	0	1
1	1	1	3	1	1	1	3	1	0	0	1
1	1	1	3	1	1	1	3	1	0	0	1
1	1	0	2	1	1	0	2	1	0	0	1
1	0	1	2	1	0	1	2	1	0	0	1
1	1	0	2	1	1	0	2	1	0	0	1
Grand Total			22	**Grand Total**			24	**Grand Total**			15

Source: Developed for the purposes of this thesis

According to above table (in combination to coding above), 22 usability issues were reported by participants concerning Limassol Amathus Hotel webpage; 12 of them were regarding layout (Could not locate 'make a reservation' – because of website colors [same with photos]), five of them regarding feedback (Could not find room photos, Website did not mention if price is per night/per person etc, cannot find if rooms have verandas or not) and another five for data entry usability issues (Problems entering the date, changed to 2011 instead of change the month).

Regarding Paphos Amathus Beach Hotel, total of 24 usability issues were recorded; 13 of them were concerning layout (Complicated, Could not locate 'make a reservation' – because of website colors [same with photos]), 6 regarding feedback (Could not find room photos, Website did not mention if price is per night/per person etc, Could not find special offers, can't find if rooms have verandas or not) and finally 5 usability issues concerning data entry (Problems entering the date, changed to 2011 instead of change the month).

Finally, 15 usability issues were recorded for Golden Bay Hotel – all of them concerning layout (Did not notice message from the hotel that will be closed for a period, did not see 'online booking').

The study found that the layout of the webpage plays an important role in customers' online decision making process. A complex layout will drive the potential user to leave the website and go somewhere else.

"I found unnecessary complex the check in and check out date entry of Paphos Amathus and Limassol Amathus. I prefer the Golden's Bay date entry format".

"Golden Bay colour – grey is too dark and not representative of Cyprus sun and blue sea"

Participants of all levels of age and experience mentioned that the brand name and 'this it was mentioned by a relative of a friend' (word of mouth) play an important role in the final decision. A previous positive experience to a website from a relative or friend gives an edge to a webpage over others. Additionally, it is expected that less experienced or older users rely on others more experienced. Trust was found an important influential in the

entire decision making process. Personal information and credit card information should be protected and be used as strictly confidential. Information regarding security protection (i.e. Norton Secure, Trustwave etc).

"I am concerned about having personal information online, but I trust Limassol Amathus and Paphos Amathus. They are both well known brands in Cyprus".

"I can't see anywhere credit card protection information and logo, I expect that this should be placed at the bottom of the homepage"

Another important finding of the study is that a successful webpage is a combination of many different aspects the place of each information, the colors, the fonts, the border everything is a piece of the puzzle for a successful website.

"I think that the colour of the 'make a reservation' in both Limassol Amathus and Paphos Amathus home page is not visible due to photo surrounding it".

"I think that the photo of the Amathus Hotels should be placed next to make a reservation', and below should be placed 'cancel / amend' option and 'Special Offers'".

Web in general and websites in particular are generally used as the easiest way to find information, consequently providing all prospective customers' critical information requirements is deemed necessary.

"I cannot find information regarding amending / cancelling policy"

"I cannot locate events and city's attractions"

"Where is the search box?"

"I believe that the grey horizontal bar of both hotels placed on the homepage photo should be placed on the main horizontal bar, labelled as 'Media Gallery' and should contain information of hotels photos, video, virtual tour, ebrochure and news"

"I cannot see credit card information and security software"

"I prefer information provided at the homepage to be more tidy and in groups; Amathus Hotels provide same-category information in mane different places; i.e. "make a reservation' and 'rates and reservation'; I think that a general "Hotel" category should be presented and below to include hotel profile, welcome message, hotel contacts, location map, weather, about Cyprus, surroundings, local attractions; with this amendment, 'rates and reservation', 'hotel surroundings' and 'contact' should be removed ".

Users do not read messages where there is too much wording. The home page should be as simple as possible with tidy information placed in key areas.

"I don't have the time to read this entire message from Paphos and Limassol Amathus Hotels"

"The fonts of the message of Paphos and Limassol Amathus Hotels are too small"

"Golden Bay uses so many different fonts..so confusing"

Additionally, this study found that unnecessary clicks should be eliminated. There are many clicks that drive to the same place; i.e. in Amathus both Hotels the "make a reservation"and "rates and reservations" or "book now" "book online"and "book your stay now" at Golden Bay website drive in the same process.

"I found it unnecessary complex to offer two options (clicks) for the same thing – 'make a reservation' and 'rates and reservation'"

"Booking process should be placed o the home page; I enter the website because I want to check the availability, no need to lose time searching for the booking form, less mouse clicks"

"Contacts of Amathus Hotels are placed in four different places on the homepage; no need to lose space, two places are more than enough"

Following the ***think aloud video recordings*** participants' critical information requirements during their online decision making process in the hotel's webpages were mainly on offers, security information, looking for credit card logos, refund policy – expected at the bottom of the webpage, tours and taxi stations, distance in km from key locations and attractions, print and send to a friend availability in pdf format of the available rooms and rates, minimum scroll down as it was found extremely inconvenient, nightlife information – this was mainly because of young participants, important messages not only in English – some of the participants asked information in Greek and in more striking position and colours – this referred to Golden Bay unavailability message, same applied to navigation in more languages (i.e. Greek, English, Russian, French and German) due to increased tourism from these countries and finally many comments received regarding the inconvenient date format in booking process of Paphos and Limassol Amathus. They found it unnecessary complex compared to Golden Bay that it was more convenient and fast. Majority of participants spent a lot of time to fill in the check in and check out dates at Paphos and Limassol Amathus websites.

Finally, it is important not only to serve their CCIRs but to invest on loyalty; by getting perspective online visitor's email and promote offers, events at the hotel (i.e. fashion show, wedding event), kids offers etc, can create needs in order to start the users decision making process. It is important that in Cyprus, weddings are celebrated in hotels, consequently providing information, offers, photos etc will bring a lot of revenue to the particular hotel.

"It will be my wedding next year and I would like to receive information regarding the organization, decoration and setup of weddings at this hotel"

It is important that younger users, having grown up with online processes, layouts and styles were more confident with the process than older participants.

7.7 Websites' Areas of Interest and participants recordings

As referred in the literature review, some areas of interest were pre-set in order to identify at which extend participants noticed them and for how long. The statistics tables are summarized in the Appendix 8.

7.7.1 Time to first fixation reveals the average of how long it took for the respondents to find an Area of Interest (AOI) on the website. Most eye catching area for Golden Bay Home page was AOI1=1.79" Horizontal Bar: Area, rooms, location. On Golden Bay Reservation Page AOI3=9.08" (Notice from Hotel), attracted interest first. On Paphos Amathus Home Page it took participants 2.68" to identify AOI 2 **(**Book now). On Paphos Amathus Reservation Page, participants spent 0.96" to find AOI2 (Photo, Amend/Cancel reservation). On Limassol Amathus Home Page AOI 2 (Book now), 3.16" is the first AOI that is able to pull attention faster than the others AOI. On Limassol Amathus Reservation Page it took participants 1.81"to allocate their attention on AOI 2, Photo, Amend/Cancel reservation. All areas noticed first in hotels' homepages are located on the top-left part of the webpages and on the reservation pages in the center. This confirms that most important information should be placed on the top left part of the homepage.

7.7.2 Fixation Length shows the length of fixation within an Area of Interest. Golden Bay home page longer length of the fixation is observed AOI4 (Important notice, 6.69"). Golden Bay Reservation Page longer length of the fixation is observed on AOI1- **(**Booking dates), 8.81". On Paphos Amathus Home Page, Reservation Page and Limassol Amathus Home Page and Reservation Page longer lengths are observed on Not on an AOI. This reveals new areas of interest as participants attention is attracted to this part of the screen. This was used during the (re)design process. The majority of participants spent more time on other areas than the one specified from the beginning as areas of interest.

7.7.3 Observation Length on hotels home pages found that for Golden Bay AOI4 (Important notice), Paphos Amathus AOI1 **(**Horizontal Bar: Area, rooms, location) and Limassol Amathus AOI2 Book now have the greater ability to retain more attention compared to other Areas of Interest. In their reservation pages the attention was mainly on reservation process and photos of the hotel. Following think aloud, participants stayed

longer on these areas as they could not locate important information so as to proceed (missing information). Only for Golden Bay the attention remained there because of the hotel's unavailability.

7.7.4 Observation Count presents the number of visits to an Area of Interest. More visits on the hotel homepages are observed in Golden Bay on AOI4 (Important notice) 4 visits, on Paphos and Limassol Amathus AOI2 (Book now) 4 to 6 visits. On their reservation pages more visits were found on AOI1 **(**Booking dates), 6 visits for Golden Bay, and 12 visits on AOI2 (Photo, Amend/Cancel reservation) for Paphos and Limassol Amathus. The more times a participant visits an area of interest this shows that this AOI contains interesting information for his / her booking decision making process. It means for our purposes that the critical information requirements are there and should be captured.

7.8 Gaze Plot Analysis

As referred above, the resulting series of fixations and saccades is called a scan path. The colored points mark the fixations in numeric order. The colored lines are the saccades.

In the questionnaire, before the participants start the process, there was a question "before you book, you search all alternatives". Following scan path recordings, 12 participants strongly agree with this statement, but in the practice they do not visit all available hotels; 12 participants strongly agree and they are indeed searching all three websites and 1 participant strongly disagrees but in the process he searches all websites.

Overall scanpath of participants gives important information if the information provided is well-organized and easy to identify. Consequently, the length and the duration of the scan path shows if the overall scanning behaviour is less efficient. A short scanpath shows an experienced user, a more efficient scanning and information search and that the Customers' Critical Information Requirements are satisfied. In Golden Bay Home Page, 8 participants had short scanpaths compared to the 17 that had long – spread all over the page scanpaths. In Paphos Amathus Home Page the overall scanning of 5 participants can be characterized as targeted (not much information search) and for the remaining 8 as

random (spread all over the webpage). Finally, for Limassol Amathus 11 participants had targeted scanning process, whereas 12 had random.

In gaze plot analysis also ***processing scanning*** is recorded. Processing scanning is when there are more than 10 fixations in the same area of interest. It is expected that the photos will have processing scanning. In Golden Bay Home Page the majority of respondents had processing scanning at photo of the hotel and AOI4 – message from the hotel. In Paphos Amathus Beach Hotel, on AOI1 **(**Rates and Reservations, Facilities, Logo) and, AOI2 (Photo). Finally, on Limassol Amathus Home Page, processing scanning was mainly observed on AOI2 (Photo)- and AOI1 **(**Rates and Reservations, Facilities, Logo). Consequently the original assumption that the photos will have processing scanning is confirmed. The scanning process is fundamental for the web designer in order to place the right information at the right place. Many search behaviours were identified during the analysis of results. The below table is presenting them in a very striking way.

Table 18: Summary of Scanning Behaviours of Hotels' Home Pages

Scanning Behaviors	Golden Bay	Paphos Amathus	Limassol Amathus	Sum
Top to Left	3	3	6	12
All Webpage	8	5	3	16
Left-hand side	6			6
Top to center	1	5	9	15
Left to bottom	2			2
Center to bottom	3			3
Top to bottom	1			1
Only top of the page	4		1	5
Only at the center			3	3

Source: Author (2013)

Table 18 shows nine different scanpath behaviours were found during the analysis. Top scanning behaviours are the "all the webpage" , 16 participants, "from the top of the website to the centre", 15 participants and "top of the website to the left hand side of the page", 12 participants. Taking this into consideration web designers should place all important information "from the top of the website to the centre" that covers all three behaviours. No behaviour found to search only at the bottom of the page or at the right hand side. It is characteristic that the scanning behaviour change in other pages than the home page. Summary tables below summarizes all these 'reservation page' behaviours.

Table 19: Summary of Scanning Behaviours of Hotels' Reservation Pages

Scanning Behaviors	Golden Bay	Paphos Amathus	Limassol Amathus	Sum
Left-hand side	3			3
Left – center	3			3
Top – left (triangle)	2			2
Center to bottom 2/3		5	19	24
Bottom 1/3		4		4
All webpage		4	4	8

Source: Developed for the purposes of this study

From Table 19, six different scanpath bahaviours were found during the analysis. Top scanning bahaviour is the center to bottom (24 respondents).

Figure 35: Golden Bay – Home page Gaze Plot Analysis and Summary Process

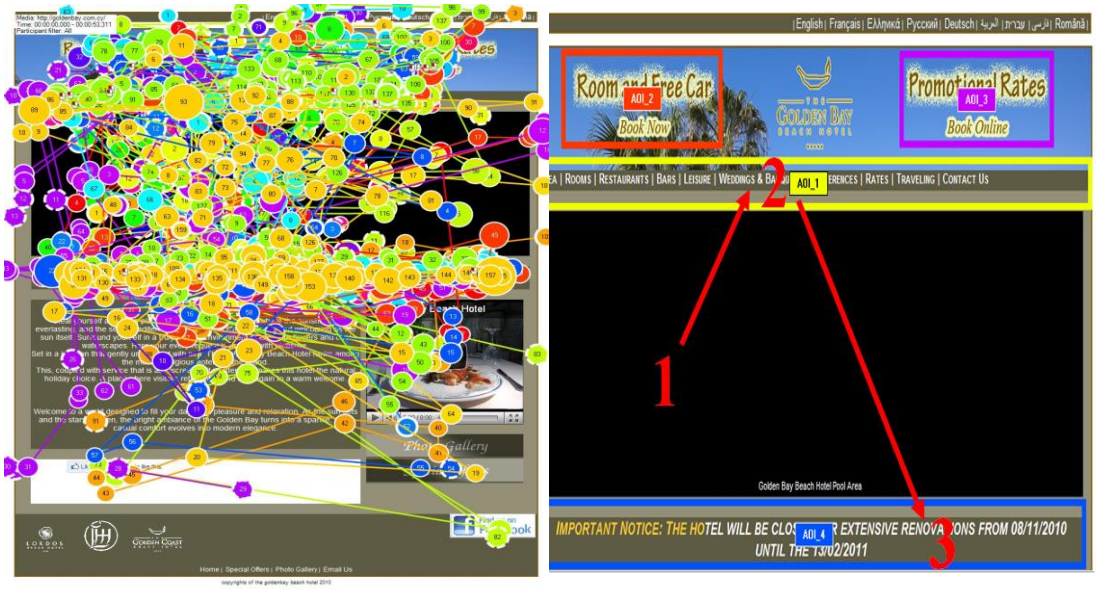


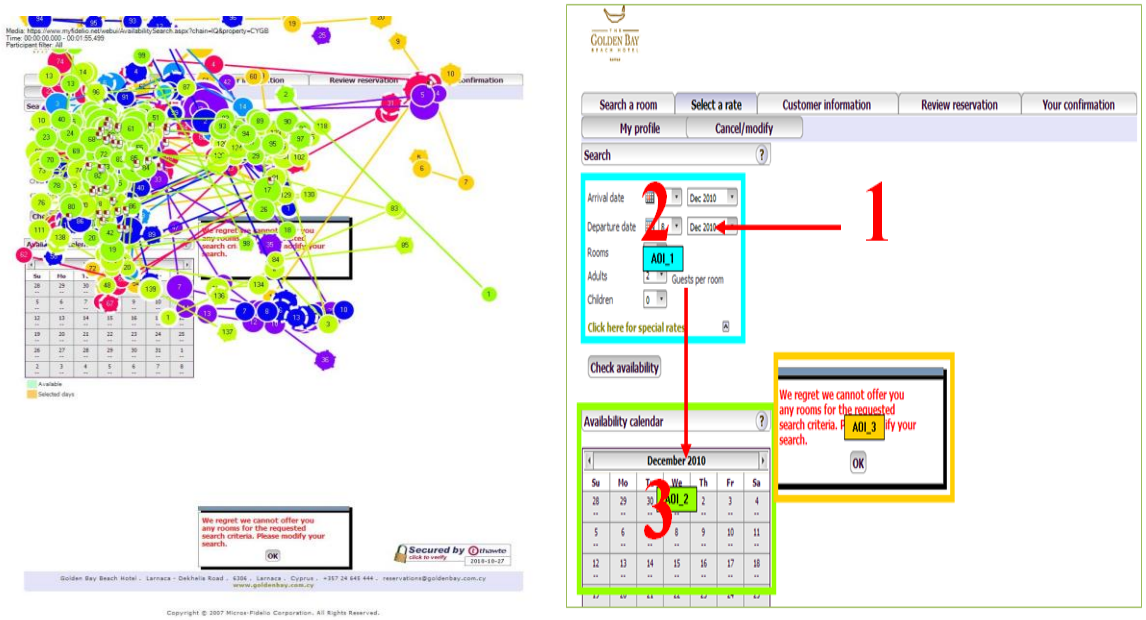
Figure 35 shows all participants' scan paths together. This is a much cluttered view which becomes more informative when converted to a heat map (Bojko A., 2009). Heat maps are in Chapter 7, Heat map section 7.10.

More fixations are noticed in the middle where the unavailability message (AOI4). 16 participants noticed the message that is located in the middle of the page where 8 participants not. The 1/3 of the respondents did not notice the message consequently the location placed was not the ideal. A summary process of the gaze plot shows in which way

each area was noticed. First area noticed by participants even though was not a hot spot in heat map was the photo of the hotel. Second noticed area was Area of Interest 1 **(**Horizontal Bar: Area, rooms, location) and finally Area of Interest 4 (Important notice).

The way participants see on the webpage, it was an important tool for the website (re)design process. The duration indicates that there was missing information there (this was confirmed with the think aloud processing). The critical information requirements were not met at these points and served in the (re)designed websites.

Figure 36: Golden Bay – Reservation Page Gaze Plot Analysis and Summary Process



Eight users in total (Figure 36) proceed with more searching of the Golden Bay Hotel. It was expected the search would stop after reading the unavailability message. Five participants out of the eight read the message however they proceeded to the booking stage; three participants that did not notice it, proceeded to the next stage and this was expected from the beginning. The second unavailability (middle of the page – red fonts) was observed only by two out of eight users that had proceeded to the next stage.

Longer fixations and overall more fixations were observed at AOI1 **(**Booking dates). Same area had more processing scanning (more than 10 fixations). First area noticed by

participants was in the middle of the page – blank area. Second noticed area was Area of Interest 1 **(**Booking dates) and finally Area of Interest 3 (Notice from Hotel).

The reservation webpage search behaviour is different than on the homepage. When participants spent more time in an area this is because they have to fill some booking information (i.e. accommodation stay, number of nights, number of visitors).

Figure 37: Limassol Amathus Home page Scan Path Analysis and Summary Process

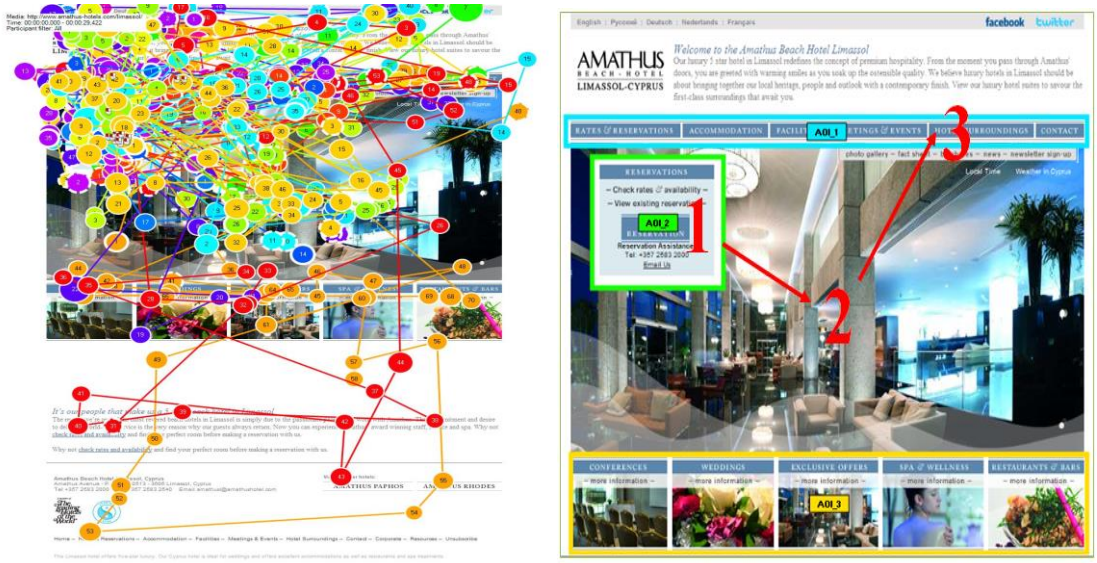
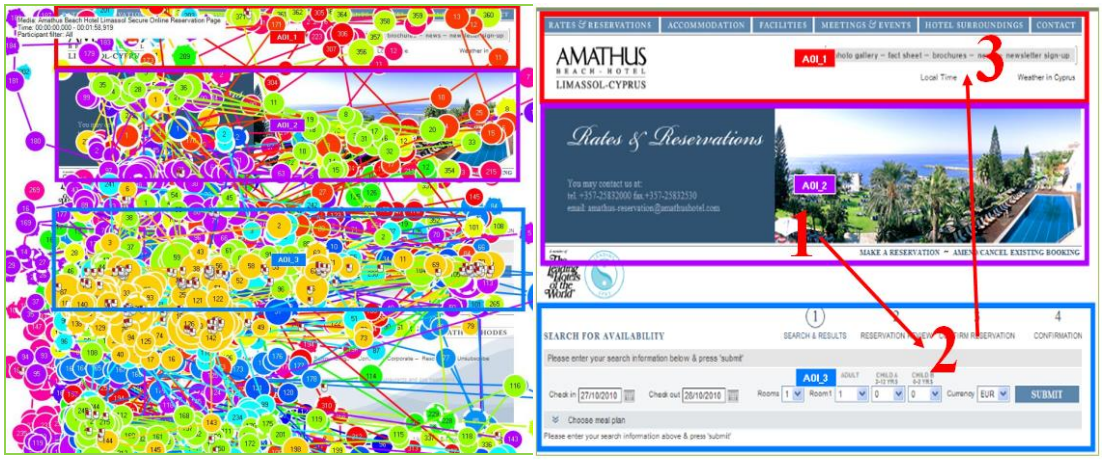


Figure 37 shows AOI3 that contains information regarding hotel's facilities, spa, restaurants, special offers, etc. was observed by only three participants but **none** of them clicked on them for further information; 20 participants did not notice them at all. Facebook and Twitter were observed only by 1 participant where 22 participants did not look at this point at all (top-right).

The logo of the hotel (top – left) was noticed by 9 participants – remaining 14 participants did not pay attention at logo; no information to take from it.

First area noticed by participants AOI2 Book now (upper left-hand side of the webpage). Second noticed area was photo of the hotel in the middle of the webpage and finally AOI1 **(**Area, rooms, location etc). Area of interest 3 - Facilities etc, was not captured in the first areas noticed by participants within the first 30 seconds of their scanning process.

Figure 38: Limassol Amathus Reservation Page Scan Path Analysis and Summary Process



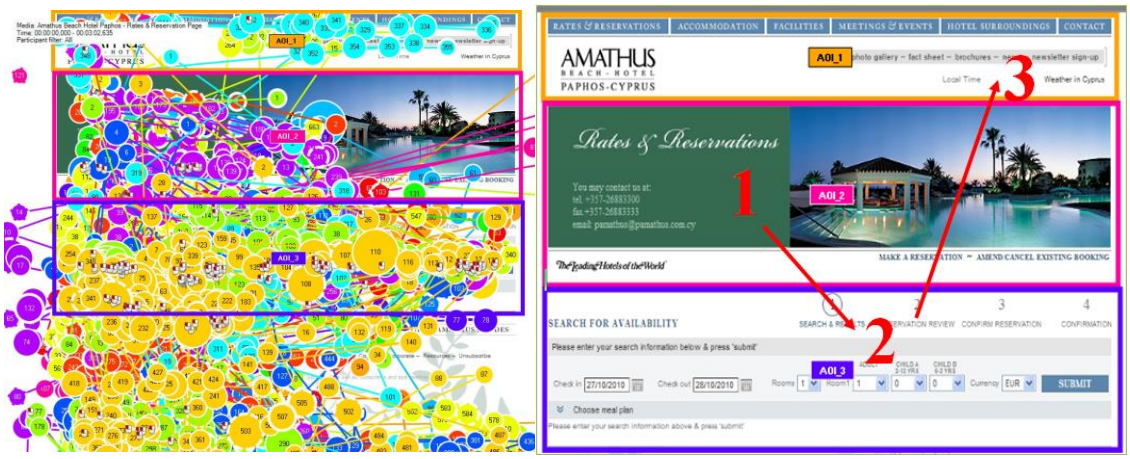
As referred above, the search behaviour changes from home page to other website pages. The photo is not noticed (Figure 38) by everybody; following above recordings, photo observed by 5 participants where 18 didnt see it. Additionally, even though the majority of participants reported that were looking for amend cancellation policy, only one found it on the page. Processing scanning (more than 10 fixations) was observed in AOI3 (Booking Process) – 23 participants. The AOI1 that contains information regarding the facilities of the hotel is observed only by 4 participants. Nineteen participants did not pay attention at all in this area.

The majority of participants within the first 30 seconds they first capture Area of interest 2 – contact details of the hotel, then Area of interest 3 – booking process and finally Area of interest 1 **(**Rates and Reservations, Facilities, Logo). Much time was spent to fill the reservation information due to the confusing date format (confirmed with think aloud method). A long delay was the number one reason for leaving both websites.

Figure 39: Paphos Amathus – Home page Gaze Plot Analysis and Summary Process

AOI3 that contains information regarding hotel's facilities, spa, restaurants, special offers etc was observed by 5 participants; 8 participants did not notice them at all (Figure 39). Facebook and Twitter were observed only by 4 participants where 9 participants did not look at this point at all (top-right). The logo of the hotel (top – left) was noticed by 10 participants – remaining 3 participants did not pay attention at the logo. First area noticed by participants was in the middle of the page – photo of the hotel. Second noticed area was AOI2 (Book now) and finally AOI1 **(**Horizontal Bar: Area, rooms, location).

Figure 40: Paphos Amathus – Reservation Page Gaze Plot Analysis and Summary Process



As referred above, the search behaviour changes from home page to other website pages. The photo is not noticed by everybody; following above recordings, photo observed by 6 participants where 7 didnt see it. Nobody looked at amend cancellation policy (Figure 40). Processing scanning (more than 10 fixations) was observed in AOI3 (Booking Process) – 13 participants. The AOI1 that contains information regarding the facilities of the hotel is observed only by 3 participants – specifically meet and events and rates and reservations. Ten participants did not pay attention at all in this area.

According to above summary figure, first area noticed by participants was in the middle – left hand side of the page – contact details of the hotel. Second noticed area was AOI3 (Booking Process) and finally AOI1 **(**Rates and Reservations, Facilities, Logo). Participants in both Limassol and Paphos Amathus homepage seem confused as they are looking all over the webpage to identify information (customers' critical information requirements not met).

7.9 Cluster Analysis

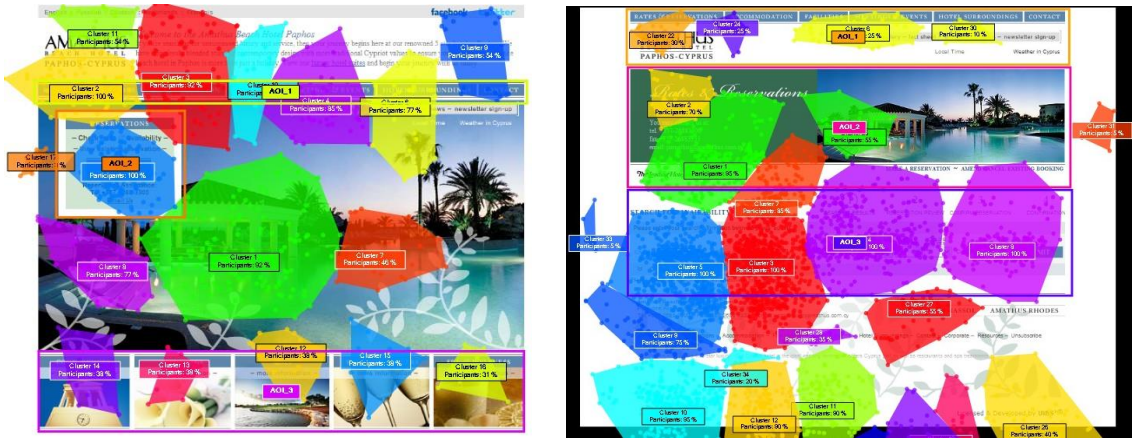
The cluster is using polygons to display each of the *actual seen areas of interest* of participants during the study. Each cluster provides data on the order of fixation points as well as the percent of all participants who shared the common point.

Figure 41: Golden Bay Cluster Analysis

New areas of interest (Figure 41) found from the cluster analysis were all on the photos (Cluster 7 Participants 70%) of the hotel (both central photo and restaurant's photo at the right-hand bottom side of the page). Again photos and images attracted participants' attention (Cluster 9 Participants 78%).

These results are fundamental in identifying the customers' critical information requirements. Where customers actually look, is where hotel website designers should present their most important information. Additionally, cluster analysis provided customers' critical information requirements not mentioned in think aloud and not identified during gaze plot and heat map analysis. New clusters are produced in sections where meal information and special offers are located. This indicates that participants are interested in this information and should be served.

Figure 42: Paphos Amathus Cluster Analysis



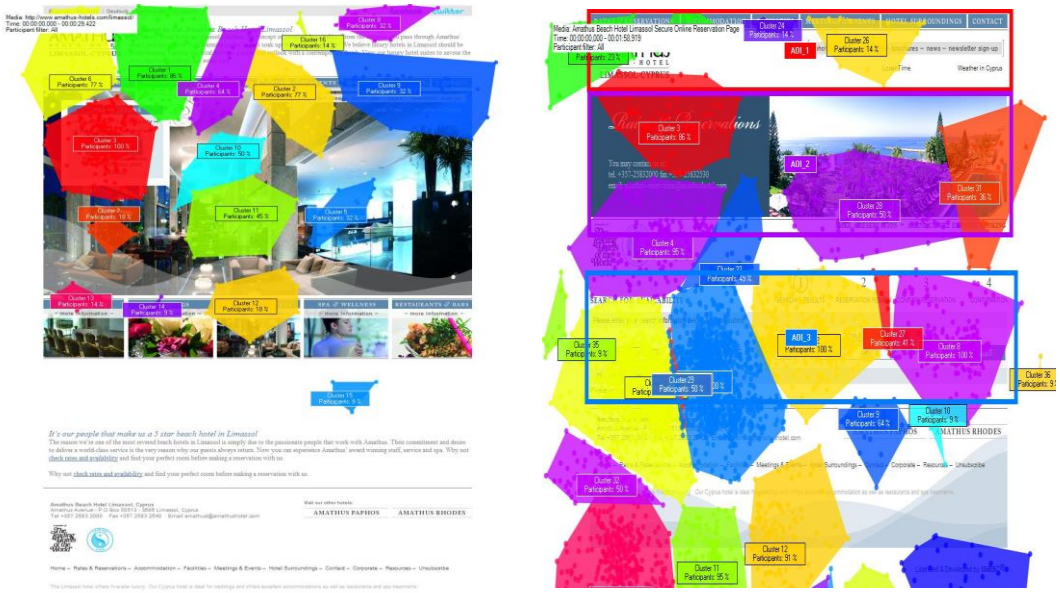
Four new clusters – Areas of interest were noticed from participants; huge clusters were created in the attractive photo of the hotel in the middle of the screen (Cluster 1, Participants 92%, Cluster 9, Participants 77% and Cluster 7, Participants 46%). Additionally, Cluster 3, Participants 92% where the welcoming message of the hotel is located. As a result, photos can be an attractive tool for website marketers in order to capture more attention and impress the potential buyer.

Many new clusters (Paphos Amathus reservation page) were noticed from participants; huge clusters were created in the bottom of the page where the information for Paphos Amathus (Cluster 22, Participants 55%, 'Home-Rates and Reservations' quick tab (Cluster

9, Participants 75%), blank area at the very bottom (Cluster 10, Participants 95% and Cluster 12, Participants 90%).

Various customers' critical information requirements were identified from the Paphos Amathus Cluster analysis. Photos of the hotel concentrate the interest of the participants as a result bright and beautiful photos attracted the participants. The participants were looking at the bottom of the page requesting information regarding the security of the website and credit card information (confirmed with think aloud method). All these were employed in the (re)designing process.

Figure 43: Limassol Amathus Cluster Analysis

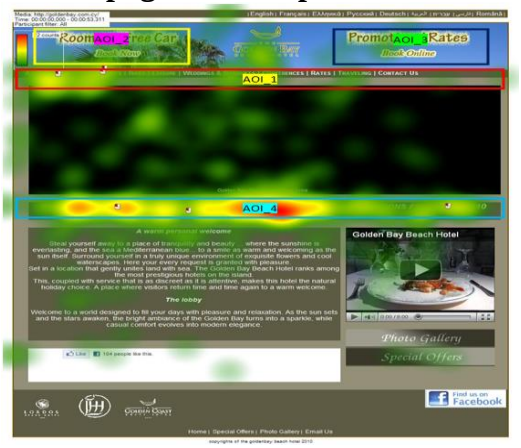


Referring to the above cluster of Limassol Amathus home page (Figure 43), new Area of Interest is observed on hotel's photo and on hotel's message (top of the page). Likewise with Paphos Amathus Hotel, safety and credit card information as expected at the bottom of the page (critical customer information requirements).

7.10 Heat Map

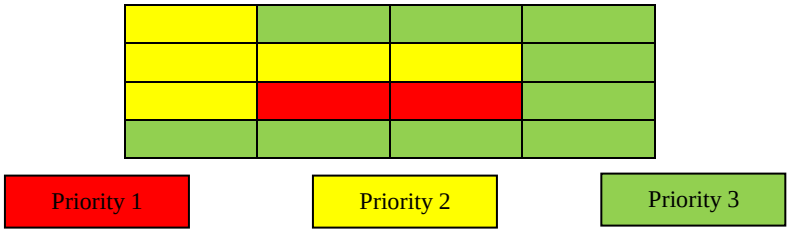
Heat maps offer a better understanding of the total hotel website observation. The red areas on the heat map indicate the areas of highest intensity, i.e. highest frequency of 'visual contact' between the user and the multimedia content on the web site. Orange transitions suggest the decreased high intensity of high frequency of perception. The heat map continues towards yellow fields representing a lower observation. Heat map sections in green and shades of blue suggest low frequency of content perception by the user.

Figure 44: Golden Bay – Home page Heat Map



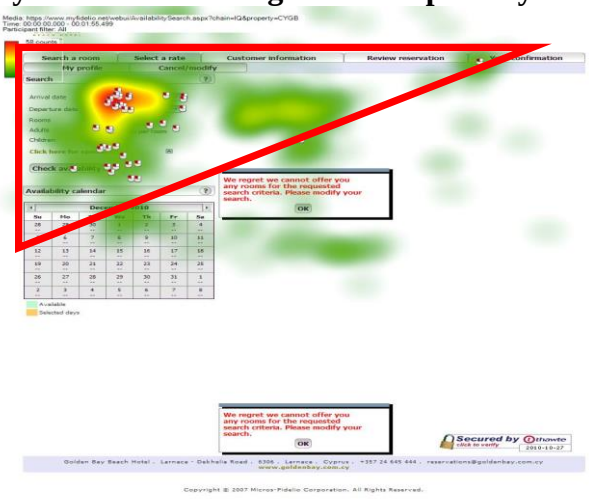
From the above heat map (Figure 44), users seem confused; they scanned all the website probable looking for information which was not very striking. Various hot spots were observed by participants' especially on Area of interest 4 - Important notice "The hotel will be closed for extensive renovations from 8/11/2010 until 13/02/2011"

Figure 45: Graphical representation of main perceptive quadrants on Golden Bay HomePage



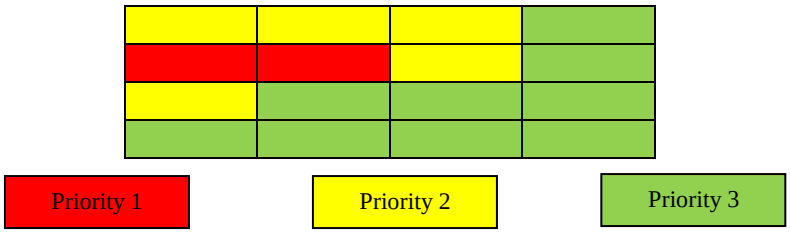
The area of highest intensity of the Golden Bay Hotel is observed (Figure 45) in the middle of the page and this is due to message of non available period. Normally the 'hot' areas in a hotel webpage are observed on top left side – location where booking information usually exists.

Figure 46: Golden Bay – Reservation Page Heat Map Analysis



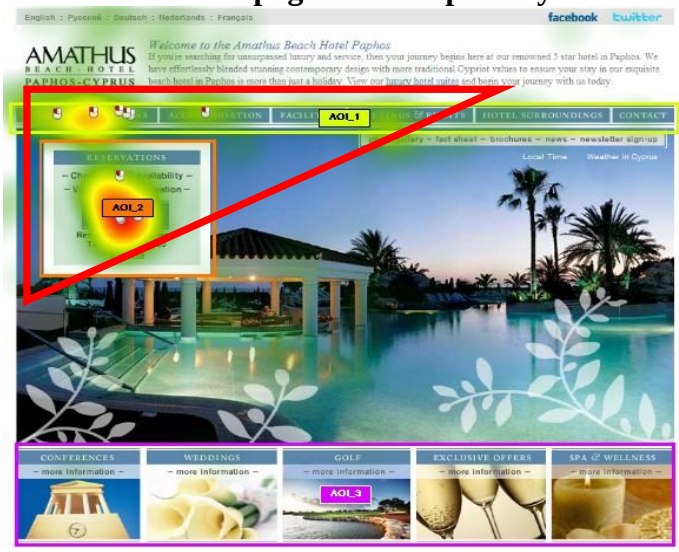
Referring to the heat map of the Golden Bay Reservation page (Figure 46) it was noticed the *Golden Triangle* theory (Hotchkiss et al. 2005). According to the theory, areas of maximum interest create a "golden triangle". The eyes of the respondents scan through the website to find requested information; however, the top-left part of the website attracts more attention and as a result most important information should be presented at this part of the screen.

Figure 47: Graphical representation of main perceptive quadrants on Golden Bay – Reservation Page Heat Map Analysis



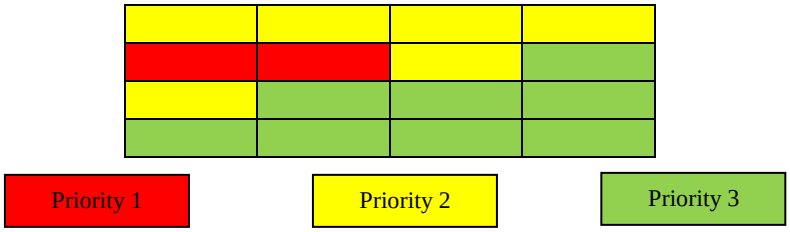
Participants tend to look at top-left side (Figure 47) because they expect from the website to provide all useful information at this part of the screen. Two hot spots were observed. Both of them on the booking section (AOI1 Booking dates). This heat map shows that more attention is given to the reservation section.

Figure 48:Paphos Amathus – Home page Heat Map Analysis



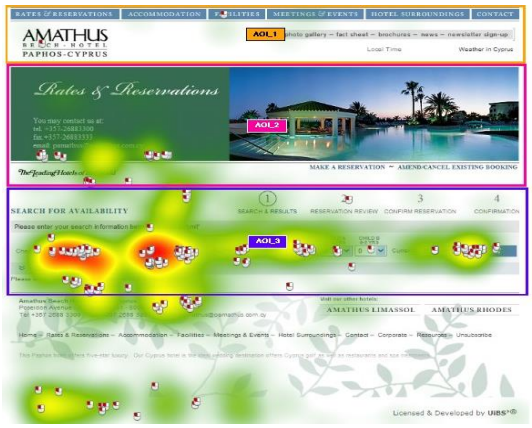
Again, *Golden Triangle* theory (Hotchkiss et al. 2005) was observed in this heat map (Figure 48). As referred above, areas of maximum interest create a "golden triangle". The eyes of the respondents scan through the website to find requested information; however top-left part of the website attracts more attention and as a result most important information should be presented at this part of the screen.

Figure 49: Graphical representation of main perceptive quadrants on Paphos Amathus HomePage



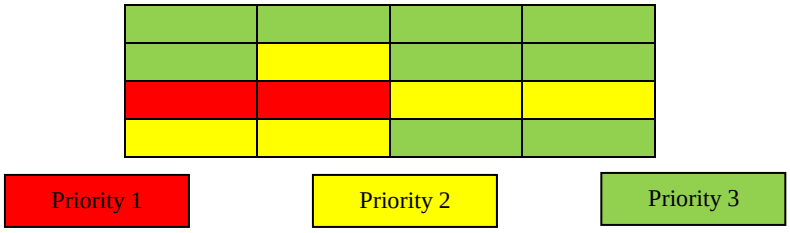
Heat map (Figure 49) contains no spots on area of interest 3 – where information regarding facilities of the hotel, its location, conferences, weddings, golf, exclusive offers, spa and wellness. This shows that at first participants are not very interested to spend time on information such as this; they are more focused on online booking process.

Figure 50: Paphos Amathus – Reservation Page Heat Map Analysis



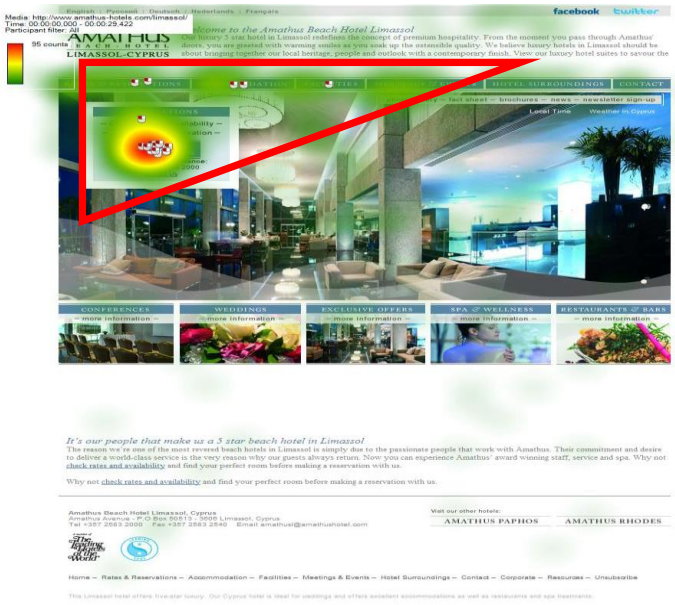
According to above heat map (Figure 50), participants followed a more orthodogonical procedure from left to right, a tidy process like book reading. No spots recorded on hotel's photo and AOI1: Rates and Reservations. However spots were founded at the bottom of the page, indicating that participants were expecting to find there some information regarding their booking process.

Figure 51: Graphical representation of main perceptive quadrants on Paphos Amathus Reservation Page



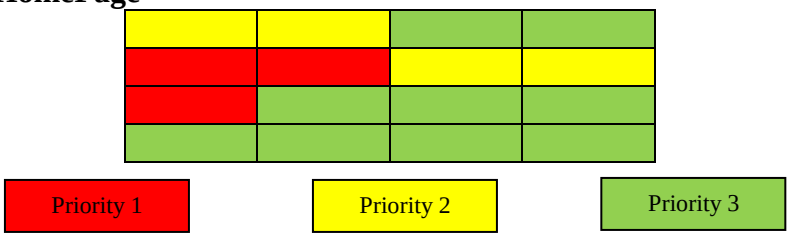
Participants did not pay attention to the right hand – upper level side of the webpage (Figure 51) where the photo of the hotel is located. Additionally, it is important that limited close to no attention was paid for 'amend cancel existing booking' although participants were looking for this information. This is due to the location of this service.

Figure 52: Limassol Amathus Home Page Heat Map Analysis



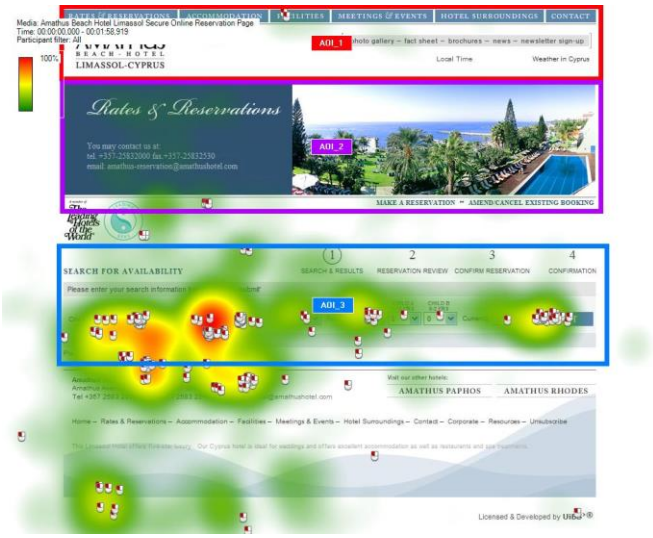
With reference to the heat map (Figure 52) of the respondents it was noticed the *Golden Triangle* theory (Hotchkiss et al. 2005). The eyes of the respondents scan through the website to find requested information; however top-left part of the website attracts more attention and as a result most important information should be presented on this part of the screen.

Figure 53: Graphical representation of main perceptive quadrants on Limassol Amathus HomePage



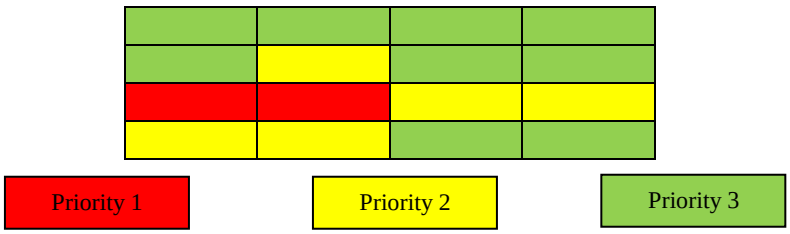
Participants tend to look at top-left side because they expect from the website to provide all fruitful information at this part of the screen (Figure 53). Three hot spots were observed: one on the reservation section and the second at the AOI1 horizontal bar. This heat map shows that more attention is attracted from the make a reservation section.

Figure 54: Limassol Amathus Reservation Page Heat Map Analysis



Two large hot spots are observed in reservation part, during the reservation process (Figure 54), participants tend to have a horizontal trend when looking at the page; no attention is paid on the photo of the hotel and the cancellation policy (AOI2) and the first horizontal bar (AOI1) where the additional hotel information is located. On this area, it was noticed only one click – on hotel's facilities.

Figure 55: Graphical representation of main perceptive quadrants on Limassol Amathus Home Page



Participants tend to look (Figure 55) and spend more time at middle-left side as main booking information to be filled is placed at this part of the webpage.

7.11 Usability of Eye Tracker and Hotels Websites

Two measures were used in order to analyse the usability of the three hotel websites. Descriptive Statistics from SPSS indicating the mean (Mean) scores and standard deviations (SD) of each webpage and System Usability Scale (SUS), a set of ten item Likert scale questions – developed by Brooke (1986) that measures system's usability.

7.11.1 Descriptive Statistics from SPSS

Table 20: Descriptive Statistics for the usability of Eye Tracker

Descriptive Statistics	N	Min	Max	Mean	S.D
Circle the amount of time you spent becoming familiar with the tool before using it	25	1	3	1,20	,500
Rate the degree to which you found this technique easy to use	25	1	5	3,96	1,338
Rate the degree to which you found the interview guide to be flexible	25	1	5	3,80	1,155
Rate the degree to which you found the output to be clear	25	1	5	3,76	1,268
Rate the degree to which you found the knowledge representation to be useful	25	1	5	3,80	1,118
Valid N (listwise)	25				

The mean score for "Circle the amount of time you spent becoming familiar with the tool before using it" was (M=1.2, S.D=0.5) is close to 1 indicating that participants needed less than 10' to become familiar with the eye tracking (for the purposes of this doctoral thesis Tobii).

The remaining statements "Rate the degree to which you found this technique easy to use" (M=3.96, S.D 1.338), "Rate the degree to which you found the interview guide to be flexible" (M=3.80, S.D=1.155), "Rate the degree to which you found the output to be clear" (M=3.76, S.D=1.268) and "Rate the degree to which you found the knowledge representation to be useful" (M=3.80, S.D=1.118) were all close to 4 showing a very positive attitude (4=Agree) towards the statements and the eye tracker usability.

As a result, usability regarding eye tracking tool used for the study was very good and no need to change anything about the process during the validation study.

Table 21: Golden Bay Website Evaluation Analysis

Descriptive Statistics - [Golden Bay]	N	Min	Max	Mean	S.D
I would like to use this website frequently	25	1	5	**2,88**	1,364
I found the website unnecessarily complex	25	1	4	**1,72**	,980
I thought the website was easy to use	25	1	5	**3,60**	1,384
I think that I will need the support of a technical person to be able to use this website	25	1	5	**1,88**	1,536
I found the various functions in this website were well integrated	25	1	5	**3,48**	1,194
I thought there was too much inconsistency in this website	25	1	5	**2,48**	1,358
I think that most people will learn how to use this website quickly	25	1	5	**3,88**	1,333
I found the website very cumbersome to use	25	1	5	**2,40**	1,291
I felt very confident using the website	25	1	5	**3,64**	1,254
I needed to learn a lot of things before I could get going with this website	25	1	5	**1,88**	1,364
Valid N (listwise)	25				

Mean score and standard deviation for "I would like to use this website frequently" is M=2.88 and SD=1.364, score neutral towards to use Golden Bay frequently. Mean scores and standard deviations for "I found the website unnecessarily complex" (M=1.72, SD=0.980), "I think that I will need the support of a technical person to be able to use this website" (M=1.88, SD=1.536), "I found the website very cumbersome to use" (M=2.4, SD=1.291), "I thought there was too much inconsistency in this website" (M=2.48, SD=1.358), and "I needed to learn a lot of things before I could get going with this website" (M=1.88, SD=1.364) were close to 2 showing negative attitude towards these questions.

Consequently, participants do not find the Golden Bay website complex, inconsistent, cumbersome and they don't have to learn things in order to use it. All other variables ranged from M=3.48 – 3.88 "I thought the website was easy to use" (M=3.60, SD=1.384), "I think that most people will learn how to use this website quickly" (M=3.88, SD=1.333), "I found the various functions in this website were well integrated" (M=3.48, SD=1.194), "I felt very confident using the website" (M=3.64, SD=1.254) showing neutral to slight positive attitude towards statement. No mean close 4+ was observed. As a result, these were taken into consideration during the (re)design process so as to make the webpage for explicit and simple.

Table 22: Limassol Amathus Hotel Website Evaluation Analysis

Descriptive Statistics - [Amathus Hotel Limassol]	N	Min	Max	Mean	S.D
I would like to use this website frequently	25	1	5	**4,40**	1,080
I found the website unnecessarily complex	25	1	5	**4,08**	1,241
I thought the website was easy to use	25	1	5	**3,76**	1,332
I think that I will need the support of a technical person to be able to use this webs	25	1	5	**1,88**	1,536
I found the various functions in this website were well integrated	25	2	5	**3,84**	,898
I thought there was too much inconsistency in this website	25	1	5	**2,32**	1,180
I think that most people will learn how to use this website quickly	25	1	5	**4,40**	1,041
I found the website very cumbersome to use	25	1	5	**2,48**	1,388
I felt very confident using the website	25	1	5	**4,08**	1,038
I needed to learn a lot of things before I could get going with this website	25	1	5	**1,88**	1,364
Valid N (listwise)	25				

Overall Limassol Amathus Beach Hotel website evaluation was very positive for the majority of the respondents, scoring very high on returning to use it, found it easy to use, not complex to use, well integrated and as easy learning. Additionally all participants agreed that they did not need to learn a lot of things before using the website and were confident in using it. The statements "I think that I will need the support of a technical person to be able to use this website" (M=1.88, SD=1.536), "I thought there was too much inconsistency in this website" (M=2.32, SD=1.180), "I found the website very cumbersome to use" (M=2.48, SD=1.388), "I needed to learn a lot of things before I could get going with this website" (M=1.88, SD=1.364) were between M=1.88-2.48 showing negative attitude towards statement. High mean scores were rated M=3.76-4.40, were observed for "I would like to use this website frequently" (M=4.40, SD=1.080), "I found the website unnecessarily complex" (M=4.08, SD=1.241), "I thought the website was easy to use" (M=3.76, SD=1.332), "I found the various functions in this website were well integrated" (M=3.84, SD=.898), "I think that most people will learn how to use this website quickly" (M=4.40, SD=1.041), "I felt very confident using the website" (M=4.08, SD=1.038) showing a very positive attitudes towards them.

Two statements were taken into account in the (re)design process in order to avoid future frustration: 'I thought the website was easy to use' and 'I found the various functions in this website were well integrated'. The reason for this was the date-entry procedure and its confusing design.

Table 23: Paphos Amathus Hotel Website Evaluation Analysis

Descriptive Statistics - [Paphos Amathus Beach Hotel]	N	Min	Max	Mean	S.D
I would like to use this website frequently	25	1	5	**4,04**	1,172
I found the website unnecessarily complex	25	1	5	**4,04**	1,172
I thought the website was easy to use	25	1	5	**3,52**	1,531
I think that I will need the support of a technical person to be able to use this web	25	1	5	**1,84**	1,463
I found the various functions in this website were well integrated	25	1	5	**3,64**	1,186
I thought there was too much inconsistency in this website	25	1	4	**2,32**	1,108
I think that most people will learn how to use this website quickly	25	1	5	**3,96**	1,428
I found the website very cumbersome to use	25	1	5	**2,28**	1,370
I felt very confident using the website	25	1	5	**3,76**	1,332
I needed to learn a lot of things before I could get going with this website	25	1	5	**1,80**	1,354
Valid N (listwise)	25				

Participants were confronted with the same situation for the two Amathus websites. Overall, users rate that they are willing to use Paphos Amathus website frequently. They found the website easy to use, not complex, well integrated and easy learning. These similarities between the two hotel websites were expected from the beginning as they belong to same hotel chain with similar website construction but entirely different colors and photos. The statements "I think that I will need the support of a technical person to be able to use this website" (M=1.84, SD=1.463), "I thought there was too much inconsistency in this website" (M=2.32, SD=1.108), "I found the website very cumbersome to use" (M=2.28, SD=1.370), "I needed to learn a lot of things before I could get going with this website" (M=1.80, SD=1.354) were between M=1.80-2.32 showing negative attitude towards statement.

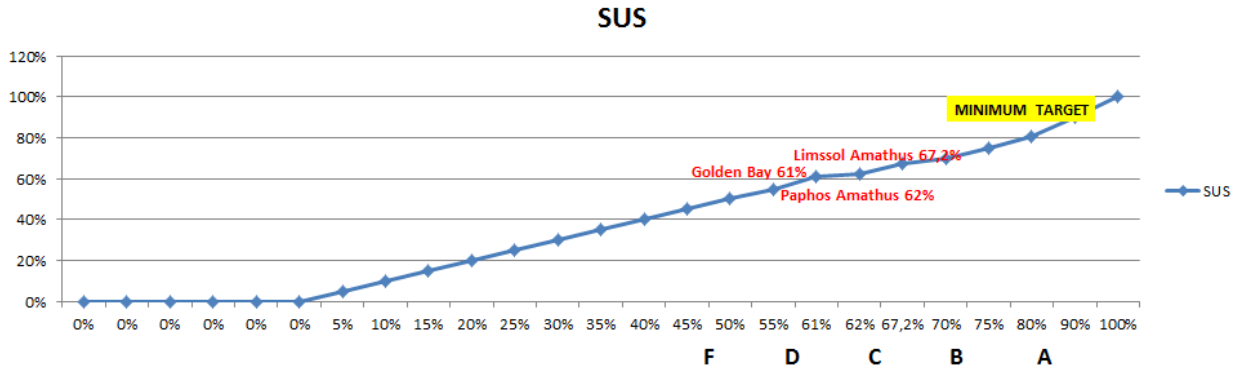
High mean scores were rated M=3.52-4.20, were observed for "I would like to use this website frequently" (M=4.04, SD=1.172), "I thought the website was easy to use" (M=3.52, SD=1.531), "I found the various functions in this website were well integrated" (M=3.64, SD=1.186), "I think that most people will learn how to use this website quickly" (M=3.96, SD=1.428) and "I felt very confident using the website" (M=3.76, SD=1.332) showing a very positive attitudes towards them. "I found the website unnecessarily complex" (M=1.80, SD=1.225); participants were positive, this is mainly due to date entry and 'make reservation' position. Customers' critical information requirements that encourage / discourage Cypriots to use online hotel reservation: search for alternatives,

credit card safety information, information regarding hotel bedrooms, hotel facilities, offers, hotel location and refund policy factors play a fundamental role in an information search stage of the decision making process. These factors are important for all participants. In Evaluation of Alternatives stage, room type, room location and meal alternatives factors influence participants' decision at this stage. Less important factor seems to be alternative payment method. The majority of respondents had internet visa cards or debit cards (i.e. visa electron), with some money in order to avoid fraud. Finally, at the online booking stage for participants it is very important the hotel to offer an easy to fill reservation form, with simple instructions and short so as to be time saving and user friendly. Similarly, with Limassol Amathus three statements were taken into account in (re)design process. Two of them were the same 'I thought the website was easy to use' and 'I found the various functions in this website were well integrated'. The third one reported for this hotel webpage was 'I felt very confident using the website'. Again, these were mainly because of the date-entry procedure and its confusing design (both confirmed during the think aloud procedure).

7.11.2 SUS Analysis (calculations are in Appendix 6)

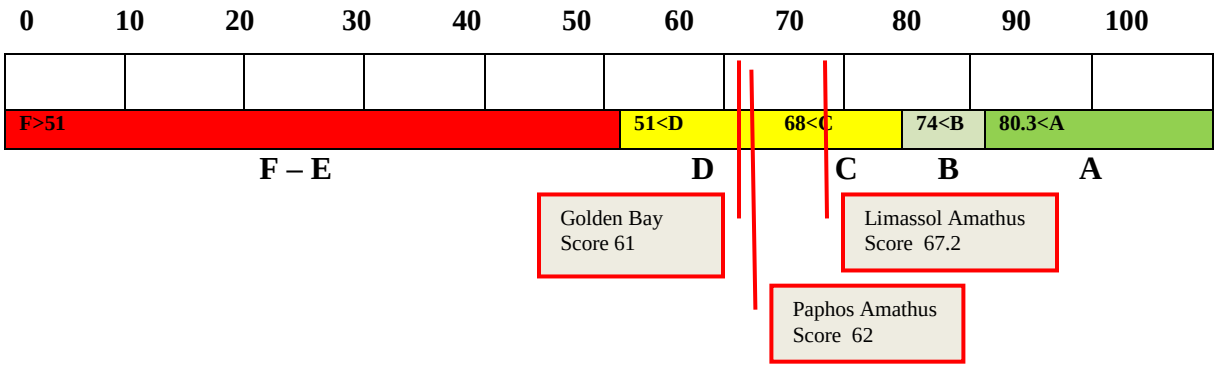
Following the System Usability Scale (SUS) methodology (Katsanos et al 2012), the higher the score, and the more usable the website is. According to Sauro a SUS score above a 68 would be considered above average and anything below 68 is below average. The graph below shows how the percentile ranks associate with SUS scores and letter grades.

Figure 56: SUS Score



Source: Author, 2013

Figure 57: Grades of the three hotels following SUS assessments



Source: Author, 2013

Following SUS analysis all three hotels are in usability 51>D, with Limassol Amathus very close to 68>C but far away from 74>B and 80.3>A. As referred above a SUS score above a 68 would be considered above average and anything below 68 is below average, as a result all usability results for the hotels are below average >68. Better usability scoring from the three hotels is from Limassol Amathus. This is examined in the redesign procedure where a larger sample of participants will evaluate the (re)designed webpages.

7.12 Critical Information Requirements and their impact on Human – Computer interaction (HCI)

Critical information requirements are the pieces of information customers need to make informed decisions. This part was mainly used in the questionnaire in case a respondent wanted to express something additional regarding this specific requirements that can change his/her decision or influence the entire decision process.

At this stage, participants already had the experience with the eye tracking and they have searched the three websites in order to form a final decision for their booking. The majority of responders were more demanding on their required information in order to formulate a decision; looking for information regarding pricing, meals, hotel facilities, offers and hotel location.

7.13 Website Design and Re-design

The overall analysis of the eye tracking recordings and analysis is compared with Nielsen's and Tahir's homepage design recognized guidelines. Following Nielsen's and Tahir's (2002) book of design guidelines and compared to the results of the study there is an agreement regarding the most striking position "*Place important information on top of the page*". This is confirmed following eye tracking recordings where many fixations found on this part of the homepage (mainly top-left-hand-side). The present thesis' findings uncover additional design or re-design guidelines. It is important that if a webpage is difficult in navigation it will influence entire online decision making process; or poorly designed this could influence website's trustworthiness. During the real-time decision making process and video recordings, customers' critical information requirements concerning hotels' webpage design and information provided are grouped as below:

[a] most 'eye catching' area: as referred above majority of participants tend to look at the top-left hand side of the webpage. This can be explained that due to participants' previous online experience their eyes have been driven in this direction unintentionally. They were expecting from the beginning that the information they need to form a decision is going to be placed at this area of the webpage. This is known as 'user's adaptability', users learn where to look over repeated exposures (Nielsen's and Tahir's, 2002). Previous experience strongly influences users' present or future online behaviour.

[b] 'Liquid design layouts', this is mainly refers to other than homepage webpages (especially reservations pages), do not enhance the completeness of scanning. Participant's scanning was focused on fixed layouts which fit on a single screen. As a result, important CCIRs of users were not met due to this reason.

[c] photos in the middle of the screen, following some users' recordings at homepages, photos placed in the middle of the screen created an 'eye-pull-down' effect; this means that due to photos, users' attention was drawn to the bottom of the page where additional information for the hotel is located. This contradicts the general website rules for top and top-left hand side attention. There are some design recommendations for bringing attention to the bottom and as a result of placing additional information in this area.

[d] colors of the photos and webpage, during the think aloud recordings, a lot of participants reported that due to photos, colour, and the 'make a reservation' (of Paphos Amathus and Limassol Amathus) was not very visible. Following psychology of colours

theory, colours can work as a very powerful tool as they can represent experiences, emotions and status. The three webpages examined following this theory and they use below background colours:

Golden Bay: a combination of blue, grey, dark grey and photos in the center of the page. The combination of black and white adds sophistication and peace. It can be cold and sterile but adding hints of silver (grey) can bring warmth.

Paphos Amathus: white background, blue horizontal bar, big centered photo and five smaller photos at the bottom.

Limassol Amathus: same with Paphos Amathus. White is sophisticated and it gives feelings of piece. Blue is calming – has been known to lower blood pressure (light blue). It is the favourite colour of more adults. Following psychology of colours theory, this is not the ideal colour for a webpage; but for hotels sector this colour is ideal as the blue is the colour of the sea; hotels in Cyprus sell sunny beaches and the blue sea.

Ideally, following psychology of colours theory (Daily Mail, 2001), the first colour the human eye notices is yellow (cheerful, used for mental stimulation). A combination of yellow background with black text has high memory retention and legibility. Additionally, usage of red is perfect as this colour is an attention grabber, full of energy. For a hotel webpage, usage of green (centre of the colour spectrum) provides perfect balance, relaxing and quiet. It is important the colour used for a hotel webpage to be used after deep consideration; colour constitutes the first website design factor that is noticed by users.

[e] Refund Policy, participants mentioned that they could not locate where refund or security policy is; adding credit card logos to the footer of the webage constitutes one of the easiest, faster and convenient ways to provide this information. Additionally, it is of utmost importance that on the booking page, a user can locate information ideally on a secure SSC page with brand icons that promote trust (a link of security policy is necessary to be linked from the homepage).

[f] Booking form, it is important that the booking form is not too big asking too many-in most cases unnecessary information. Mandatory fields should be minimum.

[g] Room and Rates information, many participants reported that in Paphos Amathus and Limassol Amathus found it difficult to obtain room information and photos (this was mainly due to scroll down webpage format). Following recordings of participants and their

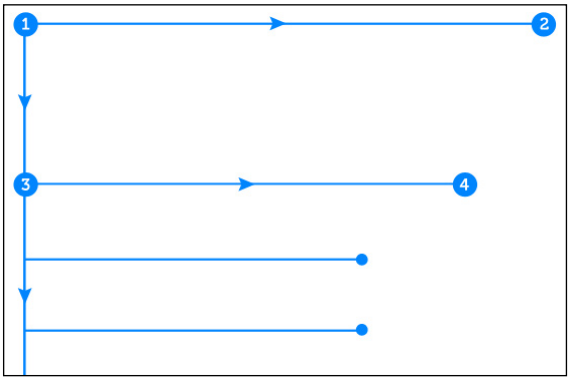
critical information requirements, all room information should be placed on one screen, in a printable pdf format that can be sent via email.

[h] Scrolling screen, the study showed that scrolling screen is annoying and in majority of participants did not notice information placed in this part of the page. The purpose of the webpage and especially a hotel's website is to satisfy CCIRs fast in order to book immediately before they leave and book somewhere else.

Most critical issue for website designers is to identify and finally predict and satisfy all customers' critical information requirements. The above findings and analysis brought into light, many useful and important requirements of participants during their decision making process stages. Re-designing hotel websites following these customers' critical information requirements will make it more likely to potential online shoppers to stay in the hotel website, satisfy all his / her needs and finally book online.

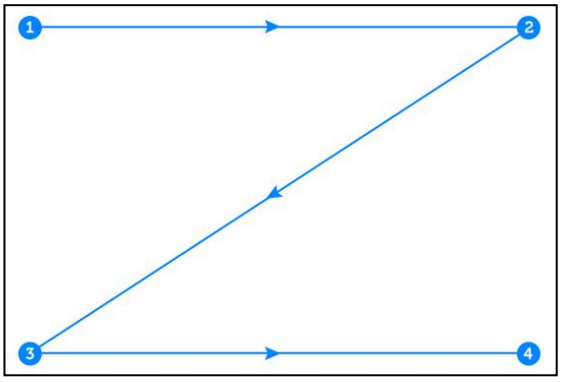
The existing presentation of the Golden Bay Hotel Home Page follows an **F-layout** (Figure 58) in web design. This actually derives from previous eye tracking studies and came to the conclusion that web surfers tend to read the screen in an "F" pattern – seeing first the top, upper left corner and mainly left sides of the screen as below:

Figure 58: F-Layout



Source: Jones (2012)

Figure 59: Z-Layout



Source: Jones (2010)

The existing presentation of the other two hotels – Limassol Amathus and Paphos Amathus Beach Hotel follow the **Z-layout** (Figure 59) in web design. Following the Z theory, the web designer should place the information that the hotel wants the reader to see first along

the top of the Z. The eye will naturally follow the path of the Z, so the goal is to place hotel's "call to action" at the end.

However, the results of the study showed that none of the above two layouts work on hotels' websites. Online hotel reservation users tend to show a different behaviour when they see the website. The majority of them follow the "golden triangle" theory of website design – at homepage areas of maximum interest create a golden triangle – top left side of the webpage attracts more attention. It is fundamental to mention that the behaviour changes when an online user proceeds to the reservation page, amenities page, spa, gym, surroundings etc. At these pages the attention is more central-to-bottom like a "T".

From the above analysis, it was concluded that the most fruitful page area in a hotel main website is mainly *the left hand side at the top*. When the online customers enter homepage and proceed to more stages (i.e. information entering for availability) then central area of the webpage is more observable. The home page of the hotel website is encountering differently than the other website pages as first impression is a must in online services. Following participants' gaze plots the two pages of a hotel's website should look like the below figures:

Figure 60: Main website's key areas

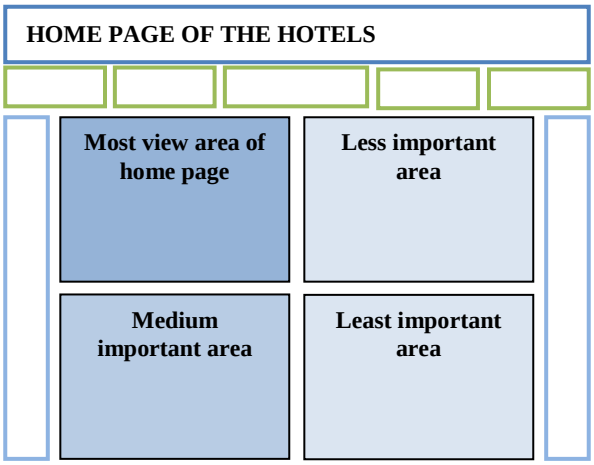
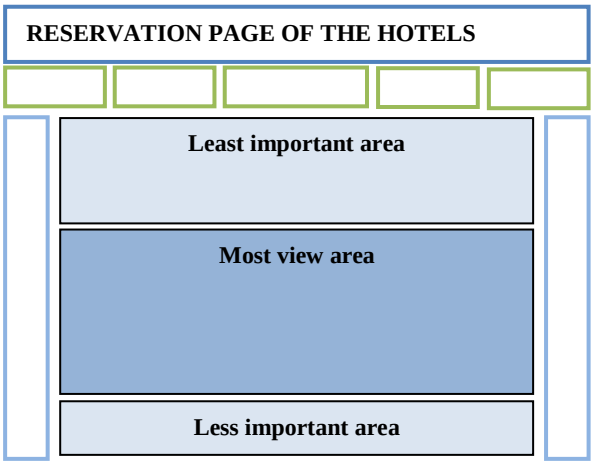


Figure 61: Reservation website's key areas



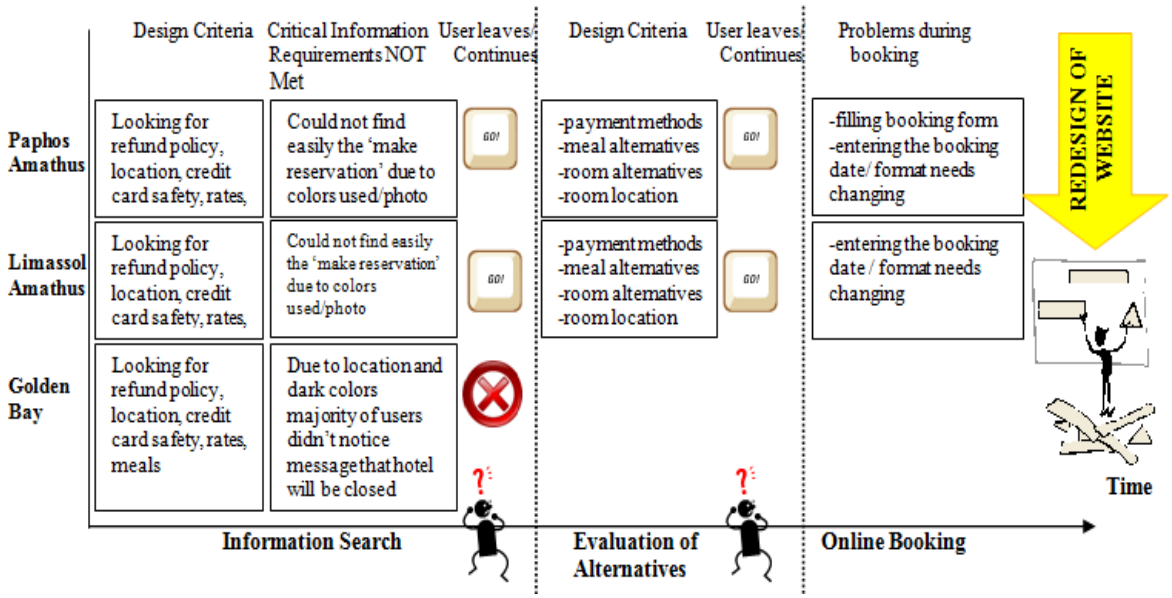
Source: Author, 2013

Hotel website designers should provide all hotels facilities on this page (Figure 60 and Figure 61), capturing as much attention as possible and serve their customer's critical information requirements. As a result, the provision of obvious and striking menus, search field (that none of the hotel had), information about the hotel – ideally near the logo of the hotel and photos or images are some useful tools in building a hotel website. Participants rarely went to the bottom of the page and they hardly ever scroll down to find information. Actually, participants they never look at the scroll bar even when using them – this is due to computer experience and consequently this side of the page is rarely seen (right hand side).

It is a good suggestion to designers to provide hotel's photos of surroundings and facilities in this part of the page. This will attract customers' eyes more easily. Hotel's photos are a powerful part of website design. Striking and beautiful bright photos (i.e. garden, swimming pool area, facilities etc) can persuade user and make him / her even they cannot locate all of their customer's critical information requirements to book this hotel. Ugly and dark photos confused users and make them leave the webpage. It is important to note that photos leave a permanent impression on the users' minds and can work as future customer's critical information requirements.

Figure 62 presents customer's critical information requirements at each stage of the decision making booking, "Time frame analysis of participants per decision making process stage" provides a summary of information gathered from participants during their decision making process – interview part and Eye tracking procedure. Following the figure, a summary is provided per hotel.It is divided into three parts: a. Information search, ii. Evaluation of alternatives and iii. Online booking. At information search, the 'Design Criteria' are the information that participants looking for during this stage. Second column – Critical information requirements not met are these critical cues that were not noticed in the hotel's website and they are fundamental in order to proceed (images GO buttons and X).

Figure 62: Time frame analysis of participants per decision making process stage

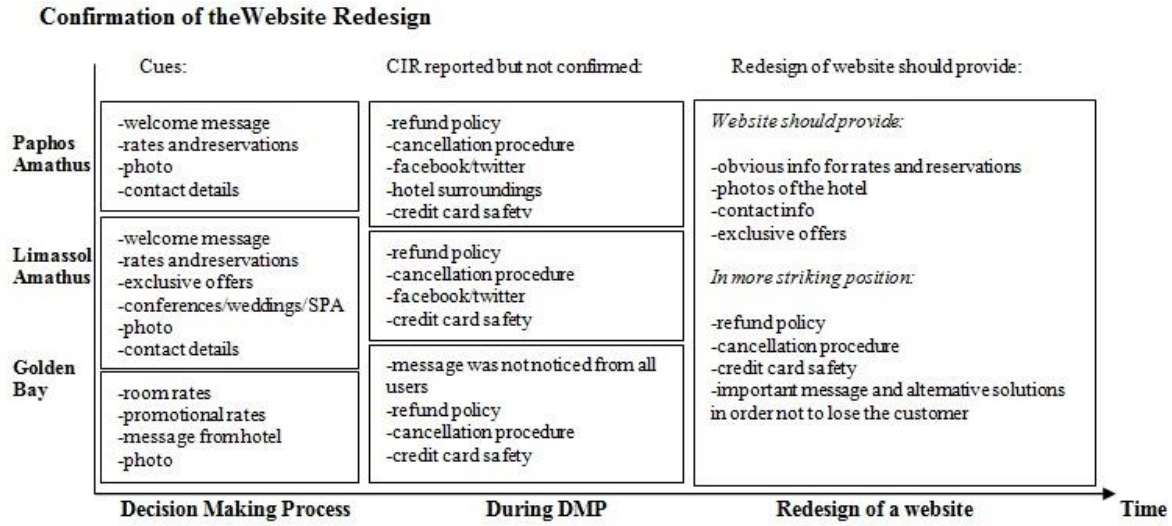


Source: Author, 2013

At the Evaluation of Alternatives stage, participants again reported 'Design Criteria'; these are the critical information requirements needed to proceed to the final stage of the decision making process. Finally, at 'Online Booking' stage, participants mentioned (during the think aloud method, critical decision method and applied cognitive task analysis) problems occurred during this stage. Following the time frame analysis, all these critical information requirements should be considered for the redesign of the hotel's website.

Figure 63 below "Confirmation of the Website Redesign" is prepared in order to confirm or reject the participants' critical information requirements and finally again provide feedback regarding the redesign of the website. The structure is similar to the Figure 2 in order to have a clear picture of the decision making process stages.

Figure 63: Confirmation of theWebsite Redesign



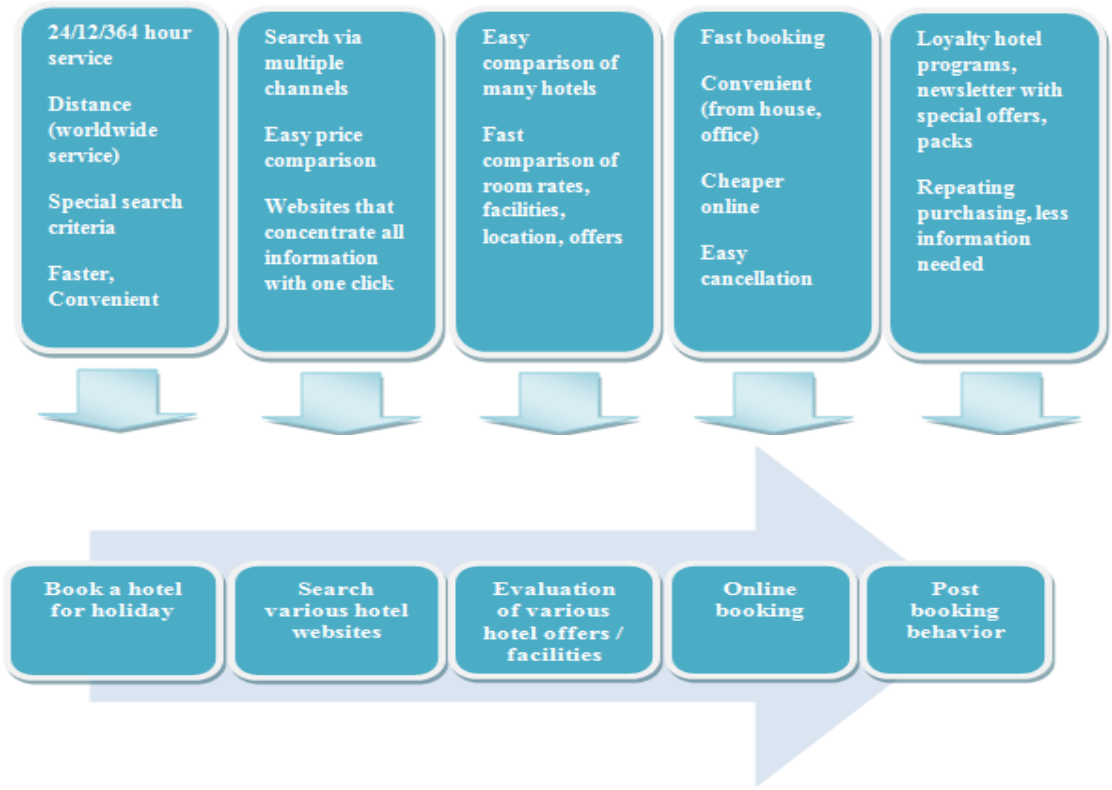
Source: Author, 2013

These critical information requirements included in the redesign of the website to be provided at 'most view area' at the home page and reservation page (following the two figures above). These are the most striking positions of the hotel's website and the most important and requested cues should be provided there.

Figure 67 provides an online decision making process following the original decision making process steps. The need recognition step, during the hotel reservation decision making is the need for hotel booking; at search stage the user will search over the Web for various hotels of different star range, locations, room rate etc. At the evaluation of alternatives stage, online users will come to figure out all hotels and evaluate them according to their needs. Then, purchase stage is the online booking; at this stage customers will fill the reservation form, book via credit card and receive a confirmation email with all booking information. Finally post-booking behaviour refers to the outcome of the entire online decision making process.

Following Figure 64, the top horizontal bar of the above figure summarizes the reason of why a customer will follow the online decision making process instead of the traditional booking via the hotel reception and travel agents.

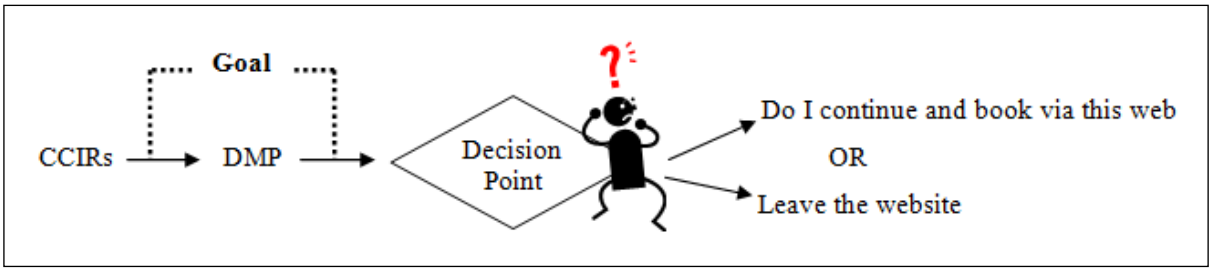
Figure 64: Online Decision Making Process



Source: Author, 2013

The website is a 24/7/365 sales, promotional and marketing tool. It is a hotel's top producing "virtual" sales office. The website is a "living organism" with descriptive copy, images, photos and keyword updates, special packages; email capture, location information, etc. In many cases local events are provided so as to attract the interest of the customers.

Figure 65: Decision Making Model



Source: Author, 2013

The Figure 65 shows that the actual decision making process is influenced by customers critical information requirements (CCIRs) – cognitive factors. It provides that users' goals are influenced by these customers critical information requirements and these plays a fundamental role in their entire decision making process. Then, at the decision point, the user will come to decide if he/she is going to book online or leave the website. As a result, before the user comes at this point, the hotel websites must satisfy all these customers' critical information requirements in order to maximize the likelihood that customers have finally booked online.

7.14 Conclusion

Getting these customers' critical information requirements that influence users online decision making process was not an easy task. Every hotel webpage is challenging and competing with the other hotel webpage and not all of them can have the final booking and as a result money from the shopper. It is vital for designers know the customer's critical information requirements in order to have them more visible and as a result get the user's attention.

Participants never read information; they scanned pages to find it. Consequently, it is important the text provided in the web pages is scanable, with striking headings and fonts and short sections. Customers get bored easily, so keeping their interest at the webpage is vital. For this reason, when they are asked to fill reservation forms it is better to require less information and the format is better to be vertical and with possible answers so as users are able to click on an answer (i.e. dates – year, month, date) and then continue to next question.

As referred in Applied Cognitive Task Analysis interviews, part three online booking, "Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation" and all participants agreed with this statement, it is crucial hotel website designers to minimize the download time in order to not to lose potential buyers with slow connections. Small photos and images can assist in minimizing download time. During the think aloud process, participants reported that there was no search field in

all the hotel websites; in well designed webpages, navigation is a must in order not customers to lose their time in useless for them information. Navigation should allow online users to find requested information efficiently. This navigation shall contain all customers' critical information requirements in order to acquire all information for their booking, less mouse clicks, security and credit card logos.

Additionally, during the think aloud process all participants faced the same problem with the Amathus Hotels websites; when they filled the reservation availability requirements and the hotel provided information regarding availability in order the user be able to see photos of the room they had to scroll down; none of them used the scroll down and at this stage all of them reposted that they could not find room's photos. Consequently, websites designers should use smaller pages that do not require a lot of scrolling and as a result minimize this usability issue.

All participants noticed horizontal bars on all three websites where hotel information about meals, weddings, surroundings, etc these were located on tab labels, with bold letters and borders. This is reasonable as users feel that if they select this tab will save them from some useless mouse clicks, it allows them error free selections. However, no attention was paid to Facebook and Twitter access.

The combination of methods used and analyses were used to specify the website redesign. Obtaining all these customers' critical information requirements were used as guidance for the next step; i.e. meet the CCIRs and gain the booking. Gaze plots, heat maps, clusters provided very useful information regarding what users actually see and for how long. The usability scale showed that all webpages were below average. This drives the need for a redesign, that will place the websites higher on the usability scale (B-A).

The time frame analysis provided the customers' critical information requirements during the online decision making process at each stage, and was extremely useful in highlighting the missing information that caused participants to leave the hotel webpage. Problems occurred during the decision making process when CCIRs were not met.

8

Validation Study

8.1 Introduction

The best way to ensure that main study's findings were valid, was to conduct a second research. On one hand, there are the findings of the main research that identify customers' critical information requirements during their online decision making process and re-design tips based on these requirements validates the main study's findings concerning (re)designing aspects. The validation's research purpose was to examine whether or not these findings were valid.

8.2 Website Redesign Process

Two web-design programs – Microsoft Visual Web Developer and Adobe Dreamweaver were used for the redesigning of the three websites. The main target was to redesign the three webpages following main study's findings during eye tracking, interview and think aloud procedures in order to examine whether or not there redesign amendments really affect the decision making process and will bring bookings to the hotels. As the two hotel pages (Paphos Amathus and Limassol Amathus) were quite similar, almost same amendments were applied. Website Redesign: Main target: make the home and reservation page as simple as possible – avoid scrolling down – remove all unseen / unnecessary info.

8.2.1 Amendments at Paphos and Limassol Amathus Home Pages

a) Search box has been added at right-hand side; participants mentioned that it was obvious that the search box was missing

b) As previously referred to, the main target was to avoid scroll-down as much as possible; consequently light blue horizontal line "exclusive offers" was removed and "exclusive offers" were placed below booking process

c) Another important target was to minimize mouse clicks; as a result booking process was placed on the home page, left-hand side

d) The home page center photo was made smaller in order the booking process is more striking

e) Under the booking process, "amend / cancel" button was placed

f) Brighter colours in horizontal and bottom bar links

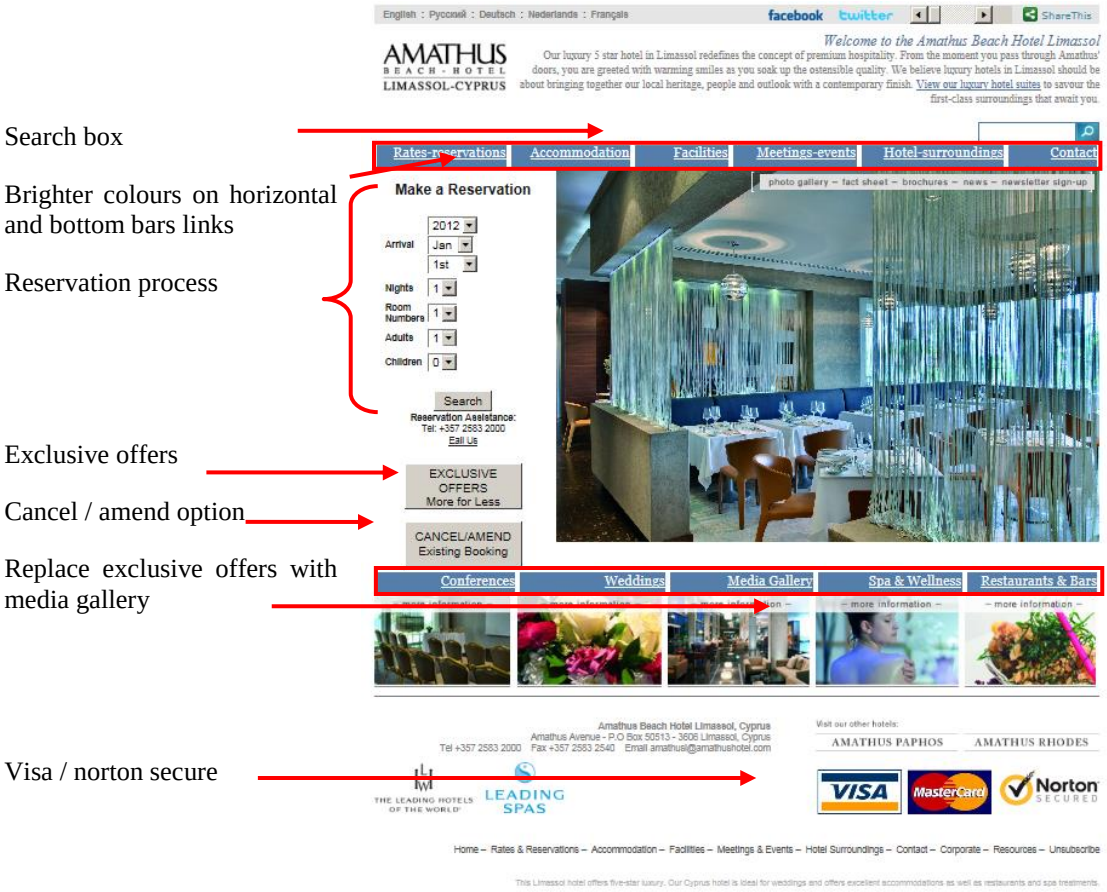
g) The message at the bottom of the page was removed as nobody paid attention to it

h) Visa logos were placed at the bottom of the page

i) Norton secured logo was placed at the bottom of the page

j) "Exclusive offers" repeated link replaced with "media gallery"

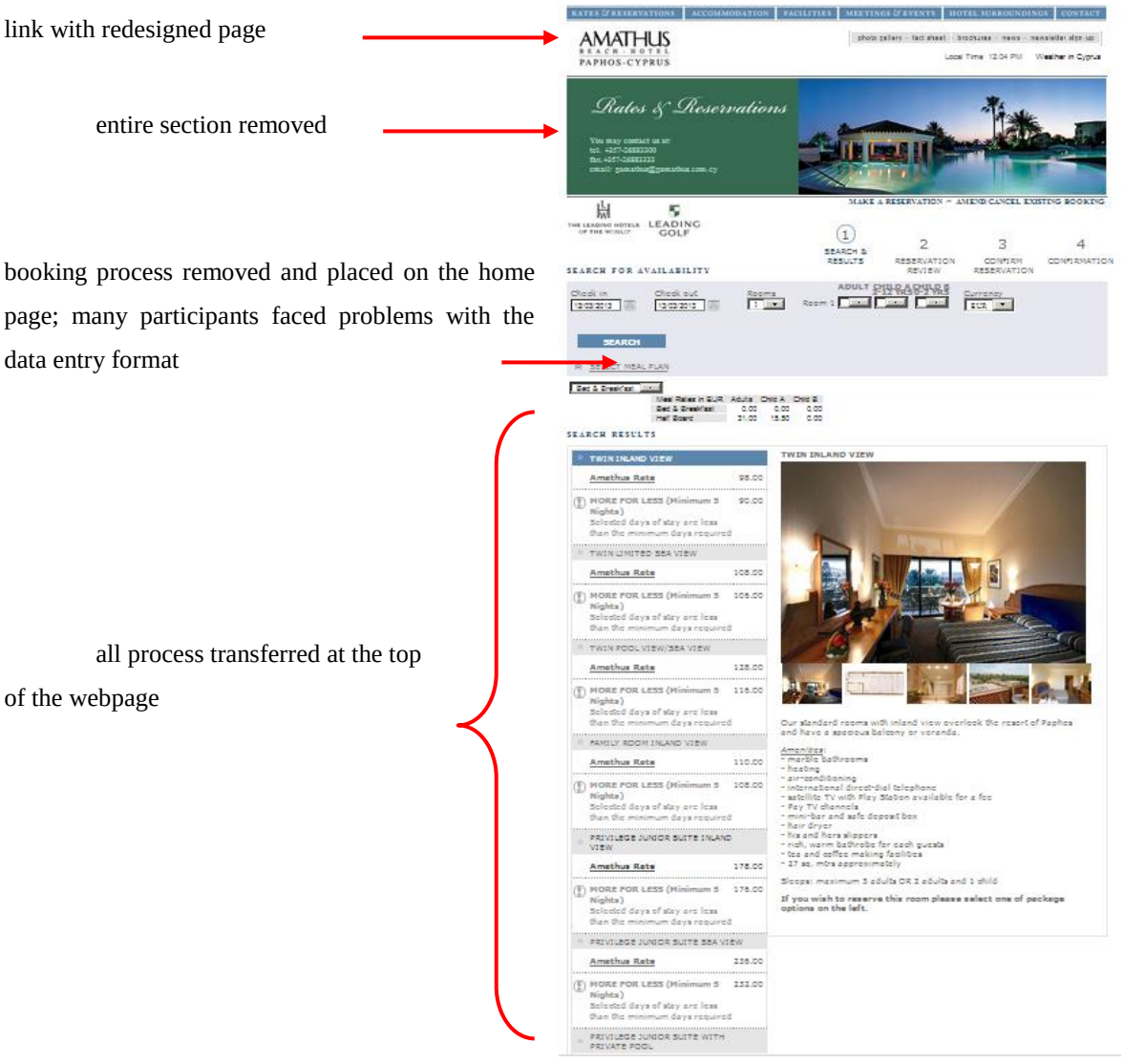
Figure 66: Limassol Amathus Re Designed Areas at Home Page



8.2.2 Amendments at Paphos and Limassol Amathus Rooms Availability Page

a) As the main issue at this part of the decision process was to locate the availability, the "rates and reservation" section that contain again hotel's contacts and same photo as a home page was deleted
b) Booking process removed and placed on the home page in order to avoid unnecessary clisks
c) the upper left-hand side logo was linked with redesigned home page

Figure 67: Paphos Amathus Original Rooms Availability Page



8.2.3 Amendments in Golden Bay Home Page

a) Lighter grey colour; participants mentioned that the colour is too dark and not representative for a country full of sun and blue sea

b) No scrolling down

c) Add a photo gallery under booking process

d) Add search box

e) Remove book online as booking process is on the home page under booking process, special offers are placed

f) Remove 'winner certificate' from home page photo

g) Visa logos were placed at the bottom of the page

h) Norton secured logo was placed at the bottom of the page

i) Remove different fonts and keep minimum different type and size of fonts; too confusing and unfriendly

Figure 68: Golden Bay Original Re Designed Home Page

8.2.4 Amendments in Golden Bay Reservation Page remains the same with the original page; the only amendment is the link from the hotel's logo to the redesigned home page.

8.3 Validation Studies

Two different studies were performed in order to test the validation of the results of the original research. The main purpose of the validity procedure was to ensure that the design amendments made on the original hotel webpages were accurate and that by implementing them the customers' critical information requirements were met and satisfied.

8.3.1 Study A - Eyetracking

The first validation study was conducted in the same eye tracking lab with 13 participants taking same process eye tracking experiment as main study's with re-designed websites. Participants were used the eye tracker in order to proceed with an online reservation decision making process via the three re-designed webpages. These results from the heat maps, gaze plots and cluster analysis were employed to identify the re-designed areas. They were used to determine whether CCIRs were met together with the duration of the gaze. Specifically, participants were asked to follow the below process:

a) Perform the calibration test, following researchers guidance and kindly ensure that during the process they stay in the ideal position for the Tobii to track their eyes
b) Go to Google
c) They were asked to visit ALL three re-designed webpages (Paphos Amathus, Golden Bay and Limassol Amathus) that were saved in the favourites of the internet explorer
d) Visit the websites acting normally as in an original website and proceed with a reservation process; requested booking period 1-5/06/2013 (4 nights, 2 adults)
e) Leave

For the analysis of these results, observation evaluation was applied (gaze plots, heat maps, cluster analysis) and quantitative analysis via Independent Samples t-test; comparing time needed for online decision making of main study and time needed for online decision making of (re)designed websites – validity study. Thirteen Participants used for the Independent Samples t-test of the original webpage. Only the participants that visited all websites were used in order to have an equal comparison of time needed for the online booking decision making process. The results are presented in Section 8.4.

At the first stage the Significant Value was tested if it was larger than .05; if yes, then Equal variances assumed. If the significance level was less than .05 then Equal variances were not assumed.

8.3.1.1 Analysis of Study A

Following the significance level of Levene's test is p=.029 (less than p=.05), this means that the variances of the two groups (Before and After Redesign) ***are not the same***. Therefore data violates the assumption of equal variance and it was taken into consideration the results of the second line of the t-test - ***Equal variances not assumed***. Assessing differences between the groups: Taking Sig. (2-tailed) value of .007 (less than .05) means that ***there is a significant difference*** in the mean scores on the **Time** taken for the online booking decision between Before and After Redesign.

Table: 24 Group Statistics

	Websites	N	Mean	Std. Deviation	Std. Error Mean
Time	Before Redesign	13	5,1800	1,57631	,43719
	After Redesign	13	3,6638	,82539	,22892

Table: 25 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Time	Equal variances assumed	5,359	**,029**	3,072	24	,005	1,51615	,49350	,49762	2,53469
	Equal variances not assumed			**3,072**	**18,120**	**,007**	**1,51615**	**,49350**	**,47984**	**2,55246**

An independent samples t-test was conducted to compare the **Time** scores of participants before and after the redesign of the webpages. There was a significant difference in the mean scores on time for online booking decision between Before redesign (M=5.18, SD=1.57) and After Redesign (M=3.66, SD=0.82). The mean time taken for completing the online decision making process is reduced from 5.18 to 3.66 minutes indicating that redesigned hotel websites significantly speeds up the customer's decision making process which is attributable to the timely satisfaction of the CCIRs.

8.3.2 Study B – Comparison of Design and Redesigned Websites

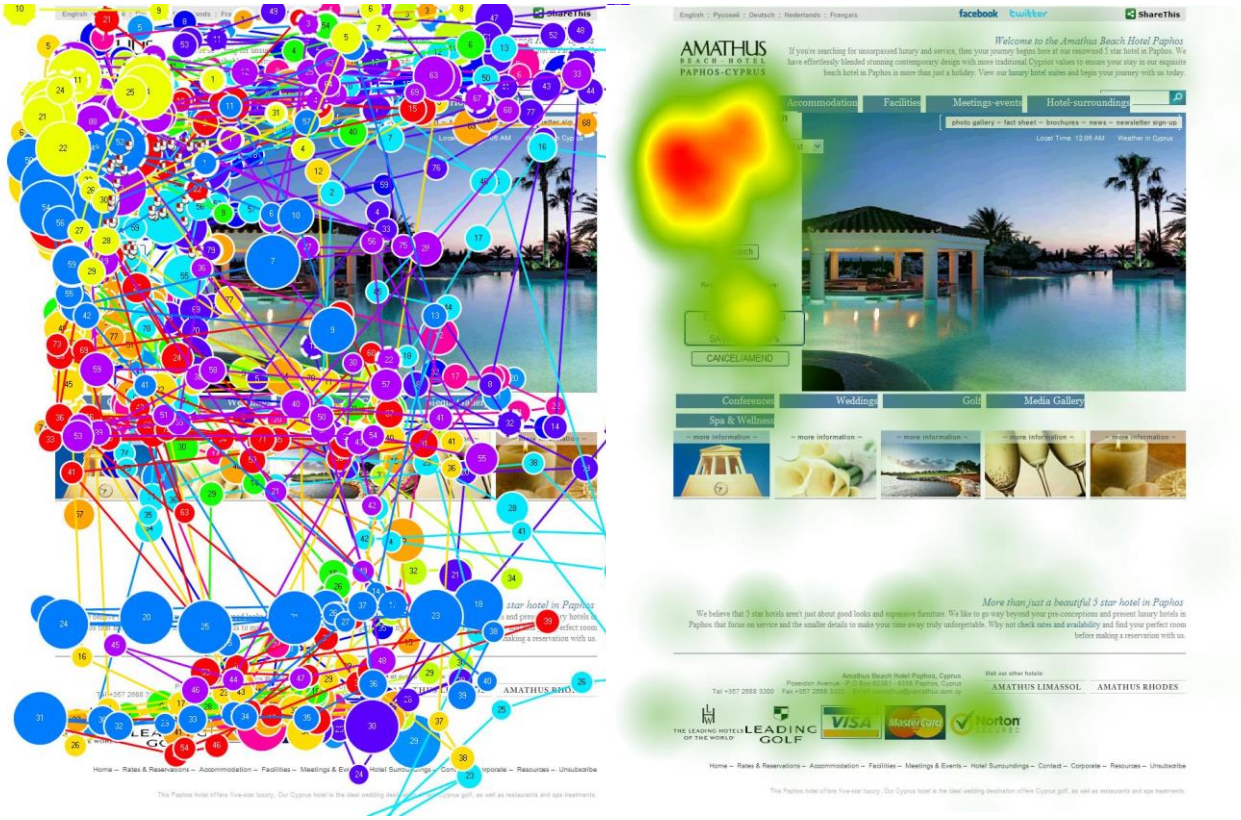
Fifty participants were asked to observe original hotel websites (all three hotels) and answer a set of questions. An additional set of Likert-scale questions was added at final part in order to get some specific answers on redesigned parts: *Credit card logos is easily identifiable, Site search is easy to access, Security for transactions logo is easily identifiable, The appearance of some recognized type of assurance of a secure transaction impacts your decision, It is very convenient to have the booking process at home page, Less mouse clicks make your decision making process more convenient, It is likely to ignore information placed at scroll down part of the webpage, The cancel/amend a reservation is in a striking position, Special offers are easy to access, A short-time booking process impacts your online decision making process*.

A week later, the same participants were asked to return and undergo the same process using the re-designed webpages. The results of the two questionnaires were analyzed using the Paired Samples Samples t-test (in SPSS). The aim was to establish whether there was a significant difference between the original and redesigned websites i.e. to accept or reject the null hypothesis i.e. no difference between the designed and redesigned websites.

With reference to Tables 26-34, the Paired Samples Samples t-test analyses showed that all the specified CCIRs were significant at the 5% level upholding the alternative hypothesis; namely, the redesigned websites for all three hotels were significantly improved in respect of all the CCIRs. These differences are discussed in section 8.5.

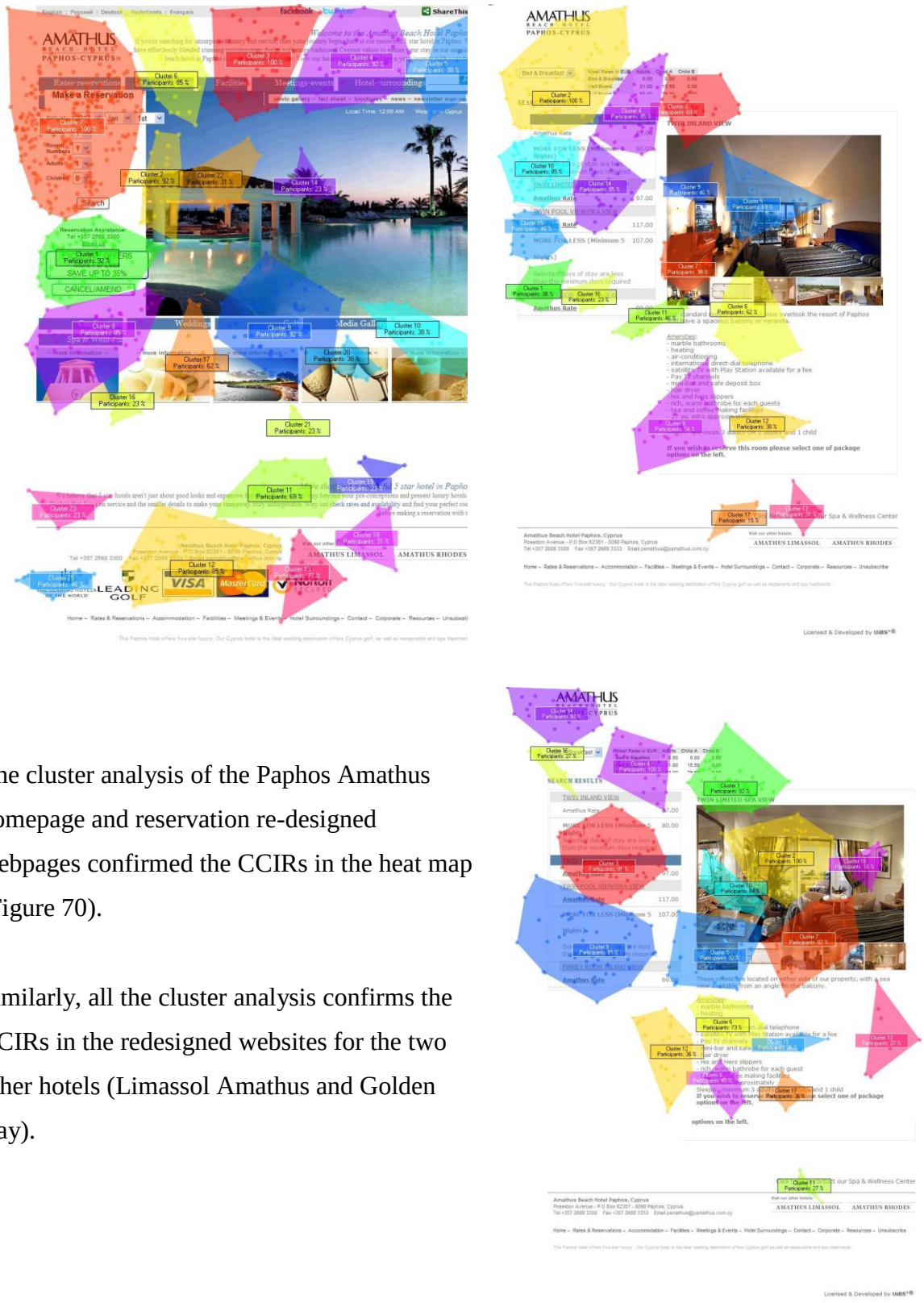
8.4 Results – Study A

Figure 69: Paphos Amathus Re-Designed – Home Page



According to above gaze plot and heat map (Figure 69) of Paphos Amathus, users can easily see all the CCIRs related to the online booking process; this is the area of highest intensity. Similarly, the CCIRs associated with 'special offers' in the middle of the page are seen by users as well as the credit card and security logo CCIRs.

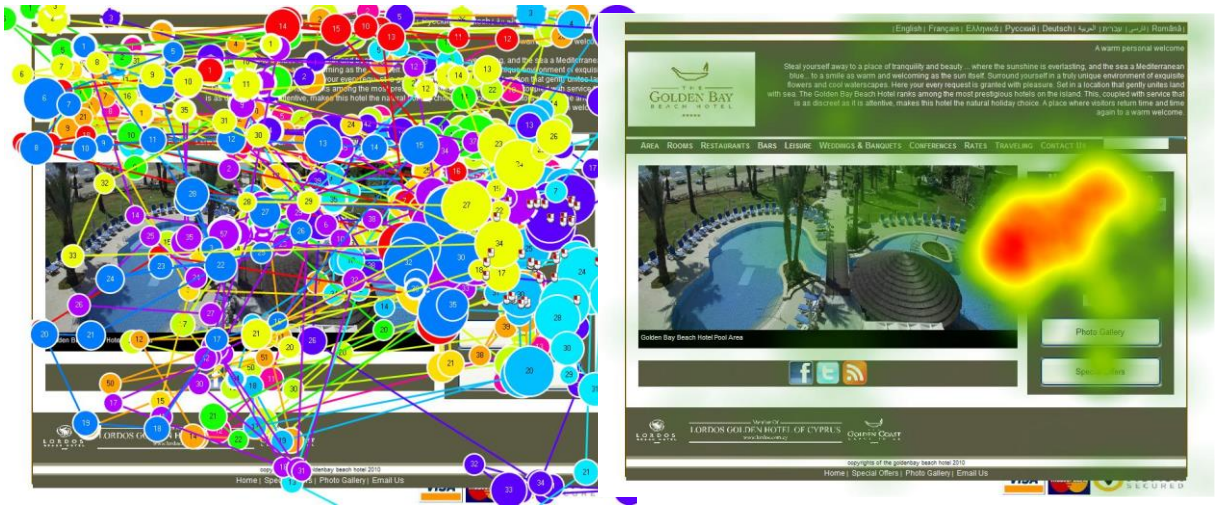
Figure 70: Paphos Amathus Re-Designed – HomePage and reservation, Cluster Analysis



The cluster analysis of the Paphos Amathus homepage and reservation re-designed webpages confirmed the CCIRs in the heat map (Figure 70).

Similarly, all the cluster analysis confirms the CCIRs in the redesigned websites for the two other hotels (Limassol Amathus and Golden Bay).

Figure 71: Golden Bay Re-Designed – Home Page



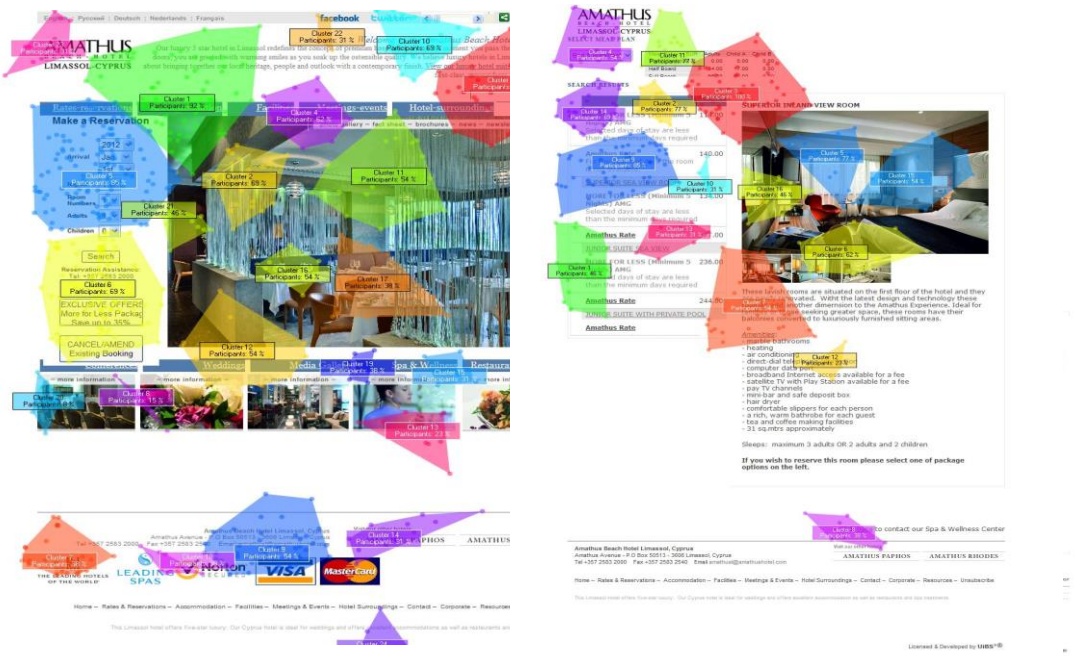
Golden's Bay Heat Map is targeted at online booking process section – right hand side, special rates and photo gallery.

Figure: 72 Limassol Amathus Re-Designed – Home Page, Cluster Analysis

Additional areas of interest were produced at all webpage especially at photo, top of page, horizontal bar and booking process.

Figure: 73 Limassol Amathus Re-Designed – Home Page

Figure 74:Limassol Amathus Re-Designed – Home Page and Reservation, Cluster Analysis



Limassol Amathus homepage and reservation re-designed webpage produced additional areas of interest at all webpage; especially top, left hand side and bottom of the page.

8.5 Results – Study B Comparison of Design and Redesigned Websites

As referred aboved, Paired Samples T-Test was applied. This test compares the means of data from two related samples; i.e. observations before and after an intervention on the same participant. This analysis considered all the hotels together. In Section 8.5.1, each hotel was considered on an individual basis. *Null Hypothesis*: Ho: There is no significant difference in mean scores between original and redesigned websites. *Alternative Hypothesis*: H1: There is a significant difference in mean scores between original and redesigned websites.

Table 26: Paired Samples Test (General Questions)

General Questions		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error M	95% Confidence Interval				
					Lower	Upper			
Pair 1	ORIGINAL and RE-DESIGNED: Before you decide to book a hotel you search all alternatives.	-,100	,303	,043	-,186	-,014	**-2,333**	49	**,024**
Pair 2	ORIGINAL and RE-DESIGNED: The site gives you information about credit card security and personal data?	-2,000	1,414	,200	-2,402	-1,598	**-10,000**	49	**,000**
Pair 3	ORIGINAL and RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel bedrooms	-,960	,968	,137	-1,235	-,685	**-7,012**	49	**,000**
Pair 4	ORIGINAL and RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel facilities	-,540	,813	,115	-,771	-,309	**-4,694**	49	**,000**
Pair 5	ORIGINAL and RE-DESIGNED: The site gives you the opportunity to search for various information regarding better packages and offers	-1,340	1,171	,166	-1,673	-1,007	**-8,090**	49	**,000**
Pair 6	ORIGINAL and RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel location	-,540	,952	,135	-,811	-,269	**-4,010**	49	**,000**
Pair 7	ORIGINAL and RE-DESIGNED: The site allows you a refund in the event of cancellation	-2,900	1,474	,208	-3,319	-2,481	**-13,909**	49	**,000**
Pair 8	ORIGINAL and RE-DESIGNED: This site allows you alternative options for room type	-1,540	1,073	,152	-1,845	-1,235	**-10,148**	49	**,000**
Pair 9	ORIGINAL and RE-DESIGNED: This site allows you alternative options for room location (inland, side, sea view)	-1,160	1,076	,152	-1,466	-,854	**-7,624**	49	**,000**
Pair 10	ORIGINAL and RE-DESIGNED: This site allows you alternative options for meal	-1,120	1,043	,147	-1,416	-,824	**-7,595**	49	**,000**
Pair 11	ORIGINAL and RE-DESIGNED: This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	-2,000	1,370	,194	-2,389	-1,611	**-10,321**	49	**,000**
Pair 12	ORIGINAL and RE-DESIGNED: It is easy to fill in the reservation form	-,880	,773	,109	-1,100	-,660	**-8,050**	49	**,000**
Pair 13	ORIGINAL and RE-DESIGNED: The instructions are simple to be followed	-1,120	,895	,127	-1,374	-,866	**-8,845**	49	**,000**
Pair 14	ORIGINAL and RE-DESIGNED: Online booking provides the opportunity to save time and money	-,260	,664	,094	-,449	-,071	**-2,768**	49	**,008**

Pair 15	ORIGINAL and RE-DESIGNED: You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	-,240	,591	,084	-,408	-,072	**-2,871**	49	**,006**
Pair 16	ORIGINAL and RE-DESIGNED: You trust the Internet to provide personal information.	-,900	,974	,138	-1,177	-,623	**-6,533**	49	**,000**
Pair 17	ORIGINAL and RE-DESIGNED: There are some other factors that influence your final decision [i.e family, friends].	-,260	,664	,094	-,449	-,071	**-2,768**	49	**,008**
Pair 18	ORIGINAL and RE-DESIGNED: Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	-,080	,566	,080	-,241	,081	**-1,000**	49	**,322**

Table 27: Paired Samples Statistics

		Mean	N	SD	Std. Error
Pair 1	ORIGINAL: Before you decide to book a hotel you search all alternatives.	**4,56**	50	,837	,118
	RE-DESIGNED: Before you decide to book a hotel you search all alternatives.	**4,66**	50	,593	,084
Pair 2	ORIGINAL: The site gives you information about credit card security and personal data?	**2,78**	50	1,298	,184
	RE-DESIGNED: The site gives you information about credit card security and personal data?	**4,78**	50	,418	,059
Pair 3	ORIGINAL: The site gives you the opportunity to search for various information regarding hotel bedrooms	**3,74**	50	,876	,124
	RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel bedrooms	**4,70**	50	,463	,065
Pair 4	ORIGINAL: The site gives you the opportunity to search for various information regarding hotel facilities	**3,70**	50	,909	,129
	RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel facilities	**4,24**	50	,431	,061
Pair 5	ORIGINAL: The site gives you the opportunity to search for various information regarding better packages and offers	**3,34**	50	,848	,120
	RE-DESIGNED: The site gives you the opportunity to search for various information regarding better packages and offers	**4,68**	50	,471	,067
Pair 6	ORIGINAL: The site gives you the opportunity to search for various information regarding hotel location	**3,62**	50	,830	,117
	RE-DESIGNED: The site gives you the opportunity to search for various information regarding hotel location	**4,16**	50	,548	,078
Pair 7	ORIGINAL: The site allows you a refund in the event of cancellation	**1,82**	50	1,101	,156
	RE-DESIGNED: The site allows you a refund in the event of cancellation	**4,72**	50	,454	,064
Pair 8	ORIGINAL: This site allows you alternative options for room type	**3,06**	50	1,038	,147
	RE-DESIGNED: This site allows you alternative options for room type	**4,60**	50	,495	,070
Pair 9	ORIGINAL: This site allows you alternative options for room location (inland, side, sea view)	**3,44**	50	1,013	,143
	RE-DESIGNED: This site allows you alternative options for room location (inland, side, sea view)	**4,60**	50	,495	,070
Pair 10	ORIGINAL: This site allows you alternative options for meal	**3,18**	50	1,063	,150
	RE-DESIGNED: This site allows you alternative options for meal	**4,30**	50	,931	,132
Pair 11	ORIGINAL: This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	**2,54**	50	,930	,132
	RE-DESIGNED: This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	**4,54**	50	,930	,132
Pair 12	ORIGINAL: It is easy to fill in the reservation form	**3,78**	50	,648	,092
	RE-DESIGNED: It is easy to fill in the reservation form	**4,66**	50	,479	,068
Pair 13	ORIGINAL: The instructions are simple to be followed	**3,54**	50	,676	,096
	RE-DESIGNED: The instructions are simple to be followed	**4,66**	50	,479	,068
Pair 14	ORIGINAL: Online booking provides the opportunity to save time and money	**4,46**	50	,862	,122
	RE-DESIGNED: Online booking provides the opportunity to save time and money	**4,72**	50	,454	,064

Pair 15	ORIGINAL: You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	**3,74**	50	,922	,130
	RE-DESIGNED: You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	**3,98**	50	,869	,123
Pair 16	ORIGINAL: You trust the Internet to provide personal information.	**3,52**	50	,931	,132
	RE-DESIGNED: You trust the Internet to provide personal information.	**4,42**	50	,673	,095
Pair 17	ORIGINAL: There are some other factors that influence your final decision [i.e family, friends].	**3,44**	50	,993	,140
	RE-DESIGNED: There are some other factors that influence your final decision [i.e family, friends].	**3,70**	50	1,055	,149
Pair 18	ORIGINAL: Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	**3,64**	50	,802	,113
	RE-DESIGNED: Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	**3,72**	50	,671	,095

8.5.1 Analysis the customer's decision making process for all hotels

Following Sig. 2-tailed column, all questions – except last one "Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation", range from p=0.000–p=0.024; this confirms that there is significant difference between original and re-designed websites (p<0.05). The null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is rejected** since p<0.05 (in fact p=0.000–p=0.024). Consequently, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is accepted**. Taking Mean scores of Paired Samples Statistics, in my case the mean of all questions shows a significant increase of all pairs from original websites to redeisigned websites.

Table 28: Paired Samples Test (Golden Bay)

Golden Bay		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ORIGINAL and RE-DESIGNED: I would like to use this website frequently	-1,440	1,110	,157	-1,755	-1,125	-9,177	49	**,000**
Pair 2	ORIGINAL and RE-DESIGNED: I found the website unnecessarily complex	1,720	1,310	,185	1,348	2,092	9,285	49	**,000**
Pair 3	ORIGINAL and RE-DESIGNED: I thought the website was easy to use	-1,460	1,182	,167	-1,796	-1,124	-8,737	49	**,000**
Pair 4	ORIGINAL and RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	1,120	1,534	,217	,684	1,556	5,163	49	**,000**
Pair 5	ORIGINAL and RE-DESIGNED: I found the various functions in this website were well integrated	-1,240	,870	,123	-1,487	-,993	-10,074	49	**,000**
Pair 6	ORIGINAL and RE-DESIGNED: I thought there was too much inconsistency in this website	1,420	1,180	,167	1,085	1,755	8,512	49	**,000**

Pair 7	ORIGINAL and RE-DESIGNED: I think that most people will learn how to use this website quickly	-1,360	1,064	,151	-1,663	-1,057	-9,034	49	**,000**
Pair 8	ORIGINAL and RE-DESIGNED: I found the website very cumbersome to use	1,620	1,308	,185	1,248	1,992	8,760	49	**,000**
Pair 9	ORIGINAL and RE-DESIGNED: I felt very confident using the website	-1,620	1,008	,143	-1,906	-1,334	-11,365	49	**,000**
Pair 10	ORIGINAL and RE-DESIGNED: I needed to learn a lot of things before I could get going with this website	1,220	1,489	,211	,797	1,643	5,795	49	**,000**

Table 29:Paired Samples Statistics (Golden Bay)

Golden Bay		**Mean**	N	SD	Std. Error
Pair 1	ORIGINAL: I would like to use this website frequently	**2,88**	50	,849	,120
	RE-DESIGNED: I would like to use this website frequently	**4,32**	50	,621	,088
Pair 2	ORIGINAL: I found the website unnecessarily complex	**2,90**	50	1,199	,170
	RE-DESIGNED: I found the website unnecessarily complex	**1,18**	50	,388	,055
Pair 3	ORIGINAL: I thought the website was easy to use	**3,34**	50	1,042	,147
	RE-DESIGNED: I thought the website was easy to use	**4,80**	50	,452	,064
Pair 4	ORIGINAL: I think that I will need the support of a technical person to be able to use this website	**2,86**	50	1,400	,198
	RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	**1,74**	50	1,026	,145
Pair 5	ORIGINAL: I found the various functions in this website were well integrated	**3,28**	50	,970	,137
	RE-DESIGNED: I found the various functions in this website were well integrated	**4,52**	50	,707	,100
Pair 6	ORIGINAL: I thought there was too much inconsistency in this website	**3,08**	50	,778	,110
	RE-DESIGNED: I thought there was too much inconsistency in this website	**1,66**	50	,688	,097
Pair 7	ORIGINAL: I think that most people will learn how to use this website quickly	**3,28**	50	,882	,125
	RE-DESIGNED: I think that most people will learn how to use this website quickly	**4,64**	50	,525	,074
Pair 8	ORIGINAL: I found the website very cumbersome to use	**3,42**	50	,785	,111
	RE-DESIGNED: I found the website very cumbersome to use	**1,80**	50	,728	,103
Pair 9	ORIGINAL: I felt very confident using the website	**3,04**	50	,638	,090
	RE-DESIGNED: I felt very confident using the website	**4,66**	50	,626	,089
Pair 10	ORIGINAL: I needed to learn a lot of things before I could get going with this website	**2,80**	50	1,229	,174
	RE-DESIGNED: I needed to learn a lot of things before I could get going with this website	**1,58**	50	1,108	,157

8.5.2 Analysis of Golden Bay Re-Designed Website

Following Sig. 2-tailed column, all questions have p-value 0.000; this confirms that there is significant difference between original and re-designed websites ($p<0.05$). The null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is rejected** since $p<0.05$ (in fact $p=0.000$). Consequently, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is accepted**. Results of Tables 28 and 29 show that redesigning reduced complexity of the original website, easier to be used, with minimum inconsistency and users would like to use more regularly. As a result website redesigning proved that benefits the hotel.

Table 30: Paired Samples Test (Amathus Hotel Limassol)

Amathus Hotel Limassol		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ORIGINAL and RE-DESIGNED: I would like to use this website frequently	-1,420	1,090	,154	-1,730	-1,110	-9,215	49	**,000**
Pair 2	ORIGINAL and RE-DESIGNED: I found the website unnecessarily complex	1,660	1,136	,161	1,337	1,983	10,334	49	**,000**
Pair 3	ORIGINAL and RE-DESIGNED: I thought the website was easy to use	-1,780	,975	,138	-2,057	-1,503	-12,909	49	**,000**
Pair 4	ORIGINAL and RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	1,160	1,346	,190	,778	1,542	6,096	49	**,000**
Pair 5	ORIGINAL and RE-DESIGNED: I found the various functions in this website were well integrated	-1,160	,650	,092	-1,345	-,975	-12,614	49	**,000**
Pair 6	ORIGINAL and RE-DESIGNED: I thought there was too much inconsistency in this website	1,440	1,215	,172	1,095	1,785	8,381	49	**,000**
Pair 7	ORIGINAL and RE-DESIGNED: I think that most people will learn how to use this website quickly	-1,120	1,154	,163	-1,448	-,792	-6,861	49	**,000**
Pair 8	ORIGINAL and RE-DESIGNED: I found the website very cumbersome to use	1,700	1,403	,198	1,301	2,099	8,566	49	**,000**
Pair 9	ORIGINAL and RE-DESIGNED: I felt very confident using the website	-1,180	,919	,130	-1,441	-,919	-9,080	49	**,000**
Pair 10	ORIGINAL and RE-DESIGNED: I needed to learn a lot of things before I could get going with this website	1,280	1,400	,198	,882	1,678	6,464	49	**,000**

Table 31: Paired Samples Statistics (Amathus Hotel Limassol)

Amathus Hotel Limassol		**Mean**	N	SD	Std. Error
Pair 1	ORIGINAL: I would like to use this website frequently	**3,34**	50	,961	,136
	RE-DESIGNED: I would like to use this website frequently	**4,76**	50	,476	,067
Pair 2	ORIGINAL: I found the website unnecessarily complex	**2,78**	50	1,075	,152
	RE-DESIGNED: I found the website unnecessarily complex	**1,12**	50	,328	,046
Pair 3	ORIGINAL: I thought the website was easy to use	**3,10**	50	,886	,125
	RE-DESIGNED: I thought the website was easy to use	**4,88**	50	,328	,046
Pair 4	ORIGINAL: I think that I will need the support of a technical person to be able to use this website	**2,58**	50	1,372	,194
	RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	**1,42**	50	,499	,071
Pair 5	ORIGINAL: I found the various functions in this website were well integrated	**3,56**	50	,675	,095
	RE-DESIGNED: I found the various functions in this website were well integrated	**4,72**	50	,454	,064
Pair 6	ORIGINAL: I thought there was too much inconsistency in this website	**2,88**	50	1,062	,150
	RE-DESIGNED: I thought there was too much inconsistency in this website	**1,44**	50	,675	,095
Pair 7	ORIGINAL: I think that most people will learn how to use this website quickly	**3,56**	50	1,033	,146
	RE-DESIGNED: I think that most people will learn how to use this website quickly	**4,68**	50	,471	,067
Pair 8	ORIGINAL: I found the website very cumbersome to use	**3,16**	50	1,076	,152
	RE-DESIGNED: I found the website very cumbersome to use	**1,46**	50	,762	,108
Pair 9	ORIGINAL: I felt very confident using the website	**3,60**	50	,808	,114
	RE-DESIGNED: I felt very confident using the website	**4,78**	50	,545	,077
Pair 10	ORIGINAL: I needed to learn a lot of things before I could get going with this website	**2,76**	50	1,205	,170
	RE-DESIGNED: I needed to learn a lot of things before I could get going with this website	**1,48**	50	,863	,122

8.5.3 Analysis of Amathus Hotel Limassol Re-Designed Website

Following Sig. 2-tailed column, all questions have p-value 0.000; this confirms that there is significant difference between original and re-designed websites ($p<0.05$). The null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is rejected** since $p<0.05$ (in fact $p=0.000$). Consequently, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is accepted**. Participants again that redesigned webpages were less complex, easier to be used, with minimum inconsistency and they would like to use more regularly.

Table 32: Paired Samples Test (Paphos Amathus Beach Hotel)

Paphos Amathus Beach Hotel		Paired Differences					t	df	**Sig. (2-tailed)**
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ORIGINAL and RE-DESIGNED: I would like to use this website frequently	-1,320	1,203	,170	-1,662	-,978	-7,761	49	**,000**
Pair 2	ORIGINAL and RE-DESIGNED:I found the website unnecessarily complex	1,660	1,136	,161	1,337	1,983	10,334	49	**,000**
Pair 3	ORIGINAL and RE-DESIGNED: I thought the website was easy to use	-1,860	,948	,134	-2,129	-1,591	-13,876	49	**,000**
Pair 4	ORIGINAL and RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	1,160	1,346	,190	,778	1,542	6,096	49	**,000**
Pair 5	ORIGINAL and RE-DESIGNED: I found the various functions in this website were well integrated	-1,180	,523	,074	-1,329	-1,031	-15,968	49	**,000**
Pair 6	ORIGINAL and RE-DESIGNED: I thought there was too much inconsistency in this website	1,520	1,182	,167	1,184	1,856	9,092	49	**,000**
Pair 7	ORIGINAL and RE-DESIGNED: I think that most people will learn how to use this website quickly	-1,400	1,385	,196	-1,794	-1,006	-7,147	49	**,000**
Pair 8	ORIGINAL and RE-DESIGNED: I found the website very cumbersome to use	1,660	1,319	,187	1,285	2,035	8,901	49	**,000**
Pair 9	ORIGINAL and RE-DESIGNED: I felt very confident using the website	-1,080	,966	,137	-1,354	-,806	-7,909	49	**,000**
Pair 10	ORIGINAL and RE-DESIGNED:I needed to learn a lot of things before I could get going with this website	1,220	1,389	,196	,825	1,615	6,209	49	**,000**

Table 33: Paired Samples Statistics (Paphos Amathus Beach Hotel)

Paphos Amathus Beach Hotel		Mean	N	SD	Std. Error
Pair 1	ORIGINAL: I would like to use this website frequently	**3,44**	50	1,110	,157
	RE-DESIGNED: I would like to use this website frequently	**4,76**	50	,476	,067
Pair 2	ORIGINAL: I found the website unnecessarily complex	**2,78**	50	1,075	,152
	RE-DESIGNED: I found the website unnecessarily complex	**1,12**	50	,328	,046
Pair 3	ORIGINAL: I thought the website was easy to use	**3,02**	50	,845	,119
	RE-DESIGNED: I thought the website was easy to use	**4,88**	50	,328	,046
Pair 4	ORIGINAL: I think that I will need the support of a technical person to be able to use this website	**2,58**	50	1,372	,194
	RE-DESIGNED: I think that I will need the support of a technical person to be able to use this website	**1,42**	50	,499	,071
Pair 5	ORIGINAL: I found the various functions in this website were well integrated	**3,52**	50	,762	,108
	RE-DESIGNED: I found the various functions in this website were well integrated	**4,70**	50	,463	,065
Pair 6	ORIGINAL: I thought there was too much inconsistency in this website	**3,02**	50	,845	,119
	RE-DESIGNED: I thought there was too much inconsistency in this website	**1,50**	50	,678	,096
Pair 7	ORIGINAL: I think that most people will learn how to use this website quickly	**3,28**	50	1,179	,167
	RE-DESIGNED: I think that most people will learn how to use this website quickly	**4,68**	50	,471	,067
Pair 8	ORIGINAL: I found the website very cumbersome to use	**3,20**	50	,969	,137
	RE-DESIGNED: I found the website very cumbersome to use	**1,54**	50	,762	,108
Pair 9	ORIGINAL: I felt very confident using the website	**3,66**	50	,872	,123
	RE-DESIGNED: I felt very confident using the website	**4,74**	50	,565	,080
Pair 10	ORIGINAL: I needed to learn a lot of things before I could get going with this website	**2,74**	50	1,192	,169
	RE-DESIGNED: I needed to learn a lot of things before I could get going with this website	**1,52**	50	,886	,125

8.5.4 Analysis of Amathus Hotel Paphos Re-Designed Website

Following Sig. 2-tailed column, all questions have p-value 0.000; this confirms that there is a significant difference between original and re-designed websites ($p<0.05$). The null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is rejected** since $p<0.05$ (in fact $p=0.000$). Consequently, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is accepted**.

Results of Tables 32 and 33 show that complexity and inconsistency is minimum, participants do not find the website very cumbersome to use and they are willing to use it again. Websites after the redesigning became more friendly to the user and convenient. As a result, users are happy to use them, search them, satisfy his CCIRs and proceed with purchasing.

Table 34: Paired Samples Test (Re-design guidelines)

Re-design tips		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ORIGINAL and RE-DESIGNED:Credit card logos is easily identifiable	-3,100	1,111	,157	-3,416	-2,784	-19,727	49	**,000**
Pair 2	ORIGINAL and RE-DESIGNED:Site search is easy to access	-2,800	1,212	,171	-3,144	-2,456	-16,333	49	**,000**
Pair 3	ORIGINAL and RE-DESIGNED:Security for transactions logo is easily identifiable	-3,060	,913	,129	-3,319	-2,801	-23,707	49	**,000**
Pair 4	ORIGINAL and RE-DESIGNED:The appearance of some recognized type of assurance of a secure transaction impacts your decision	-,440	,884	,125	-,691	-,189	-3,518	49	**,001**
Pair 5	ORIGINAL and RE-DESIGNED: It is very convenient to have the booking process at home page	-,080	,274	,039	-,158	-,002	-2,064	49	**,044**
Pair 6	ORIGINAL and RE-DESIGNED: Less mouse clicks make your decision making process more convenient	-,220	,418	,059	-,339	-,101	-3,718	49	**,001**
Pair 7	ORIGINAL and RE-DESIGNED: It is likely to ignore information placed at scroll down part of the webpage	,080	,944	,134	-,188	,348	,599	49	**,552**
Pair 8	ORIGINAL and RE-DESIGNED: The cancel/amend a reservation is in a striking position	-2,740	1,575	,223	-3,188	-2,292	-12,298	49	**,000**
Pair 9	ORIGINAL and RE-DESIGNED: Special offers are easy to access	-2,020	1,286	,182	-2,385	-1,655	-11,111	49	**,000**
Pair 10	ORIGINAL and RE-DESIGNED: A short-time booking process impacts your online decision making process	-,100	,303	,043	-,186	-,014	-2,333	49	**,024**

Table 35: Paired Samples Statistics

		Mean	N	SD	Std. Error
Pair 1	ORIGINAL: Credit card logos is easily identifiable	**1,70**	50	,814	,115
	RE-DESIGNED: Credit card logos is easily identifiable	**4,80**	50	,404	,057
Pair 2	ORIGINAL: Site search is easy to access	**2,00**	50	1,030	,146
	RE-DESIGNED: Site search is easy to access	**4,80**	50	,404	,057
Pair 3	ORIGINAL: Security for transactions logo is easily identifiable	**1,78**	50	,790	,112
	RE-DESIGNED: Security for transactions logo is easily identifiable	**4,84**	50	,370	,052
Pair 4	ORIGINAL: The appearance of some recognized type of assurance of a secure transaction impacts your decision	**4,16**	50	1,076	,152
	RE-DESIGNED: The appearance of some recognized type of assurance of a secure transaction impacts your decision	**4,60**	50	,495	,070
Pair 5	ORIGINAL: It is very convenient to have the booking process at home page	**4,66**	50	,479	,068
	RE-DESIGNED: It is very convenient to have the booking process at home page	**4,74**	50	,443	,063
Pair 6	ORIGINAL: Less mouse clicks make your decision making process more convenient	**4,34**	50	,939	,133
	RE-DESIGNED: Less mouse clicks make your decision making process more convenient	**4,56**	50	,675	,095
Pair 7	ORIGINAL: It is likely to ignore information placed at scroll down part of the webpage	**4,10**	50	1,093	,155
	RE-DESIGNED: It is likely to ignore information placed at scroll down part of the webpage	**4,02**	50	1,392	,197
Pair 8	ORIGINAL: The cancel/amend a reservation is in a striking position	**1,90**	50	,995	,141
	RE-DESIGNED: The cancel/amend a reservation is in a striking position	**4,64**	50	,693	,098
Pair 9	ORIGINAL: Special offers are easy to access	**2,60**	50	,990	,140
	RE-DESIGNED: Special offers are easy to access	**4,62**	50	,490	,069

Pair 10	ORIGINAL: A short-time booking process impacts your online decision making process	**4,54**	50	,646	,091
	RE-DESIGNED: A short-time booking process impacts your online decision making process	**4,64**	50	,485	,069

8.5.5 Analysis of Re-Designed Tips

Following Sig. 2-tailed column, nine questions have p-value from 0.000 to 0.044; this confirms that there is significant difference between original and re-designed websites ($p<0.05$). The null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is rejected** since $p<0.05$ (in fact $p=0.000$–$p=0.044$). Consequently, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is accepted**.

One question "It is likely to ignore information placed at scroll down part of the webpage" has p-value 0.552 ($p>0.05$) which shows that there is no significant difference between original and re-designed websites. For this question the null hypothesis *"Ho: There is no significant difference in mean scores between original and redesigned websites"* **is accepted** since and, the alternative hypothesis *"H1: There is a significant difference in mean scores between original and redesigned websites"* **is rejected**.

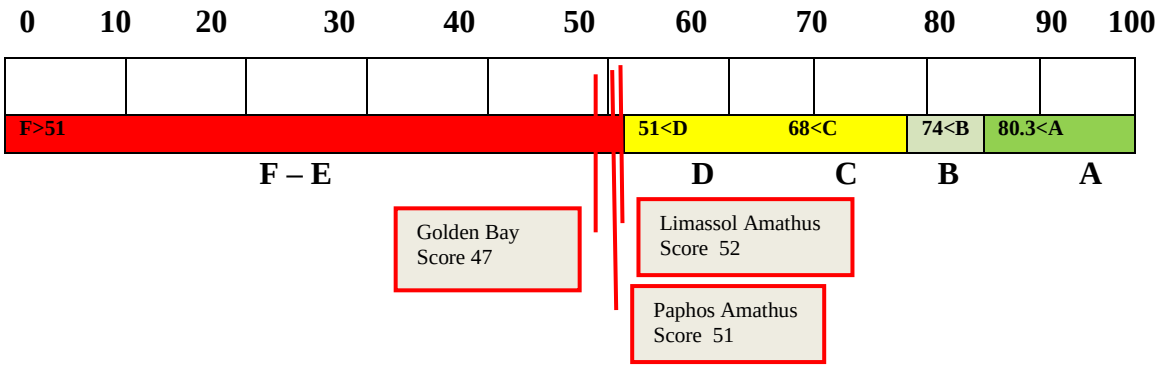
Taking Mean scores of Paired Samples Statistics Table, in our case the mean of all questions shows a significant increase of all pairs from original websites to redesigned websites. In all websites complexity and inconsistency is minimum, participants do not find the websites very cumbersome to use and they are willing to use them again. This information taken with the heat maps provides concrete evidence theat the novel methodology for website redesign produces dramatic improvements in the cognitive utility of the website by directly addressing the CCIRs.

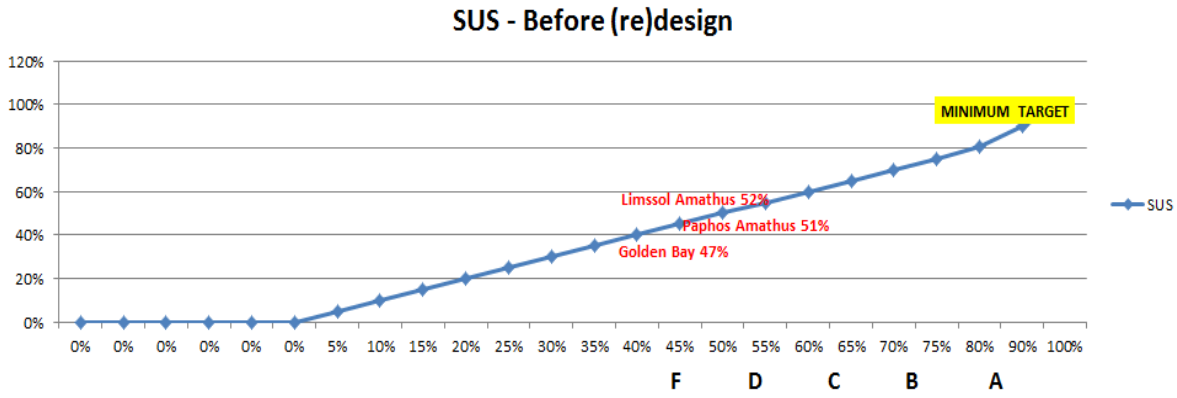
8.5.6 Usability Analysis

As referred in Chapter 6, to calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. The total score should be between 0 and 100. The higher the score, the more usable the website is. Any value from 0-50, is grade scale F-E, the acceptability range is not acceptable and poor, between 51-74 (D-C) usability is ok to good and from 74-100 (B-A) is excellent to best imaginable.

Figure 75a: Grades of the three hotels following SUS assessments

A. Validation Study – 50 Participants (Original Websites)

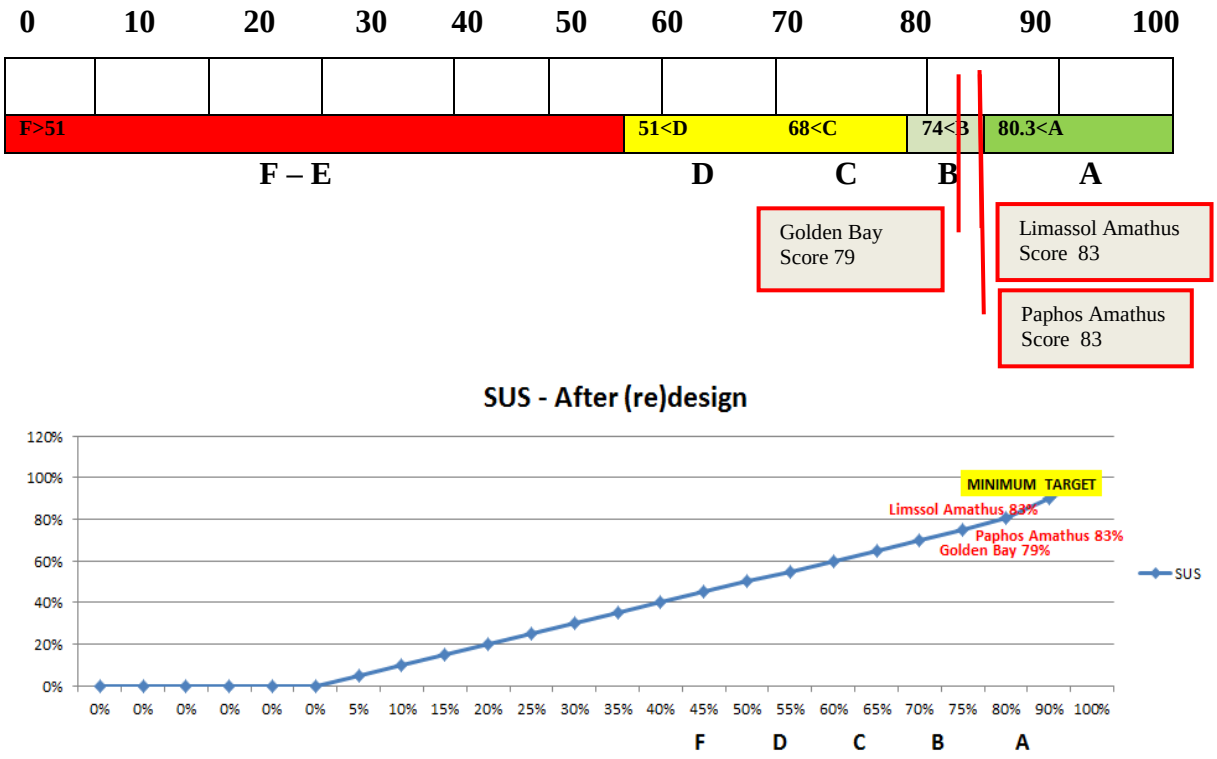




Following SUS analysis of original websites, rates of 50 participants showed that all three hotels are in usability E-D (Figure 75a). The minimum SUS target is close to 80% and website redesign brought the three websites on this (Figure 75b). Figure 75a shows that Golden Bay Original website is range F-E (not acceptable), Limassol and Paphos Amathus is a slightly better usability situation range D (ok).

Figure 75b: Grades of the three hotels following SUS assessments

B. Validation Study – 50 Participants (Re-Designed Websites)



Re-designing of the three websites transfer the hotels' usability from range E-D to B-A (excellent to best imaginable). This confirms that changes actually influence usability of the three hotels' websites with more positive scores (79-83). Finally, the System Usability Scale (SUS) confirms that the redesigned websites are well above average (Figure 75b).

8.6 Conclusion

The results and findings of these analyses demonstrate comprehensively (p-value < 0.05) that the approach to website redesign developed in this research for the redesign of websites, which exploits CCIRs and eyetracking information (heat maps and cluster analyses) does improve customers' online decision making process and satisfies their CCIRs, as well as ensuring the decision processes is completed in a timely manner and keeps the customer engaged until the booking process is completed.

9

Conclusions and Contribution of the research study

9.1 Introduction

The primary purpose of this research was to develop an approach to capture CCIRs for online hotel booking. The study uses the hotel industry as a case study, however its validity can be used in many sectors of online purchasing. It was constructed to understand what is going on in customer' head during their online decision process for a hotel reservation. What actually drives their decision, what influences their decision making process, what makes them leave the webpage and what makes them stay and proceed with the booking.

A key outcome of this research is a novel, robust and precision approach that (i) combines cognitive task analysis, eye tracking techniques, statistical and clustering methods in order to facilitate the precise identification of both explicit and tacit CCIRs; (ii) for the first time provides a time frame analysis of CCIR across each stage of the customer's decision making process and identifies the concomitant decision points where the customer is most likely to abandon the web site; (iii) elicits the mental model of the customer together with the CCIRs and uses this knowledge as the basis for generating the re-design specification for the website; and, (iv) evaluates whether there is a significant improvement in the usability and cognitive utility of the redesigned website that is of practical value.

The Internet offers to the Hotel Industry enormous benefits and exceptional opportunities in order to offer innovative services. However, the understanding of the cognitive factors and

Critical Customers Information Requirements (CCIR)s that influence customers' decision making process is essential to ensure that the customer remains engaged with the hotel website through out their decision making process and completes the booking. Of course, capturing these CCIRs is not straight forward as they are often tacit. Therefore an approach is required to make these CCIRs explicit. Questionnaires might work but tacit knowledge is always difficult to capture. Therefore, if one can capture the behaviour surrounding the pinpointing of the CCIRs, like the gaze (Eye Tracking Device), then this will be more accurate and can be correlated with the Areas of Interest (CCIRs).

Therefore, capturing Critical Customers Information Requirements (CCIRs) and usability analysis of the websites is vital and the perquisite precision and reliability of the data required informing the approach to website (re)design requires the inclusion of eye-tracking techniques.

The aim of the following sections is to present the contributions of the research in accordance with the research objectives.

1. Define the Customers Critical Information Requirements (CCIRs) during their online decision making process when using a hotel website.
2. Investigate previous experiences of participants and how these are influenced present decision making process
3. Establish theoretical underpinning and develop an approach for capturing CCIRs during the customer's decision making process.
4. Develop method for specifying website design improvements based on CCIRs and its subsequent assesment
5. Determine the implications of the findings for the hotel sector.

9.2 Theoretical and methodological contributions of the study

The theoretical models, such as Technology Acceptance Model (TAM) developed by Davis (1989), Theory of Planned Behavior (TPB) (Limayen et al 2000), Theory of Reasoned Action (TRA) (Chen and Wells 1999) are too high level and do not reveal what goes on within the customers decision making process. The novel approach developed herein for eliciting CCIRs addresses this weaknesses and gap in the literature. Most of these theories

have been developed from the Theory of Reasoned Action originally proposed by Fishbein and Ajzen (1985). TAM and the other similar theories are too general and employ questionnaire that do not address the information requirements of the customer which is at the heart of understanding adoption. In order to get inside a customer's head (their decision making process) a combination of techniques is needed that are going to cross check the findings and provide some valid feedback. For instance, for the purposes of this study, several methods were used: Critical Decision Method (CDM) (Klein, 1989), Applied Cognitive Task Analysis (Militello and Hutton, 1998), Eye Tracking, Website Evaluation applying SUS (Katsanos et al 2012), Think Aloud Technique (Hyrskykari et al, 2008), were used in order to overcome any gap and cover all potential unwanted limitations. These techniques allow the capture of customers' articulated CCIRs (expressed through talk aloud, survey and interviews) but as this research has shown that cognitive task analysis on its own can be very erroneous. A methodology that incorporates eyetracking data overcomes this problem by confirming the information cues that the eye is picking up. Further, information requirements that were specified but not used in the decision making process were also identified.

Critical Decision Method (CDM), the purpose of the specific method is to systematically uncover the decision making requirements and psychological processes used by expert individuals. As referred above, until now Critical Customer's Information Requirements (CCIRs) were captured via Critical Decision Method (CDM) used to capture via interview/questionnaires. For the purposes of this research I move a step forward and I use the CDM probes in eye tracking device. This is important not only to capture the requested CCIRs but to cross check whether stated CCIRs are actually required. It was found that some customers articulate CCIRs were not in fact required as confirmed by the gaze plots and cluster analyses. This information was employed in the redesign to eliminate redundant information or cues and so simplifify the design of the website, at the same time streamlining the customers' decision making process and overall experience.

Eye tracking techniques. This research seeks to obtain a deep understanding of the cognitive factors that influence online hotel reservations. Ocular indices (i.e. MyTobii Eye Tracking Device) enable researchers to determine what a computer user is indeed reading

and viewing, for how long and in what order. This gives the researcher the opportunity to extract more accurate conclusions regarding hotel websites and what actually a potential client sees and what makes him to go to another hotel website for his booking. Tracking people's eye movements benefit Human – Computer Interaction and researchers to understand visual based information processing and the factors impact the whole process. Even though there are large numbers of studies on Human Computer Interaction, the behavioural aspects are still ignored Turban and Aronson (2003), Hung (2012), Singh, G. et al. (2001). Since few studies have explored the area of online decision making, and none about online decision making about hotels, very little is known about the cognitive factors (i.e. Critical Customers' Information Requirements / behavioral factors) that actually influence customers when they come to book online their hotels.

Website Evaluation / Attractiveness, the first target of the hotel website designers is to get the potential bookers to stay on the website for sufficient time to search it further. Attracting users' attention and keeping them at the website especially at this stage of first impression is more than crucial for the rest decision making procedure and finally the booking. System Usability Scale was used in order to evaluate the usability of the original and the redesigned webpages. The result after the validation study showed that the amendments applied on the original websites work and categorized the websites to B-A usability class. This is extremely important in website design process as it is proved that amendments really played a role in improving websites usability.

Eye tracking data was combined with additional qualitative data because eye movements cannot always be clearly interpreted without the participant providing context to the data. As referred above, it is important to attempt to supplement eye tracking data with additional information gained from the participants about their experiences (uncover previous experiences – critical decision method and video recording the entire process). The participants were encouraged to speak or think out loud while performing the tasks. The use of these two techniques techniques in parallel provide a method for correcting errors in the identification of CCIRs not covered in the contemporary literature.

The proper combination of all above methods, gave the study more reliable findings, confirming (or not) that what participants actually said is what they actually saw (or not). As a result CCIRs were obtained and I was in a position to develop precise design specifications for website re-design. Consequently, the contribution of the study will add to the body of knowledge thespecification and design of hotel websites that are aligned directly to the customer's decision making process for the benefit of the hotel sector.

9.3 Contribution to website design

Consequently, the first target of the hotel website designers is to get the potential bookers to stay on the website for sufficient time to search it further. Attracting users' attention and keeping them at the website especially at this stage of first impression is more than crucial for the rest decision making procedure and finally the booking. At this stage, many users pay attention on trust and risk-free booking (security logo pays an important role on this), as a result projection of brand and organizational identity that promote trust (Kollock, 1999) will also contribute to holding users' attention. Once the potential customer is attracted from the website, second target is to offer him/her all the information he/she may requires in order to proceed with the booking. Careful design and clear booking navigation and procedure are important.

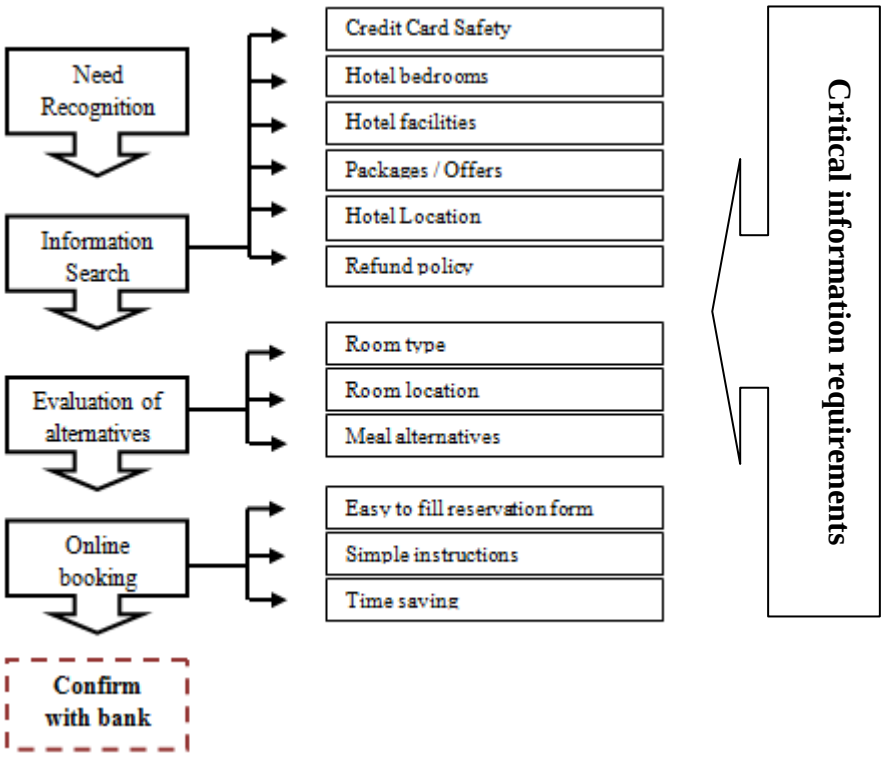
CCIRs that are investigated in this research pinpoint these critical incidents and misleading cues of information provided so as to keep the user in the website. This study found that most attention paid to the home page of the hotel is at the top left-hand side and in reservation pages in the centre of the page. Photos were observed by participants but not as much as was expected before the development of our novel approach.

9.4 Implications of findings for the hotel industry

With reference to the timeframe analysis in Section 7.3, the CCIRs are specified for each stage of the of the developed cognitive task model i.e. the customer's decision making process. This finding is presented as theoretical model in Figure 93. The main purpose of the model depicted in Figure 93 is to pinpoint the informational cues that match the customer's critical information requirements. The implications of the CCIRs informed

decision making process model (Figure 76) are: (i) It provides an explicit decision making process that defines the entire decision logic and CCIRs for the particular customer types; (ii) It provides a baseline for guiding the design of hotel websites, without having to undertake the new approach developed in this research for capturing CCIRs. This requires the expertise and investment in eye tracking equipment. Figure 93 can therefore be employed by any hotel to inform the design of their website without incurring the costs of a CCIR cognitive study. Though it must be said that applying our approach to website design will increase the specificity and value of the website so that the website design matches any target customer group or hotel market segment.

Figure 76: CCIRs decision making process model



Source: Author, 2013

Furthermore, exploiting the (re)design guidelines together with the webpage layout templates present in Section 7.13 offers a foundational blueprint for informing the design, build and evaluation of hotel websites that is affordable.

9.5 Conclusions drawn from the validation study findings

The independent samples t-test between the original and the redesigned websites showed that there is a significant difference in the CCIR mean scores for the time taken to complete the decision making process. Moreover, the heat maps unmistakably confirmed the 'red areas' as key areas of interest on the homepage, where CCIRs are located in the redesign.

Finally, System Usability Scale (SUS) confirms that the implementation of the redesign, as a result of our approach, will transfer the hotels' SUS score from E-D (original hotel website design. See Figure 82a) to B-A (new website redesign. See Figure 82b). This is well above average and confirms a marked improvement to the usability of hotel websites if a CCIR based design approach is adopted.

Concluding statement

In conclusion, this research has delivered:

First: A novel, robust and precision approach that (i) combines cognitive task analysis, eye tracking techniques, statistical and clustering methods in order to facilitate the precise identification of both explicit and tacit CCIRs; (ii) for the first time provides a time frame analysis of CCIR across each stage of the customer's decision making process and identifies the concomitant decision points where the customer is most likely to abandon the web site; (iii) elicits the mental model of the customer together with the CCIRs and uses this knowledge as the basis for generating the re-design specification for the website; and, (iv) evaluates whether there is a significant improvement in the usability and cognitive utility of the redesigned website that is of practical value.

Second: A theoretical model presented in Figure 93 "CCIRs informed decision making process model" for the (re)design of hotel websites as a result of applying our novel and innovative approach. Moreover, I have demonstrated for the first time how our approach can be applied to theory building of CCIRs-based cognitive task models that explicitly define the customer's decision making process.

Third: The abovementioned methodology and theoretical outputs of this research can be applicable to other industry sectors beyond the hotel industry. For example, financial trading decision support systems, air traffic control displays, mobile phone apps, i.e. to name a few from the myriad of possible applications.

9.6 Limitations

The approach developed (combining usability, critical decision method, applied cognitive task analysis) is not tied to a specific sector, though to demonstrate and validate the approach, hotel sector has been used. The approach has been applied on hotels' websites so that future research could investigate at applying this approach to other contexts (i.e. travel websites, hotels located to other countries, banking sector etc).

Firstly the sample used meets the requirements in terms of the number of respondents required, though ideally a more extensive study with more respondents addressing additional ancillary online purchasing products and services at a location (car hire, restaurants and bars, theatres, etc) will add to the cognitive factors and Critical Customers Information Requirements that influence online behaviour. For the purpose of this study, three Cypriot hotels' websites were used. As referred in methodology part, hotel websites across Europe generally have the same look and feel and Cypriots have a European mindset, as a result sample frame and size is justified.Consequently future researches should examine more products and services, more target customer groups in order to develop a more thourough framework for customers' online decision making process that will cover the whole customer experience associated with a hotel location. These are addressed in the Future research section below.

Some eye trackers cannot pick up quick glances and the targeted position on screen is only an approximation of the actual position been viewed (Killam, 2012). However, current eye tracking systems and data analysis software (i.e. tobii x50 used in this study) have proven accurate enough for general use. Another limitation of eye tracking is the system cost itself that prevent this technology from becoming commercialized for use. Although limitations exist for using eye tracking as an interface tool, gaze response has been used successfully to evaluate changes in cognitive load (Rosch and Walcutt, 2012).

9.7 Future research

By finishing this study, several additional issues arose for further investigation. The combination of techniques firstly used for the purposes of this research has successfully contributed to the analysis of existing webpage design guidelines and the proposal of re-design tips. However, the huge volume and richness of the data collected by all these techniques used suggest further possible ways of analysis, which provide deeper understanding of the areas of interest (i.e. additional hotel webpages, more sample, different hotel booking reasons – holiday , business, different locations, respondents coming from other backgrounds, different instructions (i.e. book your wedding); search behaviour will be different, book for a business trip, book christening, multiple pages, complex tasks. Different user groups can extract different outcomes, not only experts or familiar with the internet, users with no previous experience. As was identified in this study, previous online experience found CCIRs to be an influential factor in users' online decision making process. Additionally, the employment of advanced eye tracking devices means more sophisticated techniques for capturing eyetracking data will be available to underpin he development of new theories and methodologies.

Moreover and with reference to the concluding statement, the methodology and theoretical outputs of this research are applicable to other industry sectors beyond the hotel industry. For example, financial trading decision support systems, air traffic control displays, mobile phone apps, i.e. to name a few from the myriad of possible applications. Clearly, the research presented in this PhD thesis opens the door for the development of further innovations which have the potential for social and economic impact that go well beyond the hotel industry. Moreover, these future lines of research will reinforce the general applicability and external validity of the research ouputs developed in this research investigation.

9.8 Ethical considerations

All respondents' data was anonymised and respondents cannot be identified from the data. The the ethics code and practice of Brunel University has been adered to. The paragraph in included in the research Covering Letter states: *"I want to emphasize and assure you that I will treat all data as confidential. All data will be reported in aggregate only. If necessary, I would be happy to sign a confidentiality or nondisclosure agreement. In appreciation for participating in my study, I will gladly make my results available to you"* (Covering Letter of the research is in Appendix 2).

APPENDIX 1 – Bibliography

A

Abran, A., Khelifi, A., and Suryn, W. (2003). "Usability meanings and interpretations in ISO standards". *Software Quality Journal*, 11, 325–338.

Alba J.W., Lynch, J., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., and Wood, D. (1997) "Interactive home shopping: consumer, retailer and manufacturer incentives to participate in electronic marketplaces" *Journal of Marketing*, Vol. 61, No. 7, pp: 38-53.

Albert, W. (2002) *"Do web users actually look at ads? A case study of banner ads and eye-tracking technology"*. In Proceedings of the Eleventh Annual Conference of the Usability Professionals' Association.

Albert, W. S., and Liu, A. (in press) *"The effects of map orientation and landmarks on visual attention while using an in-vehicle navigation system"*. To appear in: A. G. Gale (ed.), Vision in Vehicles 8. London: Oxford Press

Alexander R. and Baravalle, A. (2011) "A quantitative approach to usability evaluation of web sites" http://roar.uel.ac.uk/996/1/Rukshan,%20A%20(2011)%20AC%26T.pdf

Altonen, A., Hyrskykari, A., and Räihä, K. (1998). "101 Spots, or how do users read menus?" In Proceedings of CHI'98 *Human Factors in Computing Systems* (pp. 132-139). NY: ACM Press.

Amathus Beach Hotel: www.amathus-hotels.com/limassol

Ashenfelter, K., Quach, V., Holland, T., Nichols, E. and Lakhe, S. (2012) *"Report for Round 3 of Usability Testing of the 2011 American Community Survey Online Instrument: Focus on Login and Roster Features"*

Association for Information Systems: http://www.qual.auckland.ac.nz/

B

Backs, R. W., and Walrath, L. C. (1992). "Eye movement and pupillary response indices of mental workload during visual search of symbolic displays". *Applied Ergonomics*, 23, 243–254.

Bagozzi R. P., Baumgartner, H., Pieters, R., and Zeelenberg, M. (2000) *"The role of emotions in goal-directed behaviour"*. In S. Ratneshwar, D. G. Mick, and C. Huffman (Eds.), The Why of Consumption: Contemporary Perspectives on Consumer Motives, Goals, and Desires (pp. 36–58). New York: Routledge.

Bangor, A., Kortum, P. T., and Miller, J. T. (2008). "An Empirical Evaluation of the System
Usability Scale". *International Journal of Human-Computer Interaction*, 24(6), 574-594.

Bakos, Y. (1997) "Reducing Buyer Search Costs: Implications for Electronic Marketplaces," *Management Science*, Volume 43, Number 12, December 1997.

Basso, A., Goldberg, D., Greenspan, S. and Weimer, D. (2001) *"First impressions: emotional and cognitive factors underlying judgments of trust e-commerce,"* inProceedings of the 3rd ACM conference on Electronic Commerce, pp. 137–143,ACM, 2001.

Bednárik, É.and Pakainé Kováts, J. (2010) "Consumer Behaviour Model on the Furniture Market", Department of Entrepreneurship and Marketing, Faculty of Wood Sciences, http://www.nyme.hu/fileadmin/dokumentumok/fmk/acta_silvatica/cikkek/Vol06-2010/06_bednarik_pakai_p.pdf , Acta Silv. Lign. Hung., Vol. 6 (2010) 75–88

Beirekdar A., Vanderdonckt J., Noirhomme M., "KWARESMI – Knowledge based web automated evaluation tool with reconfigurable guidelines optimization." in C, Stephanidis (ed.) Proceeding of 2nd Int. Conf. on Universal Access in Human – Computer Interaction UAHCT'2003. Mahwah: Lawrence Erlbaum Associates, 4. pp. 1504 – 1508, 2003.

Belch E.G and Belch A.M. (2003) *"Advertising and promotion: an integrated marketing communication perspective"* 6th Edition, McGraw-Hill

Benel, D. C. R., Ottens, D., and Horst, R. (1991) *"Use of an eye tracking system in the usability laboratory"*. In: Proceedings of the Human Factors Society 35th Annual Meeting (pp.461–465). Santa Monica: Human Factors and Ergonomics Society.

Bettman, James R., Johnson, Eric J., Luce, Mary Frances, andPayne, JohnW. (1993) "Correlation, conflict, and choice". *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 19, 931–951.

Bitner, MJ, Ostrom AL, Roundtree, RI and Meuter, ML (2000) "Implementing successful self-service technologies", *Journal of the Academy of Management Executive*, Vol. 16 No.4, pp.96-110.

Blackwell, R. D., Miniard, P.W. and Engel, J.F. (2006) *"Consumer behaviour"* (10. ed.) Mason, Ohio: Thomson Business and Economics

Bojko A. (2009). Informative or Misleading? Heatmaps Deconstructed, in: Human-Computer Interaction, Part I, HCII, 2009. Jacko J. A. (Ed.). Springer-Verlag Berlin, pp 30-39.

Bolla, K. I., Eldreth, D. A., Matochik, J. A., and Cadet, J. L. (2004) "Sex-related differences in a gambling task and its neurological correlates". *Cereb Cortex*, 14(11), 1226-1232.

Boyd, H.W., Walker, O.C., Mullins, J. and Larreche, J-C. (2002) *"Marketing Management, A Strategic Decision-Making Approach"*, McGraw-Hill/Irwin, Columbus, OH.

Brooke, J. (1996) *"SUS: a "quick and dirty" usability scale"* in P. W. Jordan, B. Thomas, B. A. Weerdmeester, and A. L. McClelland. Usability Evaluation in Industry. London: Taylor and Francis.

Brown, M., Pope, N., and Voges, K. (2007) "Buying or browsing? An exploration of shopping orientations and online purchase intention". *European Journal of Marketing*, 37, 1666-1684.

Brown, M., Pope, N. and Voges, K.,(2003)"Buying or browsing? An Exploration of Shopping Orientations and Online Purchase Intention" , *European Journal of Marketing* Vol. 37, No. 11/12: 1666-1685, 2003.

Byrne, M. D., Anderson, J. R., Douglas, S., and Matessa, M. (1999) *"Eye tracking the visual search of click-down menus"*. In: Proceedings of CHI 99 (pp. 402–409). NY: ACM Press.

C

Cales, M.(2000) "Etiquette for the global market" *Management Review*, 89, 7.

Card, S. K. (1984) *"Visual search of computer command menus"*. In: H. Bouma and D. G. Bouwhuis (eds), Attention and Performance X, Control of Language Processes. Hillsdale,NJ: Lawrence Erlbaum Associates

Center for Cognitive Technology: USC, www.cogtech.usc.edu/

Chappel, J.J. and Huang, Z. (2007) “A usability analysis of company websites”, *Journal of Computer Information Systems*

Chipman, Susan F., Schraagen, Jan Maarten, and Shalin, Valerie L. (2000) *"Introduction to Cognitive Task Analysis"*, In J. M. Schraagen, S. F. Chipman, and V. L. Shalin (Eds.), Cognitive Task Analysis, (pp. 3-23). Lawrence Erlbaum Associates, Mahwah, NJ: Erlbaum.

Cho, N. and Park, S. (2001) “Development of electronic commerce user-consumer satisfaction index (ECUSI) for Internet shopping”, *Industrial Management and Data Systems*, Vol. 101 No. 8, pp. 400-6.

Cho, J., (2004) “Likelihood To Abort An Online Transaction: Influences From Cognitive Evaluations, Attitudes, and Behavioral ariables”, *Information and Management* Vol. 41, 827-838, 2004.

Chung, T., and Law,R (2003) “Developing a performanceindicator for hotel websites International” *Journal of Hospitality Management*, 22(1), 343–358"

Classification of hotel establishments within the EU (2009) http://ec.europa.eu/consumers /ecc/docs/hotel_establishment_classification_EU_en.pdf

Cohen, J. (1999) “The Grinch Cometh”, Neteffect, October

Coltekin, A., Heil, B.,Garlandini, S. and Fabrikant, S. (2009) “Evaluating the Effectiveness of Interactive Map Interface Designs: A Case Study Integrating Usability Metrics with Eye-movement Analysis” *Cartography and Geographic Information Science*, Vol. 36, No. 1, 2009, pp. 5-17

Cooke, L. (2006) “Is the Mouse a “Poor Man’s Eye Tracker”? *Usability and Information Design* p.252-255

Cooke, N. M. (1994) "Varieties of Knowledge Elicitation Techniques" *Inernational Journal of Human-Computer Studies*,41(6), 801-849.

Cooper, D. and Schindler, P. (2003) *“Business research methods”* (8th ed.). New York: McGraw-Hill.

Coupey, E (1994) “Restructuring: Constructive processing of information displays in consumer choice”, *Journal of consumer Research* 21 (1), 83-99

Cowen, L. (2001) *"An eye movement analysis of web-page usability"*. Unpublished Masters' thesis, Lancaster University, UK

Cowen, L., Ball, L. J., and Delin, J. (2002) *"An eye-movement analysis of web-page usability"*. In People and Computers XVI (Proceedings of HCI 2002). Springer, London, 2002, 317-335.

Crandall, B., and K. Getchell-Reiter (1993). *"Critical decision method: A technique for eliciting concrete assessment indicators from the ''intuition'' of NICU nurses"*. Advances in Nursing Sciences, 16(1): 42–51.

Cullen, K. (1998) *"Best Practices for Maximizing Your Hotel's Online Revenue and ROI"*

Czinkota, M.R. and Kotabe, M.(2001) *"Marketing Management"*, 2nd ed., South-Western College Publishing, Cincinnati, OH.

Czinkota, M.R., Cickson, P.R., Dune, P., Griffin, A., Hoffman, K.D.,Hutt, M.D., Lindgren, J.H. Jr, Lusch, R.F., Ronkainen, I.A.,Sheth, J.N., Shimp, T.A., Siguaw, J.A., Simpson, P.M., Speh,T.W. and Urbany, J.E. (2000), *"Marketing Best Practices"*,The Dryden Press, Fort Worth, TX.

D

Dash, N.K. (2005) *"Module: Selection of the Research Paradigm and Methodology"* http://www.celt.mmu.ac.uk/researchmethods/Modules/Selection_of_methodology/

Darley, W. K., Blankson, C., and Luethge, D. J. "Toward an integrated framework for online 303 consumer behavior and decision making process: A review," Psychology and Marketing (27:2) 2010, pp 94-116

Devaraj, S., Fan, M. and Kohli, R.,(2002)"Antecedents of B2C ChanneSatisfaction and Pre ference: Validating E-Commerce Metrics", *Information Systems Research* Vol. 13, No. 3: 316-334, 2002.

Davis, F. D., and Arbor, A. (1989). "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS Quarterly*, September

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989) "User acceptance of computer technology: a comparison of two theoretical models". *Management Science*, vol.35, no.8, pp.982-1003

Dibb, S., Simkin, L., Pride, W.P. and Ferrell, O.C. (2001)*"Marketing Concepts and Strategies",* 3rd ed.,Houghton-Mifflin Company, Boston, MA.

Dinev, T., and, Hart, P.(2002) *"Internet Privacy Concerns and Trade-Off Factors: Empirical Study and Business Implications,"* Working Paper, Florida Atlantic University

Dishion, T. J., and I. Granic. 2004. "Naturalistic Observation of Relationship Processes." *In Comprehensive Handbook of Psychological Assessment* Volume 3, edited by S. N. Haynes and E. M. Heiby. Hoboken, NJ: John Wiley and Sons, 143–161.

Dix, A., Finlay, J., Abowd, G. D., and Beale, R. (2004). *"Human –Computer Interaction".* Third edition, Prentice Hall, England, UK

Dommeyer, C.J., and Gross, B.L.; (2003) "What Consumers Know And What They Do: An Investigation of Consumer Knowledge, Awareness, and Use Of Privacy Protection Strategies", *Journal of Interactive Marketing*, 17(2).

Douglas J. D. and Leonard J. P. (2000), *"The textbook of Marketing Management"*, USA

Dubois, D. and Shalin, V. (2000) *"Describing job expertise using cognitively oriented task analyses (COTA)".* In Schraagen, et al. (2000).

Duchowski, A. T. (2003) *"Eye tracking methodology: Theory and practice"* London: Springer-Verlag Ltd.

E

Eger, N., Ball, L., Stevens, R. and Dodd, J. (2007) *"Cueing Retrospective Verbal Reports in Usability Testing Through Eye-Movement Replay"*

Ehmke, C. and Wilson, S. (2007) *"Identifying Web Usability Problems from Eye-Tracking"*, Published by the British Computer Society Data

Eisenfuhr, F. (2011). *"Decision making"*. New York, NY: Springer.

Eisner, Alan B and Shapira, Zur, (1997) "Attention Allocation and Managerial Decision Making", *Information Systems Working Papers Series*, Vol. , pp. -, 1997. Available at SSRN: http://ssrn.com/abstract=1284291

Elliott, R., Dolan, R. J., and Frith, C. D. (2000). “Dissociable functions in the medial and lateral orbitofrontal cortex: Evidence from human neuroimaging studies”. *Cerebral Cortex*, 10, 308–317.

Ellis, S., Candrea, R., Misner, J., Craig, C. S., Lankford, C. P., and Hutshinson, T. E. (1998). *“Windows to the soul? What eye movements tell us about software usability. In: Proceedings of the Usability Professionals”* Association Conference 1998 (pp. 151–178).

Engel, J. F., Kollat, D. T., and Blackwell, R. D. (1968) *"Consumer Behavior, New York: Holt, Rinehart and Winston,"* One of the earliest presentations of a cognitive model of consumer choice).

Engel, J., Blackwell, R., and Miniard, P. (1990).*“Consumer behavior”.* 6th ed. Chicago:Dryden Press.

Engel, J., Blackwell, R., and Miniard, P. (1995). *“Consumer behavior”*. International ed. Florida. Dryden.

F

Fang, W. and Salvendy, G. (2003) “Customer centered rules for design of E-Commerce websites”, *Communications of the ACM*, Vol. 46, No. 12

Ferle, C.A. (2000) “Teens’ Use of Traditional Media and the Internet”, *Journal of Advertising Research*, May-June, vol. 40, issue 3, pp. 55-66.

Fitts, P. M., Jones, R. E., and Milton, J. L. (1950). *“Eye movements of aircraft pilots during instrument-landing approaches”*. Aeronautical Engineering Review 9(2), 24–29.

Flanagan, J.C. (1954), “The critical incident technique”, *Psychological Bulletin*, Vol. 51 No. 4, pp. 327-58.

Flemisch F. O., and Onken, R. (2000). *“Detecting usability problems with eye tracking in airborne battle management support”*. NATO RTO HFM Symposium on Usability of information in Battle Management Operations (pp. 1–13). Oslo

Foucault, B. and Scheufele, D., (2002) "Web vs. Campus Store? Why Students Buy Textbooks Online," *Journal of Consumer Marketing* Vol. 19, No. 4/5: 409-424, 2002.

Foxall, G., Goldsmith, R., and S. Brown (1998) *“Consumer Psychology for Marketing”.* Second Edition. London, Boston: Intemational Thompson Business Press.

Fram, E.H. ad Grady, D.B.(1995)“Internet Buyers: Will the Surfers Become Buyers?”, *Direct Marketing*, 58, 6, p63-65

G

Gazzaniga, M. S., Ivry, R. B., Mangun, G. R., and Phelps, E. A. (2002) *“Emotion”*. In M. S.

Gibbs, Graham R. (2002) *“Qualitative Data Analysis: Explorations with NVivo”*, Buckingham: Open University Press

Gifford, A. (2002)“Emotion and self-control”. *Journal of Economic Behavior and Organization*, 49, 113–130.

Gleichgerrcht, E., Ibáñez, A., Roca, M., Torralva, T., and Manes, F. (2010). “Decision-making cognition in neurodegenerative diseases”. *Nature Reviews*, 6, 611-623

Goldberg, H. J., and Kotval, X. P. (1999). “Computer interface evaluation using eye movements: Methods and constructs”. *International Journal of Industrial Ergonomics*, 24, 631-645.

Goldberg, H. J., and Wichansky, A. M. (2003). *“Eye tracking in usability evaluation: A practitioner’s guide”*. In J. Hyönä, R. Radach, and H. Deubel (Eds.), The mind's eye: Cognitive and applied aspects of eye movement research (pp. 493-516). Amsterdam: Elsevier.

Goldberg, J. H., Stimson, M. J., Lewenstein, M. Scott, N., and Wichansky, A. M. (2002). *“Eye tracking in web search tasks: Design implications”*. In: Proceedings of the Eye Tracking Research and Applications Symposium 2002 (pp. 51–58). New York ACM

Golden Bay Hotel www.goldenbay.com.cy

Grady, C. L., McIntosh, A. R., Bookstein, F., Horwitz, B., Rapoport, S. I., and Haxby, J. V. (1998). “Agerelated changes in regional cerebral blood flow during working memory for faces”. *Neuroimage*, 8(4), 409-425.

Graf, W., and Krueger, H. (1989). *“Ergonomic evaluation of user-interfaces by means of eyemovement data”*. In: M. J. Smith and G. Salvendy (eds), Work with Computers: Organizational, Management, Stress and Health Aspects (pp. 659–665). Amsterdam: Elsevier Science.

Granka, LA, Joachims, T, Gay, G (2004*), "Eye-tracking analysis of user behaviour in WWW search"*. Annual ACM Conference on Research and Development in Information Retrieval, PP 478 - 479 http://portal.acm.org/citation.cfm?id=1008992.1009079

Guba, E. G., and Lincoln, Y. S. (2005) *"Paradigmatic controversies, contradictions, and emerging influences"* In N. K. Denzin and Y. S.Lincoln (Eds.), The Sage Handbook of Qualitative Research (3rd ed.), pp. 191-215. Thousand Oaks, CA: Sage. ISBN 0-7619-2757

H

Haddioui, I.E. and Khaldi, M. (2011) "Learner Behavior Analysis through Eye Tracking" http://www.icvl.eu/2011/disc/icvl/documente/pdf/tech/ICVL_Technologies_paper15.pdf

Hann, I.H., K.L. Hui, T.S. Lee and I.P.L. Png, (2003) *"The Value of Online Information Privacy: An Empirical Investigation"*. AEI-Brookings Joint Center for Regulatory Studies, Related Publication 03-25, October.

Harrell, G.D. and Frazier, G.L.(1999) *"Marketing, Connecting with Customers"*, Prentice-Hall, Englewood Cliffs, NJ.

Harris, R. L., and Christhilf, D. M. (1980). *"What do pilots see in displays?"* In: Proceedings ofthe Human Factors Society — 24th Annual Meeting (pp. 22–26). Los Angeles: Human Society.Factors

Harrison, C.M. (2008) *"Exploring emotional web experience: More than just usability and good design"* https://www.cs.york.ac.uk/ftpdir/reports/2008/YCST/20/YCST-2008-20.pdf

Heijden, V.H., Verhagen, T. and Creemers, M.(2001) *"Predicting online purchase behavior: replications and the test of competing models"* paper presented at the Proceedings of the 34th International Conference on system sciences, Vrije University, Amsterdam, faculty of economics

Heminghous, J. (2005) *"A Viable Implementation of a Comparison Algorithm for Regions of Interest "*http://andrewd.ces.clemson.edu/courses/cpsc412/fall05/teams/reports/group4.pdf

Henderson, R., Rickwood, D. and Roberts, P. (1998) *"Beta test of an electronic supermarket. Interacting with Computers"* 10, 385-399.

Hendrickson, J. J. (1989) *"Performance, preference, and visual scan patterns on a menu-based system: Implications for interface design"*. In: Proceedings of the ACM CHI'89 Human Factors in Computing Systems Conference (pp. 217–222). ACM Press

Henrichs, R.B.(1995) *"Factors That Impact Consumers Adoption of Innovation Technological Services Over Time: The Case of Internet"*,Unpublished doctoral dissertation, Golden Gate University, San Francisco, CA.

Herr, P. M., Kardes, F. R., and Kim J. (1991). "Effects of word-of-mouth and productattribute information an persuasion: an accessibility-diagnosticity perspective". *Journal of Consumer Research*, 17, 454-462.

Hevner, A. R.; March, S. T.; Park, J. and Ram, S. (2004) *"Design Science in Information Systems Research"*. MIS Quarterly, , 28, 75-106. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.103.1725andrep=rep1andtype=pdf

Hodkinson, C., Keil, G., and Mccoll-Kennedy, J. (2000) "Consumer web search behaviour: diagrammatic illustration of way finding on the Web". *International Journal of Human Computer Studies* 52, 805-830.

Hoffman, D.L., Novak, T.P., and Peralta, M., (1999) *"Building consumer trust online"*, Communications of the ACM, 42(4).

Hoffman, R. R., ed. (1992) *"The psychology of expertise: Cognitive research and empirical AI"*. New York: Springer-Verlag

Hotchkiss, G., Alston, S. and Edwards, G. (2005) "Google eye tracking study: How searchers see and click on google search results" *Enquiro search solutions*, 7/2005

Huang, S. and Christopher, D (2003).*"Planning an effective internet retail store"*. Marketing Intelligence and Planning, 21[4], 230-238.

Huizingh, E. K. R. E (2000) "The content and design of web sites: An empirical study" *Information and Management* 37 (3), 123-134

Hyrskykari, A. and Ovaska, S., Majaranta, P., Räihä, K.-J. and Lehtinen, M. (2008) "Gaze Path Stimulation in Retrospective Think-Aloud". *Journal of Eye Movement Research*, 2(4):5, 1-18.

I

Internet World Statistics, www.internetworldstats.com

ISO. ISO 9241: Ergonomic requirements for office systems with visual display terminals (VDTs). International

J

Jacob, R. J. K., and Karn, K. S. (2003).*"Eye tracking in Human-Computer Interaction and usability research: Ready to deliver the promises",* In J. Hyönä, R. Radach, and H. Deubel (Eds.), The mind's eye: Cognitive and applied aspects of eye movement research (pp. 573-605). Amsterdam: Elsevier.

Jarvenpaa, S. L., Tractinsky, N., and Vitale, M. (2000) "Consumer trust in an Internet store", *Information Technology and Management*

Jasselette A., Keita M., Noirhomme M., Randolet F., Vanderdonckt J., Brussel C., Grolaux D., (2007) "Automated repair tool for usability and accessibility of web sites." Calvary, G. et al. (eds.). Computer-Aided Design of User Interfaces. Springer 2007, pp. 261- 272.

Jobber, D.(2001) *"Principles and Practice of Marketing",* McGraw-Hill International (UK) Limited, New York, NY.

Jokela, T., Koivumaa, J., Pirkola, J., Salminen, P. and Kantola, N. (2006) "Methods for quantitative usability requirements: a case study on the development of the user interface of a mobile phone" Pers Ubiquit Comput (2006) 10: 345–355 DOI 10.1007/s00779-005-0050-7

Jones, B. (2010) *"Understanding the Z-Layout in Web Design"*, http://webdesign.tutsplus.com /articles/design- theory/understanding-the-z-layout-in-web-design/

Jones, B. (2012) *"Understanding the F-Layout in Web Design"*, http://webdesign.tutsplus.com /articles/design-theory/understanding-the-f-layout-in-web-design/

Josephson, S., and Holmes, M. E. (2002). "Visual attention to repeated Internet images: Testing the scanpath theory on the world wide web". In: *Proceedings of the Eye Tracking Research and Applications Symposium* 2002 (pp. 43–49). New York: ACM

K

Kaempf, G., D. Klinger, and S. Wolf. (1996) *"Development of decision-centered interventions for airport security checkpoints"*. Contract DTRS-57-93-C-00129 for the U.S. Department of Transportation. Fairborn, OH: Klein Associates.

Kargaonkar, P. K. and Wolin, L. D. (1999) "A Multivariate Analysis of Web Usage," *Journal of Advertising Research*, March/April, pp. 53-68.

Karimi, S. (2013) "A purchase decision-making process model of online consumers and its influential factor a cross sector analysis" Manchester Business School

Katsanos, C., Tselios, N. and Xenos, M. (2012) *"Perceived Usability Evaluation of Learning Management Systems: A First Step towards Standardization of the System Usability Scale in Greek"*

Khalifa, M. and Liu, V. (2002) "The state of research on information system satisfaction" *Journal of information technology theory and application*, 37-49

Kim, J. and Moon, J. (1998) "Designing towards emotional usability in customer interfaces – trustworthiness of cyber-banking system interfaces". *Interactig with Computers*, 10, 1-29.

Klein, G. A., and Brezovic, C. P. (1986). *"Design engineers and design processes"*.Proceedings of the 30th Annual Human Factors Society, , 771-775.

Klein, G. A., and R. Hoffman. (1993) *"Seeing the invisible: Perceptual/cognitive aspects of expertise. In Cognitive science foundations of instruction"*, edited by M. Rabinowitz, 203–226. Mahwah, NJ: Lawrence Erlbaum and Associates. "Rapid decision making on the fireground". Proceedings of the 30th annual Human Factors Society, 1, 576-580. Dayton, OH : Human Factors Society.

Klein, G. A., Calderwood, R., and Clinton-Cirocco, A. (1986). *"Rapid decision making on the fireground"*. Proceedings of the 30th annual Human Factors Society, 1, 576-580. Dayton, OH : Human Factors Society.

Klein, G. A., Calderwood, R., and MacGregor, D. (1989)*"Critical decision method for eliciting knowledge"*. IEEE Transactions on Systems, Man and Cybernetics, 19 (3), 462-472

Klein, G. and Armstrong, A.A. (In Press) *"Critical Decision Method"*. In N.A. Stanton, Handbook of Human Factors methods, UK

Killam, B. (2012) *"Is an Eye Tracker Really Useful in Usability Testing?"*, White paper by, updated October 2013

Klinger, D. W., and M. G. Gomes. (1993).*"A cognitive systems engineering application for interface design".* Proceedings of the Human Factors and Ergonomics Society 37th Annual Meeting, 16–20.

Koivumi, T., (2001) "Customer Satisfaction and Purchasing Behaviour in a Web-Based Shopping Environment", *Electronic Markets* Vol. 11, No. 3: 186-193, 2001.

Kolers, P. A., Duchnicky, R. L., and Ferguson, D. C. (1981). "Eye movement measurement of readability of CRT displays". *Human Factors*, 23, 517–527.

Kollock, P. (1999) *"The production of trust in online markets"*. In E. J. Lawler, M. Macy, S. Thyne and H. A. Walker (Eds.), Advances in group processes, vol. 16. JAI Press, Greenwich CT, 1999.

Komínková, B. (2008) "Comparison of two eye tracking devices used on printed images" , Master thesis, University of Pardubice.

Kotval, X. P., and Goldberg, J. H. (1998). *"Eye movements and interface components grouping: An evaluation method"*. In: Proceedings of the 42nd Annual Meeting of the Human Factors and Ergonomics Society (pp. 486–490). Santa Monica: Human Factors and Ergonomics Society

Krausman, A. S.; Pettit, R. A.; Elliott, L. R. (2007) *"Effects of Redundant Alerts on Platoon Leader Performance and Decision Making";* ARL-TR-3999; U.S. Army Research Laboratory: Aberdeen Proving Ground, MD

Kulviwat, S., Guo, C. and Engchanil, N. (2004) "Determinants of online information search: a critical review and assessment". *Internet Research: Electronic Networking Applications and Policy*, vol. 14:3, pp. 245-253

L

Lamar, M. (2006) *"Psychology Department and Section of Brain Maturation, Institute of Psychiatry"* , King's College, UK

Lamar, M., Yousem, D. M., and Resnick, S. M. (2004). *"Age differences in orbitofrontal activation: an fMRI investigation of delayed match and nonmatch to sample".* Neuroimage, 21(4), 1368-1376. Larkin, J., McDermott, J., Simon, D. P., and Simon, H.

A. (1980). Models of competence in solving physics problems. Cognitive Science, 4, 317-345.

Lamb, C.W., Hair, J.F., McDaniel, C., Boshoff, C. and Terblanche, N.S. (2000).*"Marketing: A South African Perspective".* Cape Town: Oxford.

Lauraéus-Niinivaara, T. (2010) *"Uncertainty is the Other Side of the Coin of Information Online Search"*, Proceedings of the 43rd Hawaii International Conference on System Sciences http://hsepubl.lib.hse.fi/pdf/diss/Aalto_DD_2011_121.pdf

Lee, P. M. "Behavioral model of online purchasers in e-commerce environment," Electronic
Commerce Research (2:1) 2002, pp 75-85.

Lehtinen, M. (2007) *"A gaze path cued retrospective thinking aloud technique in usability testing",* http://tutkielmat.uta.fi/pdf/gradu02002.pdf

Lewenstein, M. (2002). *"Study snapshot suggests serendipity lives online"*. Poynter.org. Retrieved May 20, 2001, from http://www.poynter.org/centerpiece/081800.htm

Li, Z.G. and Gery, N.(2000)"E-Tailing – For All Products", *Business Horizons*. 43(6), 49-54

Limassol Amathus Beach Hotel: www.amathus-hotels.com/limassol

Lunenbur, F.C (2010), "The decision making process", *National forum of educational administration and supervision Journal*, Volume 27, Number 4, 2010

M

March, S. T. and Smith, G. (1995). *"Design and Natural Science Research on Information Technology"*.

Mehta, R. and Sivadas, E. (1995)"Comparing Response Rates and Response Content in Mail versus Electronic Mail Surveys, *Journal of the Market Research Society*, 37, 4, pp. 429-439

Mellers, B. A. (2000). "Choice and the relative pleasure of consequences" *Psychological Bulletin*, 126, 910–924.

Mello-Thoms, C., Nodine, C. F., and Kundel, H. L. (2004) *"What attracts the eye to the location of missed and reported breast cancers? In Proceedings of the Eye Tracking"* Research and Applications Symposium 2002 (pp. 111-117). NY: ACM Press

Merriënboer, Clark and de Croock (2002) "Blueprints for complex learning: The 4C/ID*-model", *Educational Technology Research and Development*, 50(2), 39-64.

Metzger, M.J., (2004) "Privacy, trust and disclosure: exploring barriers to electronic commerce", *Journal of Computer Mediated Communication*, 9(4).

Microsoft (2008), http://research.microsoft.com/en-us/um/cambridge/projects/hci2020/downloads/beinghuman_a3.pdf

Militello, L. and Crandall, B. (2004) *"Critical Incident/Critical Decision Method"* http://learngen.org/~aust/EdTecheBooks/Task_Analysis/018-CHAPTER.pdf

Militello, L. G. and Lim, L. (1995), "Early assessment of NEC in premature infants", *Journal of Perinatal and Neonatal Nursing*, 9

Militello, L. G., and R. J. B. Hutton. (1998)"Applied Cognitive Task Analysis (ACTA): A practitioner's toolkit for understanding cognitive task demands". *Ergonomics, Special Issue: Task Analysis*, 41(11):1618–1641

Moe, W. W. and Pader, P. S., (2004) "Dynamic Conversion Behavior at E-Commerce Site", *Management Science* Vol., 326-336, 2004.

Monsuwe, T.P.Y., Dellart, B.G.C. and de Ruyter, K. (2004), 'What drives consumers to shop online? A literature review', *International Journal of Service Industry Management*, Vol. 15 No. 1, pp. 102-121

N

Nguyen, H. (2012) *"Human Computer Interaction in Game Design"*

Nielsen, J. and Tahir, M. (2002). *"Homepage Usability: 50 Sites Deconstructed"*. Indianapolis, IN: New Riders Publishing.

Nielsen, J. (1993) *"Usability Engineering"*, New York: Academic Press, Inc.

O

Obrist, M., Bernhaupt,R., Beck, E. and Tscheligi, M. (2007) *"Focusing on Elderly: An iTV Usability Evaluation Study with Eye-Tracking"* P. Cesar et al. (Eds.): EuroITV 2007, LNCS 4471, pp. 66–75, 2007

Ofcom Annual Report (2009) www.official-documents.gov.uk/document/hc1011/hc00/0031 / 0031.pdf , www.ofcom.org.uk . © Ofcom copyright 2010

O'Hare, D., Wiggins, M., Williams, A. and Wong, W. (2000). *"Cognitive task analysis for decision centred design and training"*. In J. Annett and N.A. Stanton (Eds.) Task Analysis (pp. 170-190). London: Taylor and Francis.

One up webwww.oneupweb.com

Outing, S., and Ruel, L. (2004). *"Eye Track III"*, The Poynter Institute study available at http://www.poynterextra.org/eyetrack2004/ .Last visited 29th April, 2005.

P

Pallant, J. (2001) *"SPSS: Survival manual"*. Licensing Agency Ltd, New York.

Pan, B., Hembrooke, H., Gay, G., Granka, L., Feusner, M., and Newman, J. (2004). *"The determinants of web page viewing behaviour: An eye tracking study"*. In S.N. Spencer (Eds.), Proceedings of ETRA, ACM SIGGRAPH .pp. 147-154.

Paphos Amathus Beach Hotel: www.amathus-hotels.com/paphos

Park, C. and Jun, J.-K., (2003) "A Cross-Cultural Comparison of Internet Buying Behavior," *International Marketing Review* Vol. 20, No. 5: 534-554, 2003.

Payne, J.W., Bettman J.R. and Johnson E.J. (1993) *"The adaptive decision maker"*, Cambridge University Press

Peter J.P., Olson J.C. and Grunert K.G. (1999) *"Consumer Behaviour and Marketing Strategy"*, European Edition McGraw Hill.

Phau, I. And Poon, S. M. (2000), *"Factors Influencing the Types of Products and Services Purchased Over the Internet, Research: Electronic Networking Applications and Policy"*, 10(2), 102-113.

Pires, G., Stanton, J. and Eckford, A., (2004) "Influences on the Perceived Risk of Purchasing Online", *Journal of Consumer Behaviour* Vol. 4, No. 2: 118-131, 2004.

Poole, A. and Ball, L. J. (2005) *"Eye Tracking in Human-Computer Interaction and Usability Research: Current Status and Future Prospects"*

Poole, A., Ball, L. J., and Phillips, P. (2004). *"In search of salience: A response time and eye movement analysis of bookmark recognition".* In S. Fincher, P. Markopolous, D.

Moore, and R. Ruddle (Eds.), People and Computers XVIII-Design for Life: Proceedings of HCI 2004. London: Springer-Verlag Ltd.

Potter, S., Gualtieri, J. and Elm, W.(2002) *"Case Studies: Applied Cognitive Work Analysis in the Design of Innovative Decision Support"*, Aegis Research Corporation; Cognitive Systems Engineering Center; Pittsburgh, PA USA, http://www.resilientcognitive solutions. com/wordpress/wp-content/uploads/2007/11/case-studies-chapter-2002-potter-et-al.pdf

Potter, Scott S., Roth, Emilie M., Woods, David D., and Elm, William C. (2000) *"Bootstrapping Multiple Converging Cognitive Task Analysis Techniques for System Design"*. In J. M. Schraagen, S. F. Chipman, and V. L. Shalin (Eds.), Cognitive Task Analysis, (pp. 317-340). Lawrence Erlbaum Associates, Mahwah, NJ: Erlbaum.

Q

Quesenbery, W. (2004). "Balancing the 5Es: Usability". *Cutter IT Journal*, 17(2), 4–11.

R

Rayner, K (1998) *"Eye movements in reading and information processing: 20 years of research"*. Psychological Bulletin, pp 124: 372-422.

Redline, C. D., and Lankford, C. P. (2001). *"Eye-movement analysis: A new tool for evaluating the design of visually administered instruments (paper and web)"*. Paper presented at 2001 AAPOR Annual Conference, Montreal, Quebec, Canada, May 2001. In: Proceedings of the Section on Survey Research Methods, American Statistical Association

Renshaw, J.A. (2004). *"Designing for visual influence: An eye tracking study".* Unpublished PhD Thesis. Leeds Metropolitan University: Leeds

Renshaw, J.A., Finlay, J. and Webb, N. (2006). *"Getting a measure of satisfaction from eyetracking in practice".* In Proceedings of CHI 2006, Montreal, Canada, pp. 1723-1726.

Roach, C. (2007) *"E-government: Usability of Trinidad and Tobago Ministry Websites",* PhD Thesis, Arizona State University, USA.

Romano, J., Holland, T. and Murphy, E. (2009) *"A Usability and Eye-Tracking Evaluation of the Economic Census Web Site: Round 2"*

Romano, J.C. and Chen J.M. (2011) *"A Usability and Eye-Tracking Evaluation of Four Versions of the Online National Survey of College Graduates (NSCG): Iteration 2"*

Rosch, J.L. and Vogel-Walcutt J.J (2012) "*A review of eye-tracking applications as tools for training*"

S

Salmon, P. M., Stanton, N. A., Walker, G. H., and Jenkins, D. P. (2003) (In Press). *"Distributed situation awareness: advances in theory, measurement and application to teamwork".* Ashgate, Aldershot, UK.

Santella, A. and DeCarlo, D. (2004) *"Robust Clustering of Eye Movement Recordings for Quanti cation of Visual Interest"*, In Eye Tracking Research and Applications (ETRA) Symposium 2004

Saunders, M., Lewis, P. and Thornhill, A. (2003) *"Research methods for business students",* Prentice Hall, Financial Times

Sekaran, U (2000) *"Research Methods for Business: A Skill-building Approach"* Third Ed. New York: John, Wiley & Sons, Inc., p. 288.

Sekaran, U (2003) *"Research Methods for Business-A Skill Building Approach"*-4th Edition. USA: John Wiley and Sons, Inc

Shani, Y., and Zeelenberg, M. (2007). "When and why do we want to know? Experienced regret promotes post-decisional information search". *Journal of Behavioral Decision Making*, 20, 207–222.

Shani, Y., Tykocinski, O. and Zeelenberg, M. (2008). "When ignorance is not bliss: How feelings of discomfort promote the search for negative information". *Journal of Economic Psychology*, forthcoming.

Shin, K. (2007) *"Master of Science in Design and Human Environment"* presented on March 22, 2007.

Sibert, J. L., Gokturk, M., and Lavine, R. A. (2000). *"The Reading Assistant: Eye gaze triggered auditory prompting for reading remediation".* In Proceedings of the Thirteenth Annual ACM Symposium on User Interface Software and Technology (pp. 101-107). NY: ACM Press

Silverman, D. (2001). *"Interpreting qualitative data: Methods for analysing talk, text, and interaction"* (2nd ed.). London: Sage

Singh, T. Jayashankar, J.V., and Singh, J.(2001)*"E-Commerce in the U.S. and Europe- Is Europe Ready to Compete?"*

Smith, A. D., and Rupp, W. T. (2003) "Strategic online customer decision making: leveraging the transformational power of the Internet," Online information review (27:6) 2003, pp 418-432.

Solomon, M., and Rabolt, N. (2004).*"Consumer behavior in fashion".* Upper Saddle River, NJ: Prentice Hal.

Solomon, M.R. and Stuart, E.W. (2003) *"Marketing, Real People, Real Choices"*, 3rd ed.

Ssemaluulu, P. (2012) *"An instrument to assess information system success in developing countries"* dissertations.ub.rug.nl/FILES/faculties/feb/.../193041-L-bw-Mukassa

Starkov, M. and Strekalov, D. (2010) *"hyper-interactive consumers"* http://www.hebsdigital .com/articles/pdf/2010/10-HotelsMag-BestPracticesinHotelWebsiteDesign-Published Article-August2010.pdf

Starkov, M. and Strekalov, D. (2010b) "Best Practices in Hotel Website Design", Hospitality eBusiness Strategies Inc., http://integratedbzstrategies.yolasite.com/resources /HEBS%20Best%20practices%20for%20website.pdf

Statistical Service of the Republic of Cyprus www.mof.gov.cy/mof

Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J. A., Wagner, R. K., Williams, W. M., Snook, S. A., and Grigorenko, E. L. (2000*)."Practical intelligence in everyday life".* Cambridge: Cambridge University Press.

Strandvall, T. (2008) "Eye tracking as a tool in package and shelf testing", http://www.tobii.com/Global/Analysis/Training/WhitePapers/Tobii_EyeTracking_in_Package_and_Shelf_Testing_WhitePaper.pdf

Svensson, E., Angelborg-Thanderz, M. Sjöeberg, L., and Olsson, S. (1997). "Information complexity: Mental workload and performance in combat aircraft". *Ergonomics*, 40, 362–380

Szymanski, D.M. and Hise, R.T. (2000) "E-Satisfaction: An Initial Examination", *Journal of Retailing*, Fall, vol. 76, issue 3, pp. 309-323.

T

Tan, S.J. (1999) "Strategies for Reducing Consumers' Risk Aversion in Internet Shopping", *Journal of Consumer Marketing*, Vol. 16 No. 2, 163-80

Teo, T.S.H. (2001)"Demographic and Motivation Variables Associated with Internet Usage Activities" ,*Internet Research: Electronic Networking Applications and Policy*, 11, 2, 125-137.

Thilmany, J. (2003) "Web search measure website appeal in seconds," *Mechanical Engineering*, vol. 125, pp. 10–14, 2003

Tobii (2006), *"User Manual Tobii Eye Tracker and ClearView analysis software Tobii Technology"* AB, 2006 Retrieved: 07/07/07 from www.tobii.com/linkpage .asp?sid=1098

Tobii: www.tobii.com

Tullis, T.S., and Stetson, J.N. (2004). A Comparison of Questionnaires for Assessing Website Usability. Proceedings of UPA 2004 (7-11 June 2004)

Travers, M. (2001). *"Qualitative research through case studies".* London ; Thousand Oaks, Calif.: SAGE. Educ Lib-Stacks H62 .T75 2001

Tripathi, K.P. (2011) A Study of Interactivity in Human Computer Interaction, International *Journal of Computer Applications* (0975 – 8887), Volume 16– No.6, February 2011

Trochim, W. M. K. (2001). *"The Research Methods Knowledge Base".* Cincinnati: Atomig Dog

Turban, E. and Aronson, J. (2003). *"Decision Support Systems and Intelligent Systems",* 6th edition. Pearson Education, New Delhi.

Tzanidou, E. (2006) *"Evaluating usability of e-commerce sites by tracking eye Movements"*, Open Research Online, oro.open.ac.uk

V

Van den Haak, M. J., de Jong, M. D. T., and Jan Schellens,P. (2003) "Retrospective vs. concurrent think-aloud protocols:testing the usability of an online library catalogue" *Behaviour and Information Technology*, 22 , 339-351.

Van Duyne, D. K., Landay, J. A., and Hong, J., I. (2003). *"The design of sites: patterns, principles and processes for crafting a customer-centred web experience".* Addison-Wesley, Boston, USA.

Vasterling, J.J., and Brewin, C.R. (2005) *"Neuropsychology of PTSD: Biological, cognitive and clinical perspectives"*. New York: The Guilford Press

Verschaffel, L. (2011). *"Use of external representations in reasoning and problem solving: Analysis and improvement".* New York, NY: Taylor and Francis.

Vikram (2010) *"The Ultimate Hotel Website Design and Usability Checklist"* http://evisionworldwide.com/learning/the-ultimate-hotel-website-design-and-usability-checklist/

W

Waldo, B.H. (2000) "Redefining the Health Care Landscape with the Internet", *Economics*, Vol. 18, Issue 2, pp.99–100. 15

Watchfire Whitepaper Series (2000), *"Bad things shouldn't happen to good Web sites: best practices for managing the Web experience",* available at: www.watchfire.com /resources/search-and-ye-shall-find.pdf

Weitzenfeld, J.S., Freeman, J.T., Riedl, T.R., and Klein, G.A., (1990) *"The critical decision method (CDM): A knowledge-mapping technique".* ATandT: Proceedings of Behavioral Sciences Days '90.

Wikipedia http://en.wikipedia.org/wiki/Cognition

Wikipedia, http://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

Willemsen, M. C., & Johnson, E. J. (2009). "*MouselabWEB: Monitoring information acquisition processes on the Web".* Retrieved August 15, 2006, from http://www.mouselabweb.org/

Y

Yamamoto, S., and Kuto, Y. (1992). "A method of evaluating VDT screen layout by eye movement analysis". *Ergonomics*, 35, 591–606

Yang, B. and Lester, D., (2004) "Attitudes Toward Buying Online", *Cyberpsychology and Behavior* Vol. 7, No. 1: 85-92, 2004.

Yatsenko, O., Mills, R. and Johnson, J. (2002), *"The golden rules of interface design: is anyone listening?"*, IACIS, http://iacis.org/iis/2002/YatsenkoMillsJohnson.pdf

Yin, R. (1994). *"Case study research: Design and methods"* (2nd ed.). Beverly Hills, CA: Sage Publishing.

Yoo, S., Shore, E. and Jin, J. (2004) "Evaluation of the home page of the top 100 university websites," *Academy of Information and Management Sciences*, vol. 8,no. 2, p. 57, 2004.

Yoo, S., Shore, E. and Mun, E. (2006) "Investigation into the home page of the top 100 liberal arts college websites," *Academy of Information and Management Sciences*,vol. 10, no. 1, p. 37, 2006.

Z

Zeelenberg M., Nelissen, R. ,Breugelmans, S.M and Pieters R. (2008) "On emotion specificity in decision making: Why feeling is for doing", *Judgment and Decision Making*, vol. 3, no. 1, January 2008, pp. 18-27.

Zeelenberg, M., Van Dijk, W. W., Van der Pligt, J., Manstead, A. S. R., Van Empelen, P., and Reinderman, D. (1998). "Emotional reactions to the outcomes of decisions: The role of counterfactual thought in the experience of regret and disappointment". *Organizational Behavior and Human Decision Processes*, 75, 117–141.

Zikmund, W. G. (2000). *"Exploring Marketing Research"* (7th ed.). Ft. Worth, TX: The Dryden Press.

Zopounidis, C. (2011b). *"Handbook of multicriteria analysis".* New York, NY: Springer.

APPENDIX 2 - A Covering Letter

Dear Respondent,

I am writing to request your participation in a research study I am conducting as part of my doctoral dissertation. I am a PhD student under the supervision of Dr. Panos Louvieris. This research entitled: "*Investigating Website Usability and Behavioral Intention for online hotel reservations: a Cognitive Perspective",* the purpose of this study is to identify the cognitive factors that influence Cypriots users' decision making process when they come to book online their hotel reservations.

The problem area identified for this research is to define the cognitive factors that affect the customer decision making (Cypriot online users) process when they come to use the internet for their hotel reservations. The primary goal of this research is to make the customer decision making process more realistic with regard to the online behaviour, including emotional factors that affect client when they come to use online reservation systems. This study will require that you complete a questionnaire survey below along with any additional comments you feel would be helpful. You will be asked to participate in an interview discussing previous experience with online reservation system and some interviews that will uncover complex cognitive processes that result to further consideration and further in-depth interviews.

I want to emphasize and assure you that I will treat all data as confidential. All data will be reported in aggregate only. If necessary, I would be happy to sign a confidentiality or nondisclosure agreement. In appreciation for participating in my study, I will gladly make my results available to you. Finally, I wish to thank you in advance for your time, willingness, and agreement to participate in my study. If you have any questions or concerns, please feel free to contact me by electronic mail (vd4523@yahoo.gr).

Drousiotou Vryona
PhD Candidate
BSc in Business Administration,
MSc in International Business Management
MSc in International Hotel Management

APPENDIX 3 - Interview Process / Questionnaire

PART 1: CRITICAL DECISION METHOD INTERVIEW QUESTIONS

Uncover previous experiences: During the interview, the participants will requested to think back to an incident (previous online experience) that occurred in the last two years in which they had to make critical decisions regarding online booking (not necessarily hotel reservation, booking can be for tickets, online banking, online purchasing etc).

PART 2: APPLIED COGNITIVE TASK ANALYSIS/ USABILITY

The purpose of the methods is to systematically uncover the customers' critical information requirements and cognitive processes used by participants during their online decision making process to book a hotel.

PART 3: CRITICAL INFORMATION REQUIREMENTS AND THEIR IMPACT ON HUMAN – COMPUTER INTERACTION

Critical information requirements are the pieces of information customers need to make appropriate decisions.

PART 4: WEBSITE HEURISTIC EVALUATION

Heuristic evaluation is a usability engineering method for finding the usability problems in a user interface design.

DEMOGRAPHICS

1. Gender Male ☐ Female ☐

2. What is your age?

Less than 15 years old	☐	35-44 years old	☐
15-24 years old	☐	45-54 years old	☐
25-34 years old	☐	55 years old and above	☐

3. What is your marital status?

Single ☐ Married ☐ Others (Divorced/ Widowed/ Separated, etc.) ☐

4. What is your highest level of education?

Primary school	☐	College/ technical school/ or equivalent	☐
Secondary school	☐	Bachelor's degree	☐
High school	☐	Masters degree or higher	☐
Other (please specify)	☐		

5. What is your present occupation?

Government officer	☐	Student	☐
Staff in a private company	☐	Housewife	☐
Other (please specify)	☐		

6. What is your personal income per month?

Less than €1.000	☐
€1.000-€2.000	☐
€2.000-€4.000	☐
More than €4.000	☐

7. Please fill (optional)

Name: .....

Tel: .....

Email: .....

PART 1: Critical Decision Method Interview Questions

Step One: Select Incident

1. [a] Can you tell me a memorable previous online experience (positive or negative) during the last two years?

   _____

   _____

   _____

[b] What was the purpose you went online? Was the experience good / bad? _____
[c] Did somebody help you (i.e. friend, expert, family)? Yes ☐ No ☐ If yes, who_____

2. [a] You decide to online book your reservations, could you please describe me your actions? (Information, booking, alternatives etc).

   _____

   _____

   _____

[b] From where you seek information? _____
[c] Do you plan to use your visa for the payment or issue an internet visa?_____

3. [i] Can you specify the benefits of the ***offline*** booking method? [multiple answers]
[a] Safety ☐ [b] Personal Communication ☐ [c] Pay in cash ☐
[d] Other _____

4. [ii] Can you specify the benefits of the ***online*** booking method?
[a] Easy ☐ [b] Fast ☐ [c] Convenient ☐
[d] Other _____

Step Two: Please recall the incident mentioned above as much as you can.

5. [a] Which is the first website you used for your search? Google ☐ Explorer ☐ Mozilla ☐ Other_____
[b] Was the information provided reliable? Yes ☐ No ☐
[c] Did you confirm it? [Information provided] Yes ☐ No ☐
[d] When you had the necessary information available what was your first action taken? [I.e. discuss with family and friends] _____
[e] Where there any concerns regarding your decision? Yes ☐ No ☐

Step Three: Incident retelling

6. Could you please describe me all your thoughts during the decision making process for a hotel booking:, (i.e. fear for unknown/confident, risk / risk free, credit card concern etc)

[a] Concerns during information search _____
[b] Concerns during evaluation of alternatives _____
[c] Concerns during booking / purchase stage _____

Step Four: Time line verification and decision point identification

7. [a] Are you happy with your decision? Yes ☐ No ☐
   Why? _____
   [b] Did you feel that you saved time / money? Yes ☐ No ☐

2. Step Five: Progressive deepening / Critical Decision Method Probes

	Information Search Process	Evaluation of Alternatives Process
Goal specification	[a] What did you expect to find during the information search for a hotel booking? …… …… ……	[b] What did you expect to have available during the Evaluation of Alternatives for a hotel booking? ……... …….. ……..
Goal identification	[c] During the information search process for a hotel, did you search for specific facilities? If yes, please specify. Yes ☐ ……..…… No ☐	[d] During the Evaluation of Alternatives, did you evaluate hotel's facilities? If yes, please specify. Yes ☐ …… No ☐
Expectancy	[e] Were you expecting to use the Internet for your Information Search Process? Yes ☐ No ☐	[f] Were you expecting to use the Internet for your Evaluation of Alternatives Process? Yes ☐ No ☐
Influence of uncertainty	[g] At Information Search stage were you uncertain about either the reliability of information you had available? Yes ☐ No ☐	[h] At Evaluation of Alternatives stage were you uncertain about either the reliability of alternatives that you had available? Yes ☐ No ☐
Information integration	[i] What was the most important piece of information that you used to formulate the decision? …… ……	[j] What was the most important piece of information that you used to evaluate the alternatives? ……... ……..
Situation assessment	[k]Did you use all the information available to you when formulating the decision? Yes ☐ No ☐	[l] Did you use all the information available to you when evaluating the alternatives? Yes ☐ No ☐
Missing Information	[m]Was there any information missing that you need it to proceed? If yes, please specify Yes ☐ No ☐ …… ……	[n] Was there any information missing during the evaluation of alternatives? If yes, please specify Yes ☐ No ☐ …….. ……..
Decision blocking	[o] Was there any stage during the Information Search process in which you found it difficult to process? If yes, which? Yes ☐…… No ☐ ……	[p] Was there any stage during the Evaluation of Alternatives process in which you found it difficult to process? If yes, which? Yes ☐…… No ☐ …….

3. Step Six: What if / Expert Novice

	Yes	No	Details
[a]Did you consider other alternatives? (agents, direct booking etc)	1	2	
[b]Did you consider other hotel websites? Why?	1	2	
[c]Might someone else in the same position have done it differently?	1	2	
[d]Could you have reasonably taken any other action? (i.e go offline)	1	2	
[e]Are you confident with the decision you have made?	1	2	

PART 2: Applied Cognitive Task Analysis/ Usability

EYE TRACKER INSTRUCTIONS

Part A – Tobii Process

1. Please switch on the computer / Tobii.
2. You need to search for a 5* hotel located in Cyprus (Limassol, Paphos, Nicosia, Larnaca) and book your vacations for you and your partner for the period 1-8/12/2010. You are requested to select hotels from the below list [hotels were randomly selected from website of Cyprus Tourism Organization]:
   a. Larnaca: Golden Bay…….…… www.goldenbay.com.cy
   b. Paphos: Amathus Beach Hotel …… www.amathus-hotels.com/paphos
   c. Limassol: Amathus Beach Hotel ……..www.amathus-hotels.com/limassol
3. For each hotel website you visit you are requested to follow the below process:
   a. Go to online booking / book now section offered from the hotel
   b. Enter the booking period 1-8/12/2010
   c. Search availability
   d. Search availability in bedrooms
   e. Search availability in meals
   f. If hotel meets your expectations please proceed for booking check out
   g. If you decide to leave the hotel's website please report the reason and proceed to next hotel
   4. For each hotel please answer the below questionnaire-rate from 1-5 where is 1 is Strongly Disagree and 5 is Strongly Agree.

Please note that during the process you are kindly requested to talk aloud and the entire process is video recorded, i.e.

- What you are trying to do
- Why you took an action

Please tick the hotel you are willing to book your holidays:

[a] Golden B ☐ **[b] Paphos Amathus Beach Ho** ☐ **[c] Limassol Amathus Beach Ho** ☐

		Please rate / circle the selected Hotel Website from 1-5 where 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4= Agree and 5=Strongly Agree	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Step One: Information Search	1	Before you decide to book a hotel you search all alternatives.	1	2	3	4	5
	2	The site gives you information about credit card security and personal data?	1	2	3	4	5
	3	The site gives you the opportunity to search for various information regarding hotel bedrooms	1	2	3	4	5
	4	The site gives you the opportunity to search for various information regarding hotel facilities	1	2	3	4	5
	5	The site gives you the opportunity to search for various information regarding better packages and offers	1	2	3	4	5
	6	The site gives you the opportunity to search for various information regarding hotel location	1	2	3	4	5
	7	The site allows you a refund in the event of cancellation	1	2	3	4	5
Step Two: Evaluation	8	This site allows you alternative options for room type	1	2	3	4	5
	9	This site allows you alternative options for room location (inland, side, sea view)	1	2	3	4	5
	10	This site allows you alternative options for meal	1	2	3	4	5
	11	This site allows you alternative options for payment methods (credit card, debit - electron, paypal etc)	1	2	3	4	5
Step Three: Online Booking	12	Remember the process you followed when you book through the Internet in the past. It is the same with the existing one	1	2	3	4	5
	13	It is easy to fill in the reservation form	1	2	3	4	5
	14	The instructions are simple to be followed	1	2	3	4	5
	15	Online booking provides the opportunity to save time and money	1	2	3	4	5
	16	You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	1	2	3	4	5
	17	You trust the Internet to provide personal information.	1	2	3	4	5
	18	There are some other factors that influence your final decision [i.e family, friends].	1	2	3	4	5
	19	Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	1	2	3	4	5

	ACTA / Tobii Usability Questionnaire	**Less than 10 minutes**	**10'-20'**	**20'-30'**	**30'-40'**	**More than 40'**
20	Circle the amount of time you spent becoming familiar with the tool before using it	1	2	3	4	5
		Strongly Disagree	**Disagree**	**Undecided**	**Agree**	**Strongly**
21	Rate the degree to which you found this technique easy to use	1	2	3	4	5
22	Rate the degree to which you found the interview guide to be flexible	1	2	3	4	5
23	Rate the degree to which you found the output to be clear	1	2	3	4	5
24	Rate the degree to which you found the knowledge representation to be useful	1	2	3	4	5

PART3: Critical Information Requirements and their impact on Human – Computer interaction

Critical Information Requirement (Information Search Stage):

25. Identify the information you are requiring when you want to book your hotel reservation online [multiple answers].

[a] Price ☐ [d] Location ☐

[b] Meals ☐ [e] Special Offers ☐

[c] Facilities ☐ [f] Other: _____

Was there any missing information at this stage? Yes ☐ No ☐ If yes, which_____

If you leave the website at this stage, please state the reason for leaving _____

Critical Information Requirement (Evaluation of Alternatives Stage):

26. Identify the services on the hotel website that match your expectations and match your needs [multiple answers].

[a] Price ☐ [d] Location ☐

[b] Meals ☐ [e] Special Offers ☐

[c] Facilitie☐ [f] Other: _____

Was there any missing information at this stage? Yes ☐ No ☐ If yes, which_____

If you leave the website at this stage, please state the reason for leaving _____

Critical Information Requirement (Online Booking Stage): [one answer]

27. What is this key single piece of information provided from the hotel website that would allow you to proceed with the online booking for a hotel reservation?

[a] Price ☐ [d] Location ☐

[b] Meals ☐ [e] Special Offers ☐

[c] Facilities ☐ [f] Other: _____

Was there any missing information at this stage? Yes ☐ No ☐ If yes, which_____

If you leave the website at this stage, please state the reason for leaving _____

PART 4: WEBSITE USABILITY SCALE

Please rate / circle each Hotel Website from 1-5 where 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4= Agree and 5=Strongly Agree	Golden Bay	Paphos Amathus	Limassol Amathus
28. I would like to use this website frequently	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
29.I found the website unnecessarily complex	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
30.I thought the website was easy to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
31.I think that I will need the support of a technical person to be able to use this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
32.I found the various functions in this website were well integrated	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
33.I thought there was too much inconsistency in this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
34.I think that most people will learn how to use this website quickly	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
35.I found the website very cumbersome to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
36.I felt very confident using the website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
37.I needed to learn a lot of things before I could get going with this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Comments:

Thank you so much for your assistance and cooperation.

APPENDIX 4 - Golden Bay Hotel Photos of Home page

APPENDIX 5 – Critical Decision Method

Step One: Select Incident								
	Previous experience	**Experience**	**Assistance**	**Actions**	**Info Source**	**Visa**	**Offline Benefits**	**Online Benefits**
Participant 1	Yes, clothing	Good	No	Information search/ evaluation/ purchase/confirm with bank	Internet	Internet Visa	Personal communication	Easy, fast
Participant 2	Hotels	Bad	No	Information search/ evaluation/ purchase	Agents	Visa	Personal communication	Easy, fast
Participant 3	Hotels	Good	Yes, friends	Information search/ evaluation/ purchase	Agents	Internet Visa	Personal communication	Easy, fast
Participant 4	Air Ticket	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety, personal communication, pay in cash	Easy, fast
Participant 5	Yes, clothing	Good	No	Information search/ evaluation/ purchase	Internet	Visa	Safety	Easy, fast
Participant 6	NPE	NPE	NPE	NPE	NPE	NPE	NPE	NPE
Participant 7	Air Ticket	Bad	No	Information search/ evaluation/ purchase	Internet	Debit card	Safety, Pay in Cash	Fast
Participant 8	Air Ticket	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety, personal communication, pay in cash	Easy, fast
Participant 9	NPE	NPE	NPE	NPE	NPE	NPE	NPE	NPE
Participant 10	NPE	NPE	NPE	NPE	NPE	NPE	NPE	NPE
Participant 11	Hotels	Good	No	Immediate search the brand / book	Internet	Internet Visa	Safety, Personal Communication	Easy, fast
Participant 12	Hotels	Good	No	Online search / evaluation / book online	Internet	Visa	Personal communication	Easy, fast convenient
Participant 13	Computer/ pc items	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety	Easy, fast
Participant 14	NPE	NPE	NPE	NPE	NPE	NPE	NPE	NPE
Participant 15	Hotels	Good	Yes, family	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety	Fast
Participant 16	Air Ticket	Good	No	Information search/ evaluation/ purchase	Internet	Visa	Safety, personal communication, pay in cash	Easy, fast convenient
Participant 17	Computer/ pc items	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety	Fast convenient
Participant 18	Hotels	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety, Pay in Cash	Easy, fast
Participant 19	Clothing	Bad	No	Information search/ evaluation/ purchase/confirm with bank	Internet	Internet Visa	Personal communication	Easy, fast
Participant 20	Air Ticket	Good	No	Information search/ evaluation/ discuss with family/ book	Internet	Visa	Safety	Easy, fast
Participant 21	Hotels	Good	Yes, friends	Information search/ evaluation/ purchase	Agents	Internet Visa	Personal communication	Easy, fast
Participant 22	Clothing	Good	No	Information search/ evaluation/ purchase/confirm with bank	Internet	Internet Visa	Personal communication	Easy, fast
Participant 23	Hotels	Good	No	Online search / evaluation / book online	Internet	Visa	Personal communication	Easy, fast convenient
Participant 24	Hotels	Good	No	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety, Pay in Cash	Easy, fast
Participant 25	Computer/ pc items	Good	Yes, family	Information search/ evaluation/ purchase	Internet	Internet Visa	Safety, personal communication, pay in cash	Fast convenient

NPE=no previous experience

Critical Decision Method Step Two

Step Two: Please recall the incident mentioned above as much as you can					
	Website	**Info Reliable**	**Info Confirmation**	**First Action**	**Decision Concerns**
Participant 1	Google	Yes	No	Discuss with family	No
Participant 2	Google	No	Yes	Discuss with family	No
Participant 3	Google	Yes	Yes	Discuss with family	No
Participant 4	Google	Yes	Yes	Discuss with family	No
Participant 5	Google	Yes	No	Decide my own	No
Participant 6	NPE	NPE	NPE	NPE	NPE
Participant 7	Google	Yes	Yes	Decide my own	Yes
Participant 8	Google	Yes	Yes	Discuss with family	No
Participant 9	NPE	NPE	NPE	NPE	NPE
Participant 10	NPE	NPE	NPE	NPE	NPE
Participant 11	Google	Yes	Yes	Discuss with family	No
Participant 12	Google	Yes	Yes	Discuss with family	No
Participant 13	Google	Yes	Yes	Discuss with family	No
Participant 14	NPE	NPE	NPE	NPE	NPE
Participant 15	Explorer	Yes	Yes	Discuss with family	Yes
Participant 16	Google	Yes	Yes	Discuss with family	No
Participant 17	Google	Yes	Yes	Discuss with family	No
Participant 18	Google	Yes	Yes	Decide my own	Yes
Participant 19	Google	Yes	No	Discuss with family	No
Participant 20	Google	Yes	No	Decide my own	No
Participant 21	Google	Yes	Yes	Discuss with family	No
Participant 22	Google	Yes	No	Discuss with family	No
Participant 23	Google	Yes	Yes	Discuss with family	No
Participant 24	Google	Yes	Yes	Decide my own	Yes
Participant 25	Google	Yes	Yes	Discuss with family	Yes

NPE=no previous experience

Critical Decision Method Step Three

Step Three: Incident retelling			
	IS concerns	**EOA concerns**	**Purchase concerns**
Participant 1	Offers	Price and quality	Payment/ Credit card
Participant 2	Availability	Good enough	Confirmation
Participant 3	Excited	Confidence	Confidence
Participant 4	Validity	Good enough	Risk
Participant 5	Stressed	Stressed	Stressed
Participant 6	NPE	NPE	NPE
Participant 7	Uncertain for info	Cheap and safety	Payment/ Credit card
Participant 8	Validity	Good enough	Risk
Participant 9	NPE	NPE	NPE
Participant 10	NPE	NPE	NPE
Participant 11	Availability	Good enough	Risk
Participant 12	Availability	Good enough	SSL
Participant 13	Availability	Good enough	SSL
Participant 14	NPE	NPE	NPE
Participant 15	Risk	Risk	Risk
Participant 16	Availability	Good enough	SSL
Participant 17	Availability	Good enough	SSL
Participant 18	Availability	Good enough	SSL
Participant 19	Offers	Price and quality	Payment/ Credit card
Participant 20	Confident	Good enough	Risk
Participant 21	Excited	Confidence	Confidence
Participant 22	Offers	Price and quality	Payment/ Credit card
Participant 23	Availability	Good enough	SSL
Participant 24	Availability	Good enough	SSL
Participant 25	Confident	Confidence	Risk

NPE=no previous experience

Critical Decision Method Step Four

Step Four: Time line verification and decision point identification		
	Happy	**Save Time/ Money**
Participant 1	Yes	Yes
Participant 2	Yes	Yes
Participant 3	Yes	Yes
Participant 4	Yes	Yes
Participant 5	Yes	Yes
Participant 6	NPE	NPE
Participant 7	Yes	Yes
Participant 8	Yes	Yes
Participant 9	NPE	NPE
Participant 10	NPE	NPE
Participant 11	Yes	Yes
Participant 12	Yes	Yes
Participant 13	Yes	Yes
Participant 14	NPE	NPE
Participant 15	Yes	Yes
Participant 16	Yes	Yes
Participant 17	Yes	Yes
Participant 18	Yes	Yes
Participant 19	Yes	Yes
Participant 20	Yes	Yes
Participant 21	Yes	Yes
Participant 22	Yes	Yes
Participant 23	Yes	Yes
Participant 24	Yes	Yes
Participant 25	Yes	Yes

NPE=no previous experience

Step Five: Progressive deepening / Critical Decision Method Probes													
	P. 1	**P. 2**	**P. 3**	**P. 4**	**P. 5**	**P.6**	**P. 7**	**P. 8**	**P. 9**	**P.10**	**P. 11**	**P. 12**	**P. 13**
Expect IS	Prices	Price and facilities	Price and quality	Price and location	Nice web presentation	NPE	Availability	Price and quality	NPE	NPE	Prices	Positive customer review	Price and facilities
Expect EOA	Avail. and cost	Avail. and cost	Price quality	Good alternative	Bedroom info	NPE	Avail. and cost	Good alternative	NPE	NPE	Good alternative	Positive customer review	Availability and cost
IS facilities	Yes, BB	No	No	Yes, BB	Yes, BB	NPE	Yes, BB	Yes, BB	NPE	NPE	Yes, BB	Yes, BB	No
EOA facilities	Yes, BB	Yes, BB	No	Yes, BB	Yes, BB	NPE	Yes, BB	Yes, BB	NPE	NPE	Yes, BB	Yes, BB	No
IS internet	Yes	Yes	Yes	Yes	No	NPE	Yes	Yes	NPE	NPE	Yes	Yes	Yes
EOA internet	Yes	Yes	Yes	Yes	No	NPE	No	Yes	NPE	NPE	Yes	Yes	Yes
IS uncertainty	No	Yes	Yes	Yes	No	NPE	Yes	Yes	NPE	NPE	Yes	No	No
EOA uncertainty	No	Yes	Yes	Yes	No	NPE	Yes	Yes	NPE	NPE	Yes	No	Yes
IS important info	Price	Tel confirm with hotel	Quality	Price	Price	NPE	Online presentation	Price	NPE	NPE	Price	Price	Price
EOA important info	Price	Tel confirm with hotel	Quality	Price	Price	NPE	Tel confirm with hotel	Price	NPE	NPE	Price	Price	Price
Info Usage	Yes	Yes	Yes	Yes	Yes	NPE	Yes	Yes	NPE	NPE	Yes	Yes	Yes
Info Evaluation	Yes	Yes	Yes	Yes	Yes	NPE	Yes	Yes	NPE	NPE	Yes	Yes	No
IS missing info	No	No	No	Yes	No	NPE	No	Yes	NPE	NPE	No	No	No
EOA missing info	No	No	No	No	No	NPE	No	No	NPE	NPE	No	No	No
IS difficulties	No	No	No	No	No	NPE	No	No	NPE	NPE	No	No	No
EOA difficulties	No	No	No	No	No	NPE	No	No	NPE	NPE	No	No	No

	P.14	**P.15**	**P. 16**	**P. 17**	**P. 18**	**P. 19**	**P. 20**	**P. 21**	**P. 22**	**P. 23**	**P. 24**	**P. 25**
Expect IS	NPE	Prices	Prices	Avail. and cost	Prices	Prices	Price and facilities	Price and Quality	Prices	Positive customer review	Prices	Avail. and cost
Expect EOA	NPE	Good alternative	Good alternative	Good alternative	Good alternative	Avail. and cost	Bedroom info	Price and Quality	Avail. and cost	Positive customer review	Good alternative	Avail. and cost
IS facilities	NPE	No	No	No	Yes, BB	Yes, BB	Yes, BB	No	Yes, BB	Yes, BB	Yes, BB	Yes, BB
EOA facilities	NPE	No	No	No	Yes, BB	Yes, BB	Yes, BB	No	Yes, BB	Yes, BB	Yes, BB	Yes, BB
IS internet	NPE	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
EOA internet	NPE	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IS uncertainty	NPE	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No
EOA uncertainty	NPE	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes	No
IS important info	NPE	Availability	Availability	Avail. and cost	Price	Price	Quality	Quality	Price	Price	Price	Avail. and cost
EOA important info	NPE	Availability	Availability	Avail. and cost	Price	Price	Quality	Quality	Price	Price	Price	Avail. and cost
Info Usage	NPE	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Info Evaluation	NPE	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
IS missing info	NPE	No	No	No	Yes	No	No	No	No	No	Yes	Yes
EOA missing info	NPE	No	No	No	Yes	No	No	No	No	No	Yes	Yes
IS difficulties	NPE	No	No	No	No	No	Yes	No	No	No	No	Yes
EOA difficulties	NPE	No	No	No	No	No	No	No	No	No	No	Yes

NPE=no previous experience

Step Six: What if / Expert Novice					
	Alternatives	**Other Webs**	**Expert Novice**	**Other Action**	**Confident**
Participant 1	Yes	Yes	Yes	Yes	Yes
Participant 2	Yes	Yes	No	Yes	Yes
Participant 3	Yes	Yes	No	Yes	Yes
Participant 4	No	Yes	No	No	Yes
Participant 5	No	Yes	No	Yes	Yes
Participant 6	NPE	NPE	NPE	NPE	NPE
Participant 7	Yes	Yes	Yes	No	Yes
Participant 8	No	Yes	No	No	Yes
Participant 9	NPE	NPE	NPE	NPE	NPE
Participant 10	NPE	NPE	NPE	NPE	NPE
Participant 11	No	Yes	No	No	Yes
Participant 12	Yes	Yes	Yes	No	Yes
Participant 13	Yes	No	No	No	Yes
Participant 14	NPE	NPE	NPE	NPE	NPE
Participant 15	Yes	Yes	Yes	Yes	Yes
Participant 16	Yes	Yes	Yes	No	Yes
Participant 17	No	No	Yes	No	Yes
Participant 18	Yes	Yes	Yes	Yes	Yes
Participant 19	Yes	Yes	Yes	Yes	Yes
Participant 20	Yes	Yes	No	Yes	Yes
Participant 21	Yes	Yes	No	Yes	Yes
Participant 22	Yes	Yes	Yes	Yes	Yes
Participant 23	Yes	Yes	Yes	No	Yes
Participant 24	Yes	Yes	Yes	Yes	Yes
Participant 25	Yes	Yes	Yes	Yes	Yes

APPENDIX 6 – SUS Analysis

GOLDEN BAY HOTEL WEBPAGE			PARTICIPANTS																									
	SUS CALCULATIONS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	Frequently	(x score) - 1	1	4	4	0	0	2	2	0	4	2	3	2	0	2	0	2	4	2	1	1	4	1	2	2	2	
2	Complex	5-(x score)	4	4	4	2	4	4	2	2	3	4	2	4	2	4	4	1	4	3	4	4	4	4	4	3	2	
3	Easy to use	(x score) - 1	3	0	4	2	2	3	0	2	4	3	2	4	2	3	0	0	4	4	3	3	4	3	4	4	2	
4	Support of a technical person	5-(x score)	4	0	4	3	4	4	4	3	3	4	4	4	0	4	4	0	0	4	4	4	4	4	4	4	1	
5	Well integrated	(x score) - 1	3	4	4	2	0	1	3	2	4	2	3	3	2	2	0	3	4	1	3	3	4	3	3	1	2	
6	Inconsistency	5-(x score)	1	4	4	2	4	2	1	2	3	4	2	4	0	4	4	1	4	2	1	1	4	1	4	2	2	
7	Easy learning	(x score) - 1	4	1	4	3	0	2	3	3	4	4	2	4	2	4	0	1	4	2	4	4	4	4	4	2	3	
8	Cumbersome	5-(x score)	3	0	4	2	4	4	4	2	3	2	2	4	2	2	4	0	0	2	3	3	4	3	4	2	2	
9	Confident	(x score) - 1	3	0	3	2	0	2	4	2	4	4	3	4	2	4	0	3	4	2	3	3	3	3	4	2	2	
10	Learn a lot	5-(x score)	4	3	4	4	4	3	3	4	3	2	4	4	4	2	4	0	4	0	4	4	4	4	4	0	2	**Av.**
	Total	**x 2,5**	**68**	**45**	**88**	**50**	**50**	**61**	**59**	**50**	**79**	**70**	**61**	**83**	**36**	**70**	**45**	**25**	**72**	**50**	**68**	**68**	**88**	**68**	**83**	**50**	**45**	**61**

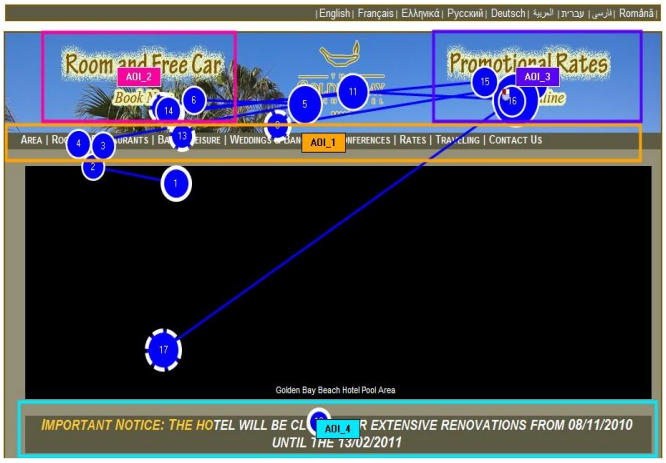
LIMASSOL AMATHUS HOTEL WEBPAGE			PARTICIPANTS																									
	SUS CALCULATIONS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	Frequently	(x score) - 1	4	1	4	3	4	3	0	3	4	4	3	4	4	4	4	2	4	4	4	4	4	4	4	4	2	
2	Complex	5-(x score)	3	4	4	2	1	4	0	2	3	4	1	4	2	4	4	1	4	4	3	3	4	3	4	4	2	
3	Easy to use	(x score) - 1	2	0	4	2	4	3	0	2	4	3	3	4	4	3	3	0	4	4	2	2	4	2	4	4	2	
4	Support of a technical person	5-(x score)	4	0	4	3	4	4	4	3	3	4	4	4	0	4	4	0	0	4	4	4	4	4	4	4	1	
5	Well integrated	(x score) - 1	3	3	4	2	3	3	2	2	4	2	3	3	4	2	4	3	4	1	3	3	4	3	3	1	2	
6	Inconsistency	5-(x score)	2	4	4	2	1	3	0	2	3	4	3	4	2	4	4	1	4	2	2	2	4	2	4	2	2	
7	Easy learning	(x score) - 1	4	0	4	3	3	3	2	3	4	4	3	4	4	4	4	1	4	4	4	4	4	4	4	4	3	
8	Cumbersome	5-(x score)	3	0	4	2	0	4	4	2	3	2	2	4	4	2	4	0	0	2	3	3	4	3	4	2	2	
9	Confident	(x score) - 1	3	0	3	2	3	3	3	2	4	4	3	4	4	4	4	1	4	4	3	3	3	3	4	4	2	
10	Learn a lot	5-(x score)	4	3	4	4	4	3	3	4	3	2	4	4	4	2	4	0	4	0	4	4	4	4	4	0	2	**Av.**
	Total	**x 2,5**	**72**	**34**	**88**	**56**	**61**	**74**	**41**	**56**	**79**	**74**	**65**	**88**	**72**	**74**	**88**	**20**	**72**	**65**	**72**	**72**	**88**	**72**	**88**	**65**	**45**	**67,2**

PAPHOS AMATHUS HOTEL WEBPAGE	P A R T I C I P A N T S													
	SUS CALCULATIONS		1	2	3	4	5	6	7	8	9	10	11	12
1	Frequently	(x score) - 1	4	3	3	3	3	2	3	3	4	0	3	4
2	Complex	5-(x score)	4	4	4	2	2	4	3	2	3	4	1	4
3	Easy to use	(x score) - 1	2	0	4	2	4	3	0	2	4	0	3	4
4	Support of a technical person	5-(x score)	4	0	4	3	4	4	4	3	3	4	4	4
5	Well integrated	(x score) - 1	3	4	4	2	3	2	3	2	4	0	3	3
6	Inconsistency	5-(x score)	2	4	4	2	1	2	1	2	3	4	3	4
7	Easy learning	(x score) - 1	4	1	4	3	3	2	3	3	4	0	3	4
8	Cumbersome	5-(x score)	3	0	4	2	1	4	4	2	3	4	2	4
9	Confident	(x score) - 1	3	0	3	2	3	2	4	2	4	0	3	4
10	Learn a lot	5-(x score)	4	3	4	4	4	3	3	4	3	4	4	4
	Total	**x 2,5**	**74**	**43**	**86**	**56**	**63**	**63**	**63**	**56**	**79**	**45**	**65**	**88**

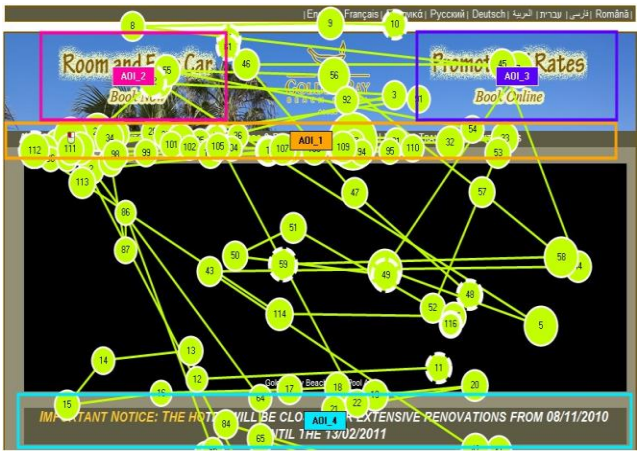
	SUS CALCULATIONS		13	14	15	16	17	18	19	20	21	22	23	24	25	
1	Frequently	(x score) - 1	2	0	4	2	4	4	4	4	3	4	4	4	2	
2	Complex	5-(x score)	0	4	4	1	4	4	4	4	4	4	4	4	2	
3	Easy to use	(x score) - 1	4	0	3	0	4	4	2	2	4	2	4	4	2	
4	Support of a technical person	5-(x score)	1	4	4	0	0	4	4	4	4	4	4	4	1	
5	Well integrated	(x score) - 1	2	0	4	3	4	1	3	3	4	3	3	1	2	
6	Inconsistency	5-(x score)	2	4	4	1	4	2	2	2	4	2	4	2	2	
7	Easy learning	(x score) - 1	0	0	4	1	4	4	4	4	4	4	4	4	3	
8	Cumbersome	5-(x score)	4	4	4	0	0	2	3	3	4	3	4	2	2	
9	Confident	(x score) - 1	4	0	4	1	4	4	3	3	3	3	4	4	2	
10	Learn a lot	5-(x score)	2	4	4	0	4	0	4	4	4	4	4	0	2	**Av.**
	Total	**x 2,5**	**47**	**45**	**88**	**20**	**72**	**65**	**74**	**74**	**86**	**74**	**88**	**65**	**45**	**65**

APPENDIX 7 – Gaze Plots Results of Main Study

Participant 1: Golden Bay – Home page



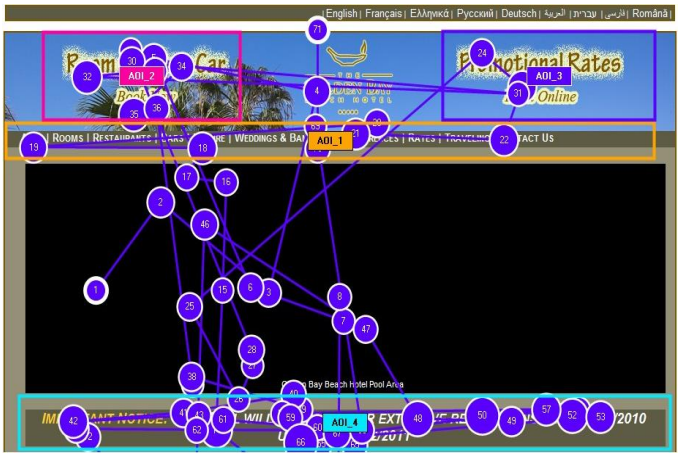
Participant 2: Golden Bay – Home page



Participant 3: Golden Bay – Home page

Participant 4: Golden Bay – Home page

Participant 5: Golden Bay – Home page



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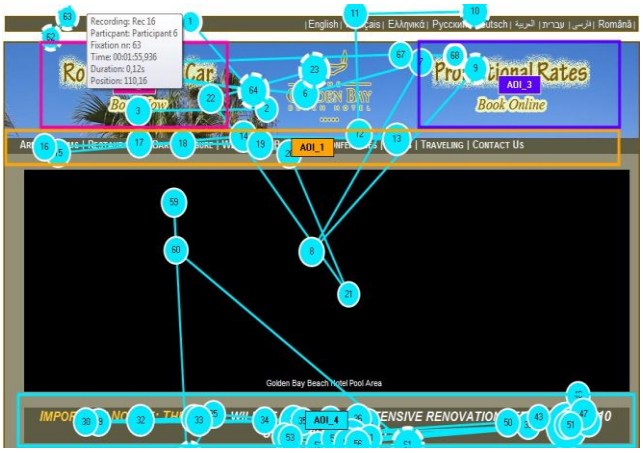

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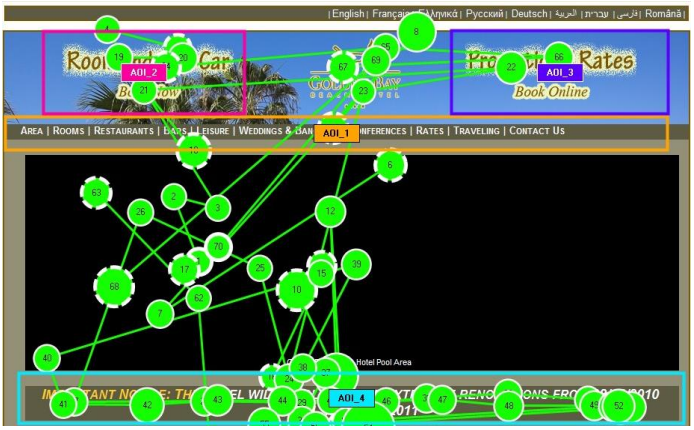

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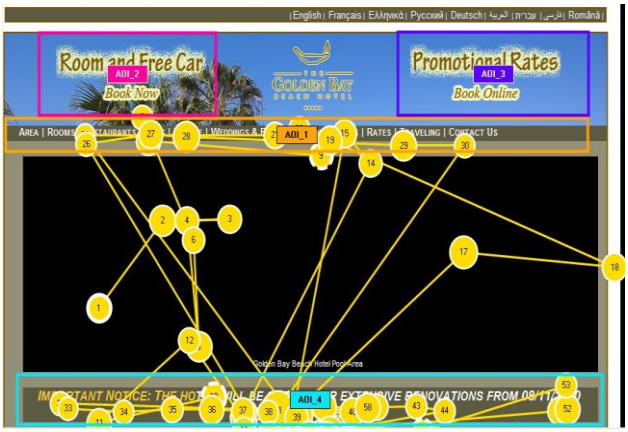
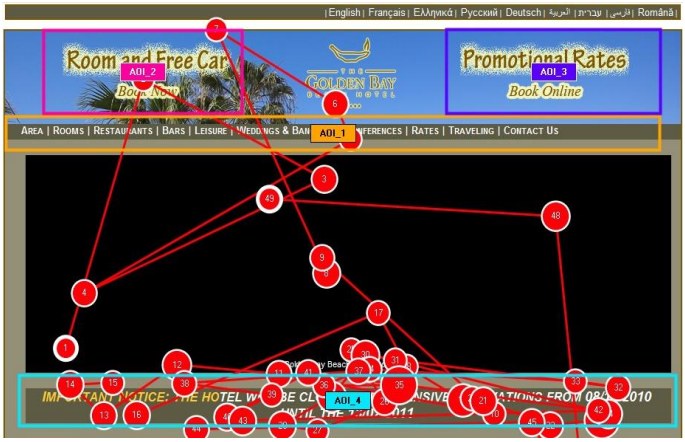
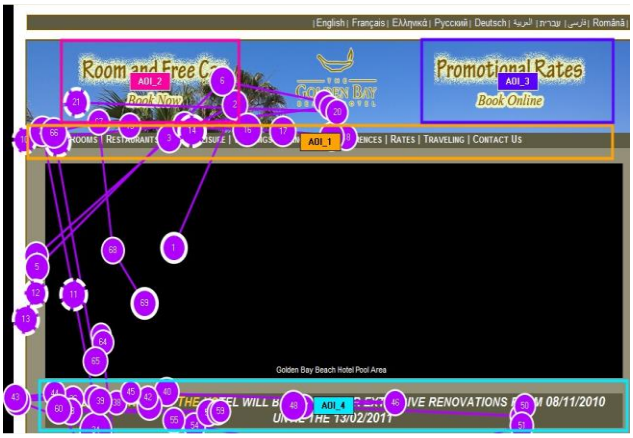


Participant 9: Golden Bay – Home page

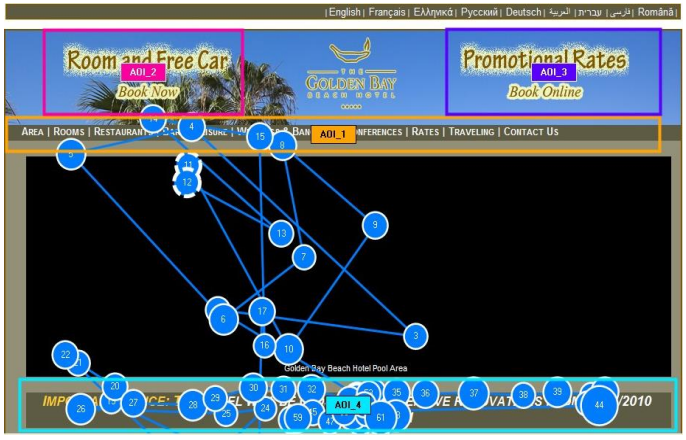
Participant 10: Golden Bay – Home page

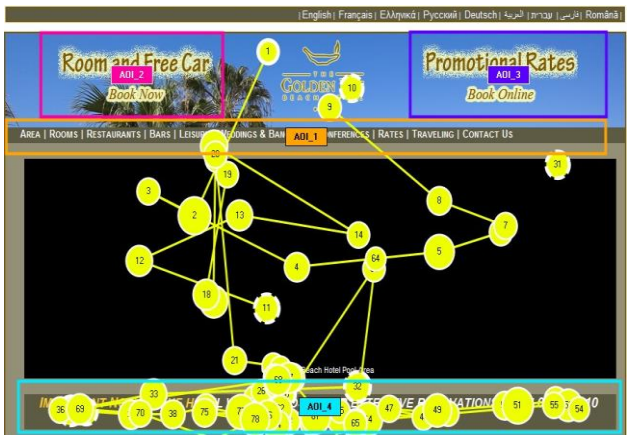




Participant 11: Golden Bay – Home page

Participant 12: Golden Bay – Home page





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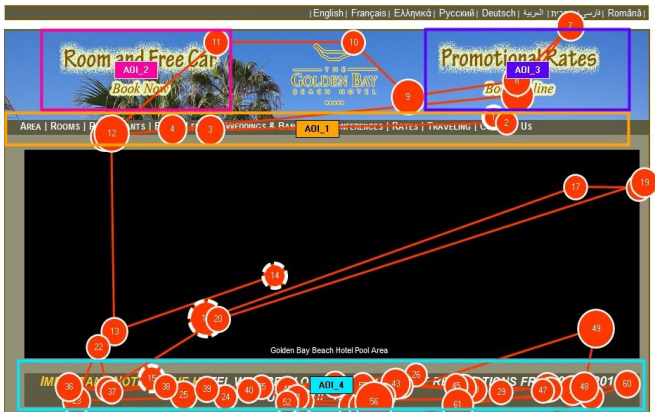

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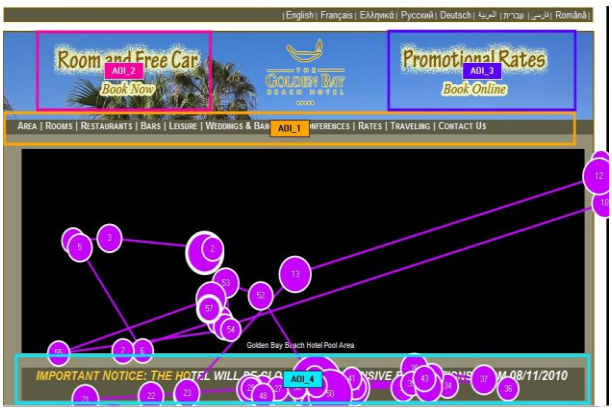

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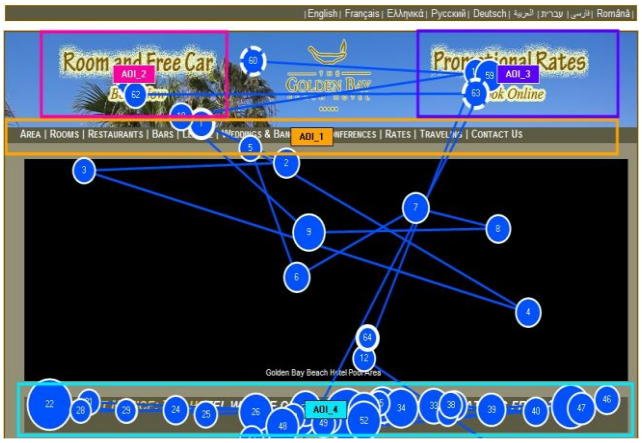

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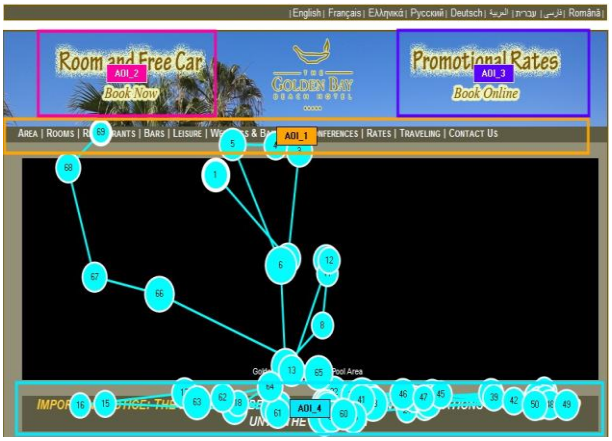

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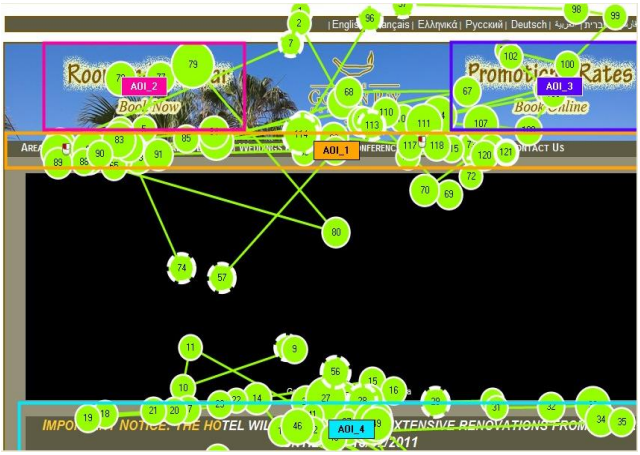
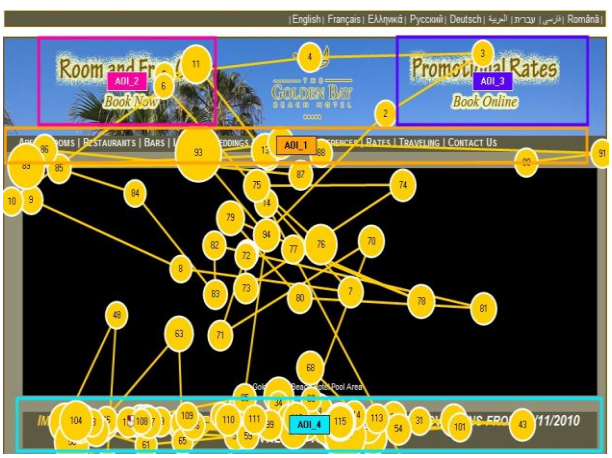


Participant 18: Golden Bay–Home page



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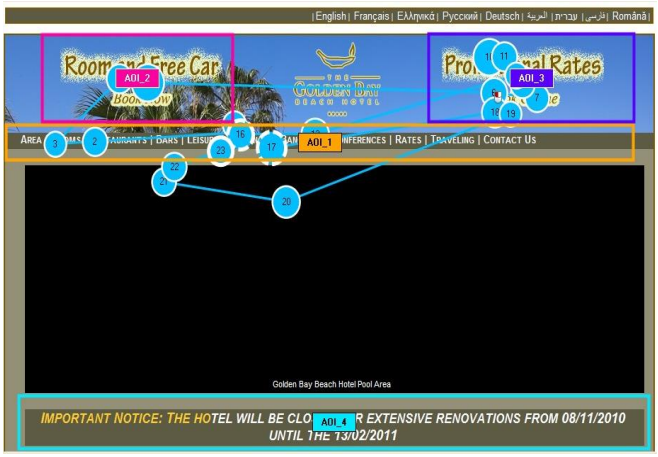

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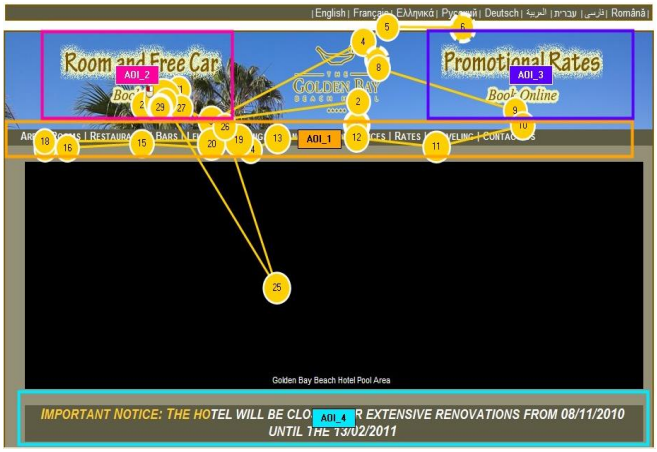

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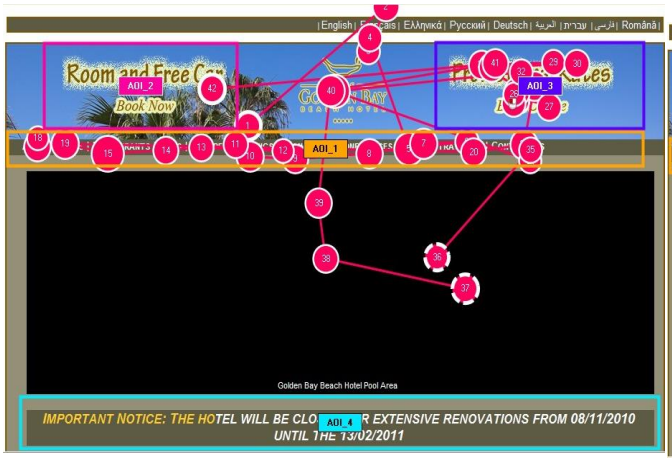

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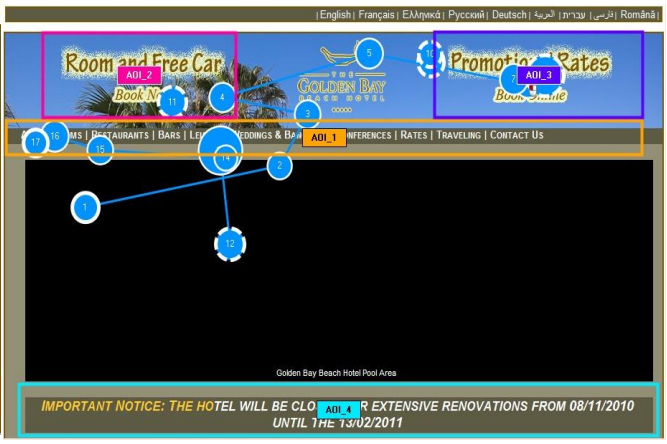

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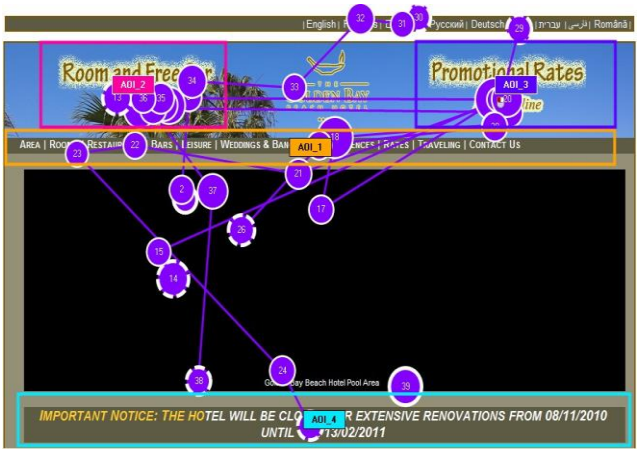

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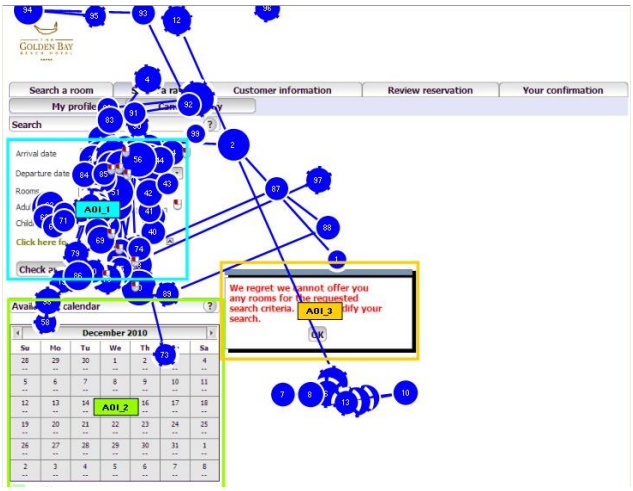

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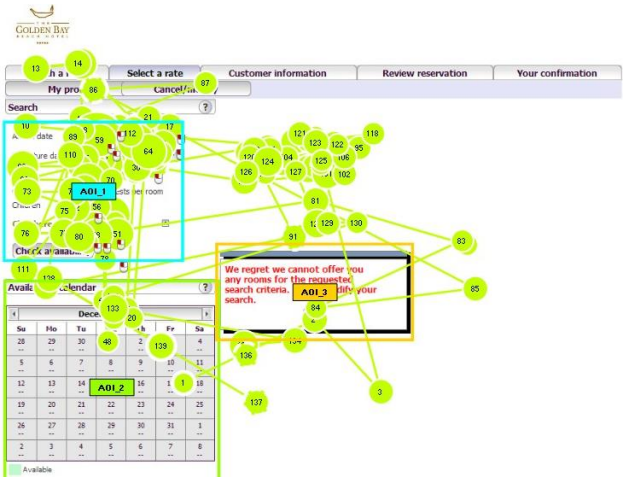

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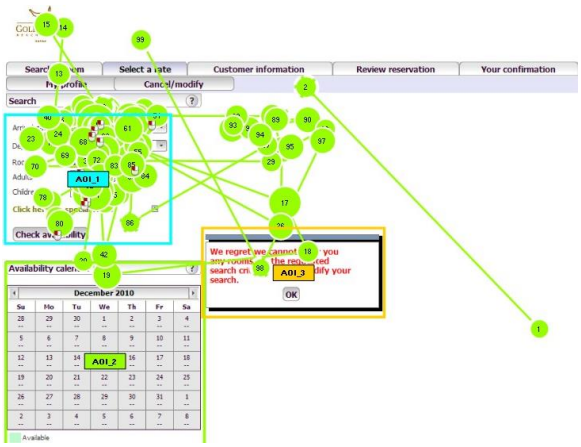

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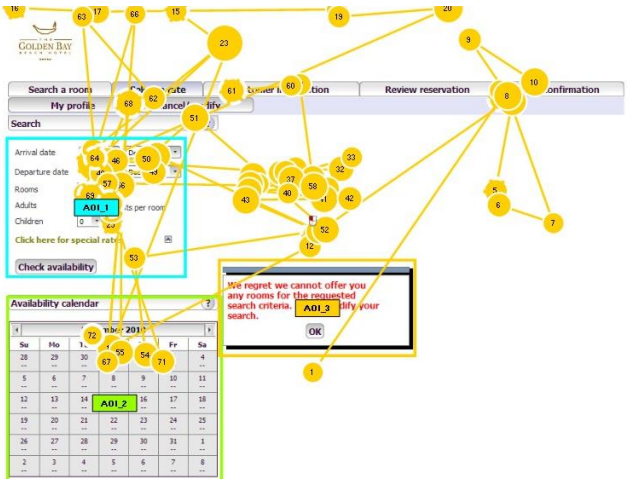

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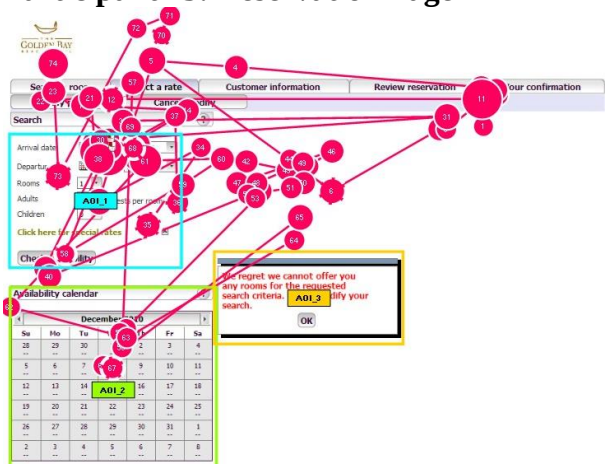
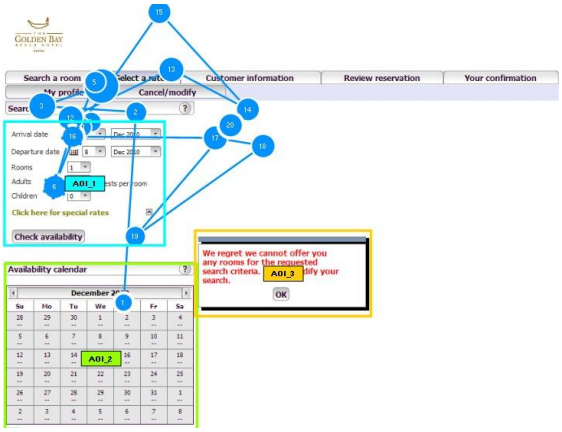
Participant 23: Reservation Page





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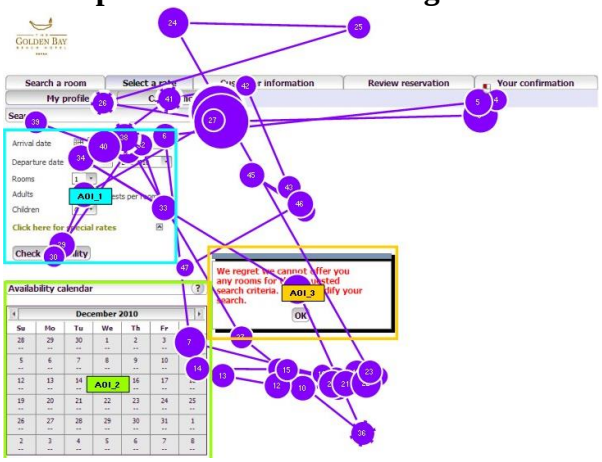

Participant 2: Home page

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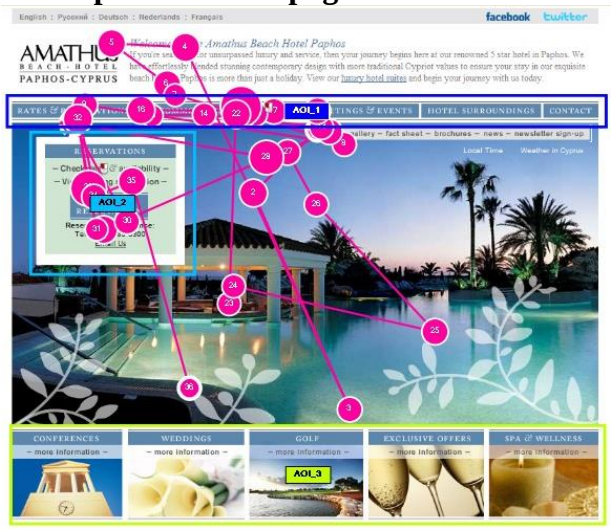
Participant 4: Home page



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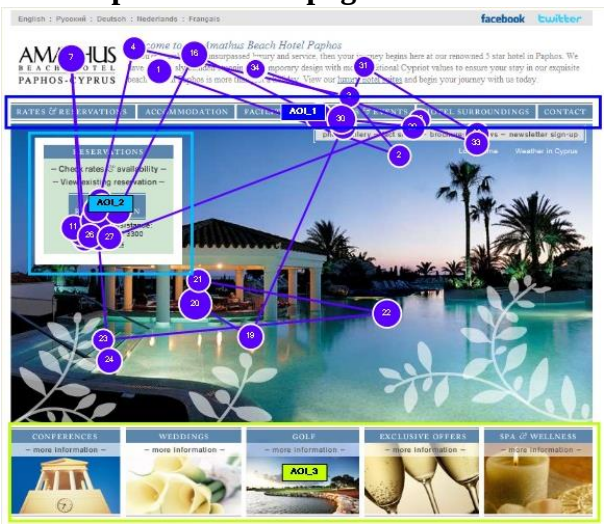

Participant 7: Home page

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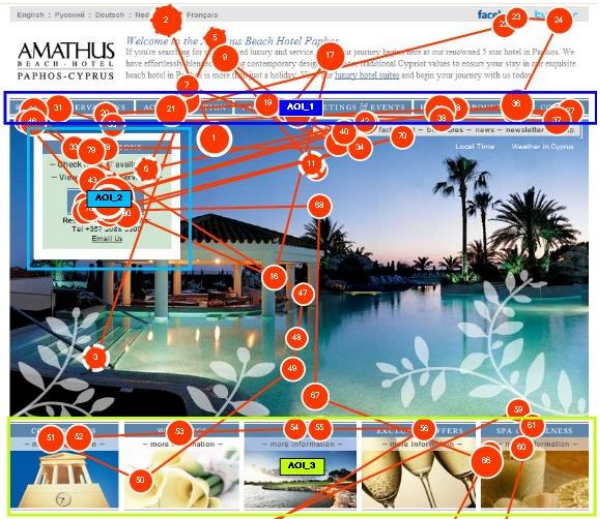
Participant 12: Home page

Participant 13: Home page



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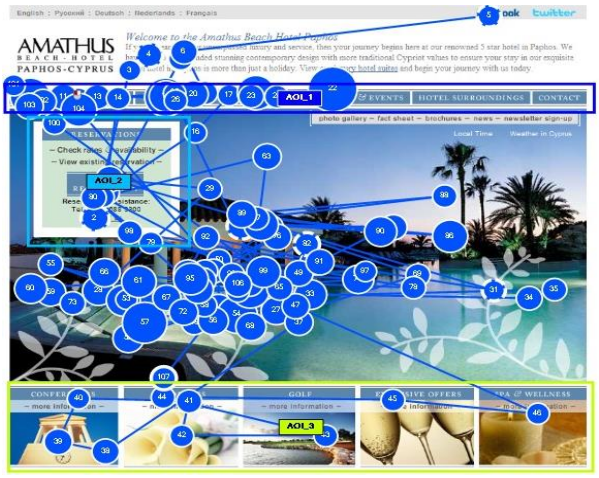


Participant 16: Home page

Participant 17: Home page

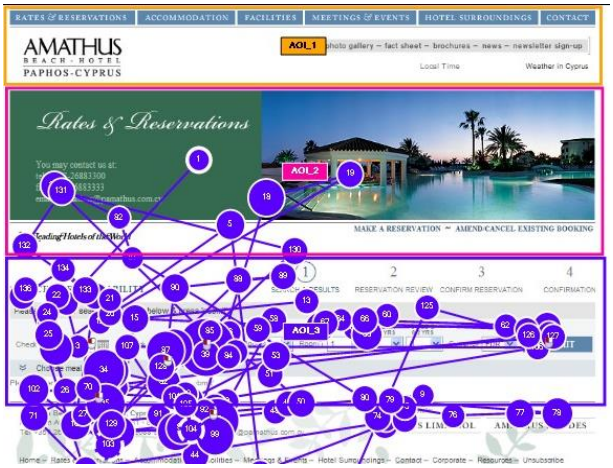
Participant 18: Paphos Amathus – Home page

Participant 2: Reservation Page

Participant 3: Reservation Page

Participant 4: Reservation Page

Participant 5: Reservation Page



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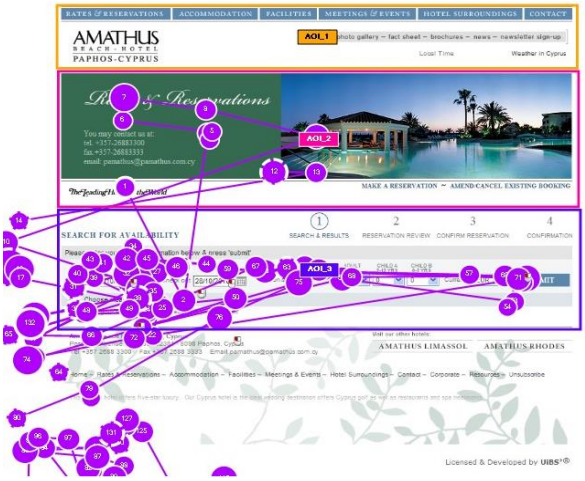

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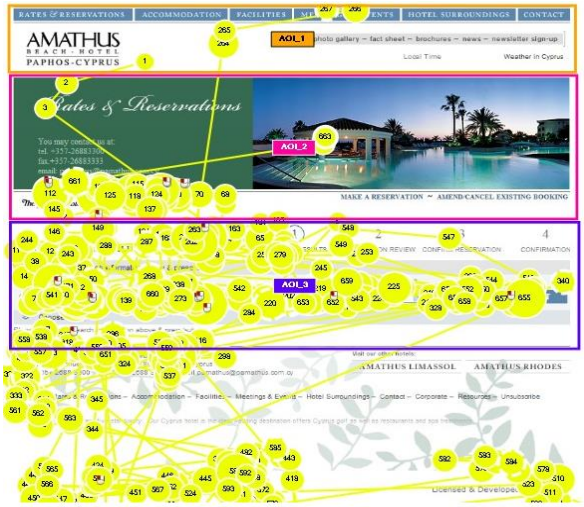

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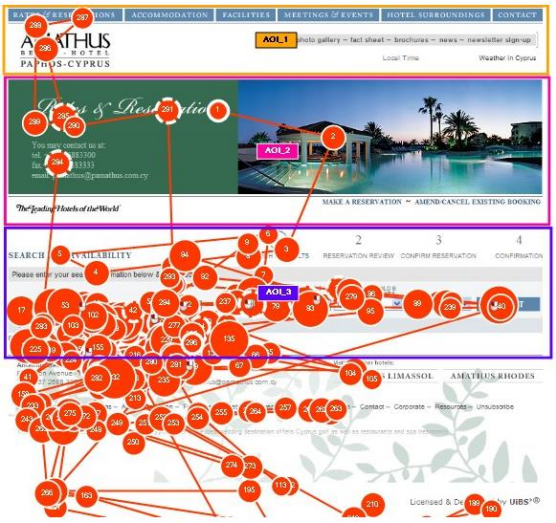

Participant 14: Reservation Page

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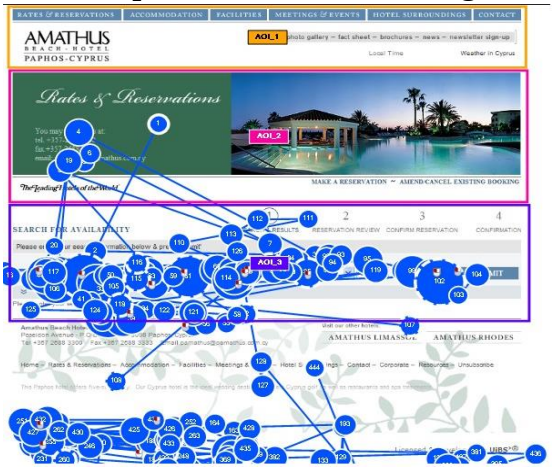

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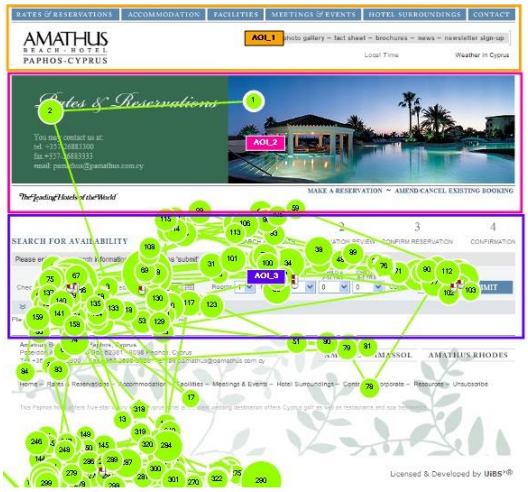

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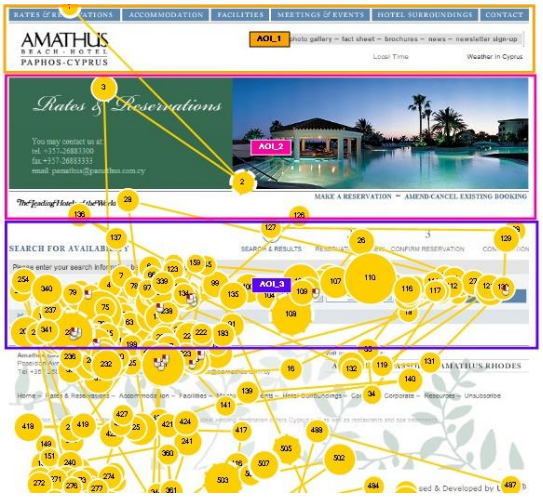
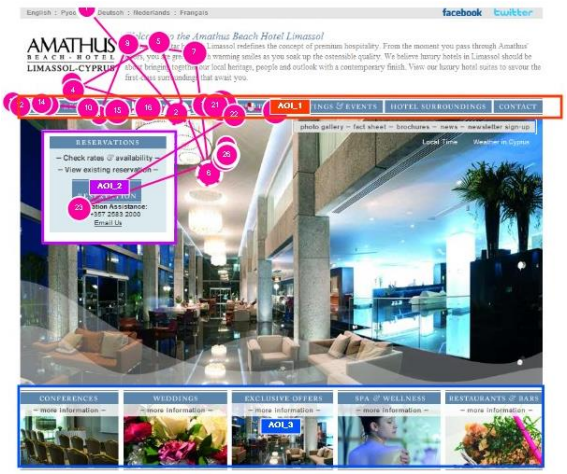


Participant 1: Home page

Participant 2: Home page

Participant 3: Home page

Participant 4: Home page



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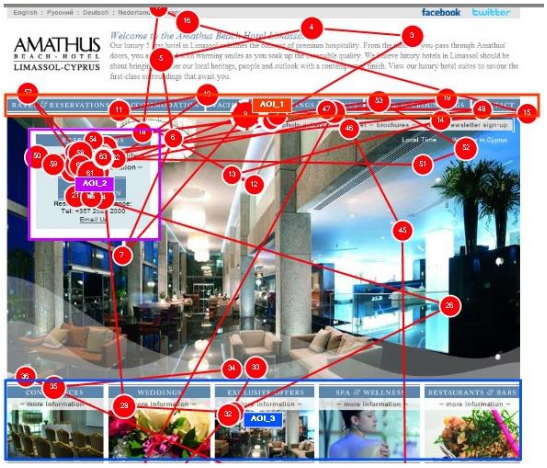
Participant 6: Home page

Participant 7: Home page

Participant 8: Home page

Participant 9: Home page



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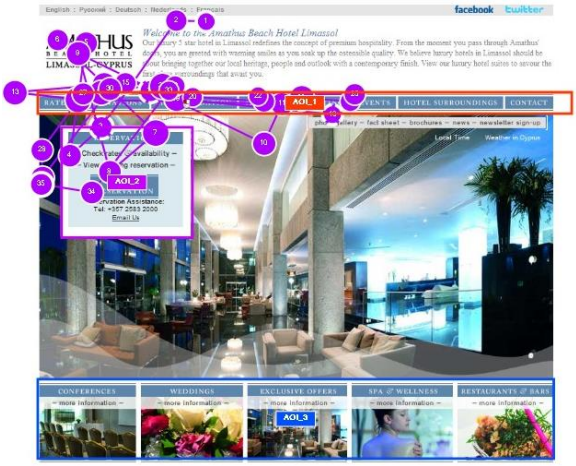

Participant 11: Home page

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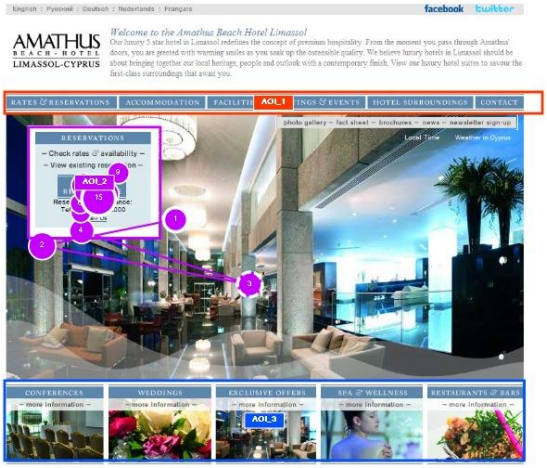
Participant 13: Home page

Participant 14: Home page



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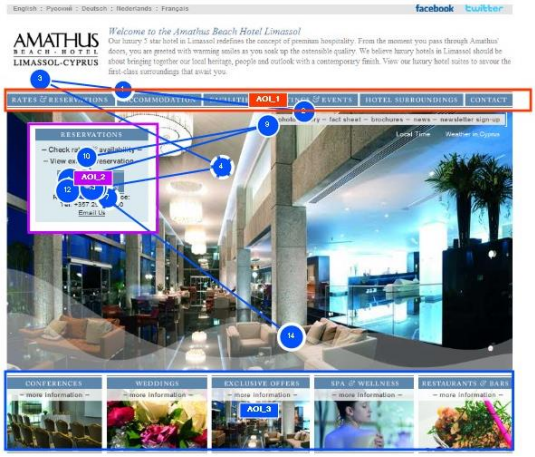


Participant 16: Home page

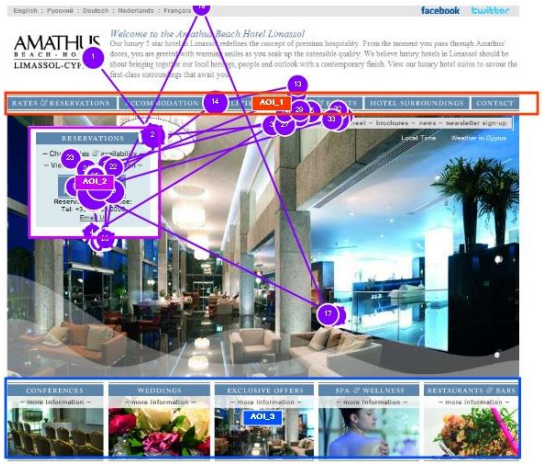
Participant 17: Home page

Participant 18: Home page

Participant 20: Home page

Participant 23: Home page

Participant 24: Home page



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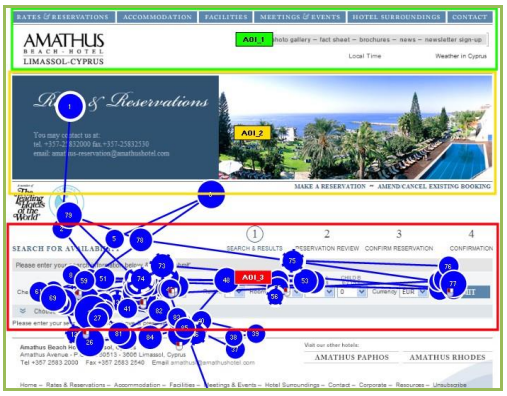
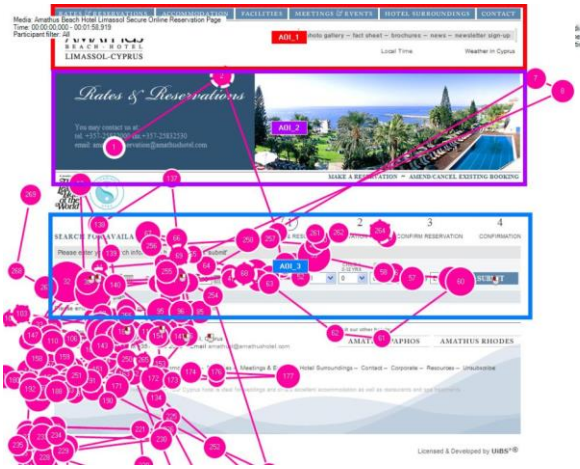
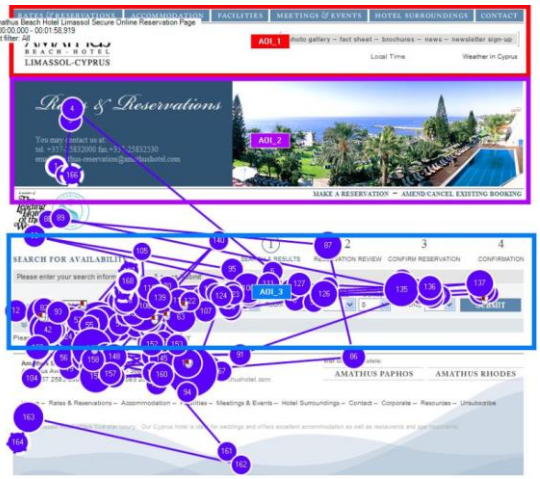


Participant 2: Reservation Page

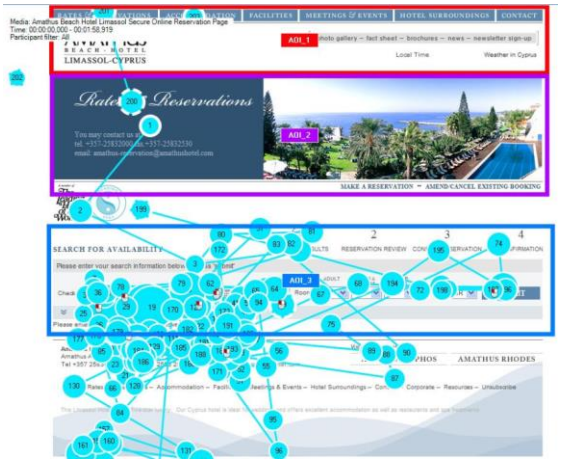
Participant 4: Reservation Page



Participant 5: Reservation Page

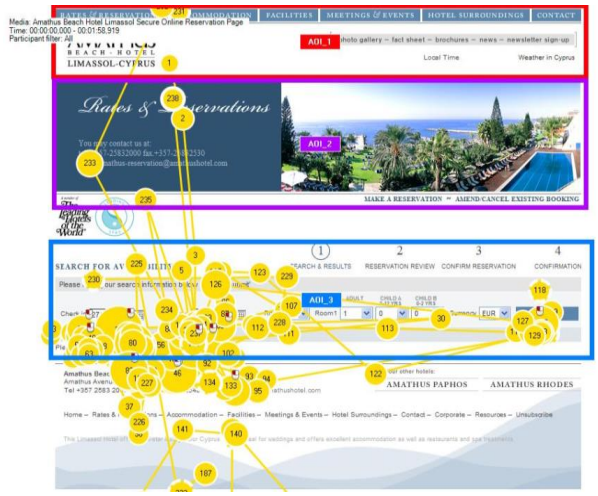


Participant 6: Reservation Page



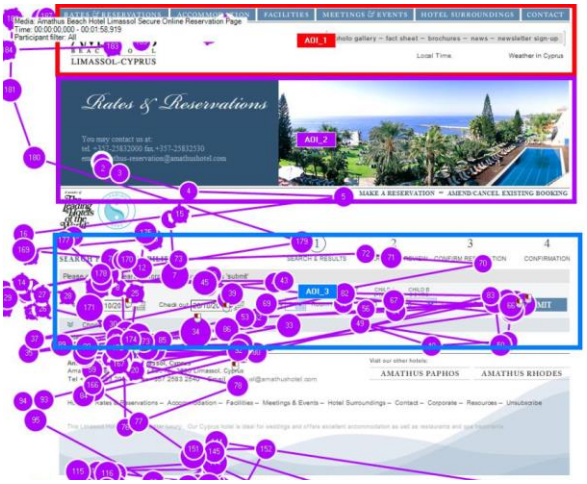
Participant 7: Reservation Page

Participant 8: Reservation Page

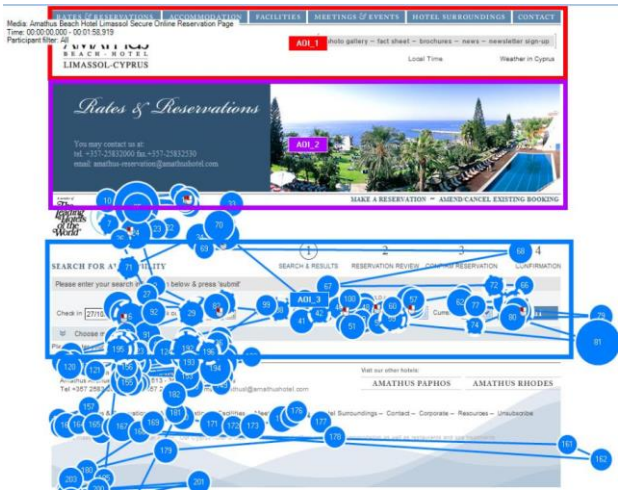


Participant 9: Reservation Page

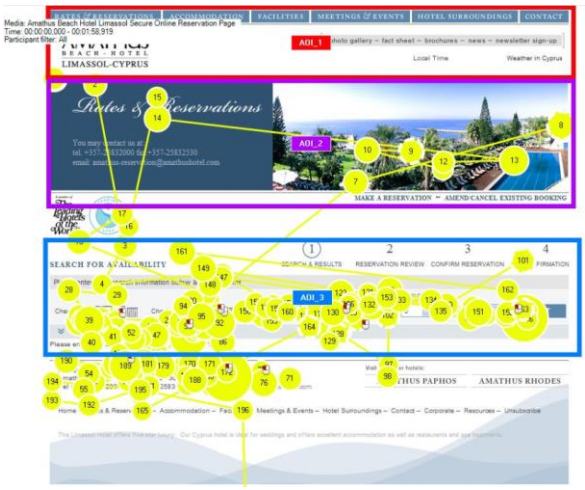
Participant 10: Reservation Page



Participant 11: Reservation Page

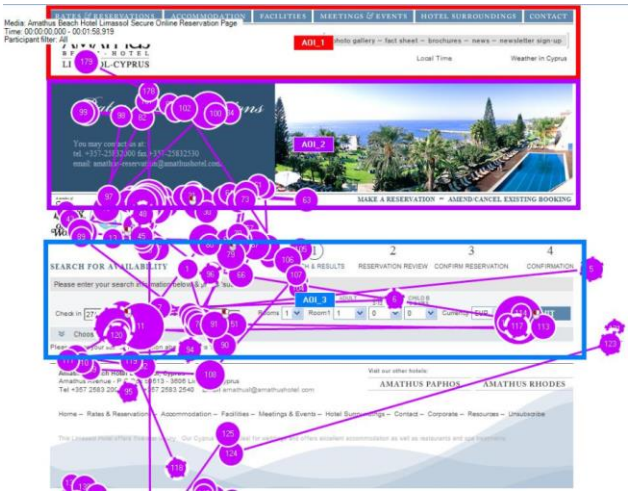


Participant 12: Reservation Page

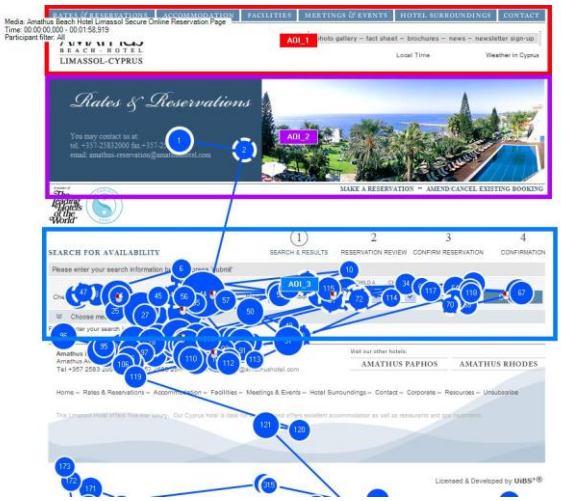


Participant 13: Reservation Page

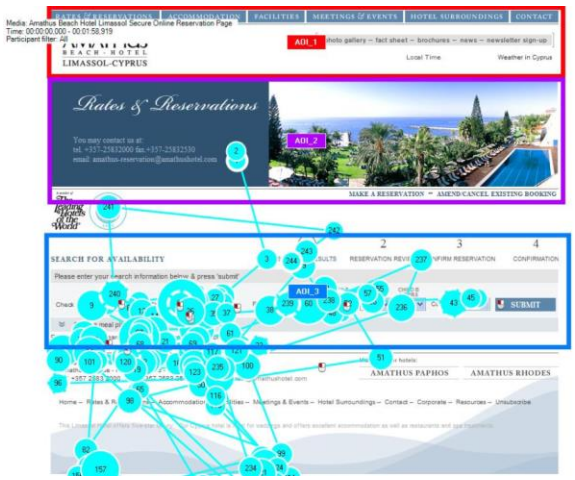
Participant 14: Reservation Page



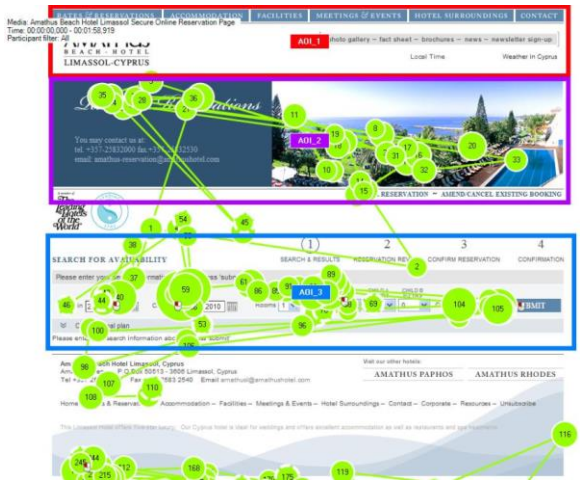
Participant 15: Reservation Page



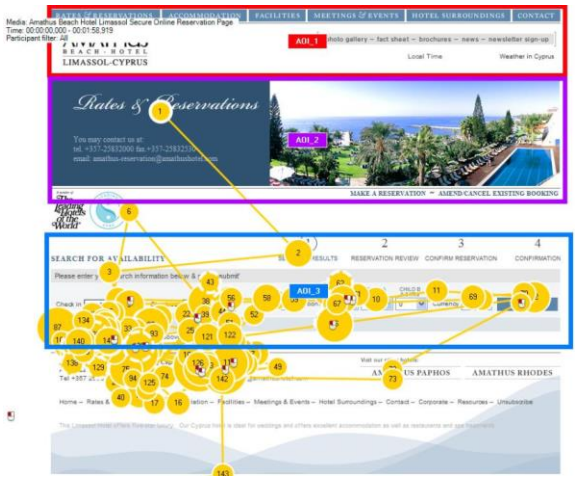
Participant 16: Reservation Page



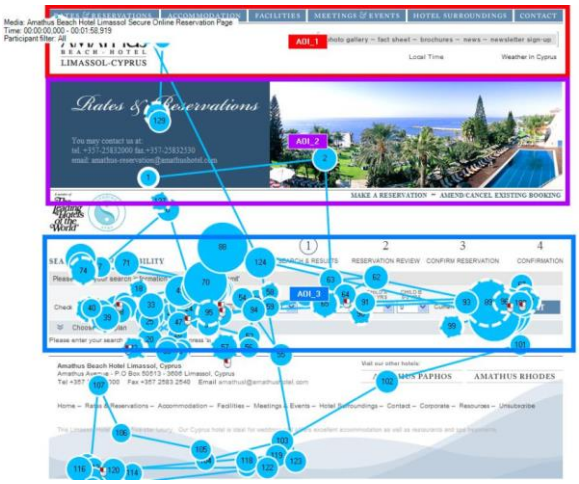
Participant 17: Reservation Page



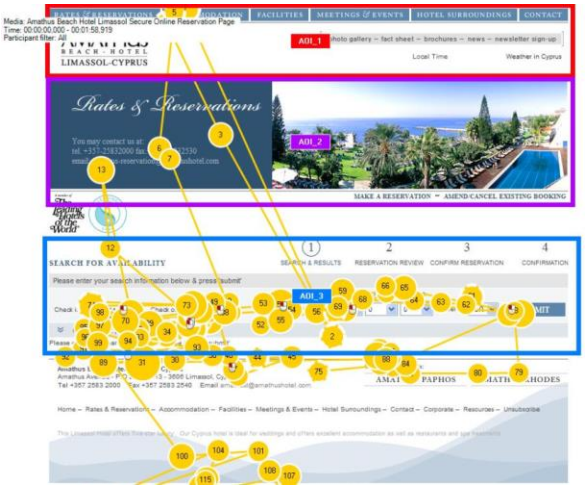
Participant 18: Reservation Page



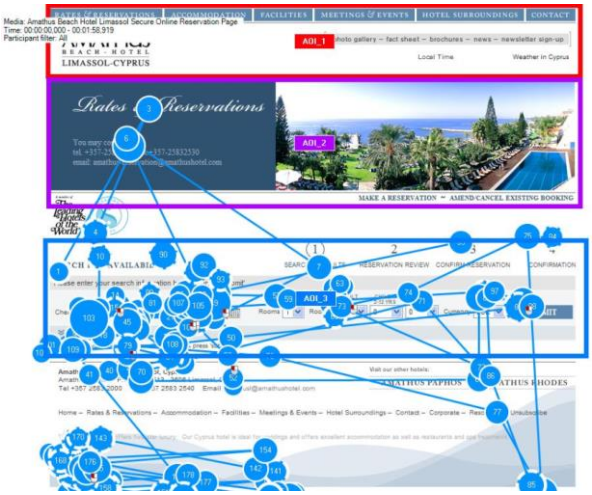
Participant 20: Reservation Page



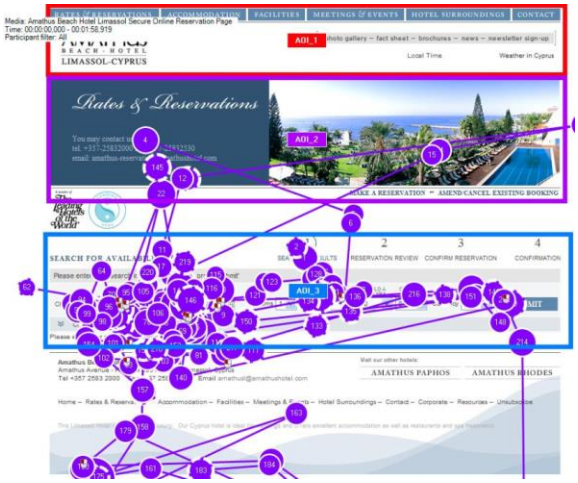
Participant 22: Reservation Page



Participant 23: Reservation Page



Participant 24: Reservation Page



APPENDIX 8 – Hotels' Websites Eye Tracking Statistics

GOLDEN BAY - HOME PAGE

TIME TO 1ST FIXATION	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21	P.22	P.23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	3	0	0	0	**0,39**
AOI_1	1	0		1	4	3	3	2	2	1	0	4	0		0	1	1	2	0	2	1	5	6	**1,79**
AOI_2	1	1	23		1	0	1		1	0			3		17		1	1	0	9	11	1	1	**4,20**
AOI_3	2	2	24		5	1	9						1		3		17	0	1	6	5	1	3	**5,43**
AOI_4	6	5	3	5	2	6	5	2	3	7	0	6	5	4	4	4	3	6					8	**4,41**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
Max	6	5	24	5	5	6	9	2	3	7	0	6	5	4	17	4	17	6	3	9	11	5	8	
Sum	10	8	50	7	12	10	18	4	5	8	1	10	10	4	24	4	22	10	5	20	17	7	17	
Mean	2	2	12	2	2	2	4	1	1	2	0	3	2	2	5	1	4	2	1	5	4	2	3	
Median	1	1	13	1	2	1	3	2	1	0	0	4	2	2	3	1	1	1	1	4	3	1	3	
Stddev	2	2	13	3	2	2	4	1	1	4	0	3	2	3	7	2	7	3	2	3	5	2	3	

FIXATION LENGTH	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21	P.22	P.23	AV.
Not on AOI	2	18	9	6	4	4	12	7	4	8	4	8	5	8	5	4	14	13	1	2	2	2	4	**6,36**
AOI_1	1	12	0	1	2	2	0	2	0	3	1	0	2	0	0	1	12	2	2	3	4	2	1	**2,33**
AOI_2	1	1	0	0	2	1	1	0	0	1	0	0	0	0	0	0	2	1	1	2	0	1	4	**0,77**
AOI_3	2	1	0	0	1	0	1	0	0	0	0	0	1	0	1	0	2	0	2	0	2	1	2	**0,69**
AOI_4	0	2	14	3	7	9	7	5	5	4	9	10	9	9	10	13	6	31	0	0	0	0	0	**6,69**
Min	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
Max	2	18	14	6	7	9	12	7	5	8	9	10	9	9	10	13	14	31	2	3	4	2	4	
Sum	5	34	24	11	15	16	21	15	10	16	13	19	17	17	17	18	35	47	5	6	10	5	12	
Mean	1	7	5	2	3	3	4	3	2	3	3	4	3	3	3	4	7	9	1	1	2	1	2	
Median	1	2	0	1	2	2	1	2	0	3	1	0	2	0	1	1	6	2	1	2	2	1	2	
Stddev	1	8	7	3	2	3	5	3	3	3	4	5	4	5	4	5	6	13	1	1	2	1	2	

OBSERVATION LENGTH	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21	P.22	P.23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	1	12	0	1	2	2	1	2	0	3	1	0	2	0	0	1	13	2	2	3	4	2	1	**2,47**
AOI_2	1	1	0	0	2	1	2	0	1	1	0	0	0	0	0	0	2	1	1	2	0	1	4	**0,92**
AOI_3	2	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	2	0	2	0	2	1	2	**0,73**
AOI_4	0	2	20	26	7	10	8	5	14	4	9	11	9	9	10	13	6	31	0	0	0	0	1	**8,48**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	2	12	20	26	7	10	8	5	14	4	9	11	9	9	10	13	13	31	2	3	4	2	4	
Sum	4	17	21	27	11	14	11	8	14	9	10	11	12	9	12	14	22	35	5	5	7	4	8	
Mean	1	3	4	5	2	3	2	2	3	2	2	2	2	2	2	3	4	7	1	1	1	1	2	
Median	1	1	0	0	2	1	1	0	0	1	0	0	1	0	0	0	2	1	1	0	0	1	1	
Stddev	1	5	9	11	3	4	3	2	6	2	4	5	4	4	4	6	5	14	1	1	2	1	1	

OBSERVATION COUNT	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21	P.22	P.23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	3	9	0	1	2	1	1	4	1	4	3	1	2	0	2	2	13	5	4	3	2	2	3	**2,96**
AOI_2	3	5	1	0	3	3	3	0	1	4	0	0	1	0	1	0	2	2	1	2	1	2	3	**1,65**
AOI_3	2	3	1	0	2	3	2	0	0	0	0	0	2	0	3	0	4	1	2	1	2	1	4	**1,43**
AOI_4	1	6	10	6	5	2	6	7	10	4	3	6	5	4	2	1	5	8	0	0	0	0	1	**4,00**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	3	9	10	6	5	3	6	7	10	4	3	6	5	4	3	2	13	8	4	3	2	2	4	
Sum	9	23	12	7	12	9	12	11	12	12	6	7	10	4	8	3	24	16	7	6	5	5	11	
Mean	2	5	2	1	2	2	2	2	2	2	1	1	2	1	2	1	5	3	1	1	1	1	2	
Median	2	5	1	0	2	2	2	0	1	4	0	0	2	0	2	0	4	2	1	1	1	1	3	
Stddev	1	3	4	3	2	1	2	3	4	2	2	3	2	2	1	1	5	3	2	1	1	1	2	

MOUSE CLICK COUNT	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	P.11	P.12	P.13	P.14	P.15	P.16	P.17	P.18	P.19	P.20	P.21	P.22	P.23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,0**
AOI_1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	**0,3**
AOI_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**0,0**
AOI_3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	**0,2**
AOI_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	**0,1**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	1	1	1	1	
Sum	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	1	1	1	1	
Mean	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	
Median	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stddev	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	

PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3	AOI_4	AV.
goldenbay.com.cy/	100%	91%	74%	65%	83%	83%

GOLDEN BAY -RESERVATION PAGE

TIME TO 1ST FIXATION	P. 1	P. 2	P. 17	P. 20	P. 21	P. 22	P. 23	P. 24	AV.
Not on AOI	0	0	0	0	0	0	0	2	**0,3**
AOI_1	1	2	2		80	5	2	10	**14,5**
AOI_2	24	0	5		12	91	0	11	**20,3**
AOI_3		0	5					22	**9,1**
Min	0	0	0	0	0	0	0	2	
Max	24	2	5	0	80	91	2	22	
Sum	24	2	11	0	92	96	2	45	
Mean	8	1	3	0	31	32	1	11	
Median	1	0	3	0	12	5	0	11	
Stddev	14	1	3		43	51	1	8	

FIXATION LENGTH	P. 1	P. 2	P. 17	P. 20	P. 21	P. 22	P. 23	P. 24	AV.
Not on AOI	8	12	7	0	10	9	4	16	**8,3**
AOI_1	19	22	16	0	4	5	1	3	**8,8**
AOI_2	1	2	0	0	1	1	0	1	**0,7**
AOI_3	0	0	0	0	0	0	0	1	**0,2**
Min	0	0	0	0	0	0	0	1	
Max	19	22	16	0	10	9	4	16	
Sum	28	36	24	0	16	16	5	20	
Mean	7	9	6	0	4	4	1	5	
Median	5	7	4	0	3	3	1	2	
Stddev	9	10	8		5	4	2	7	

OBSERVATION LENGTH	P. 1	P. 2	P. 17	P. 20	P. 21	P. 22	P. 23	P. 24	AV.
Not on AOI	0	0	0	0	0	0	0	0	**0,0**
AOI_1	22	23	19	0	13	7	17	64	**20,5**
AOI_2	2	2	0	0	6	5	0	1	**2,0**
AOI_3	0	0	1	0	0	0	0	1	**0,3**
Min	0	0	0	0	0	0	0	0	
Max	22	23	19	0	13	7	17	64	
Sum	23	25	20	0	19	12	17	66	
Mean	6	6	5	0	5	3	4	16	
Median	1	1	1	0	3	3	0	1	
Stddev	11	11	9		6	4	8	32	

OBSERVATION COUNT	P. 1	P. 2	P. 17	P. 20	P. 21	P. 22	P. 23	P. 24	AV.
Not on AOI	0	0	0	0	0	0	0	0	**0,0**
AOI_1	7	7	8	0	7	9	4	4	**5,8**
AOI_2	3	6	1	0	4	3	1	2	**2,5**
AOI_3	0	2	2	0	0	0	0	2	**0,8**
Min	0	0	0	0	0	0	0	0	
Max	7	7	8	0	7	9	4	4	
Sum	10	15	11	0	11	12	5	8	
Mean	3	4	3	0	3	3	1	2	
Median	2	4	2	0	2	2	1	2	
Stddev	3	3	4		3	4	2	2	

MOUSE CLICK COUNT	P. 1	P. 2	P. 17	P. 20	P. 21	P. 22	P. 23	P. 24	AV.
Not on AOI	0	0	0	0	0	0	0	0	**0,0**
AOI_1	10	12	10	0	0	2	0	0	**4,3**
AOI_2	0	0	0	0	0	0	0	0	**0,0**
AOI_3	0	0	0	0	0	0	0	0	**0,0**
Min	0	0	0	0	0	0	0	0	
Max	10	12	10	0	0	2	0	0	
Sum	10	12	10	0	0	2	0	0	
Mean	3	3	3	0	0	1	0	0	
Median	0	0	0	0	0	0	0	0	
Stddev	5	6	5		0	1	0	0	

PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3	AV.
AvailabilitySearch	100%	88%	88%	38%	**78%**

LIMASSOL AMATHUS HOME PAGE

TIME TO 1ST FIXATION	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 22	P. 23	P. 25	AV.
Not on AOI	3	0	0	1	2	1	0	3	0	1	0	1	1	0	2	0	0	1		2	5	8	**1,58**
AOI_1		2	5	2	4	0	6	1	0	4		3	1		2	3		12		4	11		**3,75**
AOI_2	4	6	3	8	2	2	6	2	3	2	0	0	2	2	3	2	2	0	2	3	7	9	**3,16**
AOI_3			13		6				8														**8,97**
Min	3	0	0	1	2	0	0	1	0	1	0	0	1	0	2	0	0	0	2	2	5	8	
Max	4	6	13	8	6	2	6	3	8	4	0	3	2	2	3	3	2	12	2	4	11	9	
Sum	7	7	22	11	14	3	12	6	11	7	0	4	3	2	6	5	2	13	2	9	24	17	
Mean	4	2	5	4	4	1	4	2	3	2	0	1	1	1	2	2	1	4	2	3	8	8	
Median	4	2	4	2	3	1	6	2	2	2	0	1	1	1	2	2	1	1	2	3	7	8	
Stddev	0	3	5	4	2	1	3	1	3	2	0	2	0	1	1	1	1	6		1	3	0	

FIXATION LENGTH	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 22	P. 23	P. 25	AV.
Not on AOI	0	7	7	2	5	6	5	5	6	4	1	2	3	1	1	6	5	8	0	1	2	0	**3,43**
AOI_1	0	6	8	4	3	2	2	3	2	3	0	0	1	0	0	1	0	2	0	1	1	0	**1,76**
AOI_2	3	1	4	0	5	4	7	3	4	1	4	4	4	3	2	4	2	3	2	5	4	0	**3,17**
AOI_3	0	0	4	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,30**
Min	0	0	4	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	3	7	8	4	5	6	7	5	6	4	4	4	4	3	2	6	5	8	2	5	4	0	
Sum	3	14	24	6	14	12	13	10	13	8	5	6	8	4	4	11	7	12	2	6	7	1	
Mean	1	3	6	2	4	3	3	3	3	2	1	2	2	1	1	3	2	3	1	2	2	0	
Median	0	3	6	1	4	3	3	3	3	2	1	1	2	0	1	2	1	2	0	1	2	0	
Stddev	1	3	2	2	2	2	3	2	2	2	2	2	2	1	1	3	2	3		2	2	0	

OBSERVATION LENGTH	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 22	P. 23	P. 25	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	7	9	4	3	2	2	5	15	3	0	0	1	0	0	2	0	2	0	1	1	0	**2,54**
AOI_2	5	1	6	0	5	4	8	4	5	1	4	4	4	3	2	4	2	3	4	9	7	1	**3,95**
AOI_3	0	0	4	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,30**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	5	7	9	4	5	4	8	5	15	3	4	4	4	3	2	4	2	3	4	9	7	1	
Sum	5	8	19	4	10	6	10	8	21	4	4	5	5	3	3	5	2	5	4	10	9	1	
Mean	1	2	5	1	2	2	2	2	5	1	1	1	1	1	1	1	1	1	1	2	2	0	
Median	0	0	5	0	2	1	1	2	3	1	0	0	1	0	0	1	0	1	0	0	1	0	
Stddev	2	3	4	2	2	2	4	2	7	1	2	2	2	1	1	2	1	1		4	4	1	

OBSERVATION COUNT	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 22	P. 23	P. 25	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	4	8	3	7	5	3	4	8	2	0	2	3	0	1	3	0	2	0	1	5	0	**2,77**
AOI_2	1	3	8	1	4	6	4	3	7	3	3	6	7	1	2	4	4	5	1	2	7	1	**3,77**
AOI_3	0	0	5	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,41**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	1	4	8	3	7	6	4	4	8	3	3	6	7	1	2	4	4	5	1	2	7	1	
Sum	1	7	21	4	12	11	7	7	18	5	3	8	10	1	3	7	4	7	1	3	12	1	
Mean	0	2	5	1	3	3	2	2	5	1	1	2	3	0	1	2	1	2	0	1	3	0	
Median	0	2	7	1	3	3	2	2	5	1	0	1	2	0	1	2	0	1	0	1	3	0	
Stddev	1	2	4	1	3	3	2	2	4	2	2	3	3	1	1	2	2	2		1	4	1	

MOUSE CLICK COUNT	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 22	P. 23	P. 25	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	**0,23**
AOI_2	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	**0,73**
AOI_3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	
Sum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	
Mean	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Median	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stddev	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	0	

PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3	AV.
http://www.amathus-hotels.com/limassol/	95%	73%	100%	14%	**70%**

LIMASSOL AMATHUS RESERVATION

TIME TO 1ST FIXATION	P. 1	P. 2	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 20	P. 21	P. 22	P. 23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	**0,27**
AOI_1		84				1		44								1				47			**35,17**
AOI_2	1	0	1	2	0	1	0	1	1	0	1	8	0	1	0	9	1	0	7	3	0	2	**1,81**
AOI_3	13	25	1	1	1	5	7	0	17	12	6	8	2	1	0	0	0	0	18	11	2	0	**5,95**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	
Max	13	84	1	2	1	5	7	44	17	12	6	8	2	1	0	9	1	0	18	47	2	2	
Sum	15	19	2	3	1	7	7	45	17	12	7	16	3	2	1	10	1	1	28	61	2	3	
Mean	5	27	1	1	0	2	2	11	6	4	2	5	1	1	0	2	0	0	9	15	1	1	
Median	1	13	1	1	0	1	0	1	1	0	1	8	1	1	0	0	0	0	7	7	0	0	
Stddev	7	39	1	1	0	2	4	22	9	7	3	5	1	1	0	4	0	0		22	1	1	

FIXATION LENGTH	P. 1	P. 2	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 20	P. 21	P. 22	P. 23	AV.
Not on AOI	20	67	51	18	37	42	45	65	32	55	69	34	40	80	53	53	53	24	33	36	33	27	**43,87**
AOI_1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	**0,25**
AOI_2	12	23	13	26	13	15	13	21	5	5	14	11	7	8	9	7	12	14	10	9	12	20	**12,81**
AOI_3	2	7	6	6	3	4	1	4	2	7	11	4	1	5	6	7	5	3	4	4	3	4	**4,51**
Min	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	
Max	20	67	51	26	37	42	45	65	32	55	69	34	40	80	53	53	53	24	33	36	33	27	
Sum	34	99	69	50	53	62	59	90	40	67	94	49	47	94	68	68	70	40	46	52	48	52	
Mean	9	25	17	12	13	16	15	23	10	17	23	12	12	23	17	17	18	10	12	13	12	13	
Median	7	15	9	12	8	10	7	13	4	6	12	7	4	7	8	7	9	8	7	7	7	12	
Stddev	9	30	23	12	17	19	21	29	15	26	31	15	19	38	24	24	24	11		16	15	13	

OBSERVATION LENGTH	P. 1	P. 2	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 20	P. 21	P. 22	P. 23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	**0,25**
AOI_2	14	25	17	36	14	16	28	28	10	8	14	11	8	8	11	11	13	18	11	10	13	35	**16,37**
AOI_3	3	10	6	6	3	4	1	5	2	8	12	5	1	7	11	7	5	3	4	5	3	17	**5,83**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	14	25	17	36	14	16	28	28	10	8	14	11	8	8	11	11	13	18	11	10	13	35	
Sum	17	36	23	42	17	20	30	33	12	17	26	16	8	15	22	19	18	21	15	17	17	52	
Mean	4	9	6	11	4	5	7	8	3	4	7	4	2	4	5	5	5	5	4	4	4	13	
Median	1	5	3	3	2	2	1	2	1	4	6	3	0	3	5	4	3	2	2	3	2	9	
Stddev	7	12	8	17	7	7	14	14	5	5	8	5	4	5	6	5	6	8		4	6	17	

OBSERVATION COUNT	P. 1	P. 2	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 20	P. 21	P. 22	P. 23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	3	0	0	0	2	0	1	0	0	0	0	0	0	0	3	0	0	0	2	0	0	**0,50**
AOI_2	9	14	11	16	11	11	22	24	14	8	15	10	10	6	7	6	11	8	8	9	11	18	**11,77**
AOI_3	3	9	6	12	10	8	5	9	8	3	10	5	3	8	6	5	3	4	3	5	4	4	**6,05**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	9	14	11	16	11	11	22	24	14	8	15	10	10	8	7	6	11	8	8	9	11	18	
Sum	12	26	17	28	21	21	27	34	22	11	25	15	13	14	13	14	14	12	11	16	15	22	
Mean	3	7	4	7	5	5	7	9	6	3	6	4	3	4	3	4	4	3	3	4	4	6	
Median	2	6	3	6	5	5	3	5	4	2	5	3	2	3	3	4	2	2	2	4	2	2	
Stddev	4	6	5	8	6	5	10	11	7	4	8	5	5	4	4	3	5	4		4	5	9	

MOUSE CLICK COUNT	P. 1	P. 2	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 20	P. 21	P. 22	P. 23	AV.
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_2	5	8	3	7	5	5	8	6	4	2	5	4	2	4	5	2	4	5	4	5	4	10	**4,86**
AOI_3	1	2	0	0	1	0	0	0	0	3	3	1	0	2	1	1	3	1	3	1	1	1	**1,14**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	5	8	3	7	5	5	8	6	4	3	5	4	2	4	5	2	4	5	4	5	4	10	
Sum	6	10	3	7	6	5	8	6	4	5	8	5	2	6	6	3	7	6	7	6	5	11	
Mean	2	3	1	2	2	1	2	2	1	1	2	1	1	2	2	1	2	2	2	2	1	3	
Median	1	1	0	0	1	0	0	0	0	1	2	1	0	1	1	1	2	1	2	1	1	1	
Stddev	2	4	2	4	2	3	4	3	2	2	2	2	1	2	2	1	2	2		2	2	5	

PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3	AV.

reservationslimassol.amathus-hotels.	100 %	23 %	100 %	100 %	**81%**

PAPHOS AMATHUS HOME PAGE

TIME TO 1ST FIXATION	P. 2	P. 3	P. 4	P. 5	P. 7	P. 10	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	1	0	0	1	0	**0,24**
AOI_1	2	6	1	1	0	3	3	3	0	2	17	2	1	**3,25**
AOI_2	1	4	2	2	1	1	4	4	1	2	8	2	2	**2,68**
AOI_3	0	3	0	5	5			3	13	10	5	6	0	**4,50**
Min	0	0	0	0	0	0	0	0	0	0	0	1	0	
Max	2	6	2	5	5	3	4	4	13	10	17	6	2	
Sum	3	13	4	8	6	4	8	11	15	14	30	11	4	
Mean	1	3	1	2	2	1	3	3	4	4	7	3	1	
Median	1	4	1	2	1	1	3	3	1	2	6	2	1	
Stddev	1	2	1	2	2	1	2	2	6	5	7	2	1	

FIXATION LENGTH	P. 2	P. 3	P. 4	P. 5	P. 7	P. 10	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	**AV.**
Not on AOI	2	8	3	3	21	3	4	8	4	17	15	5	5	**7,45**
AOI_1	6	7	4	1	2	3	2	5	1	7	3	5	8	**4,25**
AOI_2	0	2	2	3	22	2	3	6	11	1	4	1	1	**4,55**
AOI_3	0	1	0	1	9	0	0	1	1	6	3	1	0	**1,73**
Min	0	1	0	1	2	0	0	1	1	1	3	1	0	
Max	6	8	4	3	22	3	4	8	11	17	15	5	8	
Sum	9	18	9	7	54	8	10	20	16	32	25	12	14	
Mean	2	4	2	2	14	2	2	5	4	8	6	3	4	
Median	1	5	2	2	15	2	3	5	2	7	4	3	3	
Stddev	3	4	1	1	10	1	2	3	5	7	6	3	3	

OBSERVATION LENGTH	P. 2	P. 3	P. 4	P. 5	P. 7	P. 10	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	6	8	4	1	3	4	2	5	1	7	115	6	407	**43,76**
AOI_2	0	2	2	3	37	2	4	6	12	2	5	2	1	**5,98**
AOI_3	0	1	0	1	11	0	0	1	1	6	3	1	0	**1,97**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	6	8	4	3	37	4	4	6	12	7	115	6	407	
Sum	7	11	6	5	51	6	6	12	13	15	123	9	409	
Mean	2	3	1	1	13	1	2	3	3	4	31	2	102	
Median	0	2	1	1	7	1	1	3	1	4	4	2	1	
Stddev	3	3	2	1	17	2	2	3	6	4	56	3	203	

OBSERVATION COUNT	P. 2	P. 3	P. 4	P. 5	P. 7	P. 10	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	5	7	5	4	6	2	3	8	2	4	8	6	7	**5,15**
AOI_2	3	8	3	3	22	4	3	7	5	5	10	3	3	**6,08**
AOI_3	2	2	3	2	15	0	0	4	4	8	7	2	1	**3,85**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	5	8	5	4	22	4	3	8	5	8	10	6	7	
Sum	10	17	11	9	43	6	6	19	11	17	25	11	11	
Mean	3	4	3	2	11	2	2	5	3	4	6	3	3	
Median	3	5	3	3	11	1	2	6	3	5	8	3	2	
Stddev	2	4	2	2	10	2	2	4	2	3	4	3	3	

MOUSE CLICK COUNT	P. 2	P. 3	P. 4	P. 5	P. 7	P. 10	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	1	1	1	0	0	0	0	0	0	1	1	1	1	**0,54**
AOI_2	0	0	1	1	3	1	1	1	1	0	0	0	0	**0,69**
AOI_3	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	1	1	1	1	3	1	1	1	1	1	1	1	1	
Sum	1	1	2	1	3	1	1	1	1	1	1	1	1	
Mean	0	0	1	0	1	0	0	0	0	0	0	0	0	
Median	0	0	1	0	0	0	0	0	0	0	0	0	0	
Stddev	1	1	1	1	2	1	1	1	1	1	1	1	1	

PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3	**AV.**
http://www.amathus-	100%	100%	100%	85%	**96%**

PAPHOS AMATHUS RESERVATION PAGE																					
TIME TO 1ST FIXATION	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 24	P. 25	**AV.**
Not on AOI	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,14**
AOI_1													71					16			**43,77**
AOI_2	0	1	0	0	2	0	0	0	0	0	1	1	3	0	1	0	2	0	1	5	**0,96**
AOI_3	10	0	44	3	1	2	10	9	22	17	0	0	0	0	1	17	4	10	11	15	**8,79**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	10	1	44	3	2	2	10	9	22	17	1	1	71	0	1	17	4	16	11	15	
Sum	13	1	44	3	2	2	10	10	22	18	1	1	75	1	1	17	6	26	12	20	
Mean	4	0	15	1	1	1	3	3	7	6	0	0	19	0	0	6	2	7	4	7	
Median	3	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	2	5	1	5	
Stddev	5	1	25	2	1	1	5	5	13	10	1	0	35	0	0	10	2	8	6	7	
FIXATION LENGTH	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 24	P. 25	**AV.**
Not on AOI	37	56	17	30	19	25	26	13	23	57	112	60	52	106	81	59	122	13	20	37	**48,35**
AOI_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**0,05**
AOI_2	9	12	16	10	10	10	10	7	6	6	29	19	34	16	12	19	15	10	6	12	**13,38**
AOI_3	3	6	1	3	3	4	0	3	2	15	21	6	8	12	5	6	11	2	2	8	**6,08**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Max	37	56	17	30	19	25	26	13	23	57	112	60	52	106	81	59	122	13	20	37	
Sum	49	74	34	43	33	39	36	23	31	78	162	85	94	134	99	84	149	26	28	57	
Mean	12	19	8	11	8	10	9	6	8	19	41	21	24	33	25	21	37	7	7	14	
Median	6	9	9	6	7	7	5	5	4	10	25	13	21	14	9	13	13	6	4	10	
Stddev	17	26	9	14	9	11	12	6	11	26	49	27	24	49	38	27	57	6	9	16	
OBSERVATION LENGTH	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 24	P. 25	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**0,05**
AOI_2	9	15	16	11	11	10	10	10	10	6	37	20	35	17	13	22	16	20	6	27	**15,99**
AOI_3	4	6	1	3	3	4	0	5	2	20	23	7	11	13	6	6	11	2	3	10	**7,04**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	9	15	16	11	11	10	10	10	10	20	37	20	35	17	13	22	16	20	6	27	
Sum	13	21	18	14	14	14	11	15	12	25	60	27	46	30	19	28	27	23	8	37	
Mean	3	5	4	4	4	4	3	4	3	6	15	7	12	7	5	7	7	6	2	9	
Median	2	3	1	2	2	2	0	3	1	3	12	4	5	6	3	3	6	2	1	5	
Stddev	4	7	8	5	5	5	5	5	5	9	18	9	17	9	6	10	8	9	3	13	
OBSERVATION COUNT	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 24	P. 25	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	**0,10**
AOI_2	6	15	15	14	8	9	10	11	8	4	19	18	15	12	12	16	21	6	7	16	**12,10**
AOI_3	6	16	2	6	5	7	2	7	5	9	21	7	13	11	11	10	11	3	2	11	**8,25**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	6	16	15	14	8	9	10	11	8	9	21	18	15	12	12	16	21	6	7	16	
Sum	12	31	17	20	13	16	12	18	13	13	40	25	29	23	23	26	32	10	9	27	
Mean	3	8	4	5	3	4	3	5	3	3	10	6	7	6	6	7	8	3	2	7	
Median	3	8	1	3	3	4	1	4	3	2	10	4	7	6	6	5	6	2	1	6	
Stddev	3	9	7	7	4	5	5	5	4	4	12	9	8	7	7	8	10	3	3	8	
MOUSE CLICK COUNT	P. 2	P. 3	P. 4	P. 5	P. 6	P. 7	P. 8	P. 9	P. 10	P. 11	P. 12	P. 13	P. 14	P. 15	P. 16	P. 17	P. 18	P. 19	P. 24	P. 25	**AV.**
Not on AOI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0,00**
AOI_2	4	5	7	4	5	4	4	4	4	2	6	4	4	5	5	4	6	5	2	4	**4,40**
AOI_3	1	0	0	0	1	0	0	0	0	7	1	3	0	5	2	2	1	1	1	4	**1,45**
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Max	4	5	7	4	5	4	4	4	4	7	6	4	4	5	5	4	6	5	2	4	
Sum	5	5	7	4	6	4	4	4	4	9	7	7	4	10	7	6	7	6	3	8	
Mean	1	1	2	1	2	1	1	1	1	2	2	2	1	3	2	2	2	2	1	2	
Median	1	0	0	0	1	0	0	0	0	1	1	2	0	3	1	1	1	1	1	2	
Stddev	2	3	4	2	2	2	2	2	2	3	3	2	2	3	2	2	3	2	1	2	
PARTICIPANT %	Not on AOI	AOI_1	AOI_2	AOI_3																	**AV.**
http://secure-reservations-paphos.	100%	10%	100%	100%																	**77%**

APPENDIX 9 – Hotels' Re-Designed Webpages

Limassol Amathus Re Designed Home Page

Limassol Amathus Re-Designed Rooms Availability Page

AMATHUS
BEACH - HOTEL
LIMASSOL-CYPRUS

SELECT MEAL PLAN

Bed & Breakfast

Meal Rates In EUR	Adults	Child A	Child B
Bed & Breakfast	0.00	0.00	0.00
Half Board	34.00	17.00	0.00
Full Board	66.00	33.00	0.00

SEARCH RESULTS

MORE FOR LESS (Minimum 5 Nights) AMG 114.00
Selected days of stay are less than the minimum days required

Amathus Rate 140.00
For the selected days the room is not available.

SUPERIOR SEA VIEW ROOM

MORE FOR LESS (Minimum 5 Nights) AMG 134.00
Selected days of stay are less than the minimum days required

Amathus Rate 177.00

JUNIOR SUITE SEA VIEW

MORE FOR LESS (Minimum 5 Nights) AMG 236.00
Selected days of stay are less than the minimum days required

Amathus Rate 244.00

JUNIOR SUITE WITH PRIVATE POOL

Amathus Rate

SUPERIOR INLAND VIEW ROOM

These lavish rooms are situated on the first floor of the hotel and they are newly renovated. Witht the latest design and technology these roomas add another dimernsion to the Amathus Experience. Ideal for families or those seeking greater space, these rooms have their balconies converted to luxuriously furnished sitting areas.

Amenities:
- marble bathrooms
- heating
- air conditioning
- direct-dial telephone connection
- computer data port
- broadband Internet access available for a fee
- satellite TV with Play Station available for a fee
- pay TV channels
- mini-bar and safe deposit box
- hair dryer
- comfortable slippers for each person
- a rich, warm bathrobe for each guest
- tea and coffee making facilities
- 31 sq.mtrs approximately

Sleeps: maximum 3 adults OR 2 adults and 2 children

Paphos Amathus Re Designed Home Page

Paphos Amathus Re Designed Rooms Availability Page

AMATHUS
BEACH - HOTEL
PAPHOS-CYPRUS

Bed & Breakfast

Meal Rates in EUR	Adults	Child A	Child B
Bed & Breakfast	0.00	0.00	0.00
Half Board	31.00	15.50	0.00
Full Board	58.00	29.00	0.00

SEARCH RESULTS

Amathus Rate	87.00
MORE FOR LESS (Minimum 5 Nights) Selected days of stay are less than the minimum days required	80.00
TWIN LIMITED SEA VIEW	
Amathus Rate	97.00
TWIN POOL VIEW/SEA VIEW	
Amathus Rate	117.00
MORE FOR LESS (Minimum 5 Nights) Selected days of stay are less than the minimum days required	107.00
FAMILY ROOM INLAND VIEW	
Amathus Rate	99.00

TWIN INLAND VIEW

Our standard rooms with inland view overlook the resort of Paphos and have a spacious balcony or veranda.

Amenities:
- marble bathrooms
- heating
- air-conditioning
- international direct-dial telephone
- satellite TV with Play Station available for a fee
- Pay TV channels
- mini-bar and safe deposit box
- hair dryer
- his and hers slippers
- rich, warm bathrobe for each guests
- tea and coffee making facilities
- 27 sq. mtrs approximately

Sleeps: maximum 3 adults OR 2 adults and 1 child

If you wish to reserve this room please select one of package options on the left.

Golden Bay Original Re Designed Home Page

GOLDEN BAY BEACH HOTEL

Search a room | Select a rate | Customer information | Review reservation | Your confirmation

My profile | Cancel/modify

English

Search

Arrival date 12 Mar 2013

Departure date 13 Mar 2013

Rooms 1

Adults 1 Guests per room

Children 0

Click here for special rates

Check availability

Availability calendar

March 2013

Su	Mo	Tu	We	Th	Fr	Sa
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Available

Selected days

Picture gallery










Golden Bay Beach Hotel

The Golden Bay Beach Hotel is an exclusive 5 star hotel set in mature landscaped gardens of tropical palms and vibrant flowers, bordering a long sandy beach on the island of Cyprus, the jewel of the eastern Mediterranean. Situated in the favoured south eastern region of Cyprus at the heart of the Bay of Larnaca, The Golden Bay is a world class haven of luxury. Just outside the town of Larnaca, only 14 kilometres from the international Airport.

Address

Larnaca - Dekhelia Road
6306 Larnaca
Cyprus
Phone: +357 24 645 444
Fax: +357 24 645 451
Email: reservations@goldenbay.com.cy

For the Businessman The Golden Bay boasts excellent conference & meeting facilities, a state of the art business center and on-line secretarial and technical services meetings. For families the hotel has a dedicated mini club a garden playground for games and outside activities. Professional child minders take care of the children throughout the day with a full program of activities (seasonal). Mini suites cater specifically for families with spacious interiors,private terraces and shared Jacuzzis.

Check in time
2:00 PM

Check out time
12:00 PM

Golden Bay Beach Hotel . Larnaca - Dekhelia Road . 6306 . Larnaca . Cyprus . +357 24 645 444 . reservations@goldenbay.com.cy
www.goldenbay.com.cy

APPENDIX 10 – Applied Cognitive Task Analysis

Table 1: Example of a knowledge audit table

Aspects of expertise	Cues and strategies	Why diffcult?
Past and future **e.g. Explosion in office strip; search the office areas rather than source of explosion**	Material safety data sheets (MSDS) tell you that explosion in area of dangerous chemicals and information about chemicals Start where most likely to find victims and own safety considerations	Novice would be trained to start at source and work out May not look at MSDS, to find potential source of explosion, and account for where people are most likely to be
Big picture **Big picture includes source of hazard, potential location of victims, ingress/egress routes, other hazards**	Senses, communication with others, building owners, MSDS, building pre-plans	Novice gets tunnel vision, focuses on one thing, e.g. victims
Noticing **Breathing sounds of victims**	Both you and partner stop, hold your breath, and listen Listen for crying, talking to themselves, victims knocking things over	Noise from own breathing in apparatus, fire noises Don' t know what kinds of sounds to listen for

Source: Militello and Hutton (1998)

Table 2: Example of a simulation interview table

Events	Actions	Assessment	Critical cues	Potential errors
On-scene arrival	Account for people (names) Ask neighbours (but don' t take their word for it, check it out yourself) Must knock on or knock down to make sure people aren' t there	It' s a cold night, need to find place for people who have been evacuated	Night time Cold - > 158 Dead space Add on floor Poor materials wood (punk board), metal girders (buckle and break under fire) Common attic in whole building	Not keeping track of people (could be looking for people who are not there)
Initial attack	Watch for signs of building collapse If signs of building collapse, evacuate and throw water on it from outside	Faulty construction, building may collapse	Signs of building collapse include: What walls are doing: cracking What floors are doing: groaning What metal girders are doing: clicking, popping Cable in old buildings hold walls together	Ventilating the attic, this draws the fire up and spreads it through the pipes and electrical system

Source: Militello and Hutton (1998)

Table 3: Example of Cognitive demands table

Difficult cognitive element	Why difficult?	Common errors	Cues and strategies
Knowing where to search after an explosion	Novices may not be trained in dealing with explosions. Other training suggests you should start at the source and work outward Not everyone knows about the Material Safety Data Sheets. These contain critical information	Novice would be likely to start at the source of the explosion. Starting at the source is a rule of thumb for most other kinds of incidents	-Start where you are most likely to find victims, keeping in mind safety considerations -Refer to Material Safety Data Sheets to determine where dangerous chemicals are likely to be -Consider the type of structure and where victims are likely to be -Consider the likelihood of further explosions. -Keep in mind the safety of your crew
Finding victims in a burning building	There are lots of distracting noises. If you are nervous or tired, your own breathing makes it hard to hear anything else	Novices sometimes don' t recognize their own breathing sounds; they mistakenly think they hear a victim breathing	Both you and your partner stop, hold your breath, and listen Listen for crying, victims talking to themselves, victims knocking things over, etc.

Source: Militello and Hutton (1998)

APPENDIX 11 – Validation Study Questionnaire

DEMOGRAPHICS

1. Gender Male ☐ Female ☐

2. What is your age?
- Less than 15 years old ☐
- 15-24 years old ☐
- 25-34 years old ☐
- 35-44 years old ☐
- 45-54 years old ☐
- 55 years old and above ☐

3. What is your marital status? Single ☐ Married ☐ Others (Divorced/ Widowed/ Separated, etc.)

4. What is your highest level of education?
- Primary school ☐
- Secondary school ☐
- High school ☐
- College/ technical school/ or equivalent ☐
- Bachelors degree ☐
- Masters degree or higher ☐
- Other (please specify) ☐

5. What is your present occupation?
- Government officer ☐
- Staff in a private company ☐
- Student ☐
- Housewife ☐
- Other (please specify) ☐

QUESTIONNAIRE USED FOR STUDY B

1. Please tick which hotel is more likely for you to book for your holidays:

[a] Golden Bay 1 ☐ 2 ☐ [b] Paphos Amathus Beach Hotel 1 ☐ 2 ☐ [c] Limassol Amathus Beach Hotel 1 ☐ 2 ☐

Please rate / circle the selected Hotel Website from 1-5 where 1=Strongly Disagree (SD), 2=Disagree(D), 3=Undecided (U), 4= Agree (A) and 5=Strongly Agree (SA)			**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**	**REDESIGNED WEBSITES**	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
INFORMATION SEARCH	2	Before you decide to book a hotel you search all alternatives.	1	2	3	4	5		1	2	3	4	5
	3	The site gives you information about credit card security and personal data?	1	2	3	4	5		1	2	3	4	5
	4	The site gives you the opportunity to search for various information regarding hotel bedrooms	1	2	3	4	5		1	2	3	4	5
	5	The site gives you the opportunity to search for various information regarding hotel facilities	1	2	3	4	5		1	2	3	4	5
	6	The site gives you the opportunity to search for various information regarding better packages and offers	1	2	3	4	5		1	2	3	4	5
	7	The site gives you the opportunity to search for various information regarding hotel location	1	2	3	4	5		1	2	3	4	5
	8	The site allows you a refund in the event of cancellation	1	2	3	4	5		1	2	3	4	5
EVALUAT. OF ALTERNAT.	9	This site allows you alternative options for room type	1	2	3	4	5		1	2	3	4	5
	10	This site allows you alternative options for room location (inland, side, sea view)	1	2	3	4	5		1	2	3	4	5
	11	This site allows you alternative options for meal	1	2	3	4	5		1	2	3	4	5
	12	This site allows you alternative options for payment methods (credit card, debit -electron, paypal etc)	1	2	3	4	5		1	2	3	4	5
ONLINE BOOKING	13	It is easy to fill in the reservation form	1	2	3	4	5		1	2	3	4	5
	14	The instructions are simple to be followed	1	2	3	4	5		1	2	3	4	5
	15	Online booking provides the opportunity to save time and money	1	2	3	4	5		1	2	3	4	5
	16	You are very positive to book on this hotel because of the brand name that you would change your booking period in order to spend your vacations there	1	2	3	4	5		1	2	3	4	5
	17	You trust the internet and this website and are happy to provide your personal information for booking purposes.	1	2	3	4	5		1	2	3	4	5
	18	There are some other factors that influence your final decision [i.e family, friends].	1	2	3	4	5		1	2	3	4	5
	19	Difficulties in the process [as slow connection, not acceptable bank card] can change your plans to make a reservation.	1	2	3	4	5		1	2	3	4	5

Please rate / circle each Hotel Website from 1-5 where 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4= Agree and 5=Strongly Agree			Golden Bay	Paphos Amathus	Limassol Amathus
WEBSITE USABILITY SCALE ORIGINAL	20	I would like to use this website frequently	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	21	I found the website unnecessarily complex	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	22	I thought the website was easy to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	23	I think that I will need the support of a technical person to be able to use this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	24	I found the various functions in this website were well integrated	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	25	I thought there was too much inconsistency in this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	26	I think that most people will learn how to use this website quickly	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	27	I found the website very cumbersome to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	28	I felt very confident using the website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	29	I needed to learn a lot of things before I could get going with this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Please rate / circle each Hotel Website from 1-5 where 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4= Agree and 5=Strongly Agree			**Golden Bay**	**Paphos Amathus**	**Limassol Amathus**
WEBSITE USABILITY SCALE REDESIGNED	20	I would like to use this website frequently	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	21	I found the website unnecessarily complex	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	22	I thought the website was easy to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	23	I think that I will need the support of a technical person to be able to use this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	24	I found the various functions in this website were well integrated	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	25	I thought there was too much inconsistency in this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	26	I think that most people will learn how to use this website quickly	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	27	I found the website very cumbersome to use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	28	I felt very confident using the website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
	29	I needed to learn a lot of things before I could get going with this website	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Please rate / circle how important are the below for you from 1-5 where 1=Strongly Disagree (SD), 2=Disagree(D), 3=Undecided (U), 4= Agree (A) and 5=Strongly Agree (SA)			Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	REDESIGNED WEBSITES	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
WEBSITE DESIGN	30	Credit card logos is easily identifiable	1	2	3	4	5		1	2	3	4	5
	31	Site search is easy to access	1	2	3	4	5		1	2	3	4	5
	32	Security for transactions logo is easily identifiable	1	2	3	4	5		1	2	3	4	5
	33	The appearance of some recognized type of assurance of a secure transaction impacts your decision	1	2	3	4	5		1	2	3	4	5
	34	It is very convenient to have the booking process at home page	1	2	3	4	5		1	2	3	4	5
	35	Less mouse clicks make your decision making process more convenient	1	2	3	4	5		1	2	3	4	5
	36	It is likely to ignore information placed at scroll down part of the webpage	1	2	3	4	5		1	2	3	4	5
	37	The cancel/amend a reservation is in a striking position	1	2	3	4	5		1	2	3	4	5
	38	Special offers are easy to access	1	2	3	4	5		1	2	3	4	5
	39	A short-time booking process impacts your online decision making process	1	2	3	4	5		1	2	3	4	5