Improving a travel recommender service by segmentation and personalization

Lars Kops

November 5, 2013

Recommender systems are increasingly deployed in e-commerce, helping the customer to overcome the information overload on the internet. So far recommender services for specific cities are not widely adopted and commercially applied in the travel industry, although it is a promising market. The aim of this study is to improve the existing service features of a specific recommender service offered in Berlin called George. Moreover, the goal is to gain marketing knowledge through identifying coherent user segments in order to find new service improvements. A customer-focused approach framework called GIST serves as a guideline to identify the different customer segments and needs. In order to understand and enhance user experience and interaction, a segmentation of users is made. Different wishes of users and service gaps in terms of content design and usability of the service are identified and practical recommendations are made.

Keywords: *travel recommender system, filtering methods, Berlin, usability testing, George Concierge, GIST, segmentation, marketing intelligence, service improvements, think aloud session, k-means cluster analysis, improvement study, design science*

Thesis coordinators

Master's degree candidate:

Name:	Lars Kops
Student-ID:	S1361813
Email:	l.kops@student.utwente.nl
Telephone:	+49(0)15253422204

Supervisory committee

1. Supervisor	Dr. A. B. J. M. Fons Wijnhoven (UTwente)
Email:	fons.wijnhoven@utwente.nl
Telephone:	+31(0)534892372
2. Supervisor	Dr. Rainer Harms (UTwente)
E-mail:	r.harms@utwente.nl
Telephone:	+31 (0)53 489 3907
Company supervisor	Karsten Nölling (George Online Concierge GmbH)
Email:	karsten@georgeconcierge.com
Telephone:	+49(0)15254055036
Mentor:	Christopher Krauß (Fraunhofer FOKUS)
Email:	christopher.krauss@fokus.fraunhofer.de
Telephone:	+49(0)1624803300

Table of Contents

List of Figures

List of Tables

1 Introduction

Today's world is revolving around information which can be easily accessed through the internet. The indexed World Wide Web contains a massive load of information on at least 14.49 billion pages which can be found through search engines (Kunder, 2013). The information era, despite all its possibilities and advantages, also comes with the drawback of information overload, making internet searches an overwhelming and time consuming task. A personal recommender system might help to overcome this problem by supporting people in daily choices and pointing out alternatives. Hereby, information retrieval systems and search engines cannot help as they are lacking the personalizing component of recommender systems (Burke, 2002).

Recommender systems serve as a decision making support for online customers by providing personalized products or service information (Schafer et al., 2001). Commonly known companies employing recommender systems are for instance amazon.com, google.com and ebay.com (Kabassi, 2010; Shih et al., 2011). In order to provide customers with personal recommendations, the recommender systems use different methods. The most popular recommendation techniques are collaborative filtering, content-based filtering and hybrid filtering (Shih et al., 2011). Collaborative filtering represents the most frequently applied method and suggests items with the aid of customer views who have comparable preferences (Liu et al., 2009). Whereas content-based recommendations neglect other customers' opinions and solely give suggestions on the basis of an analysis of the item description and the customer's interests and past behavior (Pazzani & Billsus, 2007). The recommendation systems using a mixture of content-based and collaborative filtering or any other filtering methods are called hybrid recommender systems. By combining certain methods and extracting their individual strengths, the hybrid approach tries to overcome the shortcomings of a single filtering method which are listed in Table 3 (Burke, 2005).

In spite of the unstable worldwide economic situation in recent years, the tourism industry emerges unaffected and the number of tourists is continually rising. In 2012, international tourist arrivals amounted to 1.035 billion, representing a new all-time high. Furthermore, this figure is expected to grow annually by 3-4% until the year 2030 (UNWTO, 2013).

In recent years recommender systems are partially applied in the travel industry helping tourists to make personalized vacation plans (Rabanser & Ricci, 2005). Considering that taking a

vacation is an action where personal preferences and interests play an important role, the application of personal travel recommender systems is plausible (Garcia et al., 2011). Especially with the decreasing demand for package travel towards more personalized trips, recommender systems gain importance. This trend is highlighted by the ITB World Travel Trends Report 2012/13 which further states that people will prefer more individual holiday experiences while relying more on personal recommendations in the course of their stay and prior to it (ITB, 2013).

Personal travel recommender systems recommend activities to tourists in a particular city on the basis of their profile. A travel recommender system should be able to profile a tourist through a survey or past interaction with the service. On the basis of this data it should come up with personalized recommendations for a particular time frame.

George – Your Personal Concierge inhibits all the mentioned features above and more. In addition George is already on the market, offering one of the first possibilities to test and improve the user experience with travel recommender systems. Since personal travel recommender services are rather new, their usability and usability testing is still in its very early stages and therefore the systems often lack usability. Despite of the existence of a huge variety of design options, the literature concerning the application of information services is limited. As a consequence this study aims at the improvement of content and service features of the investigated travel recommender system by segmentation and personalization in order to increase the usability. (Wijnhoven, 2012).

The thesis is structured as followed. In *Chapter 2* state-of-the art of personal recommender services for regions and cities are presented. Furthermore, the design and classification of recommender systems are discussed and their drawbacks and usability issues are depicted in order to provide a broad understanding of recommender systems. *Chapter 3* discusses user segmentation versus 1 to 1 personalization and introduces the concept of marketing intelligence and the GIST framework for the proceeding segmentation approach. *Chapter 4* examines the explicit functioning of the investigated travel recommender system George including its architecture, service portfolio and business model. In *Chapter 5* the research design of this study is presented and the single parts of the multi-method design are described. *Chapter 6* incorporates the results of this research. A following analysis and recommendations based on these results are presented in the final *Chapter 7*.

2 Design and classification of recommender systems

This chapter gives an overview of the state-of-the art recommender services in the travel industry and explains the basics of these services including the different information filtering approaches. User profiling and data representation as well as the approach drawbacks and usability of recommender systems are elaborated. The purpose of this chapter is to provide a broad understanding about recommender systems and to show the possible angles to improve those.

2.1 State-of-the-art

This chapter deals with literature about state-of-the-art services that are similar to the investigated traveler recommender system George – Your Personal Concierge. The similar travel recommender systems are depicted and explained and an overview of the systems is provided. The systems reviewed differ amongst each other in terms of their location, usage of information filtering methods, application and other factors and are shortly described. The core sources for the literature review are SCOPUS and Web of Knowledge. Essential key words are identified by forward and backward analysis of publications in top journals and are then used to narrow down the literature to the essential publications.

WebGuide is a project that suggests personalized recommendations for a tour in the city of Heidelberg. Thereby, traveler's interests and preferences are used to suggest POIs in Heidelberg. Even preferences in terms of duration, distance and transportation means are considered. Regrettably, WebGuide has not made it to the market and remains a research prototype (Fink & Kobsa, 2002).

etPlanner is another travel recommender system research prototype which yet lacks commercial application. Furthermore, the system is not sophisticated as it absences contextual limitations such as budget or distance constraints. However, the *etPlanner* offers support during all stages of a trip including searching for a vacation area, the trip itself and a feedback loop at the end (Höpken et al., 2006).

The research prototype for *personalized recommendations for tourist attractions* from Huang & Bian (2009) considers detailed suggestions for a recommender system in the business of tourism. The system differentiates between the following segments of travelers: adventurer,

multifarious, relaxation seeker, and urban. This segmentation can help to suggest the traveler's favored activities (Sarigöllü & Huang, 2005). The system was never implemented in the real world. Hence, it lacks proof of the usefulness of traveler segmentation (Huang & Bian, 2009).

Tainan City travel is a recommender system that relies solely on the content based filtering approach. The tourist directly states his or her interests and preferences through a manual data input. This input is then used to create a personal trip route using the ant colony optimization as an answer to the traveling salesman problem (Lee et al., 2009).

E-Tourism helps travelers to plan their days in the city of Valencia. The system focuses on the planning phase of trips. Interests and preferences of the user are polled through a detailed questionnaire where personal details and preferences are submitted. A list of personalized recommendations is then proposed to the user who can choose between them and also has the possibility to reject suggestions. The system lacks the functioning of routing (Sebastia et al., 2009).

The research prototype called *hybrid recommender system* mainly focuses on using multiple information filtering approaches in order to overcome the individual weaknesses. Emphasizing the combination of the collaborative, content-based and demographic filtering method the authors do not consider any other features (Chikhaoui et al., 2011).

City Trip Planner is very much alike to George in terms of the services provided and market maturity. It can give recommendations for five cities in Belgium in a very individualized way. The traveler decides start and finish position, how many activities to visit and even the duration of lunch breaks is adjustable. The system is the only one found with a large field application and market implementation (Vansteenwegen et al., 2011).

An additional current travel system is *Turist@* which was implemented for the city of Tarragona. The outstanding feature of this travel system is that it can give suggestions based on the user's location. Moreover, depending on the knowledge available, the system makes different use of filtering techniques (Batet et al., 2012).

SigTur/E-Destination is for planning a vacation in the area of Catalonia. It features an appealing user interface and takes various sources including implicit and explicit information for the creation of a user profile into account. The usefulness and usability of the system was confirmed in a survey at the FITUR'11 conference (International Conference of Tourism) held in Madrid (Moreno et al., 2013).

Name	Location	Filtering approaches			Obligatory POIs	Multiple days	Polling of interest (e.g. questionnaire)	Opening hours	Budget considera-tion	Routing	User segmentation	Application	Reference
		Content-based	Collaborative	Demographic									
WebGuide	Heidelberg (GE)	X	X	X	X					X		Research prototype	Fink & Kobsa (2002)
etPlanner		X	X		X		X					Research prototype	Höpken et al. (2006)
Personalized recom-mendations for tourist attractions	-	X	X	X			X	X	X	X	X	Research prototype	Huang & Bian (2009)
Tainan City travel	Tainan (TW)	X				X	X			X		Small field application	Lee et al. (2009)
e-Tourism	Valencia (ES)	X		X			X	X	X			Small field application	Sebastia et al. (2009)
Hybrid Recommender System	-	X	X	X	X							Research prototype	Chikhaoui et al. (2011)
City Trip Planner	5 cities in Belgium	X		X	X	X	X	X	X			Large field application	Vansteenwegen et al. (2011)
Turist@	Tarragona	X	X	X	X		X	X	X			Small field application	Batet et al. (2012)
SigTur/E-Destination	Catalonia (ES)	X	X	X			X		X	X		Small field application	Moreno et al. (2013)
George – Your Person-al Concierge	Berlin	X	X				X	X	X	X		Large field application	Kops (2013)

Table 1: Overview of related travel recommender systems (own table based on Moreno et al. (2013))

As shown in Table 1 most of the recommender systems inhibit more than one filtering approach. This hybrid approach helps to overcome the individual information filtering drawbacks which are listed in Table 3. Furthermore, the table shows different functionalities of the services and what kind of contextual data they can include in their recommendations. Some of the recommenders offer the pre-selection of obligatory POIs allowing travelers to decide up front which activities they will execute on their travel day. The minorities of travel recommender offer the possibility to plan a trip for multiple days and approximately half consider opening hours of the activities, the traveler's budget constraints and a route of the recommended activities. Most of the travel recommenders use a form of interest polling to gain user data and only one system uses user segmentation in the process of giving travel recommendations.

2.2 Definition and application of recommender systems

People frequently make decisions in their daily lives with insufficient knowledge about the existing alternatives. In the past people relied on reviews, word of mouth and recommendation letters from others to overcome this lack of knowledge. With the rise of the internet, the first recommender systems which were introduced around the mid-1990s tried to imitate this behavior. These systems collected user-written recommendations and forwarded them to adequate recipients (Resnick & Varian, 1997). One of the first of these recommender systems was *Tapestry*, an email system that collaboratively filtered messages according to people's opinions (Goldberg et al., 1992).

Initially relying a collaborative filtering approach recommender systems vastly developed and nowadays recommender systems use various filtering techniques including content-based and knowledge-based filtering approaches (Konstan & Riedl, 2012). By applying these methods they offer a personalization service, trying to suggest items according to the user's preferences. Hereby, the term "item" represents the objects which a recommender system recommends to the user. These item recommendations are the result of an analysis of the user's characteristics and needs (Ricci et al., 2011). Depending on the area of application those systems can recommend items like movies, music, books and lately content on social networks (Zhou et al., 2012). An elaborated but not complete list of recommender system application domains with classes is provided by Ricci et al. (2011) in Table 2. Firms are using recommender systems to achieve increased user satisfaction and loyalty by personalizing the

information filtering and reducing the information overload by pointing out alternatives. In this way only the information which is relevant according to the profile of a user is presented (Ricci et al., 2011).

Domain	**Classes**
Entertainment	recommendations for movies, music, and IPTV
Content	personalized newspapers, recommendation for documents, recommendations of Web pages, e-learning applications, and e-mail filters
E-commerce	recommendations for consumers products
Services	travel services recommendations, expert consultation recommendation, or matchmaking services

Table 2: Recommender systems domain and classes according to Ricci et al. (2011)

The profile of a user is usually the starting point for the recommendation process as the recommender system is not able to function without the creation of a user profile (Montaner et al., 2003). Nevertheless, there are two additional ways to represent data that a recommender system can exploit. One is item representation and the other is transactional representation (Huang et al., 2004a).

These two approaches are noteworthy because some filtering techniques rely heavily on them and therefore they are shortly described in 2.3. Though, the main focus of this research in terms of data representation is user representation in the form of user profiles. After a user profile has been established the profile can be exploited. This last step can contain various approaches including one, many or even a combination of different sequential filtering and matching techniques (Montaner et al., 2003). Recommender systems vary from each other in terms of techniques and information they use.

As a consequence there is no standard process or clear cut functioning of recommender systems (Huang et al., 2004a). Therefore, only an overview of recommender system's typical mode of operation is visualized in Figure 1 and the process components are further elaborated

in chapter 2.3 and 2.4. In the course of this process the sum of available information to represent a user profile plays a decisive role for the recommendations' accuracy (Montaner et al., 2003).

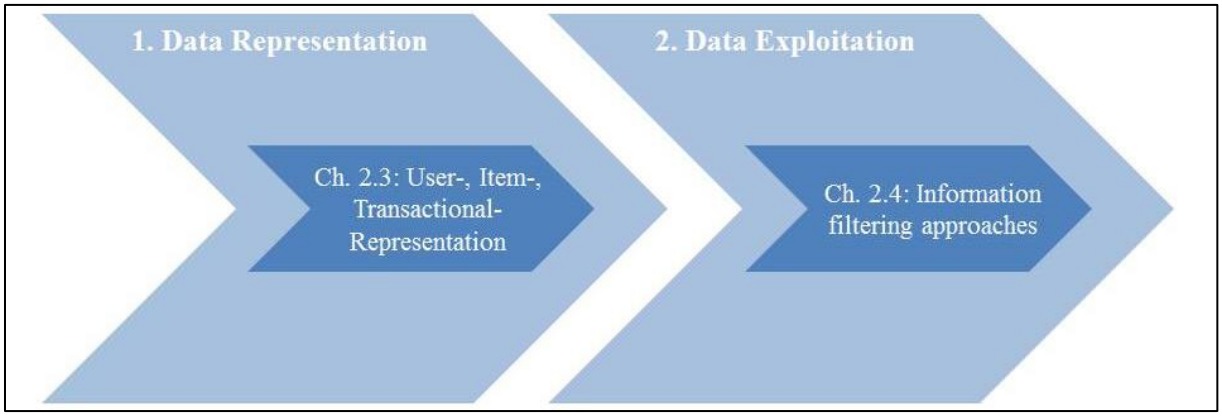


Figure 1: Basic recommender system's mode of operation according to Montaner et al. (2003)

2.3 User profiling and data representation

As already mentioned in 2.1 there are three ways of data representations, exploited by recommender systems, which are user representation (e.g. demographics), item representation (e.g. attributes of items) and transaction representation (e.g. time spent making a purchase). The latter two are briefly explained in the following. Item representation is achieved by allocating certain attributes to items for example brand, price, color etc. (Huang et al., 2004a). A simple example can be provided from the service of MovieLens, a movie recommendation website, where movies are represented by their genres (Kant & Bharadwaj, 2012). The content based information filtering method heavily relies on this kind of information as it provides recommendations based on item attributes. Transaction representation utilizes information about transactions, namely the time spent making a purchase or the amount bought (Huang et al., 2004a).

Users of recommender systems usually possess different sets of characteristics and in order to individualize recommendations, recommender systems use a variety of user information (Ricci et al., 2011). Hereby, the accurate representation of users through profiles is crucial for the success of the recommendations (Montaner et al., 2003). According to Huang et al. (2004a) user information for profiles can be separated and represented by four categories. One category is user attributes (e.g. age, gender and profession), the other is specified by associated items (purchased or rated items), and the user's transaction history (behavior pattern such as time and amount spent). The last category represents a user by item attributes. This case is

reflected by describing a user as adventurous as the person watched an action movie. Pazzani & Billsus (2007) narrow down the types of information to create a user profile to two, namely user preferences and user's interaction history. Preferences of the user are obtained by a *manual data input* through a user interface allowing the user to create an initial profile that represents their interests. The interest input is often realized via questionnaires with check boxes which let users choose certain attribute values, e.g. characteristics like athletic, medium athletic or non-athletic. A further method is the entering of text e.g. an author name, a user might favor. Additionally to the manual data input the *user transaction history* also represents a valuable source for creating a profile. Mining the user's past behavior, items are separated into two classes: items the user liked and items the user did not like. This distinction is achieved by either implicit or explicit user feedback. An example for implicit feedback in a positive sense is buying an item whereas returning an item is a negative implicit feedback. Explicit feedback is collected from the user ratings of items. However, these two approaches come with a tradeoff regarding the amount and quality of the feedback collected. Implicit feedback can be collected on a large scale but comes with ambiguity in terms of feedback precision. Explicit user feedback is typically only provided on a small scale but tends to be more accurate than implicit feedback.

Apparently, the profile customization process comes with several obstacles for the user and recommender systems. First it requires an effort from the user to manually create a profile, a task that should be kept to a minimum. Moreover, the user's interests change over time and therefore require some sort of adjustment (Pazzani & Billsus, 2007). Keeping a profile up to date can be achieved by observing the interaction of user and application and analyze the resulting feedback. This process is called relevance feedback and as the feedback received has usually no meaning it needs to be interpreted by a profile learning technique in order to convert the information to fit the user profile. In the final step the learned information is adapted to the user profile as new interests are added and old ones are forgotten (Montaner et al., 2003). The main possibilities to receive information for a user profile are summarized in Figure 2. After the creation of the user profile the recommender system can start giving recommendations (Pazzani & Billsus, 2007). Maintaining an accurate user profile is crucial to the success of a recommender system as it mirrors the interests of the user. Without accurate user profiles, recommendations are unlikely to be appropriate no matter which filtering method follows (Montaner et al., 2003).

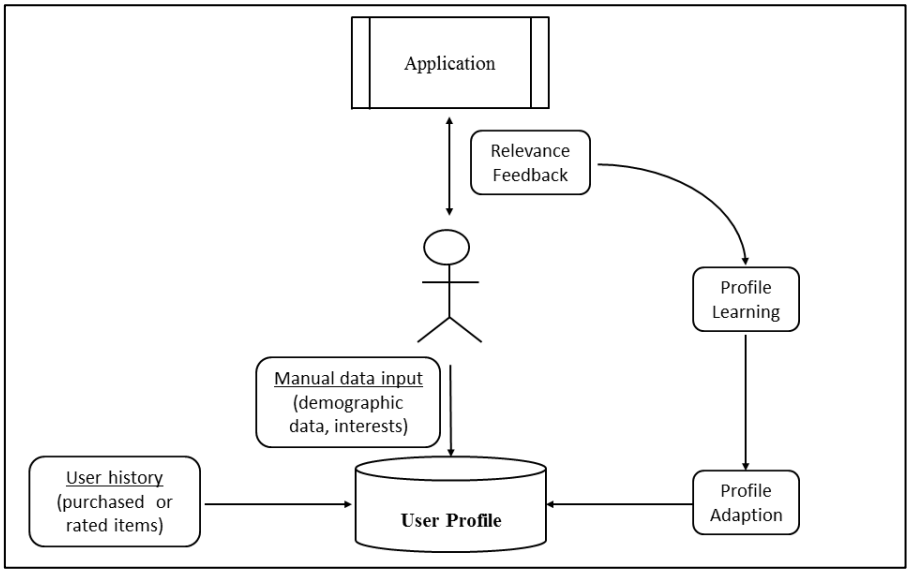


Figure 2: Information retrieval for user profiling according to Montaner et al. (2003); Pazzani & Billsus (2007)

2.4 Data exploitation with the help of information filtering

Exploiting item representation and user profile data in order to provide users with personal recommendations, recommender systems use different methods. The most popular recommendation techniques are collaborative filtering, content-based filtering and hybrid filtering (Shih et al., 2011). Burke (2007) differentiates among others between 5 types of recommenders systems, namely *collaborative, content-based, demographic, knowledge-based and hybrid*. This taxonomy of recommender systems is widely accepted in this research field. Moreover, with the rise of social networks the *community-based* filtering approach has gained importance and receives a lot of attention (Ben-Shimon et al., 2007). Each of the above mentioned approaches is explained in the following. However, some overlapses among the different classes do exist, making the distinction between them rather difficult.

2.4.1 Collaborative filtering

Collaborative filtering was the first method applied in a recommender system which was named Tapestry (Goldberg et al., 1992). Back then it was called *active collaborative filtering* as people had to tag their explicit opinion about items manually in order for other users to see if these items were interesting for them. Later on, collaborative systems worked more incognito, automatically deciding which items to present to a user (Schafer et al., 2007). Nowadays, this technique represents the most frequently applied filtering method and suggests items with the aid of customer views who have comparable preferences (Liu et al., 2009). The matching

of users is determined by their ratings in the past. If these ratings have been similar their tastes are also considered similar (Ricci et al., 2011). Hereby, the assumption prevails that users with past agreement will agree in the future (Schafer et al., 2007). In a nutshell "the collaborative filtering technique matches people with similar interests and then makes recommendations on this basis" (Montaner et al., 2003). Thus, people create a profile by providing user data e.g. rating items. These profiles are then matched against other user profiles in order to find an overlap of interests. The results are utilized to give new suggestions to the original user. Usually, there are so called "nearest neighbors" for every user which are established through connecting the profiles which are "nearest" to each other because of similar past ratings. The "nearest neighbor" scores are then used to give recommendations on items that the user has not seen before. As a consequence this method needs fewer computations than the method described above without the "nearest neighbors". Summarizing, the collaborative filtering approach is all about the computation of the similarity of users or more so user profiles, which is called a user-profile matching technique (Montaner et al., 2003).

2.4.2 Content-based filtering

Content-based recommendations neglect other customers' opinions and solely give suggestions on the basis of an analysis of the item description and the customer's interests and past behavior. In this approach a definition of every item occurs through a set of features each item possesses. The recommender system then suggests items which best fit the user's interest according to the profile, which was essentially created by using explicit or implicit user feedback of items or manual user data input. Hereby, the assumption is made that the user would evaluate items with comparable objective set of features alike (Pazzani & Billsus, 2007). Applying the content-based filtering method to the travel industry the example in Figure 3 is given. Taking into account attributes of a traveler activity such as category, travel companionship and price travelers have liked in the past, these systems recommend activities which possess a high correlation with the preferred activity attributes. In general, multiple available items are compared to previously rated items and the most equivalent items are suggested (Adomavicius & Tuzhilin, 2005).

2.4.3 Collaborative filtering vs. content-based filtering

Whereas the collaborative filtering approach is focusing on the computation of the similarity of users, the content based approach utilizes the computation of similar items in order to be

able to give recommendations. This technique is also called item-profile matching (Montaner et al., 2003). The differences of these approaches are summarized in Figure 3.

Collaborative Filtering			**activity**	**Content Based Filtering**		
traveler A	**traveler B**	**traveler C**		**category**	**travel company**	**price**
4	2	4	**National-galerie**	culture	No kids, group	expensive
?	2	**5**	**Mauerpark**	outdoor	Kids, group	cheap
?	4	1	**Pergamon-museum**	culture	No kids, group	expensive
4	1	4	**The Berlin Zoo**	outdoor	Kids, group	expensive
2	2	3	**Kater Holzig**	nightlife	No kids, group	decent

Figure 3: Collaborative vs. Content-Based Filtering (scores from 1-5, 1 meaning bad and 5 meaning very good)

In the left example above the recommender system is looking for a recommendation concerning the activity “Mauerpark” for traveler A. Traveler C has the most congruent scoring than traveler A and is thus considered the nearest neighbor of traveler A. Consequently, “Mauerpark” is recommended to traveler A based on traveler B enjoying this activity which is reflected by traveler B’s high rating.

For the right example of content based filtering it is assumed that traveler A has chosen and visited the activity “Nationalgalerie”. Based on the attributes of the activity the recommender system finds the best matching activity with the same or alike attributes. In this case, “Pergamonmuseum” is recommended for traveler A as it possesses the same attributes as the “Nationalgalerie”.

2.4.4 Demographic filtering

Demographic recommenders categorize users according to stereotypical classes and base the recommendations on general features related to those classes. Rough recommendations result from this approach as individual preferences are not considered (Batet et al., 2012). With this

approach the assumption is that for different demographic sectors there should exist a specific set of recommendations. A common example is directing users to homepages according to their native language (Ricci et al., 2011). Other possible classes of demographic information can be age, gender and occupation (Basiri et al., 2010). The essential information for the demographical classification of the users is usually collected through manual data input of the registration form (Montaner et al., 2003). Demographic filtering may offer a way to provide recommendations without a need of user rating and/ or other user information (Burke, 2002).

2.4.5 Knowledge-based filtering

The knowledge based approach represents another recommendation approach and uses detailed knowledge about users and products to be able to give recommendations. Hereby, the system suggests items which have been calculated based upon the user's preferences and needs. It can be argued that every recommendation technique makes inferences to be able to give recommendations. However, the knowledge based approach knows in what way a specific item meets the user's demand and need. The source of the user knowledge can be manifold, whereas the most popular source represents a detailed questionnaire (Burke, 2002). Eventually, the knowledge-based approach recommends items to the users that are approximately most useful (Ricci et al., 2011).

2.4.6 Community-based filtering

This type of approach is based on the friend's preferences of a user in order to give recommendations (Arazy et al., 2009). Hereby, it is assumed that people that are connected via a network share some interests (Ben-Shimon et al., 2007). Furthermore, previous research suggests that recommendations given by the user's friends are more accurate as the ones given by strangers that have similar interests (Sinha & Swearingen, 2001). If the user has a personal social network the ratings of "friends" in that network are taken into account for the recommendation process. Thereby, positive as well as negative ratings of the user's friends play a role, since the sum of the ratings is determining whether an item is recommended or not. The items with the highest scores are suggested whereas negatively rated items are disregarded (Ben-Shimon et al., 2007). The popularity of this approach increases with the upsurge of social networks and offers a huge amount of data, which is usually maintained on a regular basis, for recommender systems to exploit (Golbeck, 2006).

2.4.7 Hybrid filtering

The recommendation systems using a mixture of content-based and collaborative filtering or any other filtering methods are called hybrid recommender systems. By combining certain methods and extracting their individual strengths, the hybrid approach tries to overcome the shortcomings of a single filtering method (Burke, 2007). Evidence suggests that the combination of different approaches leads to an improved performance of the system (Montaner et al., 2003). This has to do with the different drawbacks of each recommendation approach which are overcome when combining different techniques into a hybrid approach (Chikhaoui et al., 2011).

There are various combinations of recommender methods imaginable leading to many possible hybrid recommenders, also called hybrids. Depending on the context, different hybrids need to be applied in order to receive the best possible outcome. Failing to use the most adequate hybrid can result in worse recommendations than with solely one filtering approach (Burke, 2002). Furthermore, hybrid approaches tend to have a longer computing time of the recommendations. This leads to longer waiting time for the user of such a recommender system (Burke, 2004). An overview of the different information filtering approaches is given in Figure 4. Creating this figure the explicitly mentioned techniques in the papers of the single authors named below the figure were taken into account and visualized in a single overview. Some of the drawbacks of the different filtering approaches are explained in 2.5.

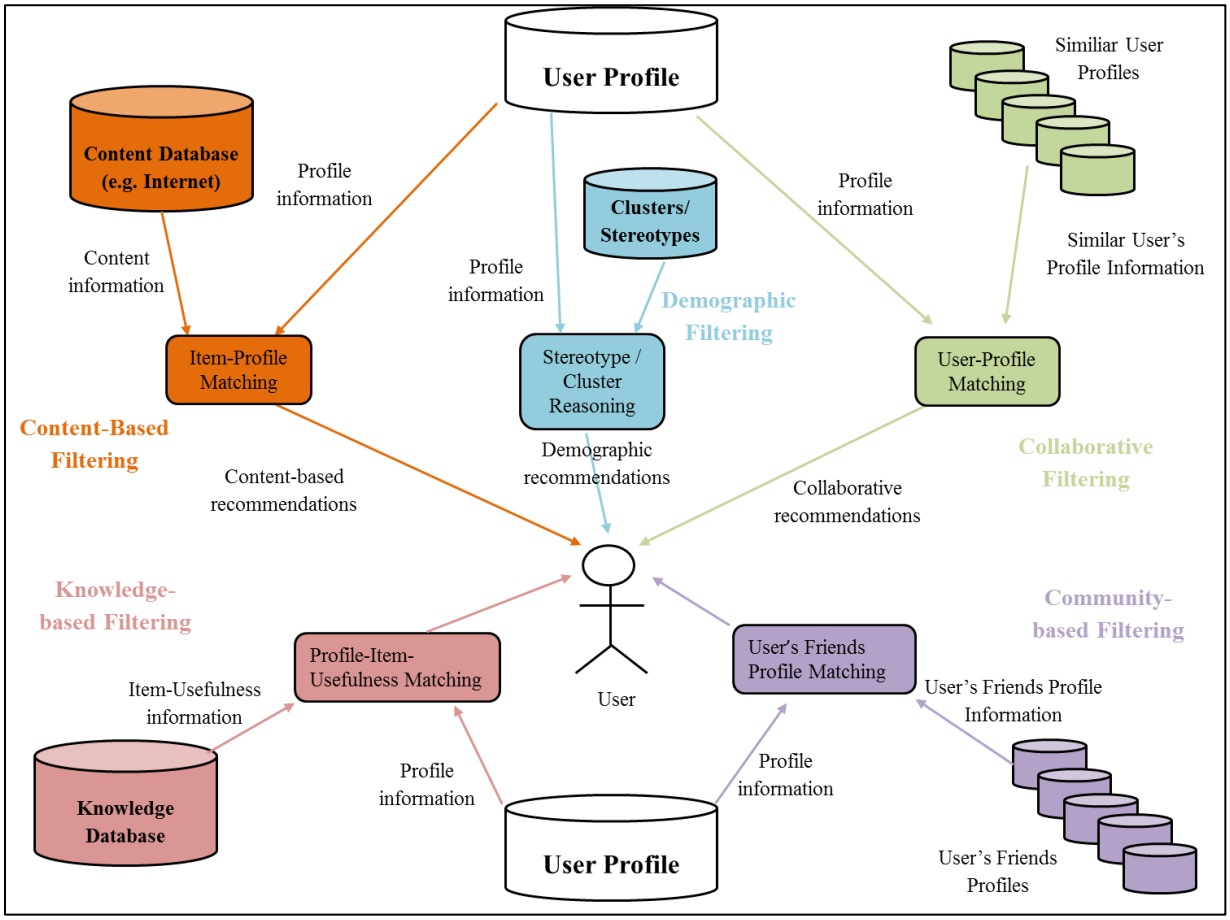


Figure 4: Information filtering overview according to (Adomavicius & Tuzhilin, 2005; Arazy et al., 2009; Ben-Shimon et al., 2007; Burke, 2007; Montaner et al., 2003; Pazzani & Billsus, 2007; Ricci et al., 2011; Schafer et al., 2007)

2.5 Approach drawbacks

Different information filtering approaches possess different drawbacks. Depending on the knowledge the approach exploits the technique can have multiple drawbacks (Ricci et al., 2011). The most popular drawbacks are explained below.

2.5.1 Overspecialization

Overspecialization occurs when the recommender system solely gives suggestions that are great matches according to the user's profile. The user only receives recommendations that are restricted to similar items viewed, bought or visited in the past. Sticking to the example of the tourism domain an example of overspecialization can be the following. Traveler A has only been to or solely rated activities with the category culture (e.g. museums) so far. Thus the recommender system suggests only activities with that specific category and the traveler

will never receive a recommendation of an outdoor or nightlife activity (Adomavicius & Tuzhilin, 2005).

2.5.2 New user problem

In order for a recommender system to function properly a sufficient number of ratings are required, enabling the system to understand the user preferences. Consequently, if there is a lack of user ratings the system cannot come up with accurate recommendations (Ricci et al., 2011).

2.5.3 New item problem

A new item usually has received very few ratings since it is new. The lack of ratings makes this item hard to be recommended to anybody as feedback information is missing in order to match user profiles. The new item problem usually occurs when a constant stream of new items is given, as in the market of news articles (Burke, 2002).

In combination, the new user and new item problem are also referred to as the "cold start problem" or the "ramp up problem" (Burke, 2007). Overcoming this problem recommender systems make use of demographic user characteristics such as gender, age, and occupation (Chikhaoui et al., 2011).

2.5.4 Sparsity

The sparsity problem occurs when there is a lack of feedback data e.g. ratings of items. The consequences are difficulties in matching similar user profiles. The results of this problem are unreliable item recommendations. Assuming a movie rental store recommender system uses the past movie rent outs to group users with similar interests. If there is a shortage of past rent outs the recommender system has not enough information to make reliable recommendations (Huang et al., 2004b).

2.5.5 Gray sheep problem

In the field of recommender systems a gray sheep is a person whose preferences greatly differ from other users. These kinds of persons tend to receive non accurate recommendations as their opinion is not consistently aligned with others no matter how many items are rated (Claypool et al., 1999).

2.5.6 Drawback overview

Most of the problems can be overcome by using a hybrid recommender approach as stated above. The table below summarizes the drawbacks of the different information filtering approaches.

Approach/ Problem	Overspecialization	Sparsity	New user	New item	Gray sheep
Collaborative		x	x	x	x
Content-based	x		x		
Demographic			x		
Knowledge-based			x		
Community-based		x	x	x	x

Table 3: Recommender systems drawbacks overview according to Burke (2002)

In this table it appears that the demographic filtering and the knowledge-based filtering approach almost have no flaws. However, the demographic approach has three main shortcomings, namely that it is too general in its recommendations and the lack of adaption possibility in terms of user interests. In addition the system needs to gather the demographic information (Burke, 2002; Montaner et al., 2003). The biggest drawback of the knowledge filtering approach is that it requires the huge acquisition of knowledge. This knowledge has to be engineered before the system can give recommendations (Burke, 2002).

2.6 Value and usability of recommender systems

The vital goal of a recommender system is to recommend suitable items to the user. This is achieved by the implementation and usage of one or a combination of the filtering methods explained in 2.4. But even the most suitable recommendation is not of any use if the usability of the system is poor and users have a hard time interacting with the service.(Swearingen & Sinha, 2001). As with any information service the value of a recommender system depends on the content and usability of the service. The better the content and usability the higher the user satisfaction and the likelier the success of the information service (Wijnhoven, 2012). The ISO 9241-11 from 1998 defines usability as: "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO, 2013).

The effectiveness, efficiency and satisfaction to reach a goal can be distorted. For instance, a bad navigation can be the source of a low usability as well as short item descriptions. Furthermore, the user interface and design choices of a recommender system influence the user's affective state in terms of emotions. The system has to be user friendly as humans, and not machines, interact with the service (Ricci, 2002). Therefore meeting the user's needs and the supply of satisfactory functionalities is the top priority in order to keep the bounce and churn rate low.

Usability can be assessed and addressed through the results of post study surveys or interviews (Zins et al., 2004). The best performance evaluation of recommender systems in terms of usability is achieved via user feedback on a Likert-scale (McGinty & Reilly, 2011). These statements and suggestions are considered in the creation of this research's design and find application in 5.1.

2.7 Goals of the implementation and usage of a recommender system

Looking at the service recommender systems provide, there are two parties that benefit from the implementation and use of a recommender system. On the one hand, there are service providers of the recommender system and on the other are users of this service. Considering the case of the travel industry, a travel intermediary offering package travels may want to increase its turnover by attracting customers through the use of a recommender system. When in fact, travelers are looking for an appropriate hotel and activities to conduct during their stay (Ricci, 2002; Ricci et al., 2011).

However, there is a variety of different reasons to exploit the recommender technology further. Especially in e-commerce, recommender systems are implemented to increase the number of items sold. Recommended items have a better chance to fit the user's taste which consequently leads to a higher consumption of these goods. Moreover, multiple diverse items are consumed with the help of recommendation systems for not only popular items are advertised but less popular items can be as well recommended to the user. Furthermore, recommender systems increase the user satisfaction and user loyalty to a web site. The more time is spent on a web site the more data is acquired by the recommender system leading to more accurate recommendations which in turn lead to a higher user satisfaction. Summarizing, provider and user have different aims when implementing or using a recommender system. Thus, both site's needs must be fulfilled in order to create value for these two parties (Ricci et al., 2011).

3 User segmentation versus 1 to 1 Personalization

This chapter elaborates the literature on segmentation done in the tourism sector and its application by recommender systems. Particularly, the segmentation according to benefits sought is described. Moreover, a definition of personalization and 1 to 1 personalization is given and possible differences between segmentation and personalization are demonstrated. Furthermore, the concept of marketing intelligence and the GIST-framework is introduced.

3.1 User segmentation

Fundamental marketing strategies give the advice to divide a heterogeneous market into smaller homogenous consumer segments in order to better understand consumer needs. These smaller subgroups of users possess particular needs, actions, and characteristics. Catering to these different segments a company aligns its product according to the varying segments, which is called segmented marketing (Kotler & Armstrong, 2010). In addition to economic theories, psychological theories also suggest market segmentation in order to better provide to consumer needs (Voorhees, 2006).

There are various ways on which variables, users can be segmented and there is no all-in-one solution in terms of what kind of segmentation will yield the best interpretation on the market structure. Kotler & Armstrong (2010) show 4 major categories of segmentation base variables which are elaborated in Table 4.

Category	**Description**	**Types of Variable**
Demographic	Dividing a market into different groups based on certain demographics such as age, gender, or occupation.	Age, gender, occupation, nationality, income, education,
Geographic	Dividing a market into different geographical units such as nations, provinces, regions, parishes, cities, or neighborhoods	Location of residence, climate, density
Psychographic	Dividing a market into different groups based on social class, lifestyle, or personality units such as nations, provinces, regions, parishes, cities, or neighborhoods	Benefits, attitudes, values, personality characteristics
Behavioral	Dividing a market into groups based on consumer knowledge, attitudes, uses ore responses to a product.	Occasions, benefits, user status, loyalty status, attitude toward product

Table 4: Main segmentation categories base variables according to Kotler & Armstrong (2010)

According to Kotler & Armstrong (2010) many marketers have confidence in the behavioral segmentation to be the preeminent initial approach to identify market segments. As can be seen in Table 2 there are multiple types of variables for a behavioral segmentation. Voorhees (2006) suggests that a segmentation strategy according to the benefits sought by customers is a promising approach. This statement receives further support from Haley (1968) who claims that the benefits sought by people when consuming a service is the main reason why market segments are existing.

Benefit segmentation divides the market into groups according to the benefits that are sought by the consumer and Kotler & Armstrong (2010) also accredit a segmentation according to the benefits sought to be powerful. Especially in the tourism market, benefit segmentation is known as an appropriate segmentation approach (Frochot, 2005). Kim et al. (2011) provide an extensive overview of past research on benefit segmentation in the tourist sector. Considering benefit dimensions such as fun, sightseeing and entertainment certain segments were identified in literature which are depicted in Table 5.

Traveler type	Benefit dimensions	Identified Segments	Reference
Japanese visitors to Honolulu	• Togetherness • Sports	• Honeymoon tourism • Fraternal association tourism • Sports tourism • Tourism for rest and relaxation • Business/VFR (visit friends & relatives)	(Kim & Agrusa, 2008)
International Travelers to Macau	• Gambling • Convention and business • Pleasure • Culture exploration • Family togetherness • Shopping	• Convention and business seekers • Family and vacation seekers • Gambling and shopping seekers • Multi-purpose seekers	(Kim et al., 2011)
North American tourists to Latin America	• Fun and Sun • Ecotourism • Performing Arts & Events • Outdoor adventure • General Sightseeing	• Adventurer • Multifarious • Fun & Relaxation • Urbane	(Sarigöllü & Huang, 2005)
Tourists to two rural areas in Scotland	• Outdoors • Rurality • Relaxation • Sport	• Actives • Relaxers • Gazers • Rurals	(Frochot, 2005)
Tourists to the Caribbean	• Sightseeing • Sports • Night Life • Beach • Parks & Arts	• Sun & Fun Seekers • Active Sportspeople • Variety Seekers • Sightseers	(Huang & Sarigöllü, 2008)

Table 5: Past research on benefit segmentation in the tourism sector according to Kim et al. (2011)

In order for a market segmentation to be effective certain segment requirements have to be met. Kotler & Armstrong (2010) argue that there are five requirements a market segment has to fulfill in order to be useful. First, the segment has to be differentiable, meaning those different segments need to react differently to marketing measures. Second, the segment needs to be accessible, though reachable for the company. Third, a segment has to be measurable in terms of size and other dimensions such as purchasing power. Fourth, a segment needs to be substantial in the way that it is worth serving this segment. Fifth, a segment has to be actionable allowing effective marketing being created for this segment. Morrison (1996) adds to these requirements and proposes 8 criteria in total which also apply to the segmentation of the tourism sector and are depicted in Table 6.

Critera No.	Description
1	People within a segment should be similar to each other and segments should be as different from each other as possible (homogeneity).
2	Segments should be identified with a reasonable degree of accuracy (measurable).
3	Segments should be large enough in size to warrant separate attention (substantial).
4	An organization needs to be able to easily reach or access the identified segments (accessible).
5	Segments must require different marketing approaches. This suggests that the segments must differ on those characteristics which will be most relevant to the organization's services or products (defensible).
6	Segments must be suited to the products or services offered by the organization (competitive).
7	Identified segments need to be compatible with existing markets (compatible).
8	There must be some stability in the segments. The identified segments need to remain relevant over an extended period of time (durable).

Table 6: Criteria for market segments in the tourism sector according to Morrison (1996)

There is no sole best segmentation approach as certain companies depending on the market they serve will value a segmentation approach differently than others. The bases on which to segment, as well as the criteria a segment should fulfill are content of ongoing discussions (Moscardo et al., 2001).

3.1.1 User segmentation in the travel sector

Regardless of the difficulties of the heterogeneous tourism domain where multiple information sources have to be matched with various user preferences (Batet et al., 2012), recommender systems have been employed in this particular market (Kabassi, 2010). However, recommender systems enjoy by far more success in the domain of e-commerce, suggesting movies or books. This refers to the fact that travelling is not undertaken as often as watching a movie or reading a book. In addition, a vacation as an experience good is way more complex than books or movies, making the use of recommender systems more difficult (Garcia et al., 2011). Furthermore, plenty of customers watch the same movies or listen to the same music (Koren et al., 2009). On the contrary, a vacation is never the same and rather unique as different factors are altering the travel experience. For instance, contextual factors like seasonality,

opening hours, distance between POIs, the user's budget and the weather are variables that have to be taken into account (Delgado & Davidson, 2002).

Early travel recommender systems like VacationCoach already tried to segment users in categories like "culture creature", "beach bum", or "trail trekker" with the purpose of giving personalized recommendations for their vacation. However, these concepts only lead to a destination recommendation and failed to give further personal advice concerning the visit of possible tourist attractions (Ricci, 2002). A further step was taken by Loh et al. (2003) when grouping travelers according to a tourism ontology with criteria such as family-, business- or single travelers with either interests in museums, music or churches. In order to enhance the quality and precision of suggestions, recommender systems make use of customer segmentation (Wang, 2012) by trying to achieve the highest variance among segments and the lowest variance inside a segment (Liu et al., 2009).

Since the segmentation approach mentioned in 3.1 is bound to general marketing and is not very suitable to the online environment the concept of marketing intelligence (3.1.2) and the GIST-framework (3.1.3) are introduced in order to provide more adequate and concrete approaches for improving a recommender system by user segmentation.

3.1.2 Marketing intelligence

The concept of marketing intelligence according to Büchner & Mulvenna (1998) implies that through collecting further marketing data an improved user understanding can be achieved while interacting with a recommender system. The main goals in regard to marketing intelligence are the recognition of similar user segments and their segment-specific preference motives. The resulting insights can be exploited for the creation of possible new service improvements in the form of new user features in order to increase the user satisfaction with the particular service (Mobasher, 2007).

Marketing intelligence helps to close the gap between the supplied service features in a recommender system and the actual demanded or wished service features by the users. In this context user segmentation according to their preferences can help to find new service features and thus improve the service (Göb, 2010). The concept of marketing intelligence lacks a specific instruction on how to identify user segments, thus the GIST framework is used for this purpose.

3.1.3 The GIST framework

The GIST-framework described by Albert et al. (2004) combines information systems and marketing disciplines and considers the seven guidelines of design science proposed by Hevner et al. (2004). The combination of these disciplines supports building services that understand consumer expectations and requirements and help to meet or exceed those. Thereby, existing marketing models such as described in 3.1 are transformed to fit the online environment. The aim is to detect gaps in user expectations on a segment level and to close these in order to increase user satisfaction. The GIST process consists of the following four stages:

Gather: This step deals with the exploration of possible data sources about the users which could influence the design and effectiveness of the Web Site.

Infer: The next step is about gaining user knowledge for the segmentation phase. For this purpose, Albert et al. (2004) suggest either information from web site registration or online surveys.

Segment: At this stage the user segments are identified and tested by marketing research.

Track: The last step of the GIST-framework includes receiving feedback by testing the usability of the service and identifying gaps between users' expectations and experience of the service. The kind of gaps can be twofold as there are information gaps in terms of content design including site design and information gaps considering the usability design inhibiting features in page design (Albert et al., 2004). Evaluating these gaps Albert et al. (2004) suggest usability studies for each segment.

In a nutshell: "GIST is a framework to continuously identify user groups at the nanosegment level, and to allow for the design and evaluation of targeted flows or user experiences for these segments". Hereby, flows are called nanoflows which represent a site navigation sequence. The actual navigation is compared with intended navigation to reveal shortcomings and information gaps in the design of the service. This process is called gap analysis. Nanosegments are segments of users that are sorted according to the user's characteristics (Albert et al., 2004). Figure 5 visualizes the degree of personalization in relation to the IT requirements and shows where nanosegments are positioned.

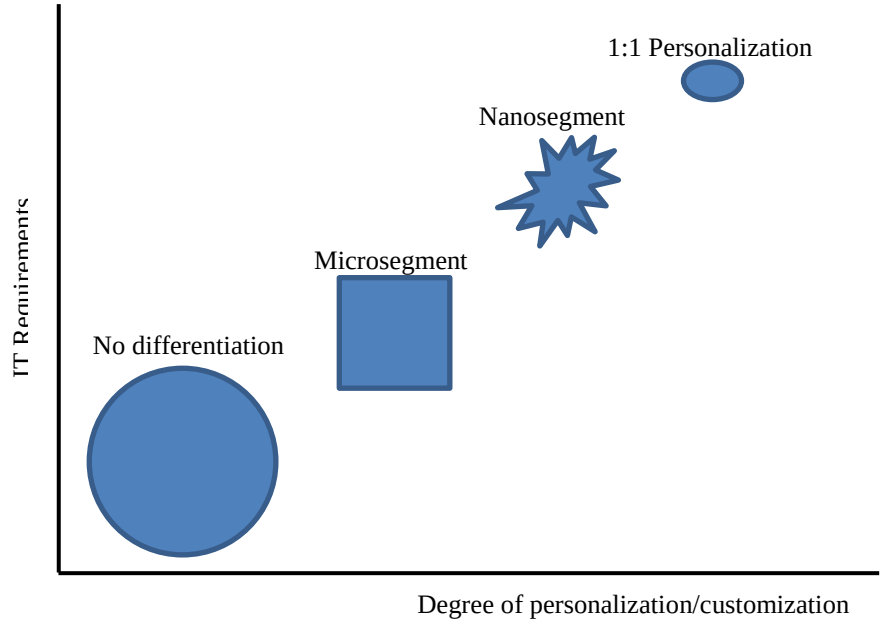


Figure 5: Nanosegments vs. Personalization and Microsegments according to (Albert et al., 2004)

As shown in Figure 5 if there is no technology used, no differentiation between the users is made. The next level of personalization requires technology and is called microsegmentation after Peltier & Schribrowsky (1997). Microsegmentation deals with the question why a purchase is made and does not focus on the user. Nanosegments require even more technology and have a higher degree of personalization as they take user's characteristics such as demographics into account. The only way to increase the degree of personalization is 1 to 1 personalization, as suggested by Peppers & Rogers (2000), which requires enormous technology and information as well as knowledge about the user (Albert et al., 2004). (in the following when talking about segmentation, segmentation on the nanosegmentation-level is meant)

3.2 1 to 1 Personalization

The advantages of personalization for marketers and customers are manifold. Increased customer attention and loyalty are only a few examples of the benefits. Especially, information systems make increasingly use of personalization. The topic of personalization has received a lot of attention lately but a clear definition of this marketing approach is still lacking (Sunikka & Bragge, 2008). This is also due to the fact that differentiating between classical market segmentation as described in 3.1 and personalization is rather difficult as for example 1 to 1 personalization approaches can also be accounted for a usage based segmentation method (Simonson, 2005).

In the online environment various definitions of personalization are present. For example (Instone, 2000) defines a personalization service as a software that uses knowledge according to user profiles in order to show different user interfaces. Wu et al. (2003) provide a more general definition of personalization. They state that the alteration of all features of a website according to the needs of the user is personalization. Peppers & Rogers (2000) state that the concept of personalization revolves around unknown customer preferences which can be revealed by gaining knowledge about the customers.

Discovering the preferences of the customers and building knowledge about them leads to better customer targeting and additional value for the customer. Moreover, catering to a segment which consists only of one customer is not less effective than catering to bigger segments, except the supplementary costs associated with targeting only one customer compensate the gained benefits (Simonson, 2005). This is exactly the point on which every company has to decide upon when serving their customers. This decision is also influenced by the market a company operates in as the bigger segments or one member segments might not fulfill the requirements of a segmentation described in 3.1 and thus the latter is not useful.

4 Travel recommender system George

This chapter explains how George works and which data representation and filtering methods are used in order to show possible weaknesses for the proceeding improvement study. First, it is depicted what the *user sees and experiences* in the process of using George. Second, the functioning and methods *behind the user interface* are elaborated in 4.2. George's architecture and business model are also elicited in this chapter.

4.1 George's mode of operation from the user's perspective

There are usually five steps to take when planning a day trip with George which are visualized in Figure 6 and explained in the following. Beginning with the profiling the user answers 10 questions and is directed to a page with recommendations and the possibility to change those. Afterwards a map with a route of the suggested activities can be seen and in the overview section the entire day's activities are listed. At the end the user can save the created day in the form of a pdf-file or to a mobile.

Figure 6: Process of using George (own figure)

4.1.1 Start

The user starts on a page with a small questionnaire. This questionnaire is specially designed to determine the traveler's needs and possible constraints for the trip. The traveler clicks one of the three possible answers for each of the ten questions. After finishing the last question the user is immediately directed to the recommended activities. A screenshot of the questionnaire which represents the homepage of George is depicted in Figure 7.

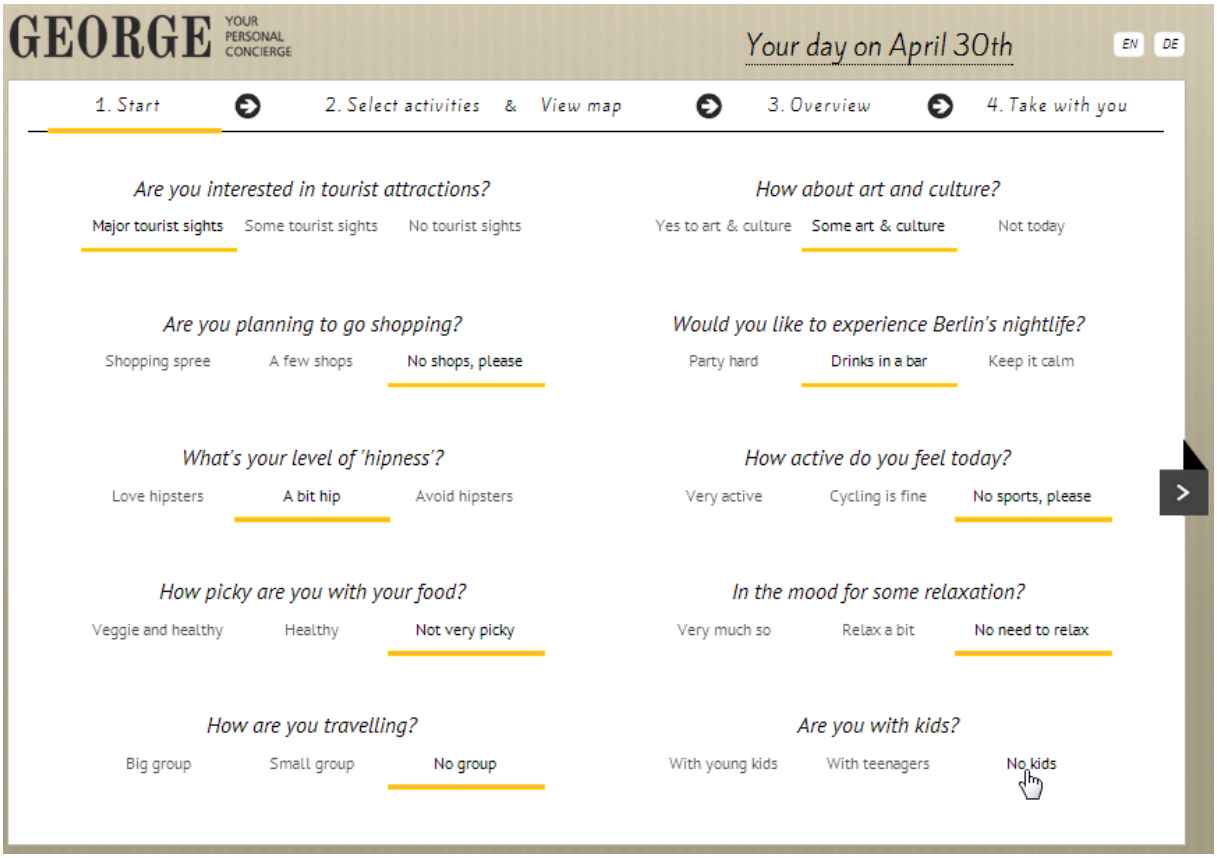


Figure 7: User profiling (http://app.georgeconcierge.com)

4.1.2 Select activities

After finishing the questionnaire the user receives a graphically appealing picture with six recommended activities for the day which can be seen in Figure 8. Of the six recommended activities, three are for the intake of food, namely breakfast, lunch and dinner. In the case of discontent about one or multiple suggestions the user has the possibility to exchange the suggestions by clicking on the arrow (»). In addition, each activity can be clicked to receive a detailed written description (Figure 9) about the activity including pictures, the nearest subway station, opening hours, category, costs and contact. Furthermore, the user also has the chance to exchange the recommended activity by clicking on the next suggestion arrow (») in this window. Once, satisfied with the recommendations the user can proceed to the next step.

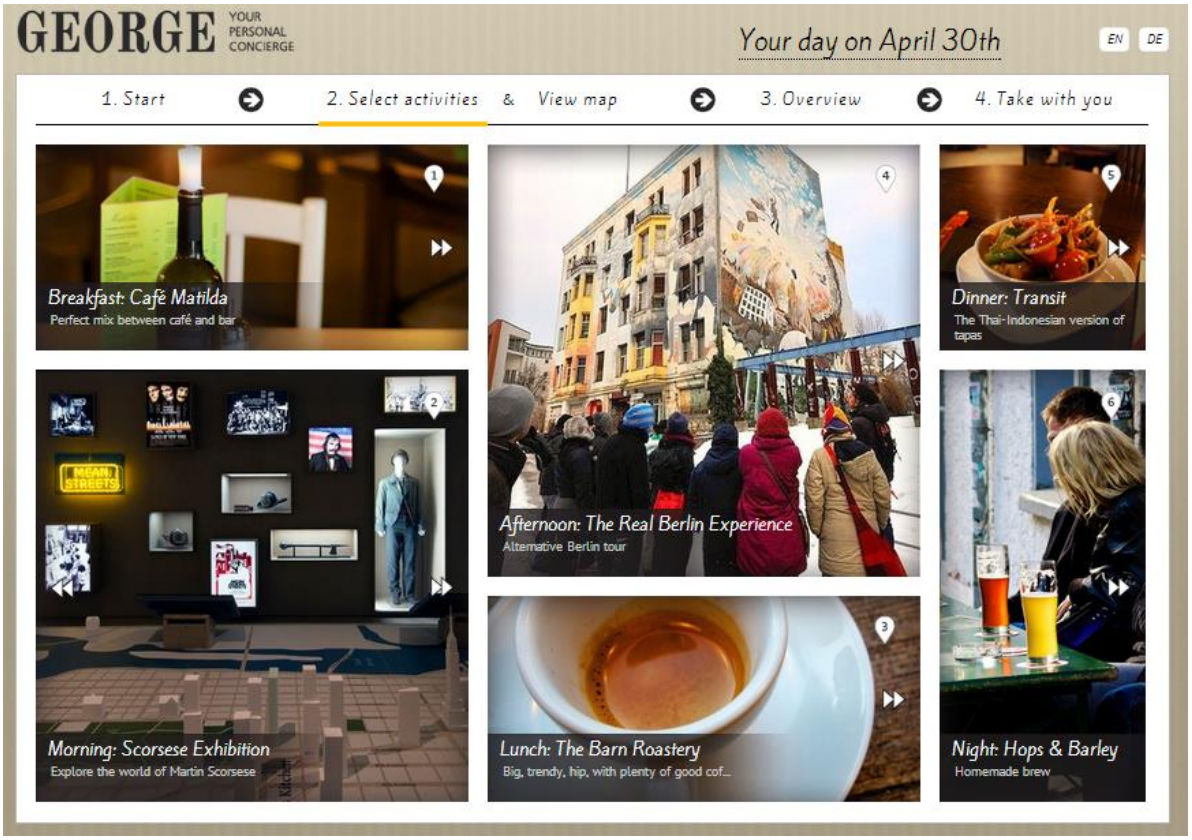


Figure 8: Selection of activities (http://app.georgeconcierge.com)

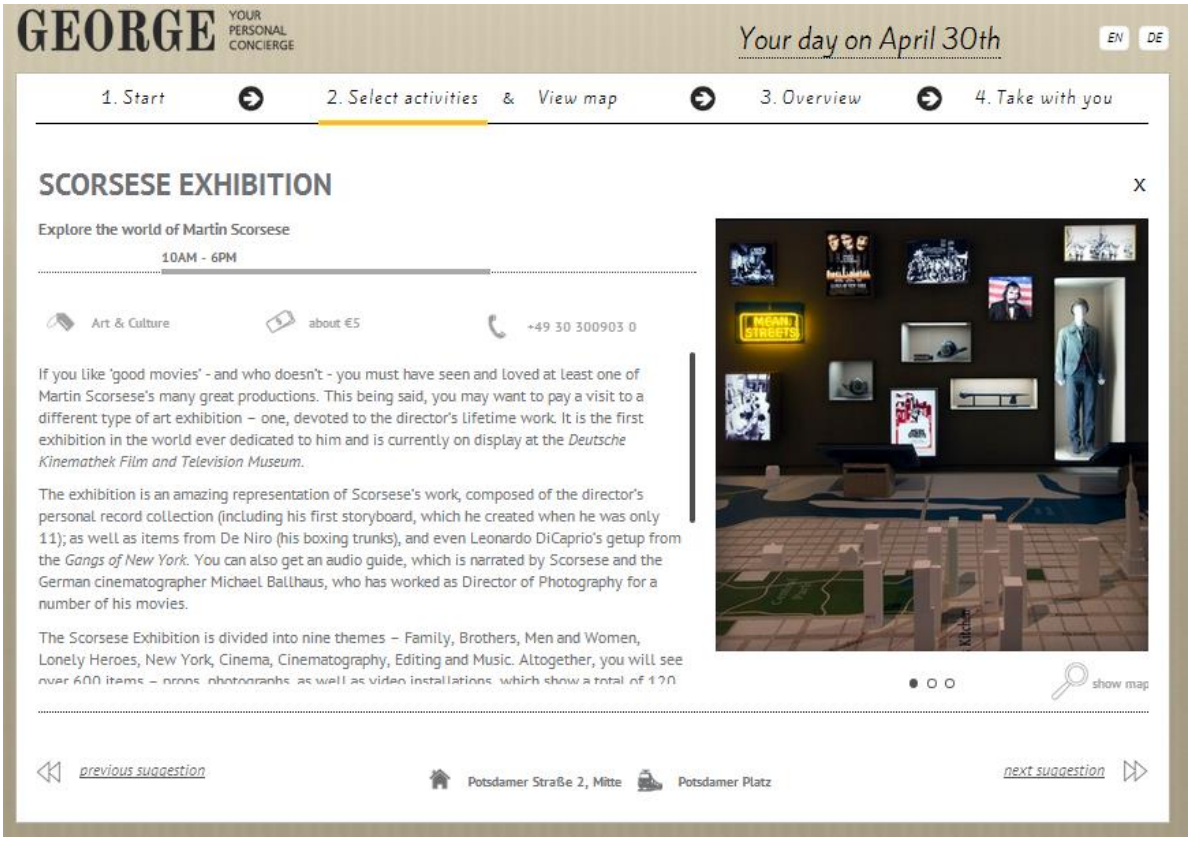


Figure 9: Detailed description of one activity (http://app.georgeconcierge.com)

4.1.3 View map

In this step the route for the six recommended activities in numerical order is shown with the help of "Google maps" (Figure 10). Hovering over a pin which represents a numbered activity the title of the activity is shown. By clicking on the pin the user is directed to the detailed description of the activity which was shown in Figure 9.

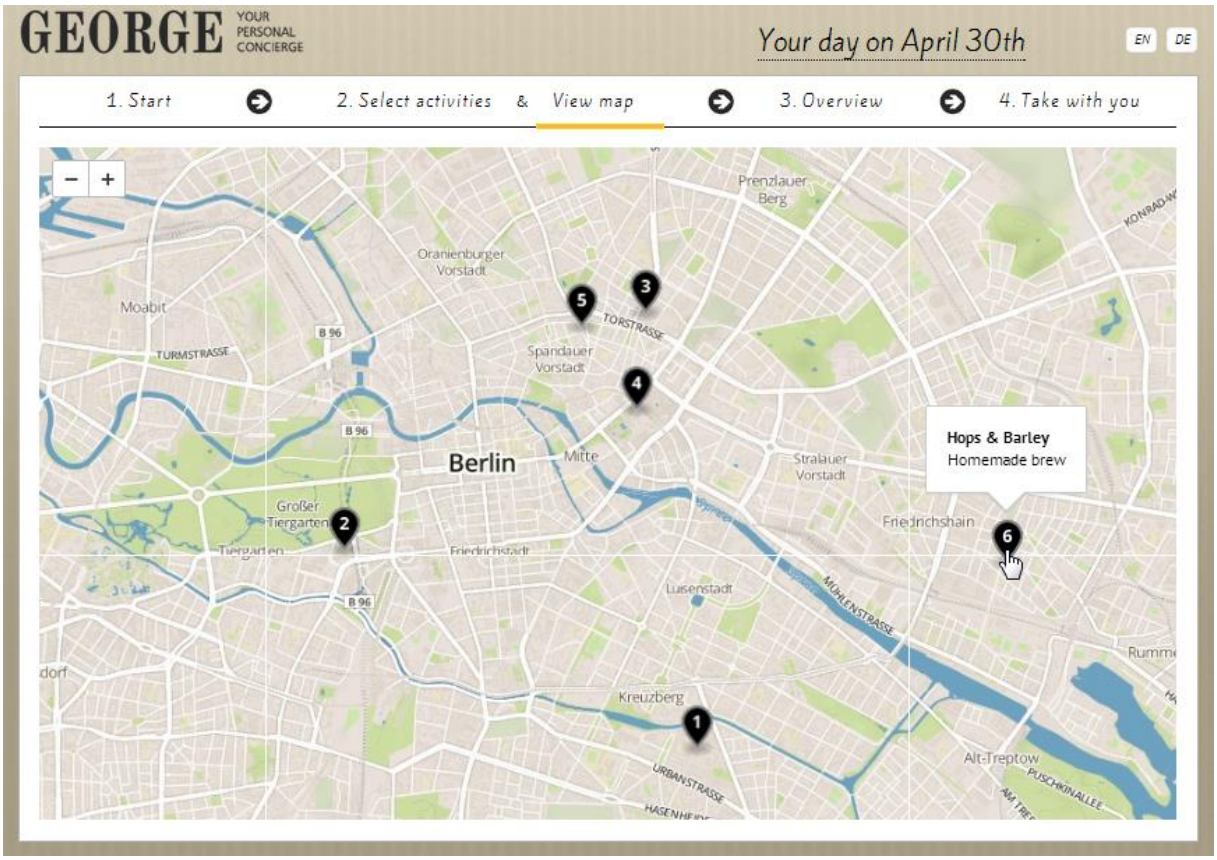


Figure 10: Map of selected activities (http://app.georgeconcierge.com)

At the next stage the user can see the planned activities in sequential order and in detail. This overview is useful to see what the user can expect from the day and increases anticipation. A section from the overview is shown in Figure 11.

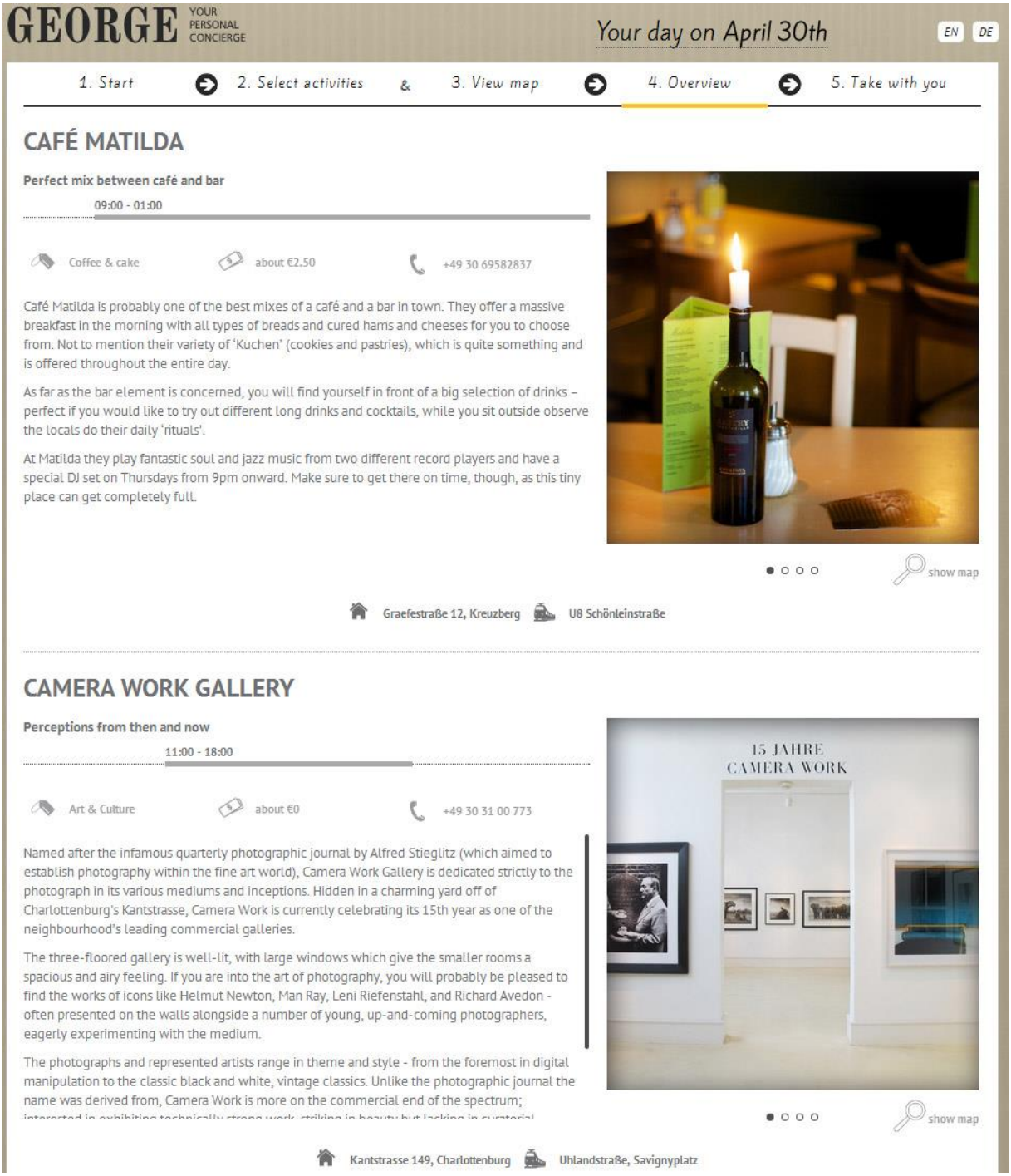


Figure 11: Overview of activity selection (http://app.georgeconcierge.com)

In the last step the user has the possibility to print out the planned day or to transfer it to a mobile phone as displayed in Figure 12. In order to transfer the planned day to a mobile phone, the George Concierge app needs to be downloaded via the Google play market or iTunes store. Once the app is installed the QR code which represents the information of the created day can be scanned and is transferred to the phone.

Figure 12: Take your day with you (http://app.georgeconcierge.com)

4.2 George's mode of operation behind the user interface

What the user does not see when using George are the data representation methods and filtering techniques in the background applied to come up with personalized recommendations for the day. George reverts to techniques and methods described in chapter 2 and the exact process is further explained in the following.

4.2.1 Data representation in the form of user profiles

In order for George to be able to give recommendations, user information is needed which is collected through a short questionnaire with 10 questions. The answers of this questionnaire are then computed and based on the results the user is assigned to 1 out of approximately 100 traveler profiles. These profiles play an important part in the process of giving personalized recommendations as mentioned in 2.3.

4.2.2 The applied filtering approaches

From a technical perspective George relies mainly on a *content-based approach* (2.4.2) when giving suggestions for the day. Capturing the information from the questionnaire George takes into account the user's needs and constraints for the trip. The system then uses this information to assign an individual profile to the user as mentioned above with the help of 70 preference levers. For visualization reasons ten of these levers are depicted below and they range from 0 to a 100.

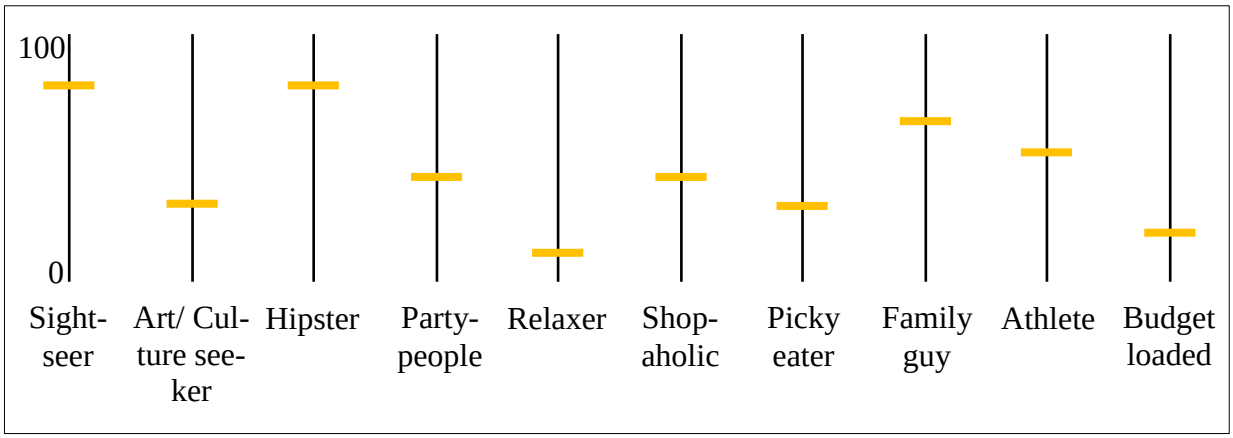


Figure 13: Exemplary snippet of the preference levers (own figure)

Answers given to the questionnaire can affect a single lever's score and can also add each other up or vice versa lead to a subtraction of a score. The results of the 70 preference levers are then matched with the 500 activities available in George's database for Berlin with the help of the Matcher. The Matcher consists of a hard and soft filter and its functioning is explained in the following.

Not all the 500 activities are considered in the progress of giving a recommendation due to contextual constraints. The events which are cut out are usually too far away or are not opened at the time when the request is performed. This first sorting out of activities is done by the hard filter also called truncated filter which typically sorts out 60% of the 500 activities leaving 40% to the soft filter.

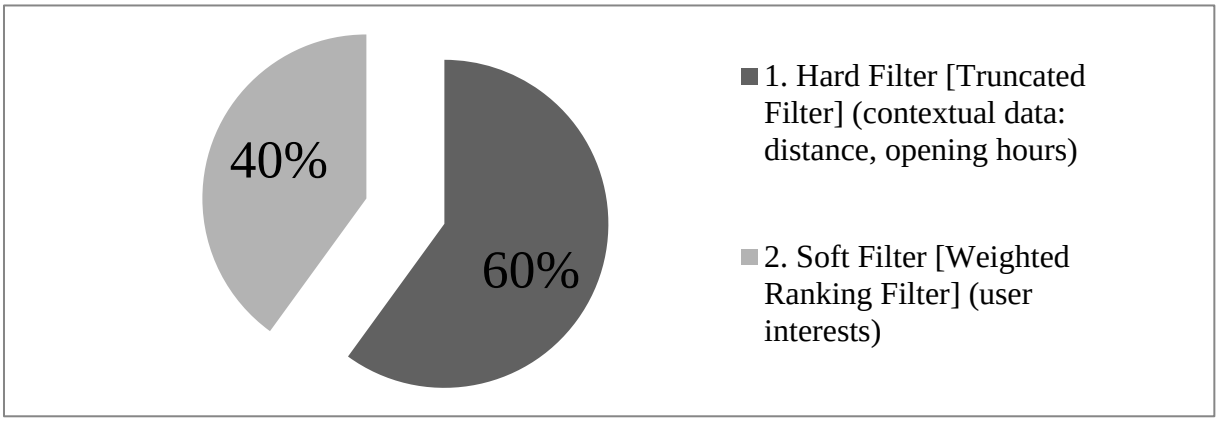


Figure 14: Kinds of Filters (own figure)

The soft filter then utilizes the results of the preference levers to weigh and rank the remaining activities. Hereby, each activity receives points in the form of koints. A koint is a term used by the George developers and represents the equivalent to a point on a metric scale. The higher the number of koints an activity possesses the higher the probability that this activity is recommended. The activities with the most koints are ranked first. The Matcher's work is done after generating this weighted ranking list which usually consists of around 200 activities and a snippet of a list for the recommended day is shown in Table 7. As shown in the Table 7 each activity is combined with the amount of koints and a tag. The tag represents a certain component of the travel day correlating with the time frame in which an activity can be executed. An activity can therefore have multiple tags if it can be performed all day. There are always six successive components to one travel day: breakfast, a morning activity, lunch, an afternoon activity, dinner and a night activity. These six components/ tags constitute the layered taxonomy of one travel day.

koints	Activity name	tag
340	Hops and Barky	Night activity
327	Transit	Dinner
289	The Real Berlin Experience	Afternoon activity
282	The Barn Roastery	Lunch
264	Café Matilda	Breakfast
220	Scorsese Exhibition	Morning activity, Afternoon activity
212	Café Hardenberg	Breakfast
203	Pergamonmuseum	Morning activity, Afternoon activity
189	Quasimodo	Night activity
147	Sage	Dinner
…		

Table 7: Snippet of weighted and ranked list from the Matcher (own table)

At this point of time the Day Creator comes into play by scanning the weighted and ranked list from the Matcher for activities with certain tags. The Day Creator always starts at the top of the list of ranked activities and firstly sorts out all activities with the tag "breakfast". The first activity for eating breakfast, in this case Café Matilda (see Table 7) with 264 koints, is presented to the user. All other activities with the tag breakfast are alternatives to Café Matilda and can be accessed in descending order by the amount of koints by clicking the right arrow (>>) on the picture as depicted in Figure 8. This procedure is repeated with all the other components of the day taxonomy until the entire day is created.

The user now has the possibility to change the recommended activities as explained above. Once finished the day can be printed out or downloaded to the phone. If done so this particular day is saved in the POI/ activity database and used in the future recommendation process. This represents a kind of *collaboration filtering* (2.4.1) approach as users with certain preferences, hence a profile, evaluated the activities by selecting them for their travel day. These activities are then treated superior for future recommendations to users with similar preferences and profiles. The entire process is summarized in Figure 15.

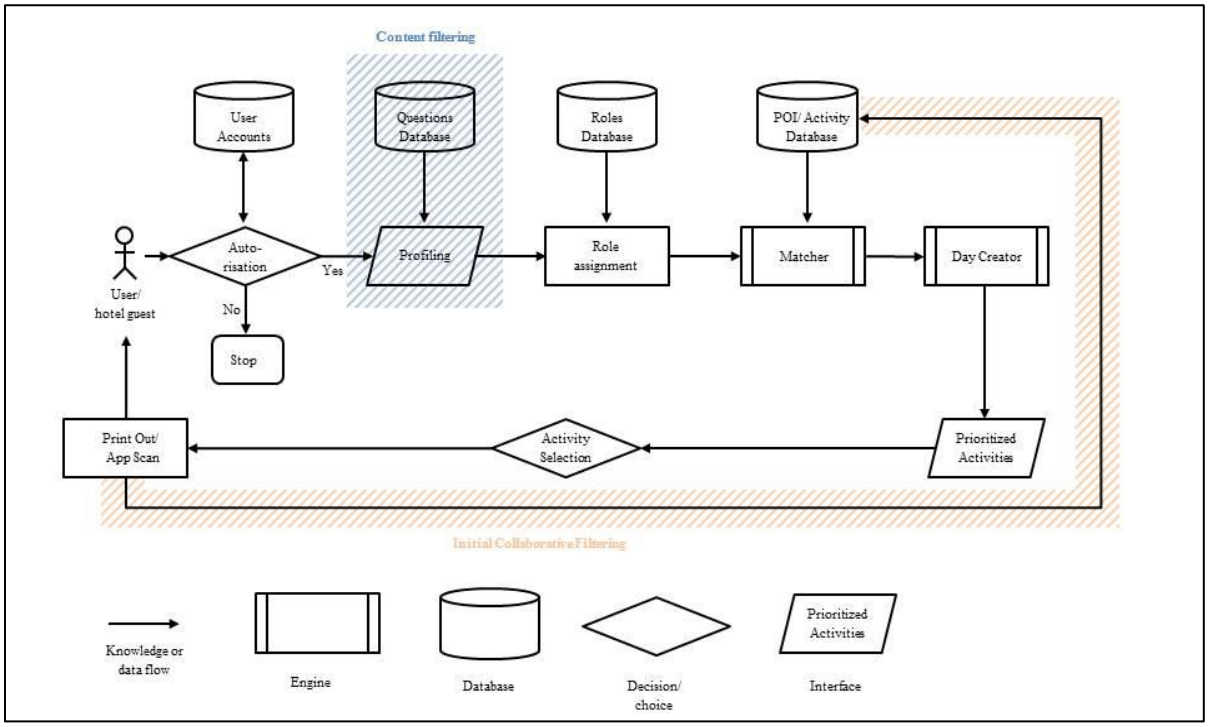


Figure 15: George's architecture (own figure)

4.3 George's service portfolio

In the following, the services which George is capable of offering are listed. Due to the dynamic environment in which George operates the list of services is continually extended and the single services are also frequently improved.

George currently is able to

- detect specific user preferences through a questionnaire and on this basis assign a specific profile to the user.
- offer a detailed graphically sophisticated user interface with focus on visualization.
- compose a trip consisting out of morning, afternoon and evening as well as night activities according to the user profile.
- check the components of the trip in terms of contextual data such as opening hours, distance and budget.
- offer the possibility to choose among alternatives as the trip is composed.
- offer the possibility to print out the created day of activities or transfer it to the user's mobile via the George Concierge App.

4.4 George's business model

In order to explain George's business model the following business model canvas according to Osterwalder & Pigneur (2010) is filled out with keywords to see the main facts of George's business model at a glance in Figure 16. Key partners, key activities and key resources are elaborated. The value proposition is explained as well as the type of customer relationship, channels and customer segments. The cost structure is depicted and last the important question of how revenue streams are generated is answered.

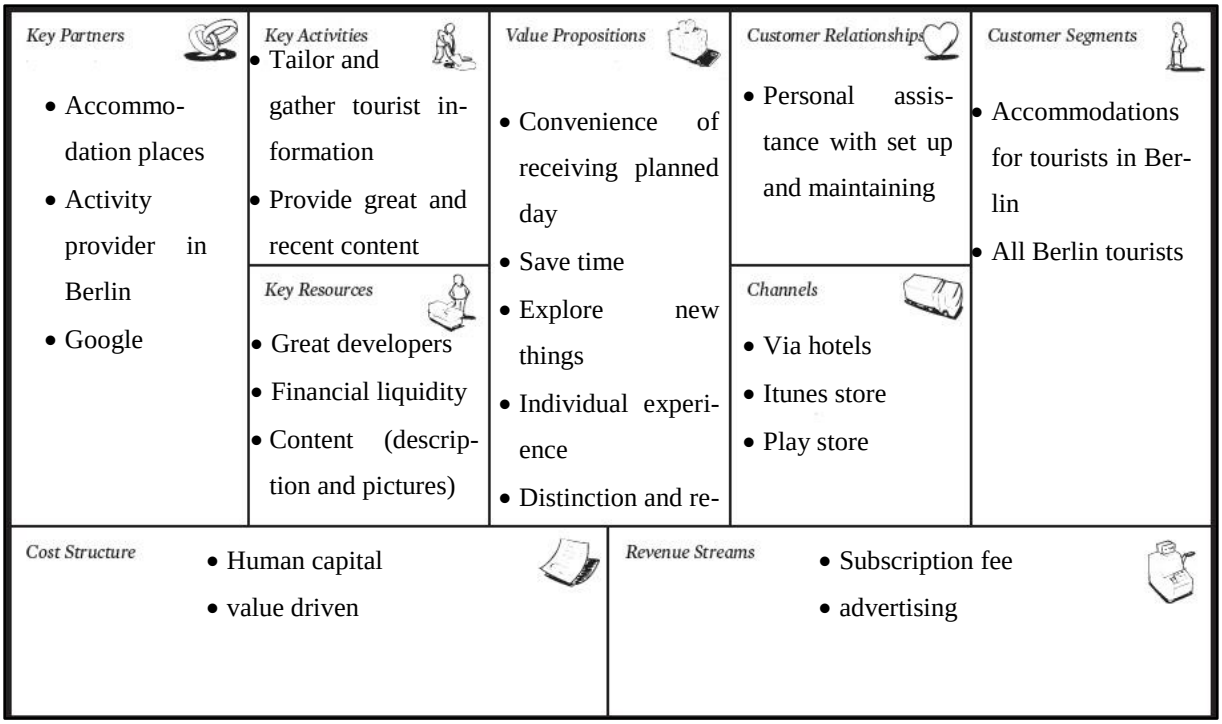


Figure 16: George's Business Model Canvas (own figure)

4.4.1 Key partners, key activities and key resources

The main *key partners* of George are those accommodations where the service is offered. The accommodation places point to the fact that George is available in their place and offer the infrastructure e.g. a computer or tablet PC and provide the user with the code they need to access George. Moreover, George stays in close contact to activity providers in Berlin in order to receive recent information about interesting activities offered in Berlin. Furthermore, Google supports George by providing web infrastructure means at a very low cost.

The *key activities* for George are to gather and tailor information to the user needs for a particular time span and make this information accessible through the George Concierge Service. On top of that, the information provided needs to be recent, well written and understandable.

George's *key resources* are the developers that create the filtering and matching method in order to come up with personalized suggestions. They make sure the system is up and running, guaranteeing a reliable and sufficient service. Content manager are equally important as they take care of the activities' high quality description and pictures. Without a proper content the service would not be as appealing as it is right now. When offering a service on a fairly new market like George it is important to have a financial back up in avoidance of illiquidity. Since the market for travel recommender systems for cities is in its early stages it is necessary to maintain liquid in order to ensure the longevity of the company so when market acceptance rises George is still viable and ready to scale its business.

4.4.2 Value proposition, customer relationship and cost structure

The actual user of George receives an individual planned day with lots of varying and insider activities within a few minutes. Thus, the *value proposition* is saving time, the possibility to explore new things and receiving an individual experience through George. The accommodation places which offer George can use the service to differentiate themselves from others and as a customer retention measure.

The *customer relationship* between the actual user and George is mediated through the accommodation places, making these places the first point of interaction. Each accommodation place receives an individualized version of George according to their wishes. This treatment needs personal assistance with the set-up of George and a constant low level of maintenance, keeping the expenses at a minimum.

In terms of *cost structure*, human capital accounts for the biggest portion of the expenses. There are mainly fixed costs such as the salaries and the rent for the office and almost no variable costs. The George team needs to develop, maintain and improve the app and provide adequate written and visual content for the service. Consequently, the business is value driven.

4.4.3 Customer segments, channels and revenue streams

George *customer segments* are obviously the travelers that are using George to compose a trip for their stay in Berlin. Users can access the app via the *channels* Google play store or iTunes

store. They receive the most benefits by using the service as George can help composing a trip and saves time and hassle. Consequently it would make sense to charge the consumer for this service. However, the Online Concierge GmbH is following a different way of monetization by approaching places offering accommodations in Berlin to include George as their personal concierge service for their guests. By committing to this offer the accommodation places pay a monthly fee and receive unlimited access to George. Offering George to their guests the places can differentiate themselves from their competitors and furthermore use the service as a retention measure and improve their customer relations. For the Online Concierge GmbH the monthly reoccurring *revenue stream* from the accommodation places is easy to forecast and more predictable as the payment from single travelers. This approach opposes the mentality that everything on the internet should be free by charging an intermediary in this case the hotels and hostels.

As can be seen from Table 1 most of the travel recommender systems are not commercially deployed and therefore do not have a revenue model. The exception is Citytrip Planner which supposedly receives money by offering tickets to certain events, tours and airport transfers. In addition they charge the traveler currently 4 Euros to receive the composed trip on their mobile (Planner, 2013). This approach is not very compatible with the low willingness of internet users to pay for information goods. Because of the possibility to save the composed trip as a pdf-file there are other ways to transferring the trip to the customer's mobile without paying for it.

In addition to the accommodation places and the users another player could profit from George's service, namely the food places suggested by George. George is recently thinking about offering advertising spots or favorite listings to restaurants in order to establish another revenue stream. Premium listings or paid restaurant suggestions have to be handled cautiously as they could easily lead to a loss of credibility of the service.

5 Research objective, design and methodology

Since this study is essentially about improving the design of George a design science study is carried out. Design science combines academic insights and practical needs which in this study is given through the application of the concept of marketing intelligence and the GIST-framework in combination with the think aloud session (Hevner et al., 2004). The GIST framework (see 3.1.3) helps to review the concept of marketing intelligence (see 3.1.1) which states that the investigation of user segments with different preferences can lead to segment-specific service improvements and new service features.

A design science study takes advantage of so called design propositions. Designing information systems is costly due to the expensive data collection needed. For this reason, design propositions serve as prognostic statements and concepts for the design of information systems. Built on logical reasoning, design propositions are guiding statements for the data collection and service improvement process. The information services' success depends on and requires correct design propositions. Applied to an information system improvement study, design propositions assist in finding ways to improve the service by confirming propositions. Hereby, the content as well as the design of an information service is crucial for the value of the service and thus important for the satisfaction of the user. Deriving design propositions the business objectives of a service need to be clear in order to come up with requirements for the service design (Wijnhoven, 2012).

The objective of George is to provide a personalized traveling day in Berlin. The question arising is what level of personalization is needed to improve and find new service features and thus enhance the user experience. Visualizing this problem the research model in Figure 17 is developed, illustrating the linkage between an increase of user experience through a user tailored service with the help of user segmentation or 1 to 1 personalization. The idea is to tailor the service according to the identified segments preference patterns in order to improve the user experience and test the usability of existing service features. Thereby, the nanosegmentation or 1 to 1 personalization helps to identify existing information gaps of the service and at the same time detect possible system improvements and new service features.

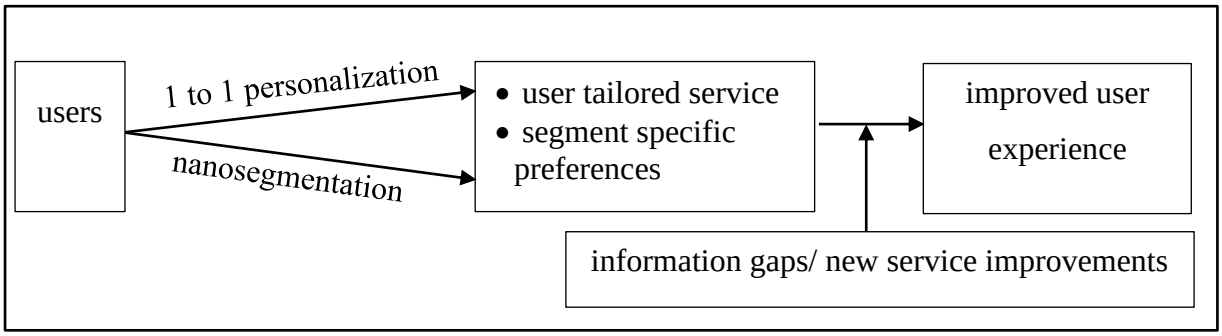


Figure 17: Research model (own figure)

Based on this thought, design proposition 1 and 2 read as follows:

DP1: A segmentation of users according to their benefits sought leads to service improvements and new service features.

DP2: A 1 to 1 personalization of users leads to service improvements and new service features.

Design proposition 3 is built upon the business objective to provide a good usability of the service which includes a proper navigation within the service as described in 2.6. The requirement to achieve an easy and understandable navigation is therefore the goal. In order to meet this goal the intended user flow in terms of navigation is compared to the actual use of the navigation according to the concept of nanoflows from Albert et al. (2004) mentioned in 3.1.3. Derived from this the following third design proposition reads as follows.

DP3: The comparison of the intended and actual user flow yields a new navigation of the service.

Carrying out the improvement study the GIST framework aids as a guide for the collection and analysis of the data. The GIST framework was originally applied to a company in the banking sector and members of the Fortune 50 firms and is now used in the tourist sector with George. In Figure 18 the four GIST-framework steps which are applied and adjusted to the case of George are summarized. These steps are taken in order to identify different information gaps for different user segments in order to come up with service recommendations and new service features to improve the current service offered by George.

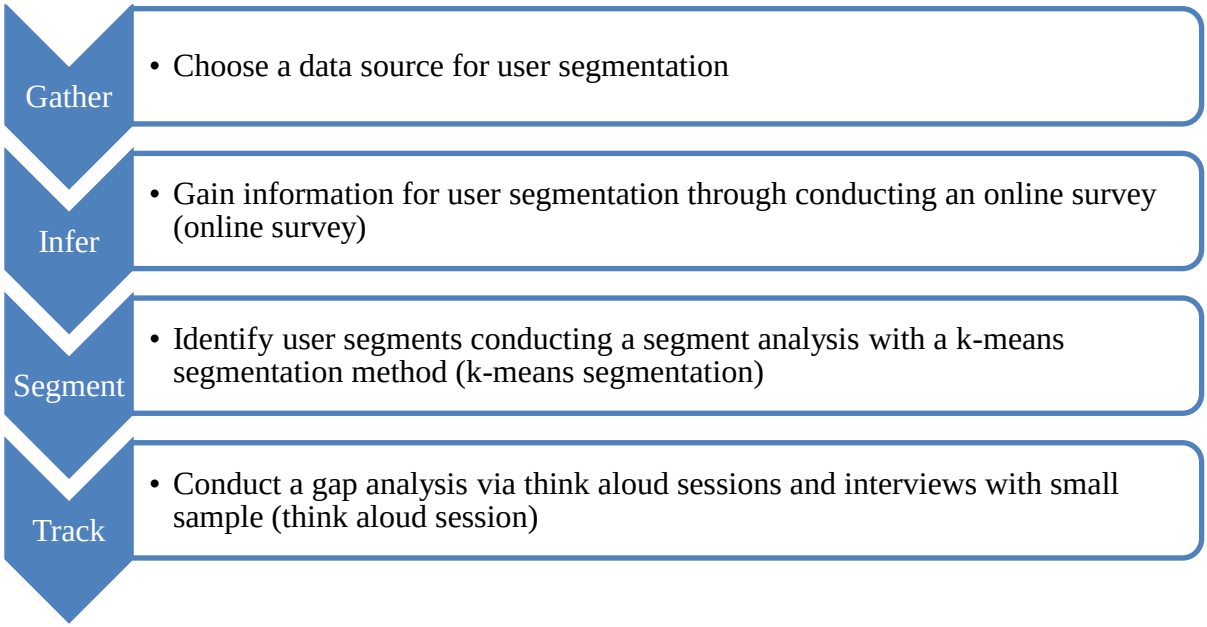


Figure 18: The GIST-framework applied to George according to Albert et al. (2004)

For the step "gather" Albert et al. (2004) suggest either information from web site registration or online surveys. This thesis chooses the latter approach to come up with information for user segmentation because online surveys because as George is rather new, the sources of data are limited. Due to this reason an online survey as data source for information retrieval is chosen. In the next step "infer" the online survey is carried out. The results of this survey is the basis for the the segmentation approach in the next step. In the phase "segment" the thesis identifies user segments conducting a segment analysis using a maximum of 10 iterations with a k-means segmentation method on the basis of different benefit dimensions identified from the results of the former online survey. The last step "track" consists of a usability study in the form of a think-aloud session. The results of these sessions are then put into recommendations for improving the service George currently offers.

5.1 Research design

Since the research field of travel recommender systems connected to usability testing with user segments is rather new, the existing literature in this field is limited. Therefore, this thesis is based on an empirical, descriptive and exploratory primary research. A multi method design consisting of surveys, think aloud sessions and interviews, as depicted in Figure 18 is used to assess quantitative and qualitative data.

5.1.1 Online survey

In order to collect data on the traveler's benefits sought for the following user segmentation, an online survey is carried out with 117 participants. The data collection from the survey solely serves the purpose of segmentation, not directly the improvement. The questionnaire was prepared in order to gather demographic and behavioral information such as age, length of stay, occupation and country of origin. For gathering behavioral information participants answered a series of benefit statements on a scale from 1 to 5 (1 meaning totally disagree and 5 meaning totally agree) concerning the benefits they seek when travelling to e.g. business, family, pleasure or culture. The 14 benefit statements which serve as a basis for segmentation are measured on a 5-point Likert-scale (from 1=strongly disagree to 5 strongly agree) and are listed in the following.

Q1: You would visit Berlin for business purposes.
Q2: You would visit Berlin to attend meetings or other business related events.
Q3: You would visit Berlin to do something with the family.
Q4: You would visit Berlin to visit friends and relatives.
Q5: You would visit Berlin to mix with locals.
Q6: You would visit Berlin to experience a different culture.
Q7: You would visit Berlin to go sightseeing.
Q8: You would visit Berlin to explore the art scene.
Q9: You would visit Berlin to do exciting things.
Q10: You would visit Berlin for the night life.
Q11: You would visit Berlin to get away from everyday life.
Q13: You would visit Berlin to enjoy the variety of activities you can experience.
Q14: You would visit Berlin to go shopping.

The selection of benefits was composed based on the most common ones found in former studies (Frochot, 2005; Huang & Sarigöllü, 2008; Kim & Agrusa, 2008; Kim et al., 2011; Sarigöllü & Huang, 2005). In order to identify possible misconceptions, mistakes and to remove ambiguity and for validity purposes, a pretest with 20 persons is executed. The pretest increases the validity as participants were asked if the questions raised are understandable. Moreover, the pretest ensures that a variance of answers are given and helps to estimate the duration of the survey (Kuß, 2012). To ensure the reliability of the survey a Cronbach's α test is carried out which is well suitable for surveys with Likert-scale items (Gadermann et al., 2012).

The sampling strategy for the online survey is called snowball sampling which is a non-probability sampling technique. With snowball sampling survey participants were reached via social media channels and email. Snow ball sampling was chosen because it is cost and time efficient when it comes to building a participant group. The disadvantages of this technique are that the sample is not chosen randomly and that there might be a community bias (Sadler et al., 2010). Moreover, the representativeness of the sample is limited as finding a representative sample for online surveys with the help of social media and email is beyond the scope of a researcher (Hollaus, 2007).

5.1.1 K-means segment analysis

Utilizing the data from the survey, a segment analysis is conducted with the help of a k-means segmentation method. The rated benefit statements of the online survey are factor analyzed in order to identify underlying dimensions. On the basis of the identified dimensions the segment analysis is carried out. Segment analysis is a multivariate analysis technique also known as cluster analysis and is a typical classification tool for the grouping of people. In marketing, a segment analysis is mainly used for market segmentation and serves as the foundation for further examination (Punj & Stewart, 1983). In this study the grouping of the travelers is based on the benefits they seek when planning a trip to Berlin as described in 3.1. In terms of validity, certain limitations concerning the completeness of the gained data need to be mentioned as the sample size might be limited as survey participants are only reached by email and social media. Concerning the reliability and significance of the segmentation Cronbach's α, ANOVA test results and post hoc analysis outcomes in the form of a Scheffe multiple range test are considered.

5.1.2 Think Aloud Session

Closely examining the identified segments from the segment analysis with the help of the guiding design propositions, 12 persons from the two biggest segments (who took part in the preceding survey) will participate in a think aloud session. The sample is therefore the result of a cluster sampling strategy which suits the limits of a qualitative investigation. The benefit of cluster sampling is the high efficiency of this method but the drawback of this method is the less accurate sample because the sample might not be representative of the population (Babbie, 2012). In carrying out the think aloud session, participants are given the task to plan a day trip in Berlin with the help of George and are closely observed and videotaped. In addition, their interaction with the service is recorded with the help of a screen capture tool. All the video material can be accessed by contacting the author. Through this method, insights about user thinking processes can be non-obtrusively gained (Van Someren et al., 1994).

The results of think aloud sessions are usually in the form of verbal protocols and the reliability of these results is doubted by many researchers (Boren & Ramey, 2000). Nisbett & Wilson (1977) argue that it is not possible for people to report their cognitive processes while executing a task. People rather rely on a priori opinions or plausible explanation for a given response when trying to verbally report their cognitive processes. Contradictory, Ericsson & Simon (1980) argue that verbal reports are in fact data and distinguish between three different levels of reliable verbalization. The reliability of the verbal reports decreases with the increase of non-task related interference and are defined in the following:

Level 1: This level is also referred to as direct verbalization as the information reproduced has the same form as the original one. An example of level 1 verbalization is reporting cognitive processes while solving a math problem because numbers can be reproduced in the same manner as they are encoded. This form of verbalization is the most reliable one according to the model of Ericsson & Simon (1980).

Level 2: Solely verbalizing images is considered level 2 verbalization because it requires a transformation of visual information into words. This form of verbalization is less reliable than level 1 verbalization but still considered reliable.

Level 3: Any interference in the course of reporting cognitive processes leads to level 3 data. The interruption of the flow as well as any additional task besides reporting cognitive process is considered level 3 data and according to Ericsson & Simon (1980) should not be used.

The model from Ericsson & Simon was developed for a very limited research space and Boren & Ramey (2000) argue that “theory and practice are out of sync”. Producing level 1 or 2 data is connected to strict rules and and collides with practicability of the verbal data collection because of compound user interfaces and stuck participants (Boren & Ramey, 2000).

Due to reliability reason the think aloud sessions for this research are carried out with the aim to collect level 2 data but in some cases because of practicability the researcher intervenes to collect real life data. In the case of longer silence the participant is reminded to talk out loud which is in line with the model of Ericsson & Simon (1980). In the event of a participant being stuck the researcher intervenes with a question that helps the participant to continue with the task. This procedure differs from the advice from Ericsson & Simon (1980)but has practical reasons for advancing with this research. According to Ericsson & Simon (1980) each think aloud session has to be transcribed and encoded in order to gather non biased metrics.

However, this approach is very time-consuming and does not automatically help finding usability issues (Van Someren et al., 1994). Therefore the research focuses on general information gaps and segment specific information gaps which occur during the think aloud sessions and are listed in 6.3. A basic transcription and coding protocol of the think aloud sessions can be found in the appendix. The think aloud sessions are carried out in the native language of the participants or the language they feel most comfortable with, in order to make the reporting of cognitive processes as convenient as possible.

5.1.3 Think Aloud participant interviews and surveys

Finally, the think aloud participants take part in a semi-structured and open-ended interview to investigate their satisfaction with George, to identify missing aspects and to find out how the service can be improved (Rapley, 2001). In addition the participants fill out a survey, evaluating the content design, usability and stating their overall satisfaction with George. The questions are inspired by McGinty & Reilly (2011) and their advice to use a Likert scale was considered. The questions are measured on a 5-point Likert-scale (from 1=very bad to 5 very good).

6 Results

In this chapter the resulting benefit factors of the factor analysis of the internet survey results and the consequential segmentation are shown. Furthermore, the think aloud session results in the form of information gaps that occurred during the usage of George in the think aloud session are depicted in the order they arose. Moreover, the results of the think aloud participants' interviews and surveys are presented considering the found segments. The results are presented according to the four steps of the GIST framework. Step 1 is not mentioned since this step is about the exploration of possible data sources which was previously set to an online survey.

6.1 Results of the internet survey (GIST step 2)

In the internet questionnaire 117 people participated from which 104 answers qualified for this study. To ensure the reliability of the survey, a Cronbach's α test is carried out, which is well suited to prove the reliability of surveys with Likert-scale items (Gadermann et al., 2012). In terms of reliability Malhotra & Birks (2007) argue that an α-score lower than 0.6 is a sign of insufficient internal consistency reliability. Argumentum e contrario an α-score higher than 0.6 can be considered as sufficient internal consistency reliability. In this case, the Cronbach's α test revealed an overall score of 0,671 for the survey with all 14 questions which is considered reliable (see A1).

After determining the reliability of the 14 benefit statements a factor analysis is used to identify the underlying dimensions of the statements. For this purpose a principal component analysis with varimax rotation and eigenvalue set to equal or greater than 1 was carried out. A four factor solution which explained 61% of the variance was the result of the factor analysis (see A2) All factors were retained since they all possessed loadings above 0.4 as can be seen from A3 (Heung & Cheng, 2000). The Cronbach's α-scores of the identified benefit factors ranged from 0.62 to 0.93 and were found to be satisfactory. In terms of sampling adequacy, the Kaiser-Meyer-Olkin value with 0.658 was considered acceptable as it was higher than 0.5. In addition, the Bartlett's test of sphericity was significant with $p<0.001$(see A4) leading to the consideration that the factor model is reasonable. The resulting four dimensions are named after the benefit statements (factors) they represent. The mean score as well as the single factor loading of the benefit statements and their dimension and the dimension's variance are displayed in Table 8.

Factor label and benefit statements	Mean*	Factor loadings	Variance (%)	Cronbach's α
Benefit Factor 1: Versatility			20.64	0.77
to experience a different culture	2.80	0.722		
to go sightseeing	3.53	0.676		
to explore the art scene	2.82	0.777		
to get away from everyday life	3.21	0.653		
to enjoy the variety	3.80	0.687		
to go shopping	2.86	0.5 7		
Benefit Factor 2: Business			14.89	0.93
for business purposes	2.34	0.903		
to attend meetings or other business related events.	2.42	0.930		
Benefit Factor 3: Family affiliation			14.54	0.62
to do something with the family	3.23	0.476		
to visit friends and relatives	3.87	0.761		
to mix with locals	2.68	0.726		
for a specific event	3.63	0.630		
Benefit Factor 4: Pleasure			10.96	0.62
to do exciting things	3.82	0.853		
for the night life	3.82	0.836		

*Mean values were calculated on the basis of 5-pont Likert-scale (1 totally disagree and 5 strongly agree)
Table 8: Factor analysis results (own table)

Benefit factor 1 explained 20.64% of the total variance with an α-score of 0.77 and is called "versatility" as it includes many varying benefit statements. Benefit factor 2 accounts for 14.89% of the total variance with an α-score of 0.93 and is named "business" since it is closely associated with business statements. Benefit factor 3 represents 14.54% of the total variance with an α-score of 0.62 and incorporates family and relative related statements and is therefore called "family affiliation". Benefit factor 4 explains 10.96% of the total variance with an α-score of 0.62 and is named "pleasure" since it contains statements around pleasure activities. On the basis of the benefit factors a k-means cluster analysis was carried out.

6.2 Results of the k-means segment analysis (GIST step 3)

In order to categorize the online survey participants into mutually exclusive segments a k-means segment analysis is conducted. Identifying the adequate numbers (k) of segments the elbow method was used. The elbow method proposed a four cluster solution (see A5) ensuring that all benefit factors contribute to the differentiation of the segments an ANOVA test is carried out. All of the 4 benefit factors fulfilled the requirement of $p<0.001$, indicating that they contribute to differentiation. Analogously, all of 4 benefit factors have a high F-value.

The F-value shows how significant the differences between the benefit factors are, the higher the F-value the higher the significant difference. In addition a post hoc analysis in the form of a Scheffe multiple range test was conducted in order to depict the differences among the segments in relation to each benefit factor. The Scheffe test results confirmed the existence of significant differences between segments as can be seen in Table 11.

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
1	5.971	3	0.606	100	9.858	0.000
2	37.570	3	0.335	100	111.986	0.000
3	21.955	3	0.304	100	72.103	0.000
4	11.808	3	0.331	100	35.671	0.000

Table 9: ANOVA test of the 4 benefit factors (own table)

The benefit factors each having an affiliation with different benefit statements are now used for a k-means segmentation method with a maximum of 10 iterations, running means and the number of clusters set to four. The distribution of the cases, which is the result of the segment analysis, is displayed in Table 10.

Segment	1	31
	2	32
	3	20
	4	21
Valid		104

Table 10: Number of Cases in each Segment (own table)

6.2.1 The four segments

The segments which resulted from the k-means segmentation are named by taking into account the highest mean scores for each benefit factor the segments possess. This approach leads to the following segment names; Segment 1: entertainment traveler, Segment 2: goal-oriented travelers, Segment 3: fun and explorative travelers and Segment 4: multi-purpose travelers.

Benefit factor	Segment				Scheffe multiple range test					
	1	2	3	4	1-2	1-3	1-4	2-3	2-4	3-4
1: Versatility	3.30*	3.07	**2.50**	**3.75**	x	n.s.	x	n.s.	n.s.	n.s.
2: Business	3.00	**4.60**	1.90	**4.40**	n.s.	x	x	x	x	x
3: Family affiliation	3.01	**4.05**	2.01	**4.06**	n.s.	x	x	x	x	x
4: Pleasure	**4.10**	**4.40**	**3.40**	2.90	x	n.s.	n.s.	n.s.	n.s.	n.s.

*Mean values were calculated on the basis of 5-pont Likert-scale (1 totally disagree and 5 strongly agree)
n.s. shows "not significant
x shows significant at $p<0.001$

Table 11: Segments with rated average benefit factors (own table)

Segment 1, is made up of 31 respondents. According to the highest mean score on the benefit factors in this segment which is pleasure (4.10) this segment is called entertainment travelers. Entertainment travelers are solely interested in pleasure activities involving excitement as well as night life. This segment is equally less interested in activities regarding versatility (3.30), business (3.00) and family affiliation (3.01).

Segment 2 consists of 32 respondents, represents the largest of all four segments and is named goal-oriented travelers. This segment is interested in particular activities such as meeting family or relatives, attending business and pleasure activities. The mean scores on those three benefit factors with a range from 4.24 to 4.58 are very high. Goal-oriented travelers are less interested in explorative or experiential activities, which is shown by the relatively low mean score on the benefit factor versatility (3.07).

The label of segment 3 is fun and explorative travelers as the highest mean scores are pleasure (3.61) and versatility (2.9) and consists of 20 respondents. Fun and explorative travelers seek a variety of activities especially including pleasure or fun activities. This segment's interest in business or family and relative activities is not very distinct as the lowest mean scores on business (1.90) and family affiliation (2.01) is within this segment.

Segment 4 is called multi-purpose travelers as this segment's mean scores concerning the 3 benefit factors versatility (3.75), business (4.40) and family affiliation (4.06) are equally and relatively high. The mean score on the benefit factor versatility is the highest throughout the segments. This means they are interested in a variety of different activities which confirms the segment's name. Out of all 4 segments this segments is at least attracted by pleasure activities (3.29). Segment 4 is made up of 21 respondents.

6.3 Results of the think aloud session (GIST step 4)

The k-means cluster analysis yielded the existence of four segments. For representation reasons participants for the think aloud session are chosen from the two biggest segments which are entertainment and goal-oriented travelers. Participant number of the think aloud session and participant number of the preceding online survey as well as the participant's segment affiliation are shown in Table 12. In this chapter general results of the think aloud session are discussed first and subsequently a confrontation of segment specific results takes place.

Segment No.	Participant No. think aloud session	Participant No. online survey
1	2	89
1	3	97
1	4	77
1	6	71
1	10	17
1	11	95
2	1	28
2	5	51
2	7	39
2	8	34
2	9	42
2	12	32

Table 12: Think aloud participants with corresponding segment number (own table)

6.3.1 General results of the think aloud session

The 12 think aloud participants needed an average time of 7:22 minutes to complete the planning of one day in Berlin. The fastest participant (10) took 4:40 minutes to complete the task whereas the slowest participant (3) needed 11:10 minutes to finish. During the usage of George several usability problems occurred which are stated in subsequent order in the following and are summarized in Table 13 at the end of this chapter.

6.3.2 The starting page

Profiling themselves by answering the 10 questions on the start page (Figure 7) did not represent a problem to any participant. Every time the participants answered a question a yellow bar appeared below the chosen answer, giving feedback that this answer has been accepted by the system.

6.3.3 The select activity & view map page

In this section (Figure 8 & Figure 10) the most complications arose as participants were unsure how to navigate through this part of planning their day. Participants needed time to orientate themselves and all but participant number 2 understood that each picture in Figure 8 represented an activity for a particular time of the day. Nonetheless, 5 out of 12 participants failed to see the possibility to change or swap their suggestions by clicking the >> arrow as elliptically highlighted in Figure 19 (information gap 1). This is a serious issue as this feature represents the main ability to select activities and ultimately create the travel day. As a consequence many participants were irritated and did not know what to do to next.

Coincidentally, participants usually clicked on one of the six suggested activities and landed on the page with a detailed description of one suggested activity (Figure 9) and also the possibility to change suggestions with a click on “next suggestion” in the right lower corner. 9 out of 12 Participants recognized this feature and used it.

Another problem (information gap 2) was that participants were unsure how to select one activity that was proposed. 5 out of 12 participants did not understand that the presented activities in Figure 8 were automatically added to their day when they were displayed. In order to change the selection one has to either change them with the >> or directly on the activities page with a click on “next suggestion” (Figure 9).

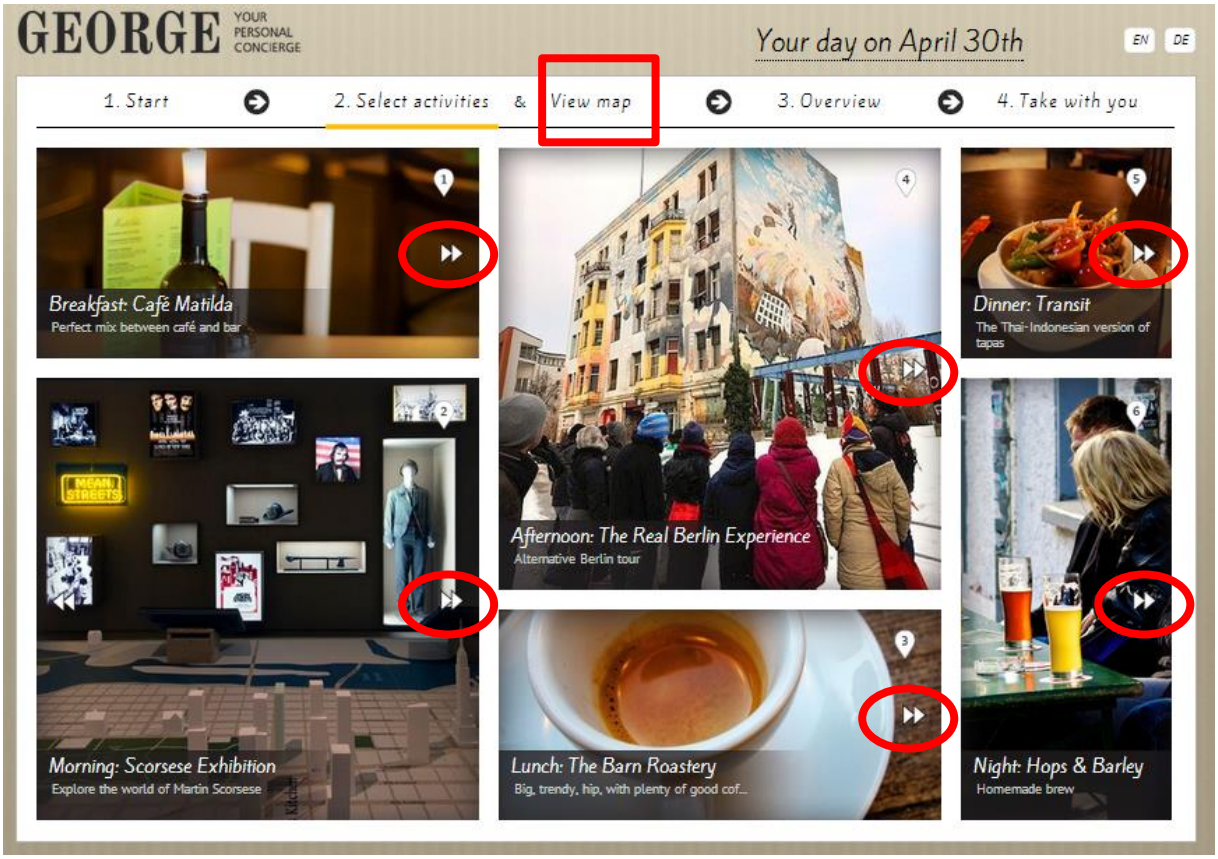


Figure 19: Changing suggestions & map section problem (own figure based on http://app.georgeconcierge.com)

Furthermore 4 out 12 participants missed the map section (information gap 3) in the process of planning their day as rectangularly highlighted in Figure 19. The map section is not separated by an arrow as for example the "overview" and "take with you section" which probably lead the participants to skip this section and move forward to the "overview" section.

6.3.4 The overview and take with you sections

In the last two steps of planning a day trip in Berlin with George, namely the "overview" and "take with you section" no issues occurred. All participants recognized that their planned day was compiled in the "overview section". Furthermore, they understood the possibility to either download a pdf-file of their day or transfer their day to a smart phone via a QR-code once they downloaded the George Concierge App in the "take with you" section. The main issues that occurred during the think aloud sessions are accumulated in Table 13.

Information gap No.	Information gap category	Description	Text passage from participant signaling the issue	Participants having the issue	
				Segment 1	Segment 2
1	Unclear about navigation	Participants do not see the possibility to change their initial suggestion to the next one.	…I would finally like to move on to other activities and select something.	2, 3, 6	1, 12
2	Orientation	Participants do not recognize that the current activities present on the screen were automatically added to their day when they were displayed.	The problem is I have not chosen anything. Let's say I choose this one how do I choose? I can't select here.	2, 3	5, 7, 12
3	Missing essential feature	Participants skip the map section and continue the process without recognizing this section.	A map would be a good idea.	2, 6	9, 12

Table 13: Description of main issues during the think aloud session (own table)

6.3.5 Results of the interviews

The subsequent interviews with the think aloud participants revealed additional information concerning advantages, disadvantages and shortcomings of the service. The interview answers are used to detect wishes and improvement suggestions the participants have in order to better tailor the service to the users according to the concept of marketing intelligence. Participant 1 complained that no shopping activity was proposed but she selected "shopping spree" in the profiling section. Also, participant 5 and 8 deplored the missing of a preference match. Participant number 2 criticized the predominant appearance of food intake suggestions. Participant 3 already went to the contemporary art exhibition "Anish Kapoor" which was one of the proposed activities. This fact speaks for the matching algorithm. Participants 9, 10 and 11 found the service good and useful.

Pitching statements from one participant against another some contradictory quotes are as follows. Participant number 11 (Segment 1) says: "I find [the service] very clearly structured." Contradictory, participant number 9 (Segment 2) states: The usability [of this service] is […] not intuitive. Opposing, other statements are very similar to each other as participant number 1 and 5 show. Participant number 1 (Segment 2) says: "There are new things and I think one can stumble upon new things which one does not know" Analogously, participant number 5 (Segment 2) states: "There were definitely things shown to me that I did not know of." These quotes show that there are different thoughts as well as shared opinions about the service Gorge offers throughout both segments.

The participants were also asked to name advantages and disadvantages of the service and the most cited results by the participants with indication of segment affiliation are displayed in Table 14. Participants were also questioned about missing features and improvement suggestions. The answers to this question as well as all comments during the interviews find applicability in the recommendation section 7.3, where participant's comments are converted into system improvements.

Advantages	**Cited by**		**Disadvantages**	**Cited by**	
	Segment 1	**Segment 2**		**Segment 1**	**Segment 2**
Exploring new things	2, 3	1, 5	Only activities that are in George's database are suggested	10	9, 12
Individual experience	6, 10	7	Possible roaming costs	4	8
Time-saving	10	8, 9	No preference match	-	1, 5

Table 14: Given advantages and disadvantages by think aloud participants (own table)

6.3.6 Results of the surveys

As a final part, think aloud participants filled out a survey consisting of 10 questions in order to assess their evaluation of George in terms of satisfaction, usability and content design. The first three questions were not answered with a Likert-type-scale and were therefore excluded from reliability testing. The survey has a Cronbach α-score of 0.913 and is thus considered reliable (see Table 15).

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.913	0.924	10

Table 15: Cronbach's α test on the think aloud survey (own table)

Since there are only 12 data sets, statistical analysis is rather difficult but for comparison reason the segmentation in Table 16 is provided. The results to the first question show that half of the participants would use and the other half would maybe use the service for planning their holidays (Segment 1 with 4 times yes and two times maybe and Segment 2 with 2 times

yes and 4 times maybe). Question 2 revealed that all 12 participants would recommend this service to their friends. Question 3 showed that out of the 6 initial proposed recommended activities the participants found on average 3.42 activities interesting for them (Segment 1 avg. 3.67 and Segment 2 avg. 3.17).

The remaining questions are about the usability and content design of George and are posted to retrieve the participant's satisfaction with the service. For the remaining 7 questions a factor analysis was conducted in order to identify underlying dimensions. For this purpose a principal component analysis with eigenvalue set to equal or greater than 1 was conducted. A one factor solution which explained 75.66% of the variance was the result of the factor analysis as can be seen in A6 (Heung & Cheng, 2000).

In terms of sampling adequacy the Kaiser-Meyer-Olkin value with 0.543 was considered acceptable as it was higher than 0.5. In addition, the Bartlett's test of sphericity was significant with$p<0.001$(see A7) leading to the consideration that the factor model is reasonable. Since the principal component analysis extracted only one component the results cannot be rotated and no factor loadings can be determined. Therefore, all questions are aggregated to one dimension named satisfaction.

Category	**Average ranking on Likert-Scale from 1-5 (1 meaning very bad and 5 meaning very good)**		
	All	**Segment 1**	**Segment 2**
Satisfaction (questions 4 to 10)	3.67	3.64	3.69

Table 16: Satisfaction, usability and content design average ranking of think aloud session survey participants (own table)

In terms of satisfaction the participants ranked the service with an average of 3.67 points. On average segment 1 participants ranked the satisfaction marginally lower with 3.64 points compared to segment 2 participants which rated the satisfaction on average with 3.69 points.

7 Analysis, Recommendations and outcome

In this section conclusions are drawn from the diverse empirical research conducted during the study which consists of a large internet survey and think aloud sessions paired with participant interviews and surveys according to the steps of the GIST framework. The results shown in Chapter 6 are analyzed and on this basis recommendations are given and a discussion, the findings and an outlook round-off this study.

7.1 Neglecting segment-specific investigation

First of all, the idea of a segment specific investigation in order to serve the single segments better and come up with service improvements can be discarded. The results of the think aloud session show that the different segment participants experienced the information gaps equally (see Table 13). Similarly, this applies to the think aloud interviews where participants from different segments made contradicting statements but also shared opinions about the service despite dissimilar segment affiliation (see 6.3.5). Moreover, the participants accredited the service George offers with the same advantages and disadvantages no matter what segment they belong to (see Table 14). Likewise, the results of the survey in terms of satisfaction are very similar with a deviation range of 0.05 (see Table 16). Since the results of both segments are very congruent a deeper investigation involving demographics is ignored. The segments do not met the first requirement of differentiability for market segments mentioned by Morrison (1996) and Kotler & Armstrong (2010) in 3.1. George seems to be lacking the basic features and usability which is required for a segmentation-specific investigation.

Concluding, investigating segments in order to improve George's services is not a suitable approach. The better option is to perceive every user as one segment and utilize 1 to 1 personalization as described in 3.2. Taking into account every single user wishes, comments and pitfalls the offered service can substantially be improved. In the following, this approach is pursued and single user wishes, comments and pitfalls are converted into recommendations for the service's improvement.

7.2 Recommendations for information gaps 1, 2 and 3

Conducting the think aloud study a series of general problems arose. Three main information gaps have been identified. In the following, suggestions are given to overcome these gaps.

7.2.1 Recommendation for information gap 1

One of the main finding is that the think aloud participants did not find the white arrows (>>) as displayed in Figure 19 which are used to change the recommended activities. The page where the user can change the recommended activities (see Figure 19) is loaded with graphical data and users need time to process this visual image. Helping the user with orientation and pointing out the possibilities, a potential solution to this problem is to make the arrows bigger or change the color of the arrows to a more obvious one e.g. red. A sophisticated solution would be the implementation of short flashing arrows to catch the user's attention that there is a feature behind the arrows.

7.2.2 Recommendation for information gap 2

Another problem that occurred was that users were not aware of the fact that the activities displayed on the page were automatically chosen. Changing the activities means inevitably selecting the activity for the day. The problem is that George does not offer any feedback when it comes to activity selection. Concerning this issue it is advised to give the user a graphical feedback in the form of a flashing frame signaling this activity has been chosen. Another solution could be feedback in the form of a pop-up with the following text: "this activity has been added to your day – Change this activity by clicking on the side arrows". This solution would also contribute to solving information gap 1. In order to not annoy the user with continuous pop-ups it is advised to limit this form of feedback to 3-5 impressions.

7.2.3 Recommendation for information gap 3

Another finding was that participants completely missed the map section. The navigation's sequence should be consistent in their sequence so that users can retrieve the wanted data easily. As can be seen from Figure 19 there is only a "&" sign which distinguishes the select activities section and map section in the navigation bar which leads to inconsistency between the two mentioned steps. It is strongly advised to redesign the navigation consisting of five steps with a clear distinction.

7.3 Service improvements and exploitation

This chapter apprehends the comments made by the think aloud participants and converts them into system improvement suggestions. All suggestions are summarized and prioritized in Table 17 according to a multi-criteria decision analysis resulting in a future roadmap for the George team.

7.3.1 Conversion of think aloud participant's comments into improvement suggestions

The survey participants were also asked if they missed any features which should be included in George. Despite the improvement suggestions for information gap 1, 2 and 3 the participants gave the following suggestions.

Participant number 2 missed the indication of a price of the service, as he feared hidden costs at the end of planning his day. As George receives the revenues through the hotels, the service is free of charge for the hotel guests, the actual user of George. A tag stating "plan your day for free" makes the pricing of the service more transparent. In order to create an even more transparent experience in terms of budget George could state the entire costs or the budget needed for the proposed trip.

Participant number 4 missed transportation guidelines for bikes and participant number 8 extended this wish to guidelines for cars and foot with a turn by turn navigation. This feature sounds useful as tourists spend a lot of their time of the day going to POI's but is very difficult and costly to implement. Perhaps at a later stage when the service has earned a high enough user base the implementation's usefulness is in proportion to its cost.

Participant number 5, 11 and 12 wished for a customer rating and comments feature which would probably add the most value out of all improvement suggestions. George users can rate and comment on the service helping future tourists to decide which POI they should visit. The data collected can be exploited in order to give better recommendations and improve the rudimentary collaborative filtering method as described in 4.2.2 George uses at the moment. Moreover, this collaborative filtering approach helps to overcome the overspecialization problem mentioned in 2.5 as users can receive information based on other users' opinion which helps to reduce the danger of overspecialization. As participant number 12 states: "There could be the *Ultimate Berlin Tour* consisting only of the activities which received the overall highest ranking". The rating feature has huge potential and is visualized in Figure 20.

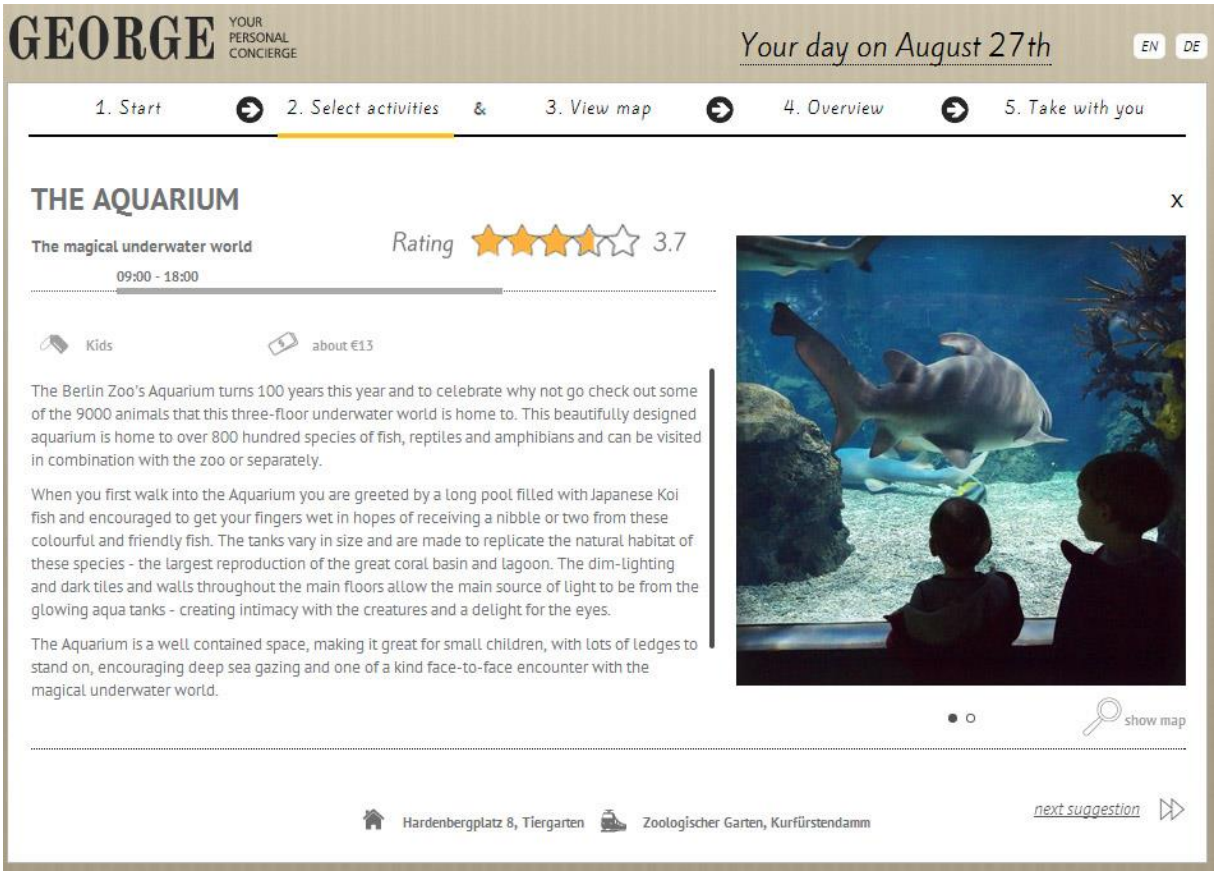


Figure 20: activity page with rating feature (own figure based on http://app.georgeconcierge.com)

Participant number 8 is missing the additional information of the average time needed to complete an activity. This service can be particularly useful when a traveler needs to make the decision if it is still worth to go to an activity when he or she has not much time left.

Participant number 9 and 12 are wishing for snippets of the recommended restaurants' menu cards. Since three out of six recommended activities are connected to eating this might be a useful but also work intensive extension to the service.

A very beneficial feature which is so far missing and wished for by participant 6 is a list of popular sights from which the user can preselect certain activities. As an example user A travels to Berlin and definitely wants to go to the Pergamonmuseum. User A should now have the possibility to preselect popular activities or should be able to search for the wished activities on the left site of the profiling page as depicted in Figure 21. The feature then integrates the activity according to opening hours or weather conditions into user A's day.

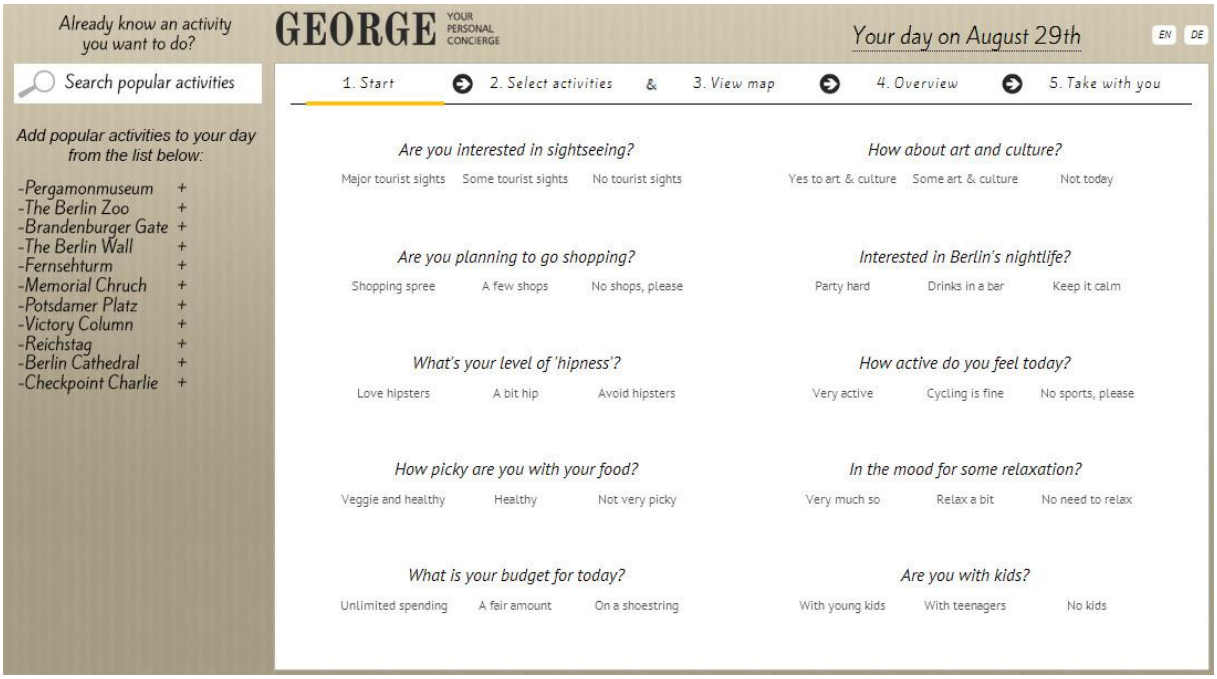


Figure 21: Profiling page with preselected popular activities feature (own figure based on http://app.georgeconcierge.com)

As of now George is not able to consider weather conditions on a particular day when giving recommendations. This feature is extremely useful as some activities are very unpleasant when carried out during bad weather e.g. a visit to the Zoo, a Segway tour or a boat trip.

This compilation of improvement suggestions is rather big and needs a lot of time and effort to implement. Nevertheless, through considering user ratings and simultaneously exploiting this information for a collaborative filtering method George can improve its service. In addition, by closing the above mentioned information gaps and implementing the proposed features George can improve the user interface and satisfy the requests from the users which ultimately leads to a better usability and evaluation of this particular recommender system (Ricci et al., 2011).

7.3.2 Roadmap with improvement suggestions

All the given suggestions in 7.3.1 are summarized and listed in sequential order according to their priority in Table 17. The order of the suggested implementation of certain features is based on a multi-criteria decision analysis considering the additional value the single features would bring the user in relation to the effort for the George employees and associated costs to implement those.

Multi-criteria decision analysis is suitable for decision-making for problems which possess multiple decision criteria. In this case a multiple attribute decision approach is used which helps evaluate a list of alternatives which are usually difficult to quantify and possess contradicting criteria. In this example the attributes of a suggested feature are the value added for the user, the effort needed to implement such feature and the associated costs. In order to assess a priority, the single attributes of the suggestions are compared and accordingly ranked in Table 17.

For the attribute “value addition” high is the best score, whereas in terms of “effort needed” low is the best score. The same applies to “associated cost” where low also represents the highest score. (Pohekar & Ramachandran, 2004). The priority of the suggested features is expressed through letters in alphabetical order where A represents the highest priority. In certain circumstances suggested features share the identical priority when their attribute comparison yields the same results.

Priority	Value addition	Effort needed	Associated costs	Name	Suggestion
A	high	low	low	Skip map	redesign the navigation consisting of 5 steps with a clear distinction
B	medium	low	low	Overlooking arrows	Add bigger arrows, colored arrows, flashing arrows
B	medium	low	low	Price indication	Add a tag stating "plan your day for free"
C	medium	medium	low	Activity selection	Flashing frame, usage of descriptive pop-ups
D	medium	medium	medium	Rating system	Allow customers to rate and comment on activities
D	medium	medium	medium	Display rating	Display ratings on each activity
D	medium	medium	medium	Preselected activities	Add a list of popular sights from which the user can preselect certain activities
D	medium	medium	medium	Weather conditions	Make suggestions based on the weather conditions on the particular day
D	Medium	medium	medium	Daily budget	Add a price tag to the day that states how much budget is needed for all the proposed activities on the day.
D	high	high	medium	Ultimate Berlin Tour	Create a day with the all-time highest rated activities
E	high	high	high	collaborative filtering	Improve collaborative filtering by taking into account user rankings of suggested activities
E	medium	high	medium	Average time	Add the average time needed to accomplish one activity
F	medium	high	high	Menu cards	Provide snippets of the suggested restaurants' menu cards
F	Medium	high	high	Turn by turn navigation	Add navigation service for bike and foot

Table 17: Roadmap for implementing features (own table)

7.4 Conclusion

This study provided an overview about recommender systems in the travel industry, an introduction into the basics of recommender systems and a way to improve a travel recommender system by segmentation and personalization.

The attempt to segment George users yielded the result of four traveler segments whereas the two biggest segments, entertainment travelers and the goal-oriented travelers, made up the think aloud participants.

The idea of a segmentation based investigation was discarded as the two investigated segments were too similar to each other in terms of the usage and evaluation results of George.

Therefore, a 1 to 1 personalization approach was pursued in order to cater to each user and to find usability issues and new service features to improve the service. This was achieved through examining George's service with the help of the GIST framework and the concept of marketing intelligence. Different information gaps were found and recommendations were given to close these gaps. In addition proposed features by the think aloud participants and suggestions to implement these features were shown.

7.4.1 Findings

Design proposition 1 could not be confirmed because a user segmentation according benefits sought did not yield the preferred results of service improvement through discovering usability issues and new service features. A higher level of personalization is needed to receive the desired outcomes.

Furthermore, the results confirm design proposition 2 as 1 to 1 personalization represents a higher level of personalization and led to the wished results. In the case of George a 1 to 1 investigation resulted in suggestions for service improvements and new service features.

Design proposition 3 is also confirmed as the user flow with the existing navigation was not given. Think aloud participants frequently missed the map section in the navigation (information gap 3). As a consequence a new design for the navigation bar is given with the suggestion to implement this design as soon as possible.

7.4.2 Discussion

It is surprising that the business segment was so small. Business travelers make up a big portion of the travel industry and the question arises that the data collection is biased. When looking at the sample it occurs that most of the survey respondents are students and usually have no working experience and traveling for business purposes. This might be the result of the snowball sampling method through social media and email. It is therefore advised to change the ways of data collection in order to receive a more representative data sample which is very hard or even impossible when conducting an online survey.

The generalizability of the results is also debatable as results are closely connected to the service the George Online Concierge GmbH offers. Perhaps in terms of navigation the results of this study are applicable to other recommender services. The outcomes show that it is important to have a well-structured, clear and sequential navigation and navigation bar for the orientation of the user.

7.4.1 Limitations

Due to the early stage of George, the current system functions solely in Berlin with 500 points of interests, limiting possible personal recommendations. Moreover, George cannot give recommendations based on geographical information meaning that the traveler's current location is not included in George's recommendations. In addition, solely an overview of the functioning of a recommender system is given to the reader. Explaining the full arsenal of recommendation techniques is not the aim of this research. Furthermore, the elaboration of algorithmic components of recommender systems is excluded. Readers interested in this topic are referred to following publications (Adomavicius & Tuzhilin, 2005; Burke, 2005; Ekstrand et al., 2011; Herlocker et al., 1999). Moreover, participants of the internet survey and think aloud session are mostly between the age of 25-34 and considered digital natives. This fact is a possible source of bias as this group tends not to be representative of the German population.

7.4.2 Outlook

The case of George has shown that improving travel recommender services in early stages should be carried out with the help of 1 to 1 personalization. The generalizability of this finding is very limited as these results particularly apply to George. Further research is needed on the topic in order to determine when which level of segmentation yields the best results.

In the case of George a follow up usability study is recommended after including all the suggested features. Implementing the proposed recommendations will result in a solid service with fewer user problems. After the updates an investigation utilizing a segmentation approach might yield segment specific results which can be used to tailor the service according to the segment's wishes. This approach was not feasible at this stage of George as there were too many common problems. It will be interesting to see if the feasibility changes and yields segment specific results in a future study.

References

Adomavicius, G., & Tuzhilin, A. (2005). Toward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions. *Ieee Transactions on Knowledge and Data Engineering, 17*(6), 734-749.

Albert, T. C., Goes, P. B., & Gupta, A. (2004). GIST: a model for design and management of content and interactivity of customer-centric web sites. *MIS Quarterly, 28*(2), 161-182.

Arazy, O., Kumar, N., & Shapira, B. (2009). Improving social recommender systems. *IT Professional, 11*(4), 38-44.

Babbie, E. (2012). *The practice of social research*: CengageBrain. com.

Basiri, J., Shakery, A., Moshiri, B., & Zi Hayat, M. (2010). *Alleviating the cold-start problem of recommender systems using a new hybrid approach*.

Batet, M., Moreno, A., Sanchez, D., Isern, D., & Valls, A. (2012). Turist@: Agent-based personalised recommendation of tourist activities. *Expert Systems with Applications, 39*(8), 7319-7329.

Ben-Shimon, D., Tsikinovsky, A., Rokach, L., Meisles, A., Shani, G., & Naamani, L. (2007) Recommender system from personal social networks. *Vol. 43* (pp. 47-55).

Boren, T., & Ramey, J. (2000). Thinking aloud: Reconciling theory and practice. *Professional Communication, IEEE Transactions on, 43*(3), 261-278.

Büchner, A. G., & Mulvenna, M. D. (1998). Discovering internet marketing intelligence through online analytical web usage mining. *ACM Sigmod Record, 27*(4), 54-61.

Burke, R. (2002). Hybrid recommender systems: Survey and experiments. *User Modeling and User-Adapted Interaction, 12*(4), 331-370.

Burke, R. (2004). Hybrid recommender systems with case-based components *Advances in Case-Based Reasoning* (pp. 91-105): Springer.

Burke, R. (2005). Hybrid systems for personalized recommendations. In B. Mobasher & S. S. Anand (Eds.), *Intelligent Techniques for Web Personalization* (Vol. 3169, pp. 133-152).

Burke, R. (2007). Hybrid web recommender systems *The adaptive web* (pp. 377-408). New York: Springer.

Chikhaoui, B., Chiazzaro, M., & Wang, S. (2011). *An improved hybrid recommender system by combining predictions*. Paper presented at the IEEE Workshops of International Conference, 644-649.

Claypool, M., Gokhale, A., Miranda, T., Murnikov, P., Netes, D., & Sartin, M. (1999). *Combining content-based and collaborative filters in an online newspaper*. Paper presented at the Proceedings of ACM SIGIR workshop on recommender systems.

Delgado, J., & Davidson, R. (2002). *Knowledge bases and user profiling in travel and hospitality recommender systems.* Paper presented at the Proceedings of the ENTER 2002 Conference.

Ekstrand, M. D., Riedl, J. T., & Konstan, J. A. (2011). *Collaborative filtering recommender systems* (Vol. 4). Hannover: Now Publishers Inc.

Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. *Psychological review, 87*(3), 215.

Fink, J., & Kobsa, A. (2002). User modeling for personalized city tours. [Review]. *Artificial Intelligence Review, 18*(1), 33-74.

Frochot, I. (2005). A benefit segmentation of tourists in rural areas: a Scottish perspective. *Tourism Management, 26*(3), 335-346.

Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research & Evaluation, 17*(3), 1-13.

Garcia, I., Sebastia, L., & Onaindia, E. (2011). On the design of individual and group recommender systems for tourism. *Expert Systems with Applications, 38*(6), 7683-7692.

Göb, J. (2010). Theoretische Fundierung von Marketing Intelligence–Entwicklung eines Konzepts zur Überbrückung der Kluft zwischen Angebots-und Nachfrageseite von Marketinginformationen *Marketing Intelligence* (pp. 87-130): Springer.

Golbeck, J. (2006) Generating predictive movie recommendations from trust in social networks. *Vol. 3986 LNCS* (pp. 93-104).

Goldberg, D., Nichols, D., Oki, B. M., & Terry, D. (1992). Using Collaborative FIltering To Weave An Information Tapestry. *Communications of the Acm, 35*(12), 61-70.

Haley, R. (1968). Benefit segmentation: a decision-oriented research tool. *The Journal of Marketing*, 30-35.

Herlocker, J. L., Konstan, J. A., Borchers, A., & Riedl, J. (1999). *An algorithmic framework for performing collaborative filtering*. Paper presented at the Proceedings of the 22nd annual international ACM SIGIR conference on Research and development in information retrieval, 230-237.

Heung, V. C., & Cheng, E. (2000). Assessing tourists' satisfaction with shopping in the Hong Kong special administrative region of China. *Journal of Travel Research, 38*(4), 396-404.

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly, 28*(1), 75-105.

Hollaus, M. (2007). *Der Einsatz von Online-Befragungen in der empirischen Sozialforschung*: Shaker.

Höpken, W., Fuchs, M., Zanker, M., Beer, T., Eybl, A., Flores, S., . . . Schnabl, M. (2006). etPlanner: An IT framework for comprehensive and integrative travel guidance *Information and Communication Technologies in Tourism 2006* (pp. 125-134). Vienna: Springer Vienna.

Huang, R., & Sarigöllü, E. (2008). Benefit segmentation of tourists to the Caribbean. *Journal of International Consumer Marketing, 20*(2), 67-83.

Huang, Y. X., & Bian, L. (2009). A Bayesian network and analytic hierarchy process based personalized recommendations for tourist attractions over the Internet. *Expert Systems with Applications, 36*(1), 933-943.

Huang, Z., Chen, H., & Chung, W. Y. (2004a). A graph model for e-commerce recommender systems. *Journal of the American Society for Information Science and Technology, 55*(3), 259-274.

Huang, Z., Chen, H., & Zeng, D. (2004b). Applying associative retrieval techniques to alleviate the sparsity problem in collaborative filtering. *ACM Transactions on Information Systems, 22*(1), 116-142.

Instone, K. (2000). Information architecture and personalization. *White Paper, Argus Associates, INC., Dec*.

ISO. (2013). Standards in usability and user-centred design Retrieved 29.09., 2013, from http://www.usabilitypartners.se/about-usability/iso-standards

ITB. (2013). ITB World Travel Trends Report 2012/2013 Retrieved 25.03., 2013, from http://www.itb-berlin.de/media/itbk/itbk_media/itbk_pdf/WTTR_Report_2013_web.pdf
Kabassi, K. (2010). Personalizing recommendations for tourists. *Telematics and Informatics, 27*(1), 51-66.
Kant, V., & Bharadwaj, K. K. (2012). Enhancing Recommendation Quality of Content-based Filtering through Collaborative Predictions and Fuzzy Similarity Measures. *Procedia Engineering, 38*, 939-944.
Kim, S. S., & Agrusa, J. (2008). Segmenting Japanese tourists to Hawaii according to tour purpose. *Journal of travel & tourism marketing, 24*(1), 63-80.
Kim, W. G., Park, Y., Gazzoli, G., & Sheng, E. (2011). Benefit segmentation of international travelers to Macau, China. *Journal of Quality Assurance in Hospitality & Tourism, 12*(1), 28-57.
Konstan, J. A., & Riedl, J. (2012). Recommender systems: from algorithms to user experience. *User Modeling and User-Adapted Interaction, 22*(1-2), 101-123.
Koren, Y., Bell, R., & Volinsky, C. (2009). Matrix Factorization Techniques For Recommender Systems. *Computer, 42*(8), 30-37.
Kotler, P. J., & Armstrong, G. M. (2010). *Principles of marketing*: Pearson Education.
Kunder, M. d. (2013). The size of the World Wide Web (The Internet) Retrieved 05.04., 2013
Kuß, A. (2012). *Marktforschung: Grundlagen der Datenerhebung und Datenanalyse* (Vol. 4). Wiesbaden: Gabler Verlag.
Lee, C. S., Chang, Y. C., & Wang, M. H. (2009). Ontological recommendation multi-agent for Tainan City travel. *Expert Systems with Applications, 36*(3), 6740-6753.
Liu, D. R., Lai, C. H., & Lee, W. J. (2009). A hybrid of sequential rules and collaborative filtering for product recommendation. *Information Sciences, 179*(20), 3505-3519.
Loh, S., Lorenzi, F., Saldaña, R., & Licthnow, D. (2003). A tourism recommender system based on collaboration and text analysis. *Information Technology & Tourism, 6*(3), 157-165.
Malhotra, N., & Birks, D. (2007). *Marketing Research: an applied approach: 3rd European Edition*: Pearson Education.
McGinty, L., & Reilly, J. (2011). On the evolution of critiquing recommenders *Recommender Systems Handbook* (pp. 419-453): Springer.
Mobasher, B. (2007). Data mining for web personalization *The Adaptive Web* (pp. 90-135): Springer.
Montaner, M., Lopez, B., & de la Rosa, J. L. (2003). A taxonomy of recommender agents on the Internet. *Artificial Intelligence Review, 19*(4), 285-330.
Moreno, A., Valls, A., Isern, D., Marin, L., & Borras, J. (2013). SigTur/E-Destination: Ontology-based personalized recommendation of Tourism and Leisure Activities. *Engineering Applications of Artificial Intelligence, 26*(1), 633-651.
Morrison, A. M. (1996). *Hospitality and travel marketing*: Delmar Publishers.
Moscardo, G., Pearce, P., & Morrison, A. (2001). Evaluating different bases for market segmentation: A comparison of geographic origin versus activity participation for generating tourist market segments. *Journal of travel & tourism marketing, 10*(1), 29-49.
Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological review, 84*(3), 231.
Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*: Wiley. com.
Palmer, J. (2002). Designing for web site usability. *Computer, 35*(7), 102-103.

Pazzani, M., & Billsus, D. (2007). Content-based recommendation systems. In P. Brusilovsky, A. Kobsa & W. Nejdl (Eds.), *The adaptive web* (Vol. 4321, pp. 325-341). Berlin, Germany: Springer-Verlag.

Peltier, J. W., & Schribrowsky, J. A. (1997). The use of need-based segmentation for developing segment-specific direct marketing strategies. *Journal of Interactive Marketing, 11*(4), 53-62.

Peppers, D., & Rogers, M. (2000). *Enterprise one to one*: Random House Digital, Inc.

Planner, C. (2013) Retrieved 21.05., 2013, from http://www.citytripplanner.com/en/home

Pohekar, S., & Ramachandran, M. (2004). Application of multi-criteria decision making to sustainable energy planning—a review. *Renewable and Sustainable Energy Reviews, 8*(4), 365-381.

Punj, G., & Stewart, D. W. (1983). Cluster analysis in marketing research: review and suggestions for application. *Journal of marketing research*, 134-148.

Rabanser, U., & Ricci, F. (2005). Recommender systems: do they have a viable business model in e-tourism? *Information and Communication Technologies in Tourism* 160-171.

Rapley, T. J. (2001). The art (fulness) of open-ended interviewing: some considerations on analysing interviews. *Qualitative Research, 1*(3), 303-323.

Resnick, P., & Varian, H. R. (1997). Recommender systems. *Communications of the Acm, 40*(3), 56-58.

Ricci, F. (2002). Travel recommender systems. *IEEE Intelligent Systems, 17*(6), 55-57.

Ricci, F., Shapira, B., & Rokach, L. (2011). *Recommender systems handbook*. New York: Springer.

Sadler, G. R., Lee, H. C., Lim, R. S. H., & Fullerton, J. (2010). Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nursing & health sciences, 12*(3), 369-374.

Sarigöllü, E., & Huang, R. (2005). Benefits segmentation of visitors to Latin America. *Journal of Travel Research, 43*(3), 277-293.

Schafer, J. B., Frankowski, D., Herlocker, J., & Sen, S. (2007). Collaborative filtering recommender systems *The adaptive web* (pp. 291-324). Heidelberg: Springer.

Schafer, J. B., Konstan, J. A., & Riedl, J. (2001). E-commerce recommendation applications. *Data Mining and Knowledge Discovery, 5*(1-2), 115-153.

Sebastia, L., Garcia, I., Onaindia, E., & Guzman, C. (2009). e-TOURISM: A TOURIST RECOMMENDATION AND PLANNING APPLICATION. *International Journal on Artificial Intelligence Tools, 18*(5), 717-738.

Shih, D. H., Yen, D. C., Lin, H. C., & Shih, M. H. (2011). An implementation and evaluation of recommender systems for traveling abroad. *Expert Systems with Applications, 38*(12), 15344-15355.

Simonson, I. (2005). Determinants of Customers' Responses to Customized Offers: Conceptual Framework and Research Propositions. *Journal of Marketing, 69*, 32-45.

Sinha, R., & Swearingen, K. (2001). *Comparing recommendations made by online systems and friends.* Paper presented at the Proceedings of the Delos-NSF workshop on personalization and recommender systems in digital libraries.

Sunikka, A., & Bragge, J. (2008). *What, who and where: insights into personalization.* Paper presented at the Hawaii International Conference on System Sciences, Proceedings of the 41st Annual.

Swearingen, K., & Sinha, R. (2001). *Beyond algorithms: An HCI perspective on recommender systems.* Paper presented at the ACM SIGIR 2001 Workshop on Recommender Systems.

UNWTO. (2013). International tourism to continue robust growth in 2013 Retrieved 26.02.2013, from http://media.unwto.org/en/press-release/2013-01-28/international-tourism-continue-robust-growth-2013

Van Someren, M. W., Barnard, Y. F., & Sandberg, J. A. C. (1994). *The think aloud method: A practical guide to modelling cognitive processes*. London: Academic Press London.

Vansteenwegen, P., Souffriau, W., Berghe, G. V., & Van Oudheusden, D. (2011). The City Trip Planner: An expert system for tourists. *Expert Systems with Applications, 38*(6), 6540-6546.

Voorhees, C. M. (2006). *A customer equity-based segmentation of service consumers: An application of multicriterion clusterwise regression for joint segmentation settings.* Doctoral dissertation, The Florida State Uniersity.

Wang, P. (2012). A Personalized Collaborative Recommendation Approach Based on Clustering of Customers. In D. Yang (Ed.), *International Conference on Applied Physics and Industrial Engineering 2012, Pt B* (Vol. 24, pp. 812-816).

Wijnhoven, F. (2012). *Information services design: A design science approach for sustainable knowledge*: Routledge New York.

Wu, D., Im, I., Tremaine, M., Instone, K., & Turoff, M. (2003). *A framework for classifying personalization scheme used on e-commerce websites.* Paper presented at the System Sciences, 2003. Proceedings of the 36th Annual Hawaii International Conference on.

Zhou, X. J., Xu, Y., Li, Y. F., Josang, A., & Cox, C. (2012). The state-of-the-art in personalized recommender systems for social networking. *Artificial Intelligence Review, 37*(2), 119-132.

Zins, A. H., Bauernfeind, U., Del Missier, F., Venturini, A., & Rumetshofer, H. (2004). *An experimental usability test for different destination recommender systems.* Paper presented at the ENTER 2004 conference. Cairo, Egypt.

Appendix

A1: Cronbach's α test (online survey)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.671	0.664	14

A2: Principal Component Analysis (online survey)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.217	22.979	22.979	2.890	20.641	20.641
2	2.628	18.774	41.753	2.086	14.898	35.539
3	1.467	10.479	52.232	2.036	14.541	50.080
4	1.234	8.816	61.048	1.535	10.967	61.048
5	.975	6.966	68.013			
6	.882	6.302	74.315			
7	.692	4.946	79.261			
8	.641	4.577	83.838			
9	.517	3.692	87.530			
10	.497	3.550	91.080			
11	.423	3.025	94.105			
12	.388	2.775	96.879			
13	.318	2.275	99.154			
14	.118	.846	100.000			

A3: Factor loading in component matrix (online survey)

	Component			
	1	2	3	4
Q1	-0.156	0.903	0.183	0.071
Q2	-0.073	0.930	0.171	0.064
Q3	0.143	0.194	0.476	0.011
Q4	-0.022	0.065	0.761	-0.028
Q5	0.309	-0.154	0.726	0.105
Q6	0.722	-0.183	0.076	-0.031
Q7	0.676	-0.197	-0.309	-0.012
Q8	0.777	0.214	0.005	0.059
Q9	-0.071	-0.048	0.092	0.853
Q10	0.021	0.165	-0.017	0.836
Q11	0.653	-0.127	0.210	-0.203
Q12	-0.015	0.321	0.630	0.042
Q13	0.687	-0.265	0.262	0.199
Q14	0.507	0.060	0.149	-0.038

A4: KMO and Bartlett's test (online survey)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.685
Bartlett's Test of Sphericity	Approx. Chi-Square	455.954
	df	91
	Sig.	0.000

A5: Elbow method (segment analysis)

Agglomeration Schedule						
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	60	102	,000	0	0	55
2	14	81	,000	0	0	47
3	54	70	,000	0	0	16
4	43	47	,000	0	0	7
5	22	78	,014	0	0	77
6	21	36	,028	0	0	17
7	43	45	,046	4	0	67
8	83	104	,078	0	0	33
9	15	30	,123	0	0	88
10	86	92	,168	0	0	21
11	48	63	,213	0	0	38
12	34	42	,258	0	0	54
13	62	96	,303	0	0	60
14	10	91	,348	0	0	46
15	9	53	,404	0	0	87
16	28	54	,478	0	3	61
17	21	90	,561	6	0	42
18	64	69	,648	0	0	57
19	25	27	,773	0	0	53
20	17	103	,898	0	0	59
21	80	86	1,034	0	10	58
22	3	99	1,172	0	0	69
23	74	98	1,311	0	0	81
24	61	94	1,450	0	0	40
25	46	95	1,606	0	0	78
26	50	85	1,763	0	0	35
27	4	59	1,919	0	0	39
28	38	40	2,089	0	0	64
29	44	89	2,259	0	0	76
30	20	66	2,429	0	0	68
31	49	56	2,600	0	0	57
32	7	51	2,770	0	0	65
33	6	83	2,947	0	8	72
34	32	87	3,127	0	0	63
35	50	82	3,309	26	0	52

36	76	77	3,521	0	0	61
37	18	79	3,733	0	0	47
38	48	97	3,951	11	0	67
39	4	57	4,170	27	0	56
40	61	65	4,420	24	0	71
41	5	35	4,670	0	0	50
42	21	75	4,941	17	0	72
43	73	101	5,222	0	0	65
44	8	37	5,503	0	0	71
45	31	93	5,799	0	0	78
46	10	52	6,101	14	0	83
47	14	18	6,429	2	37	69
48	41	67	6,766	0	0	84
49	19	26	7,102	0	0	90
50	5	100	7,468	41	0	85
51	58	68	7,843	0	0	76
52	39	50	8,220	0	35	62
53	25	71	8,614	19	0	66
54	34	55	9,046	12	0	79
55	1	60	9,546	0	1	60
56	4	11	10,087	39	0	86
57	49	64	10,636	31	18	58
58	49	80	11,237	57	21	82
59	17	29	11,895	20	0	73
60	1	62	12,555	55	13	80
61	28	76	13,280	16	36	70
62	33	39	14,007	0	52	74
63	2	32	14,757	0	34	86
64	16	38	15,508	0	28	88
65	7	73	16,265	32	43	83
66	25	72	17,052	53	0	81
67	43	48	17,845	7	38	82
68	20	24	18,790	30	0	79
69	3	14	19,775	22	47	75
70	12	28	20,769	0	61	87
71	8	61	21,805	44	40	73
72	6	21	22,903	33	42	77
73	8	17	24,033	71	59	98
74	33	84	25,295	62	0	92
75	3	23	26,558	69	0	92
76	44	58	27,935	29	51	89

77	6	22	29,332	72	5	84
78	31	46	30,734	45	25	89
79	20	34	32,194	68	54	94
80	1	13	33,688	60	0	85
81	25	74	35,272	66	23	90
82	43	49	37,314	67	58	95
83	7	10	39,481	65	46	91
84	6	41	41,827	77	48	94
85	1	5	44,179	80	50	96
86	2	4	46,590	63	56	93
87	9	12	49,389	15	70	93
88	15	16	52,397	9	64	95
89	31	44	55,690	78	76	96
90	19	25	59,047	49	81	102
91	7	88	63,042	83	0	97
92	3	33	67,195	75	74	97
93	2	9	73,809	86	87	99
94	6	20	80,429	84	79	101
95	15	43	89,277	88	82	98
96	1	31	98,533	85	89	100
97	3	7	108,467	92	91	99
98	8	15	119,925	73	95	100
99	2	3	139,235	93	97	102
100	1	8	162,258	96	98	101
101	1	6	194,073	100	94	103
102	2	19	228,635	99	90	103
103	1	2	389,586	101	102	0

Elbow method: number of cases - step of elbow = number of clusters

104-100=4

A6: Principal Component Analysis (think aloud survey)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.296	75.660	75.660	5.296	75,660	75.66
2	0.675	9.637	85.297			
3	0.440	6.291	91.588			
4	0.312	4.454	96.042			
5	0.154	2.206	98.248			
6	0.113	1.620	99.868			
7	0.009	0.132	100.000			

A7: KMO and Bartlett's test (think aloud survey)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.543
Bartlett's Test of Sphericity	Approx. Chi-Square	73.898
	df	28
	Sig.	0.000

A8: Scheffe multiple range test (segment analysis)

Dependent Variable	(I) Segment	(J) Segment	Mean Difference (I-J)	Std. Error	Sig.
Benefit factor 1	1	2		0.198111749982908	0.000
		3		0.278847624432395	0.004
		4	1.264957264957365	0.179921885096264	0.000
	2	1	-0.925451092117859	0.198111749982908	0.000
		3	0.11728395061738	0.277516601918917	0.981
		4	0.339506172839606	0.177852049259000	0.308
	3	1	-1.042735042735143	0.278847624432395	0.004
		2	-0.117283950617384	0.277516601918917	0.981
		4	0.222222222222322	0.264837843964806	0.872
	4	1	-1.264957264957365	0.179921885096264	0.000
		2	-0.339506172839606	0.177852049259000	0.308
		3	-0.222222222222322	0.264837843964806	0.872
Benefit factor 2	1	2	-0.4359	0.1428	0.030

		3	3.2308	0.2010	0.000
		4	1.2784	0.1297	0.000
	2	1	0.4359	0.1428	0.030
		3	3.6667	0.2001	0.000
		4	1.7143	0.1282	0.000
	3	1	-3.2308	0.2010	0.000
		2	-3.6667	0.2001	0.000
		4	-1.9524	0.1909	0.000
	4	1	-1.2784	0.1297	0.000
		2	-1.7143	0.1282	0.000
		3	1.9524	0.1909	0.000
Benefit factor 3	1	2	-0.01603	0.13552	1.000
		3	2.65064	0.19075	0.000
		4	1.21612	0.12308	0.000
	2	1	0.01603	0.13552	1.000
		3	2.66667	0.18984	0.000
		4	1.23214	0.12166	0.000
	3	1	-2.65064	0.19075	0.000
		2	-2.66667	0.18984	0.000
		4	-1.43452	0.18117	0.000
	4	1	-1.21612	0.12308	0.000
		2	-1.23214	0.12166	0.000
		3	1.43452	0.18117	0.000
Benefit factor 4	1	2	-1.0819	0.1993	0.000
		3	-0.3226	0.2805	0.724
		4	-0.5449	0.1810	0.033
	2	1	1.0819	0.1993	0.000
		3	0.7593	0.2792	0.067
		4	0.5370	0.1789	0.034
	3	1	0.3226	0.2805	0.724
		2	-0.7593	0.2792	0.067
		4	-0.2222	0.2664	0.874
	4	1	0.5449	0.1810	0.033
		2	-0.5370	0.1789	0.034
		3	0.2222	0.2664	0.874

A9: Online survey questions

Dear survey participants,

within the scope of my Master Thesis I am conducting research about a travel recommendation system called George, which supports travelers in planning their trip by giving personalized recommendations. Your answers will help to improve this innovative service.

George is available as app, desktop and print version allowing users to instantly see what's going on around them to help plan their day. Faster than any other city guide and smarter than common social media. This saves time and helps to overcome the increasing information overload in the tourism sector.

Please take 5 minutes of your time and contribute to this new and exciting research field. The survey answers are handled anonymously and no personal data is saved or passed on. The results are exclusively used for my Master Thesis which I would gladly provide access to upon request.

For the sake of this research, assume that you are going to travel to Berlin within the next month and fill in the questionnaire with this in mind.

Contact: kopslars@gmail.com

1. What is your gender?

◯ female

◯ male

2. How old are you?

◯ 15-25 years

◯ 26-35 years

◯ 36-45 years

◯ 46-55 years

◯ 56-65 years

◯ above 65 years

3. Would you travel alone, with partner, friends or children?

◯ partner
◯ friends
◯ alone
◯ children
◯ family

4. What is your field of occupation?

◯ student
◯ business
◯ Creative arts and culture
◯ IT
◯ law
◯ retails and sales
◯ media and publishing
◯ None of the above

5. What is your annual gross income?

◯ below 15.000€
◯ 15.000€-30.000€
◯ 30.001€-50.000€
◯ 50.001€-70.000€
◯ above 70.000€

6. What is your country of origin?

_____ (free answer)

Travel motivation

In the next section questions concerning your travel motivation are posted. Please keep in mind that you are planning a specific trip and therefore not all reasons below can fit in your travel plan.

7. You would visit Berlin for business purposes.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

8. You would visit Berlin to attend meetings or other business related events.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

9. You would visit Berlin to do exciting things

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

10. You would visit Berlin for the night life

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

11. You would visit Berlin to go sightseeing.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

12. You would visit Berlin for a specific event.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

13. You would visit Berlin to do something with the family.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

14. You would visit Berlin to visit friends and relatives.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

15. You would visit Berlin to mix with locals.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

16. You would visit to experience a different culture.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

17. You would visit Berlin for the art scene.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

18. You would visit Berlin to get away from everyday life.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

19. You would visit Berlin to enjoy the variety of activities you can experience.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

20. You would visit Berlin to go shopping.

	1	2	3	4	5	
totally disagree	○	○	○	○	○	totally agree

Thank you very much for filling out the survey. If you are further interested in contributing to my research and take part in a usability test of George send an email to kopslars@gmail.com.

A10: Think aloud session survey

Think aloud session survey

1. Would you use this service for planning your holidays?

◯ yes
◯ no
◯ maybe

2. Would you recommend this service to your friends?

◯ yes
◯ no

3. How many of the 6 initial proposed activities were interesting for you?

◯ 1
◯ 2
◯ 3
◯ 4
◯ 5
◯ 6

4. How satisfied were you with the recommended activities on a scale from 1 to 5? (1 meaning not very satisfied and 5 meaning very satisfied)

	1	2	3	4	5	
not very satisfied	◯	◯	◯	◯	◯	very satisfied

5. How useful is this service to plan your holidays on a scale from 1 to 5?

	1	2	3	4	5	
not very useful	◯	◯	◯	◯	◯	very useful

6. How would you rate the variety of the recommendations of this service?

	1	2	3	4	5	
very bad	◯	◯	◯	◯	◯	very good

7. How would you rate the navigation of this service?

	1	2	3	4	5	
very bad	○	○	○	○	○	very good

8. How would you rate the easiness to use this service?

	1	2	3	4	5	
very bad	○	○	○	○	○	very good

9. How would you rate the user interface of this service?

	1	2	3	4	5	
very bad	○	○	○	○	○	very good

10. How would you rate the pictures of this service?

	1	2	3	4	5	
very bad	○	○	○	○	○	very good

Thank you very much for filling out the survey.

A11: Interview results and questions

Q1: What is your overall impression of the service you just used? Q2: What are the advantages of the service? Q3: What are the disadvantages of the service? Q4: Did you miss any features? Q5: What additional information could be added to the activity information?

Participant Number	Segment	Think aloud session duration (min)	Q1:comments	Q4:missing features	Q2:advantages	Q3:disadvantages	Q5:additional activity information
1	1	05:20	Selected shopping in profiling section but not shopping activity was displayed, Selected drinks in a bar and received East side Gallery as suggestion	change arrow to bigger ones	exploring new things	not a perfect match	BVG stations on map
2	2	06:30	too many food activities, visually appealing, clear user interface, 6 windows pieces of the day, map sections	bigger arrows, windows clearer, display the service cost	exploring new things, nice visualization	x	x
3	2	11:10	Has been to one activity which was suggested	a select button	nice hidden tips from locals	too long description	x
4	2	06:30	x	transportation guidelines for bikes	x	online access roaming costs	x
5	1	08:40	overview redundant, useful, no preference match,	rating and comments feature	helps you explore new things	not a perfect match	detailed descriptions
6	2	05:40	good	additional field for preselected sights	individual experience	x	x

A11a Interview results and questions (continued)

Participant Number	Segment	Think aloud session duration (min)	comments	missing features	advantages	disadvantages	additional activity information
7	2	05:50	many recommendations	x	individual experience	x	x
8	1	07:30	too much cultural recommendation, very innovative	transportation guidelines for bikes, foot,car,estimated time of arrival, average time to complete am activity, turn by turn navigation, interactive recommendations	saves time	Roaming	distance to next recommended activity
9	1	10:50	Idea is good, usability is bad	snippet on menu cards	saves time, individual experience,	narrow selection	
10	1	04:40	good	list of preselected sights	saves time, individual experience,	narrow selection,	transportation guidelines
11	2	06:45	makes sense	rating feature and connection to qype	simple	x	qype ratings
12	1	09:10	clear user interface	snippet on menu cards, customer ratings, more pictures	clear user interface	narrow selection,	x

A12: Think aloud session survey answers

Participant	Would you use this service for planning your holidays?	Would you recommend this service to your friends?	How many of the 6 initial proposed activities were interesting for you?	How satisfied were you with the recommended activities on a scale from 1 to 5? (1 meaning not very satisfied and 5 meaning very satisfied)	How useful is this service to plan your holidays on a scale from 1 to 5? (1 meaning not very useful and 5 meaning very useful)	How would you rate the variety of the recommendations of this service? (1 means very bad, 5 means very good)	How would you rate the navigation of this service? (1 means very bad, 5 means very good)	How would you rate the easyness to use this service? (1 means very bad, 5 means very good)	How would you rate the interface of this service? (1 means very bad, 5 means very good)	How would you rate the pictures of this service? (1 means very bad, 5 means very good)
1	Maybe	Yes	2	2	3	3	3	4	2	2
2	Yes	Yes	3	4	4	4	3	3	4	5
3	Yes	Yes	4	4	4	5	3	3	5	5
4	Yes	Yes	4	4	4	4	4	4	4	4
5	Maybe	Yes	2	2	3	3	4	4	3	5
6	Maybe	Yes	4	4	4	4	3	4	5	5
7	Yes	Yes	5	4	4	4	4	4	4	5
8	Yes	Yes	3	4	4	4	3	3	3	5
9	Maybe	Yes	3	4	4	5	5	4	3	4
10	Yes	Yes	4	2	2	3	1	1	2	3
11	Maybe	Yes	3	4	4	4	3	3	4	4
12	Maybe	Yes	4	4	5	4	2	5	4	4

A 13: Online survey answers

Participant No.	What is your gender?	How old are you?	How long are you planning to stay in Berlin for this specific trip?	Would you travel alone, with partner, friends or children?	How much money are you planning to spend on average per day?	What is your field of occupation	What is your annual gross income?	What is your country of origin?	You would visit Berlin for business purposes.	You would visit Berlin to attend meetings or other business related events.	You would visit Berlin to do exciting things	You would visit Berlin for the night life	You would visit Berlin to go sightseeing.	**You would visit Berlin for a specific event.**	**You would visit Berlin to do something with the family.**	**You would visit Berlin to visit friends and relatives.**	**You would visit Berlin to mix with locals.**	**You would visit Berlin to experience a different culture.**	**You would visit Berlin to explore the art scene.**	**You would visit Berlin to get away from everyday life.**	**You would visit to enjoy the variety of activities you can experience.**	**You would visit Berlin to go shopping.**	Segment
1	female	15-25 years	5	friends	50	IT	below 15.000€	Bulgaria	3	2	4	2	3	5	4	5	4	4	3	5	5	4	4
2	male	15-25 years	3	friends	80	student	15.000€ - 30.000€	France	1	3	4	2	5	2	4	5	4	5	4	5	5	2	4
3	female	15-25 years	30	friends	20	student	below 15.000€	Germany	4	4	3	4	5	5	4	5	5	5	5	2	5	5	4
4	male	26-35 years	5	friends	100	business	15.000€ - 30.000€	Germany	2	3	2	2	4	5	3	5	5	5	5	5	5	3	4
5	female	26-35 years	3	partner	50	student	below 15.000€	Germany	2	2	4	5	5	4	2	4	4	3	5	5	5	5	1
6	female	15-25 years	5	friends	50	student	below 15.000€	Germany	1	1	3	2	5	5	1	5	5	3	4	4	5	5	4
7	male	26-35 years	3	friends	50	student	below 15.000€	Germany	2	2	4	5	4	5	2	4	4	5	5	5	5	5	1
8	female	26-35 years	4	partner	150	student	below 15.000€	Germany	5	5	3	3	3	2	5	5	3	1	4	5	2	5	4
9	male	15-25 years	3	partner	50	student	below 15.000€	Germany	3	3	4	4	5	5	5	5	3	2	5	5	4	5	4
10	female	26-35 years	4	partner	50	student	below 15.000€	Germany	2	4	4	3	5	5	3	4	3	4	5	5	5	3	4
11	male	26-35 years	14	partner	100	IT	30.001€ - 50.000€	Germany	2	3	3	3	4	5	2	5	2	5	4	5	5	5	4
12	male	26-35 years	3	partner	150	IT	30.001€ - 50.000€	Germany	2	3	4	2	4	4	3	5	3	2	2	4	4	1	4

13	female	26-35 years	4	friends	50	IT	50.001€ - 70.000€	Germany	2	2	3	5	5	4	2	5	3	2	4	2	4	5	1
14	female	36-45 years	7	partner	100	none of the above	15.000€ - 30.000€	Germany	1	1	3	3	3	5	5	5	5	2	1	5	5	5	4
15	female	26-35 years	3	family	100	none of the above	15.000€ - 30.000€	Germany	1	2	5	4	4	4	5	5	5	3	3	5	5	5	2
16	female	15-25 years	7	friends	80	student	15.000€ - 30.000€	Germany	2	2	3	2	4	3	5	5	4	4	3	5	4	5	4
17	male	15-25 years	5	partner	30	student	below 15.000€	Germany	2	2	3	5	4	4	4	4	2	4	3	4	4	4	1
18	male	15-25 years	1	friends	30	student	below 15.000€	Germany	1	1	4	5	4	5	4	5	5	5	5	5	4	5	2
19	male	26-35 years	3	partner	80	IT	50.001€ - 70.000€	Germany	4	4	3	2	4	4	5	5	3	2	2	3	3	3	4
20	male	15-25 years	7	friends	120	student	below 15.000€	Nether-lands	2	2	4	5	5	5	4	4	2	2	3	5	5	4	2
21	male	15-25 years	6	friends	70	student	below 15.000€	Paraguay	2	2	3	4	3	4	3	5	4	3	2	4	4	2	4
22	male	26-35 years	2	friends	30	none of the above	below 15.000€	Poland	3	2	3	1	5	5	5	2	2	4	5	2	5	2	4
23	male	15-25 years	2	alone	30	IT		Russia	1	1	3	1	2	4	4	4	2	4	2	3	3	3	4
24	female	15-25 years	14	friends	50	student	below 15.000€	Russia	1	1	3	2	3	5	5	5	3	3	5	5	5	3	4
25	female	46-55 years	1	family	200	none of the above	50.001€ - 70.000€	USA	3	3	3	4	5	2	5	5	2	5	5	5	4	5	4
26	female	56-65 years	14	family	100	Retails and Sales	30.001€ - 50.000€	USA	1	1	3	3	5	5	5	5	5	5	2	5	5	2	4
27	male	15-25 years	7	partner	35	student	below 15.000€	France	4	5	4	5	2	5	5	5	1	3	4	4	3	2	2
28	female	26-35 years	5	partner	50	student	below 15.000€	Germany	1	1	5	4	5	4	5	5	3	5	3	3	5	3	2
29	female	26-35 years	4	partner	75	IT	30.001€ - 50.000€	Germany	5	5	4	5	3	4	4	5	4	1	3	1	4	3	2
30	male	26-35 years	3	friends	100	IT		Germany	5	5	4	5	1	5	5	5	5	1	2	1	5	1	2
31	female	26-35 years	7	friends	20	student	below 15.000€	Germany	1	1	4	4	1	5	5	5	5	3	4	5	5	1	2

32	male	15-25 years	5	friends	100	student	15.000€ - 30.000€	Germany	5	5	4	5	4	5	5	4	1	1	2	2	4	1	2
33	female	26-35 years	2	partner	10	student	30.001€ - 50.000€	Germany	5	5	5	4	1	5	4	5	3	1	2	5	3	5	2
34	male	26-35 years	7	partner	40	IT	below 15.000€	Germany	5	4	5	5	1	4	5	5	1	1	3	1	3	3	2
35	male	26-35 years	2	partner	30	student	below 15.000€	Germany	5	5	5	4	3	3	4	5	2	1	1	3	3	3	2
36	male	26-35 years	3	partner	60	student	below 15.000€	Germany	3	3	4	5	4	3	4	5	2	2	3	2	4	4	2
37	male	26-35 years	3	partner	150	Retails and Sales		Germany	1	1	5	4	5	3	5	4	2	2	2	3	5	3	2
38	female	15-25 years	7	alone	50	student	below 15.000€	Germany	1	1	5	4	3	2	4	5	3	2	2	3	4	4	2
39	female	15-25 years	7	alone	50	student	below 15.000€	Germany	1	1	3	5	4	3	4	5	4	1	2	3	3	4	2
40	male	26-35 years	4	friends	100	IT	30.001€ - 50.000€	Germany	1	1	3	3	3	4	5	5	1	3	1	4	4	2	4
41	male	46-55 years	3	family	250	IT		Germany	2	2	3	5	4	2	5	4	4	4	3	4	3	3	2
42	female	15-25 years	10	partner	40	student	below 15.000€	Germany	1	1	5	5	2	4	5	5	4	1	1	1	1	1	2
43	male	15-25 years	5	friends	25	student	below 15.000€	Germany	5	5	4	4	3	5	3	5	2	1	4	4	4	2	2
44	male	26-35 years	5	friends	50	business	below 15.000€	Germany	4	4	4	5	1	4	4	4	4	4	4	4	4	1	2
45	male	26-35 years	4	alone	10	student	below 15.000€	Germany	5	5	5	4	1	5	5	5	5	1	1	1	5	3	2
46	male	26-35 years	4	friends	40	student	below 15.000€	Greece	3	3	4	5	5	3	4	4	3	4	5	4	3	2	2
47	male	26-35 years	10	family	50	student	below 15.000€	Kuwait	1	1	4	4	4	3	5	5	3	3	1	4	3	1	2
48	male	15-25 years	9	friends	50	student	below 15.000€	Paraguay	5	5	5	4	3	5	4	5	4	2	2	2	4	2	2
49	male	26-35 years	1	friends	50	Law	below 15.000€	Poland	5	5	4	5	4	5	4	4	3	3	3	4	4	5	2
50	female	26-35 years	4	partner	70	business	15.000€ - 30.000€	Poland	3	3	5	5	5	5	5	5	4	5	4	5	5	3	2

51	female	15-25 years	4	friends	60	student	below 15.000€	Russia	3	3	4	4	3	4	5	5	2	5	3	5	5	4	2
52	female	46-55 years	7	partner	250	business	above 70.000€	USA	1	1	4	5	5	3	5	5	4	5	4	3	5	4	2
53	male	26-35 years	3	partner	50	student	below 15.000€	Vietnam	2	2	4	4	5	4	5	5	3	4	1	2	4	1	2
54	female	46-55 years	5	partner	150	none of the above	30.001€ - 50.000€	Germany	1	1	3	3	5	1	1	1	3	3	4	5	5	3	3
55	female	46-55 years	3	partner	100	none of the above	30.001€ - 50.000€	Germany	1	1	4	4	5	1	1	1	1	4	2	2	5	4	3
56	male	15-25 years	2	friends	75	student	below 15.000€	Germany	1	1	4	2	5	4	1	1	3	2	3	3	5	4	3
57	male	15-25 years	5	partner	20	student	below 15.000€	Germany	1	1	5	4	5	1	1	1	1	3	2	3	4	4	3
58	female	26-35 years	5	partner	60	student	below 15.000€	Germany	1	1	3	4	5	1	1	1	1	1	4	2	5	3	3
59	male	56-65 years	4	partner	100	IT	More than 70.000€	Germany	2	2	4	4	4	4	1	1	2	3	3	2	4	3	3
60	female	26-35 years	3	friends	100	none of the above	30.001€ - 50.000€	Germany	1	1	3	3	3	1	1	1	1	1	2	5	1	2	3
61	female	26-35 years	2	alone	80	none of the above	30.001€ - 50.000€	Nigeria	3	3	4	4	1	5	1	1	1	1	1	1	1	1	3
62	female	56-65 years	2	alone	12	none of the above	below 15.000€	Serbia	1	1	4	3	5	1	1	1	1	3	1	5	2	1	3
63	female	26-35 years	7	friends	700	student	below 15.000€	China	1	1	3	3	4	1	2	5	1	4	1	4	4	4	1
64	male	15-25 years	5	alone	40	creative arts and culture	below 15.000€	Colombia	5	2	4	5	2	3	1	5	4	5	4	1	5	1	1
65	female	56-65 years	10	children	67	IT	below 15.000€	England	3	5	3	3	3	3	2	3	3	3	3	3	3	3	3
66	male	36-45 years	4	partner	25	IT	50.001€ - 70.000€	France	1	3	4	4	3	4	3	3	1	2	4	2	3	1	1
67	male	15-25 years	2	friends	100	student	below 15.000€	Germany	1	3	2	3	3	1	1	5	1	1	1	1	1	1	3
68	female	15-25 years	5	friends	70	business	15.000€ - 30.000€	Germany	1	1	5	5	4	4	1	4	2	1	1	1	4	1	1
69	male	15-25 years	5	partner	30	student	below 15.000€	Germany	1	1	3	2	5	4	1	4	2	1	2	1	5	1	3

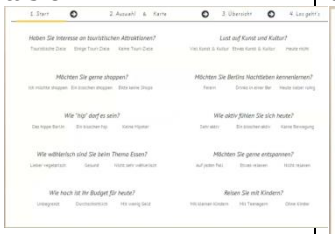
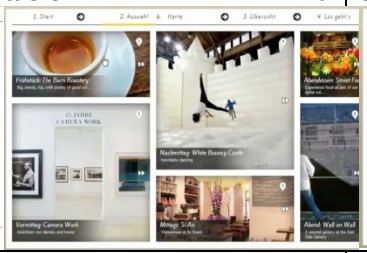
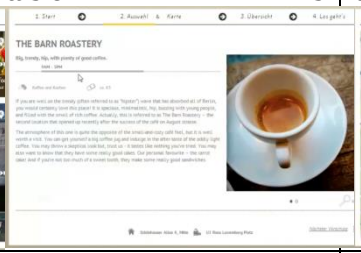
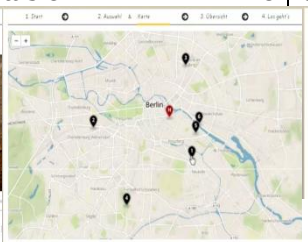
70	male	15-25 years	7	friends	100	student	below 15.000€	Germany	2	2	3	3	2	5	2	3	2	1	1	1	1	1	3
71	female	15-25 years	4	friends	80	student	below 15.000€	Germany	1	2	4	4	3	4	1	5	3	4	4	4	5	3	1
72	male	26-35 years	2	alone	50	student	below 15.000€	Germany	1	1	5	3	4	5	2	4	3	4	3	2	4	2	1
73	male	26-35 years	3	family	100	IT	50.001€ - 70.000€	Germany	5	5	3	4	4	5	5	3	1	1	1	1	1	3	2
74	male	26-35 years	3	friends	100	student	below 15.000€	Germany	4	3	4	4	3	5	2	4	5	1	1	1	3	1	1
75	female	15-25 years	3	family	80	Law		Germany	1	1	4	5	1	4	4	4	1	1	1	1	1	1	2
76	female	15-25 years	3	partner	50	student	below 15.000€	Germany	4	3	3	3	3	3	4	2	1	4	1	4	2	3	3
77	male	26-35 years	7	partner	100	business	15.000€ - 30.000€	Germany	3	2	3	2	2	3	1	5	4	2	4	4	4	2	1
78	male	56-65 years	5	partner	150	IT	30.001€ - 50.000€	Germany	1	1	4	4	5	1	5	1	1	5	5	5	5	1	1
79	female	26-35 years	4	friends	50	student	below 15.000€	Germany	1	1	5	5	3	1	1	5	1	1	3	4	5	4	1
80	female	26-35 years	10	alone	35	student	below 15.000€	Germany	1	1	4	5	5	2	1	5	3	3	4	5	5	2	1
81	female	26-35 years	7	partner	30	student	below 15.000€	Germany	1	1	4	1	2	3	4	4	2	1	1	4	2	4	4
82	female	36-45 years	5	partner	40	IT	30.001€ - 50.000€	Germany	1	1	5	5	4	1	5	1	4	4	1	3	4	4	1
83	male	26-35 years	2	partner	30	student	below 15.000€	Germany	3	1	4	4	2	4	2	3	1	2	3	2	3	2	3
84	female	26-35 years	3	alone	100	business	30.001€ - 50.000€	Germany	2	3	5	5	3	4	1	3	2	2	3	1	2	1	3
85	male	15-25 years	10	partner	50	student	below 15.000€	Germany	3	2	3	2	1	1	2	4	1	1	1	1	1	1	3
86	male	26-35 years	2	partner	20	student	below 15.000€	Germany	1	1	3	3	3	3	1	5	1	1	1	1	3	3	3
87	male	26-35 years	3	friends	75	student	below 15.000€	Germany	5	5	4	5	4	3	3	5	1	1	3	1	3	2	1
88	male	26-35 years	4	friends	60	student	below 15.000€	Germany	2	2	4	5	5	4	2	5	2	4	5	4	4	2	1

89	male	15-25 years	4	partner	80	student	below 15.000€	Germany	4	4	3	3	5	4	3	2	3	5	3	4	3	3	1
90	male	26-35 years	3	partner	50	student		Germany	1	1	3	4	4	4	4	1	3	2	1	3	4	3	1
91	female	15-25 years	7	partner	100	student	below 15.000€	Germany	3	2	3	5	2	4	3	5	1	4	1	2	4	2	2
92	female	15-25 years	3	friends	40	student	below 15.000€	Germany	4	4	3	3	3	3	3	3	1	3	2	2	3	1	3
93	male	15-25 years	3	alone	50	Media and Publish-ing	50.001€ - 70.000€	Germany	3	4	4	4	3	5	3	1	1	1	3	3	3	3	3
94	male	26-35 years	3	friends	20	student	below 15.000€	Germany	2	2	3	3	1	4	1	5	2	2	1	2	4	4	1
95	male	15-25 years	4	friends	60	student	below 15.000€	Germany	4	3	4	3	3	4	2	4	3	3	2	3	3	2	1
96	male	26-35 years	4	partner	40	student	below 15.000€	Greece	2	3	3	4	5	5	4	2	2	3	5	3	4	1	1
97	female	15-25 years	7	friends	35	student	below 15.000€	Russia	4	4	4	4	4	4	3	3	3	3	4	4	3	4	1
98	male	15-25 years	3	friends	50	student	below 15.000€	Indonesia	1	1	5	5	5	3	1	4	4	5	3	2	5	2	1
99	male	26-35 years	7	friends	300	IT		Mexico	1	2	5	5	3	5	2	2	5	4	2	5	5	3	1
100	female	above 65 years	4	children	100	creative arts and culture	below 15.000€	Nether-lands	1	4	5	5	1	3	2	4	3	2	5	5	4	5	1
101	female	36-45 years	2	family	100	none of the above	30.001€ - 50.000€	Nether-lands	1	1	4	3	5	1	5	1	1	5	5	1	5	3	1
102	male	26-35 years	2	partner	50	student		Poland	5	5	5	5	2	5	2	3	2	2	2	2	2	4	1
103	male	15-25 years	7	friends	120	public safety officer	30.001€ - 50.000€	USA	1	1	4	5	4	2	4	2	3	4	3	3	4	1	1
104	female	46-55 years	1	family	100	educator	30.001€ - 50.000€	USA	1	1	4	4	4	3	4	1	1	1	1	4	4	5	1

A14: Think Aloud Session Transcription and Decoding (open coding with descriptive codes)

Introduction *(by Lars Kops)*:

Vielen Dank dass du heute an der Studie teilnimmst. Wir sind hier weil wir eine Benutzerfreundlichkeitsstudie durchführen über ein Reiseempfehlungsservice in dem Fall George. Der Prozess besteht aus 3 Schritten. Als erstes wird dir eine Aufgabe gestellt, die du am PC lösen musst. Wir führen dabei eine Think Aloud Session durch, das heißt, dass du dein Gedachtes laut sprichst. Wenn du nicht kontinuierlich sprichst, werde ich dich kurz erinnern, laut zu denken. Gerne kannst du Kritik oder Anmerkungen äußern. Der zweite Schritt ist ein kurzes Interview. Der dritte Schritt ist ein Fragebogen. Die erste Aufgabe lautet jetzt, dass du jetzt einen Tagestrip mit George nach Berlin planen sollst.

Participant No.	table 1	table 2a	table 2b	table 2c	table 3	table 4
						
1	Okay und das heißt ich klicke jetzt an was ich möchte – okay... ja gut ich schaue jetzt überhaupt erst einmal was es ist ähm ich habe mir erst einmal die Fragen kurz durchgelesen und nehme einfach an, dass ich die Fragen beantworten soll und klicke darunter jeweils an was ich denke ich klicke mich jetzt einfach einmal durch alle Fragen durch – wie hip darf es sein, mache ich ein bisschen hip, wie wählerisch sind sie beim Thema esse – nicht sehr wählerisch wie hoch ist ihr Budget für heute ja gut was ist wenig was ist durchschnittlich unbegrenzt ist klar, aber durchschnittlich und wenig Geld finde ich ist ja relativ und für jeden ist wenig Geld wahrscheinlich was anderes also mach	Okay. Ähm 6 Bilder die mir anscheinend zeigen, was ich machen soll. Ähm Frühstück Joghurt Essen, Vormittag sieht nach Kunst aus Temporary Art da unten oder was das sein soll. Nachmittag also anscheinend irgendeine sportliche Aktivität dann Mittagessen Abendessen genau und abends nochmal Kunst und Kultur East Side Gallery. Mmmmmmm Ich weiß jetzt nicht ob ich's auswählen soll oder .	ah ok – ähm okay also ich habe jetzt einfach mal eins ausgewählt und angeguckt und sehe da was dort los ist was ich dort machen könnte und das erklärt auch nochmal ein bisschen genauer was da passieren würde. Ähm Okay. Jetzt gucke ich mir alle Vorschläge einfach einmal an und ja gehe weiter	also klicke auf die Karte ob das was anderes ist ach so ja und die Karte wo ich überall 123456 wo ich nach und nach hingehen würde hm, ja gut würde ich wahrscheinlich jetzt mal so spontan nicht die 4 nehmen weil es einfach sehr weit weg ist vom Zentrum.	Übersicht – ok bei der Übersicht habe ich alles noch einmal untereinander was ich würde ich drucken können ausdrucken könnte ähm. Ich würde mich jetzt theoretisch fragen ob ich irgendetwas wechseln könnte weil ich jetzt kein Frozen Joghurt zum Frühstück möchte. Würde ich das jetzt einfach gerne wechseln, aber hier kann ich nichts wechseln. Interviewer: „Und wo könnte das möglich sein?" Ja wahrscheinlich, ja ich würde wahrscheinlich auf Auswahl gehen *(participant went back to table 2a)* ah ok und da ist so ein Pfeil zum wechseln, ja ok, hier bei der Auswahl	Ach ja und da ist auch schon der QR Code

	ich durchschnittlich weil damit kann ich nichts falschanklicken würd ich sagen Lust auf Kunst und Kultur sage ich etwas Kunst und Kultur . Möchten Sie Berlins Nachtleben kennen lernen Feiern Drinks in einer Bar heute lieber ruhig, Drinks in einer Bar wie aktiv fühlen Sie sich heute, sehr aktiv ein bisschen keine Bewegung nehme ich sehr aktiv möchten sie gerne entspannen mmm nicht relaxen reisen sie mit Kindern ohne Kinder				kann man sich da nochmal durchklicken und ok dann hat es sich auch in der Übersicht geändert und ich könnte auf Los geht's und dann ist es da drin.	
Decoding P 1	P 1 orientates oneself by the questions P 1 has problems making sense of the budget questions P 1 answers the rest of the questions posed	P 1 processes the highly visual content P 1 is stuck	P 1 navigates through the system by trial and error	P 1 makes sense of the map feature	P 1 recognizes and understands overview function P 1 experiences information gap 1 P1 finds possibility to change activities	P 1 understands take with you function
2	Ok also ich fang auf der Starseite an ich guck mir die verschiedenen Möglichkeiten an spontan fühle ich mich hingezogen erst mal zu dem Budget und sage dass ich hier durchschnittliches Budget dabei habe ähm beim Thema Essen bin ich nicht sehr	Ok jetzt springt der Service weiter zu Auswahl und Karte ich nehme an das sind jetzt ok das sind jetzt die Essensvorschläge für den Tag ähm ich nehmen an ich muss mich entschieden zwischen 6 verschiedenen ähm ... Interviewer: Was für Aktivitäten siehst du genau?" Ich sehe		Participant did not find the map	und bekomme dann alles auf einen Blick. Ja genau jetzt kann ich halt hier durchscrollen kann das was ich eben ausgewählt hab in kleinen Fenstern untereinander aufgelistet mit Details mit Preis Kosten mit verschiedenen	Jetzt kann ich meine Tag angucken, hier die App kann das alles als PDF runterladen , Interviewer „Wo könnte es noch eine Route geben von deinem Tag?" – Ne Route? Das ist dann wahrscheinlich im

	wählerisch wie hip darf es sein höchstens ein bisschen hip, möchten sie gerne shoppen möchte nicht shoppen Interesse an touristischen Attraktionen habe ich nicht ich will lieber das echte Berlin erleben Lust auf Kunst und Kultur ja heute mal nicht das Berliner Nachtleben interessiert mich auf jeden Fall ich fühle mich sehr aktiv äh bisschen relaxen ist aber auch gut und ich reise ohne Kinder	halt Frühstück Vormittag Nachmittag ah es sind also verschiedene Aktivitäten ähm wobei Essen jetzt spontan sehr vorherrschend war als Motto ja also mit diesen unterschieden fällt es mir jetzt schwer mich festzulegen fangen wir mal chronologisch an und gehe auf Frühstück	und ok bekomme jetzt hier einfach erklärt was ich machen soll „Barn Roastery“ nächster Vorschlag weil mir das jetzt auch nicht soviel sagt der nächste Vorschlag scheint auch wieder sehr essenslastig zu sein kommen wir zu funk you ja also das scheint auch wieder ums Essen zu gehen ähm ja sieht auf jeden Fall sehr interessant aus Deli Yoga ist dann das nächste Kaffeehaus das mir hier vorgeschlagen wird also ich würde jetzt auch gerne mal weiter gehen zu anderen Aktivitäten aber ich klick mich jetzt munter durch die ganzen Kaffeehäuser durch ja also ist auf jeden Fall übersichtlich erklärt ansprechende Fotos Preis dabei definitiv nur würde ich so langsam		Details ja wie gesagt die einzelnen Angebote sind kurz und knackig beschrieben die Fotos sind ansprechend Design ist auf jeden Fall sehr schön jetzt hier oben auf 4.	PDF enthalten oder wahrscheinlich auf der Auswahlkarte da ok ach so *(participant went back to table 2c)* Auswahl und Karte das sind 2 verschiedenen Sachen auch das würde ich optisch voneinander abgrenzen damit klar ist, dass ich hier noch ne Karte hab ja auch die optische sehr schön gemacht sehr übersichtlich ja

		also ich wüsste ehrlich gesagt nicht also ich dachte ich würde mir einen Tagesablauf zusammenstellen also würde vielleicht ein Frühstück auswählen kann aus 3 Angeboten – was man hier auch machen kann ah ok jetzt verstehe ich das System also quasi 1 2 3 4 5 6 6 verschiedene ok also ich entscheide mich jetzt fürs Frühstück Kaffee Oliv, vormittags ja kann ich hier verschiedene Aktivitäten durchklicken – laufen ist auf jeden Fall sehr schön, nachmittags nicht so viel tanzen ähm nachmittags klicke ich jetzt die verschiedenen Sachen durch Sightseeing Run muss nicht sein ja nehmen wir Yoga – Mittags kann ich jetzt auch die verschiedenen Möglichkeiten durchklicken also als Rückmeldung die Pfeile könnten größer sein also irgendwie optisch klarer sein, das diese 6 Fenster letztendlich meine Tag bilden und ich die einzelne Fenster auch durchklicken	auch mal langsam ne Aktivität auswählen – Interviewer“ Und wie denkst du kommst du zurück?“ Ich nehme an dass ich oben klicke auf Auswahl und Karte da bin ich wieder vorne wahrscheinlich keine Ahnung			

		kann mit verschiedenen Möglichkeiten habe mich jetzt hier für die rote Harfe entschieden also für Mittag/ Abendessen da gibt's Streetfood abends Party im Kater Holzig das ist doch was so dann klicke ich jetzt auf Übersicht				
Decoding P 2	P 2 orientates oneself by the questions	P 2 processes the highly visual content P 2 is stuck and therefore only concentrates on "breakfast-activity" P2 experiences information gap 2 P 2 understands the principle of George	P 2 is reading the details about "breakfast-activity" P2 experiences information gap 2	P2 experienced information gap 3	P 2 recognizes and understands overview function	P 2 understands take with you function P 2 discover figure 2c P 2 gives suggestions
3	Ok should I answer these questions? .. Ya of course I want to see tourist attraction of course. But it depends in what you are interested are you more interested in museum and so on Interviewer: Just focus on the application". To go shopping? No I dont want to go shopping. Interviewer: „would you answer the questions?" yes. Interviewer: How would you answer the questions? Yes. Oh ok to answer the question yes, yes I would probably go to a few shops.	Then the service will provide me some suggestion. Okay this exhibition I already was in there, I don't like it but I was in Arish Kapoor ääh I have to pick up just one? Interviewer: „Just try it" I would definitely choose this one. Yes I know it's really nice suggestion and in my interest but what ist he next suggestion? Ah ok.	Interviewer: „What do you see right now?" Yeah like it's also an exhibition, yes but ok now I understand the service	Participant did not find the map	Interviewer: „How would you proceed now?" Okay now how do I proceed now – overview but how can I, I will probaly go to overview. Okay thats restaurants, yeah I kind of see what you suggest for - ah ok now I get like I stop in something and then program suggest me this thing where I stop. Right? Ok. Probably you have to put a button for select. For me it was a little bit challenging.	Okay.

	What is your level of hipness? I have no idea what is hipness ok probably no i have no die. How picky are you with your food. Just healthy food. What is your budget for today? A far amount probably. How about art and culture? Yes definitely I would spent a lot of culture definitely. Would you like to experience Berlin's night life? Party hard of course. How active do you feel today? Very active. In the mood for some relaxation? No. Like I'm one day in Berlin I would definitely not relax. So very active. And no kids.	Probably maybe I will even go to 2 museums or something now he also offer me something for breakfast I don't know that coffee but it seems nice it's nice because you are really lost to go for breakfast when you are in Berlin. It's really good.	is the offer. You give me suggestion like where I can go but ok, how can I pick up suggestion? Next suggestion Gemäldegalerie yes of course it's really nice. Berggruen ok this is very nice, too. Okay but if I chose a suggestion. Yeah they really suits to my interest that is also a museum, they provide kind of nice exploination and okay. Im a bit lost should I chose all the possibilities change check okay. Thats really nice really interesting There are a lot of suggestions really nice probably, i'll like them. Pergamon ok but what next Im a little bit lost service offer me lots of opportunities but how can i pick them. Okay yeah very interesting probably I will take now on a map I can see the suggestion where are they and i can probably plan a trip but now i get it.		When you go to next step you kind of understand it but then I can change it right? I can come back and change then what I want. But can I like will I see all oft them in a map? Let me see – show map, only pictures no map. Because for instance I plan a trip but then if I want to plan a trip I want them all together not in different districts.	

		First breakfast in the morning then museum then lunch somewhere or probably even dinner. Okay yeah street food thursday very nice. Ya thats really nice that you can see it on a map so you can plan where to go. Interviewer: „And is there a possibility to change the opportunities in this overview?“ Well actually I dont think so. But for instance like two activites during a day will be too much I guess. like if you are going in the morning and afternoon to museum. You kind of choose like two museums. Its difficult like I would say I go to two museum because museum is not like 5 minutes, and then no other activity. But still the suggestions are good and then the person can chose what kind of activity.	Now I can watch it on the map plan and I can plan my trip I see also the price, can collect my budgets. I really don't get how i can select one opportunity. If I kind of chose something. Now this is kind of doubt what should I do. Ok that's other suggestions for other activities also really interesting but probably I will not mix ähm museums and other activities.			
D	P 3 orientates oneself by	P 3 is talking about the pro-	P 3 is reading details about	P2 experienced infor-	P 3 recognizes and	P 3 understands take

	the questions P 3 has problem making sense of tourist attractions P 3 orientates oneself by the questions	vided places P 3 is looking to take two times the same activity P 3 plans the whole day	museums P2 experiences information gap 2	mation gap 3	understands overview function P2 talks about information gap 2 P 3 wants a map wit all activities	with you function
4	I guess I just follow the questions here okay. So are you interested in tourist attractions? Some tourist attraction. How about art and culture? Yes. Are you planning to go shopping – a few shops. Would you like to experience Berlin's nights? Drinks in a bar what's your level of hipness? a bit hip – How active do you feel? Very active. How picky are you with your food? Ya healthy. In the mood for some relaxation? A little bit. What's your budget for today? Lets take a fair amount. Ah no kids.	Ok so activities, breakfast. What I see is different – the day is divided in different zones – morning breakfast dinner in the mean time some activities. I can chose between different options so i can chose for example for breakfast 1 2 places okay, Interviewer: „How would you proceed? If I'm correct in the numbers it was from breakfast the lunch something in the afternoon until the evening activities. Then click maps and start from 1 until 6. Interviewer: „would you do anything else now?" Right now I would check for the Overview	I see, and I can then get more information about the different proposed places. Ok coffee cake... next suggestion...So ok if I click here I go back there and I see so I guess here is something I can do during the day. So is an exhibition in the morning if I'm correct okay, now I see how it works, then I can chose a drink in the afternoon lets say I go there. So there are different suggestions behind my choice.	I was looking for this kind of information for a map, you now, I use this kind of information if I go on a trip some where to put the places on a map to see how to travel from one place to another . So it's only the activities on the map. Chose another one here and then click on a map	I guess that's the same view but in a list what I chose for my trip.	Ah. Interviewer: „What can you do here?" I suppose I can download or get printed my program oft he day. Or up on my phone or get the PDF. Ok it looks nice.
Decoding	P 4 orientates oneself by the questions	P 4 plans the day	P 4 is reading details about the chosen trip	P 4 is positively surprised about the map	P 4 recognizes and understands overview function	P 4 understands take with you function
5	So I just go through the questions so I have to plan the trip that is what the service can offer me? okay	Okay ...Interviewer: „So what do you see here?" This is activities for –what is serious for me- during the day right?	.	So I can just browse basically see the map – okay, lets say I like it – Interviewer" What do	Okay now I have all of them on one page? Just to make sure I want it – well. I'm not sure if	Aha Interviewer: „so what's the feature here?" So I can basically get the same

	so yeah okay so are you interested in tourist attractions? I click on it okay planning to go shopping – a few shops form e what's your level of hipness a bit hip – how picky are your with your food – oh not very picky what's your budget fort he trip? We are in Berlin right? Ok so a tourist thing I'm traveling ok so lets say just a little bit how about art and culture? Yes would you like to experience Berlin's nights? Party hard how active are you feeling today – very active – cycling free okay in the mood for some relaxation relax a bit are you with kids? No kids	What can I do for breakfast what can I do in the afternoon what can I go for dinner ok so the service analyze my preferences and make some suggestions. Okay so I click what I like right? Hm, okay.. Interviewer: „And what do you think can you do here?" I can click on the activity I like right? For example like – okay and get to know what is it okay and If i want to okay I can choose this one, okay, in the nightlife okay I think the programme doesn't really offer me really parties I ask for some parties so I expect to get some clubs here is mostly bars – lets say if I want to take some, pf, okay, lets say it should be this one ya? I don't chose right? There are the pictures okay. So this just provide the information ya? Ya. I cant select okay right? Hm?	okay lets click to the first one over here okay I'm lost Interviewer: „How do you think can you get back?" How can I get back? Over here? Okay – Well the problem is I haven't chosen anything okay we started we started from another one I'm pretty sure there wasn't white trash	you see here?" I think those are the preferences selected activities I see over here aha so you can change for example this bar to another one okay I got this here – and it changes the map aha ok – so it reminds it remembers my selections on the map it seems like ok, lets say I'm happy with those six things	this one is necessary. I already got all the information actually it seems when you see all together on e page like that so this new view doesn't provide new information to me- lets say I'm happy	thing on my mobile or smartphone or I can just download it okay? Okay so I will get this picture

Decoding 5	P 5 orientates oneself by the questions	P 5 plans the day P 5 is disappointed about the offered places P 5 is lost, therefore experience information gap 2	P 5 experienced information gap 1	P 5 understands the map	P understands the overview P5 gives suggestions	P 5 understands take with you function
6	Okay haben sie Interesse an touristischen Attraktionen? Einige touristische Ziele, möchten sie gerne shoppen ja das wäre gut wie hip dar f es sein, ich glaube ich bin kein Hipster. Wie wählerisch sind sie beim Thema Essen? Nein nicht sehr wählerisch kommt eigentlich alles in Frage. Wie hoch ist ihr Budget für heute? Würde ich sagen durchschnittlich. Lust auf Kunst und Kultur? Heute eher nicht ist ja schönes Wetter Berlins Nachleben kennenlernen in ne Bar was trinken gehen wie aktiv fühlen sie sich heute sehr aktiv möchten sie gerne entspannen, im Urlaub eigentlich nicht, reisen sie mit Kind, nein.	So jetzt sehe ich hier verschiedene Bilder wahrscheinlich irgendwelche Vorschläge Frühstück mal gucken was er mir da anbietet Ganz gut vormittags kann ich laufen oder Sport machen. Okay gut also vormittags Vorschläge waren jetzt nicht so zutreffend für mich vielleicht ist nachmittags was dabei Hüpfburg, Knopfladen der könnte ganz interessant sein, Sightseeingtour so was ist immer ganz gut wenn man so was schon vorgelegt bekommt naja also für den Nachmittag werd ich schon was finden. Mittagsvorschläge was zu essen, Wenn das auf	da sagt er mir was ich da essen kann dass es 4 Euro kostet und ich da einen Tisch reservieren kann andere Vorschläge ok also schon mal Frühstücksvorschläge da kann ich mir etwas aussuchen	*Participant hasn't found table 2c*	Stellt er mir hier noch eine Übersicht was ich den Tag über machen kann. Geht's auch runter? Ja jetzt schlägt er mir wieder alles vor, was er mir auch vorhin vorgeschlagen hat. Kann man nichts auswählen.	So dann geht's los. Interviewer „Was kannst du hier machen?" Alles wieder runterladen auf mein Handy wahrscheinlich hat man immer dabei oder QR Code scannen oder ne App vielleicht gibt's ja auch ne App damit ich das parat hab wenn ich unterwegs bin. Interviewer: „Gibt's noch die Möglichkeit einer Route?" Ne also ich denk halt wenn ich mir das als PDF runterlade wird das ja auf dem PDF sein. Interviewer: „Aber sonst siehst du nirgendwo, wo noch eine Karte von deinem Tag sein könnte?" Ne also wenn ich die App besitzen

		der Route liegen würde vom Nachmittag wäre das ja ganz gut dann gibt's ja auch noch Abendessen und was schlägt er mir abends vor zu machen? Ja irgendwie was trinken gehen, habe ich ja auch eingegeben in eine Bar gehen da wird ja dann bestimmt auch was dabei sein. So.				würde, würde er mir vielleicht die Route nochmal anzeigen, wenn ich den QR Code scanne.
Decoding P 6	P 6 orientates oneself by the questions	P 6 processes the highly visual content and clicks on the first picture P 6 plans the rest of the day	P 6 is reading the details about "breakfast-activity" and reads further suggestions	P 6 experienced information gap 3	P 6 recognizes and understands overview function P 6 is unclear about navigation, therefore experienced gap 1	P 6 understands take with you function & still didn't found the map
7	Okay. Ich muss jetzt klicken? Haben sie Interesse an touristischen Attraktionen? Ja an einigen touristischen Zielen. Lust auf Kunst und Kultur? Heute nicht. Möchten sie gerne shoppen? Ein bisschen shoppen. Möchten Sie Berlins Nachleben kennenlernen? Ähm eher Drinks in einer Bar. Wie hip darf es sein? Ein bisschen hip. Wie aktiv fühlen Sie sich heute? Ein bisschen aktiv. Wie wählerisch sind sie beim Thema Essen? Nicht sehr wählerisch. Möchten Sie gerne entspannen?	Jetzt gibt er mir Tipps für das was ich machen kann. Also erst mal frühstücken, dann Checkpoint Charlie besuchen, White Bounce Castle, dann Mittagessen, Abendessen und abends ne Bar oder was? Ah es gibt verschiedene Möglichkeiten. Okay. Hier kann ich wahrscheinlich auswählen was ich machen möchte.	Ah ok. Jetzt zeigt er mir die einzelne Möglichkeiten der Vorschläge. Hab ich die jetzt auch ausgewählt? Ich kann sehen was ich machen kann wie teuer wo es sich befindet, kannste dir auf der Karte angucken. Interviewer: „Wie würdest du jetzt weiter verfahren?"	Jetzt auswählen was ich machen möchte. Jetzt kann man auf die Karte gucken wo sich die einzelnen Sachen befinden.	Und jetzt gibt es gleich eine Übersicht.	Jetzt kann ich mir das auf mein Handy ziehen oder als PDF ausdrucken.

	Nicht relaxen. Wie hoch ist das Budget für heute? Durchschnittlich. Reisen mit Kindern: nein, ohne Kinder					
Decoding P 7	P 7 orientates oneself by the questions	P 7 processes the highly visual content	P 7 is reading the details P 7 doesn't know if he has chosen a possibility already, experienced information gap 2	P 7 understands the map	P 7 recognizes and understands overview function	P 7 understands take with you function
8	Ja Starseite mit jeder Menge Fragen: Haben Sie Interesse an touristischen Attraktionen? Da ich Berliner bin weniger, also keine. Möchten Sie gerne shoppen? Ein bisschen. Wie hip darf es sein? Ein bisschen. Thema essen – gar nicht wählerisch. Wie hoch ist ihr Budget? Unbegrenzt, durchschnittlich eher wenig Geld, mmm sag ich mal durchschnittlich. Lust auf Kunst und Kultur – nur etwas möchten Sie Berlins Nachtleben kennenlernen – ne lieber eher ruhig heute. Wie attraktiv, nein wie aktiv fühlen Sie sich heute? Mmmm ein bisschen aktiv. Möchten Sie gerne entspannen? Auf keinen Fall nicht relaxen, Reisen Sie	So dann kommt die zweite Seite. Eine Karte, ok Print Design, einige Vorstellungen ok, mach ich mal auf, Information, da kann man sich andere Vorschläge zeigen lassen. Die nächste U-Bahn Station. Das ist jetzt die Karte man konnte auswählen zwischen Auswahl und Karte – ein Auszug aus dem Stadtplan mit den durchnummerierten Zielen die vorgeschlagen worden sind, bei 1 haben wir jetzt das Frühstücksangebot – aber da stellt sich jetzt die Frage, wenn man sich das vorher nicht gemerkt hat – müsste man immer wieder zurück springen. Hier kommt man nicht direkt rein,- Das heißt man muss immer wieder zurück und sich dann hier die ganzen Vorschläge. Ok, Früh-		*P 8 hasn't found the map*	Ok dann muss ich hier wahrscheinlich auf Übersicht klicken. Das ist jetzt der gesamte Tagesablauf chronologisch aufbereitet, mit den Vorschlägen zu welchen Uhrzeiten man hingehen sollte, nochmal kurze Beschreibung und auch zusätzlich noch die Telefonnummer, ansonsten alle Informationen vorhanden die man braucht, wenn man jetzt den Tagesablauf ausgedruckt hat dann sind alle Informationen da. Ja los geht's.	Ja hier hat man die Möglichkeit es sich entweder als PDF auszudrucken . QR-Code sich in die App zu scannen oder per QR Code direkt zum App Store zu kommen. Das heißt entweder habe ich die Wahl zwischen Online auf dem Handy, dann generell über die App oder Offline als PDF.

	mit Kindern, nein.	stück haben wir gut. Bei 2 vormittags hätten wir ein Camera Built, andere Vorschläge gibt es auch, bleiben wir bei der Fotogalerie. Bei 3 Italienisch essen. Die 4 am Nachmittag die Hüpfburg sieht sehr schön aus, abends Street Food, ja asiatisch und abends schlägt er vor East Side Gallery, Ad-	Hier hat man jetzt die Detailansicht der einzelnen Vorschläge mit einer kurzen Beschreibung. Ähm kurze Angabe und was es sich handelt, also die Kategorie und die Preiskategorie in dem Fall ca 5 Euro pro Nase und weitere Fotos. Jo und die Adresse ist sehr kurz gehalten, das sind wahrscheinlich nicht die Öffnungszeiten, sondern der Vorschlag in welchem Zeitraum man das besuchen sollte. Generelle Informationen wie zum Beispiel wenn man sich Verspätet oder so, also die Öffnungszeiten weiß man leider nicht und auch nur wo die nächste U-Bahn Station wäre. Wär gut wenn man da später in ner App sich das anzeigen lassen könnte den Standort.			

		miralspalast, ok das wär jetzt für ein bisschen Kultur durchgängig Kultur ja bis auf die Hüpfburg sehr kulturelle Vorschläge. Das sieht nach einem schönen Tagesablauf aus.				
Decoding	P 8 orientates oneself by the questions	P 8 processes the highly visual content	P 8 is reading the details P 8 is giving suggestions	P 8 experienced information gap 3	P 8 recognizes and understands overview function	P 8 understands take with you function
9	Ok also ich gehe jetzt die einzelnen Fragen durch. Also ich würde jetzt sagen touristische Attraktionen eher viel wenig oder gar nicht da mach e ich mal einige ähm shoppen keine, hip ok also ja das könnte man als also das nehme ich mal viel. Essen also da spreche ich verschiedenen Punkte an ich bin nicht seh wählerisch und das Budget – dadurch dass ich momentan noch nicht so richtig verdiene machen wir mal Durchschnitt. Kunst und Kultur das lass ich auch mal weg mich geh eher gerne durch die Städte Berlins Nachtleben ok wenn nicht so viel Zeit ist rechts ein bisschen von allem sehe ich etwas unge-	Also das ist jetzt das was er ausgewählt hat Moment jetzt muss ich das mal kurz schnallen. Ich sehe 6 Stationen – ah den Tagesablauf	jetzt hab ich's wart mal kann ich hier nochmal genauere Infos kriegen ah ja ok. Ah jetzt sagt er mir das Ding hat von 9-17 Uhr geöffnet - äh Kaffee und Kuchen im Schnitt 3 Euro und die Beschreibung kann ich bin mir nicht sicher ob das ein festgelegter Vorschlag ist oder ob ich wählen kann oder was auswählen kann. Obwohl Moment nächster Vorschlag ah ok es gibt also verschiedene Möglichkeiten zu Frühstücken das unterschiedet sich also logischerweise in der Beschreibung und in der Lage. Okay. Genau Preis ist	*Participant hasn't found table*		Jetzt habe ich hier den QR Code ähm würd sagen wenn ich auf Download PDF klicke habe ich alles erfüllt. Ok also ich könnte nochmal mein Feedback abgeben und dann per PDF alles downloaden. Interviewer: „Wo würdest du noch eine Route von deinem Tagesplan vermuten?" Äh in dem PDF oder nochmal in der Übersicht da gab's ja in den einzelnen – ach so du meinst so eine Gesamtübersicht. Es gab ja die Option mit den Karten nochmal schnell

	nau ich sehe da mehr Kategorien und würde mich für die Mitte entschieden für Drinks in einer Bar. Wie aktiv – mittel. Also keine Bewegungen würde quasi auch implizieren, dass man die Strecken mit den Öffentlichen Verkehrsmitteln zurücklegt und ich möchte gerne eine Mischung. Also ich würde das auf die Wege beziehen Gerne entspannen also ein bisschen zwischendurch mit Kindern das ist relativ klar ohne Kinder. Aber wenn ich Kinder hätte fehlt vielleicht eine Alterseingrenzung bezüglich der Kinder.		relativ ähnlich wohl weil ich mittleres Budget gewählt habe. Okay also ich würd jetzt sagen bezieht sich das alles noch auf den ersten Tagesabschnitt. Ich bin ein bisschen unsicher ob er unendlich viele Vorschläge und vor allem wo ich etwas auswählen kann. Ich bin grad so ein bisschen verwirrt – wo kann man denn jetzt irgendwo zurück. Also es gibt ja keinen zurück Button, also müsste ich wohl auf Schritt 3 auf Übersicht gehen . Oder viermal zurück gehen.		Ah ja ok ähm jetzt sehe ich die Auswahlmöglichkeiten von grad eben, das würde ich jetzt an den Tagesanfang packen, dann wo man durchgehen kann also Mauerpark, also es scheint ein strukturierter Tagesablauf zu sein in anderer Ansicht und dann halt irgendwie Mittags was zu essen und der hat jetzt sozusagen feste Vorschläge rausgepackt . Mauerpark Bouncy Castle für den Abend dieses	zurück aber ich glaub da ist jetzt nur eins ich probiere das mal schnell aus. *(participant went back to 2)* Jetzt bin ich verwirrt jetzt zeigt er was anderes. Warum ändert sich das nicht, ist das gerade mein Fehler? Straße, also ehrlich gesagt habe ich gerade keine Ahnung wo ich die komplette Route ansehen könnte außer in dem PDF.

		Ok Moment Karte, ach so ne, indem ich auf Begriff klicke auch nicht, das wäre auch unlogisch, vielleicht nochmal unter Auswahl und Karte – also wenn ich in den einzelnen Kategorien reingehen würde und dann- ich probiere das mit dem Rechtspfeil – ach ne das kam später in der Liste wo er mir mehrere Variationen gezeigt hat, also für andere Optionen die Pfeile. Ach so und jetzt verstehe ich so ein bisschen das Prinzip. Weil ich jetzt hier sozusagen auswählen kann was mir zusagen würde und wenn ich dann mein Tag fertig hab dann das so eingeloggt lassen			Street Food scheint wohl für so zwischendurch zu sein. Ah wenn ich jetzt hier rechts weiterklicke ach ne dann kommen andere Bilder. Interviewer: „wo würdest du andere Vorschläge erwarten?“ und dann auf die Übersicht und alles im Überblick sehen. Genau. So . Jetzt würde ich das abschließen und sagen alles ist ok	
De-	P 9 orientates oneself by the questions	P 9 experienced information gap 2	P 9 is reading the details P 9 experienced information	P 9 experienced information gap 3	P 9 experienced overview function	P 9 understands take with you function

		P 9 understands the function of figure 2a	gap 2		P 9 experienced information gap 2 P 9 recognizes and understands overview function	P 9 still hasn't found table 2c
10	Ich würde mal oben links anfangen Haben Sie Interesse an touristischen Attraktionen, ähm touristische Ziele, einige Touri Ziele, keine Touri Ziele ja ich weiß jetzt nicht was klassische Touri Ziele sind nehme ich einfach mal einige Touri Ziele dann gehe ich weiter nach links unten möchten sie gerne shoppen, ne eigentlich habe ich keine Lust in Berlin zu shoppen wie hip darf es sein, das hippe Berlin , ein bisschen hip, gar nicht hip, na komm das hippe Berlin würde mich schon interessieren auch malwissen was das genau ist . Wie wählerisch sind sie beim Essen: Lieber Vegetarisch- bin ich nicht gesund, sehr wählerisch ja, irgendwie gesund ja, könnte es vielleicht noch irgendwas normales geben. Wie hoch ist ihr Budget für heute? Äh unbegrenzt ne	So dann springt er weiter., Alles klar wie ich sehe hat er irgendwie meine Tag geplant, vom Frühstück bis abends, ähm also 6 Attraktionen schlägt er mir vor soweit ich das sehe, Ja gibt irgendwie verschiedene Vorschläge die ich mir hier aussuchen kann, kann mir also aussuchen was ich möchte, also ob ich meinte Kategorie wechseln lassen. Es gibt Eiscreme der Zukunft Kunst Tanz irgendwas – kann ich auch auswählen dass ich mittags anstatt abends was essen will.	wenn ich auf das erste raufklicke zeigt er mir sozusagen an wo ich hingehen kann okay, was es ungefähr kosten wird Kaffee Kuchen gibt es alles klar also Frühstück ist geplant, danach geht's äh zu einer zeitgenössischen Kunstaustellung für 11 Euro. Alles klar, Karte – am Potsdamer Platz 2 ist das, alles klar ok.	Mach ich mal Karte, zeigt er mir an die Berlin karte wo ich starte wo's dann langgeht, anscheinend ist es nicht die kürzeste Strecke die er mir vorschlägt – also die Anordnung der Attraktionen wie es gelegen ist. Wenn ich jetzt davon ausgehen, dass es das ist was ich eben ausgewählt habe was ich an dem Tag tun will...	bekomm ich noch einmal eine Übersicht, okay, da zeigt er mir nochmal an was ich ausgewählt habe als Übersicht, damit ich mir das fix unterwegs nochmal angucken kann.	Und jetzt könnte ich das ganze mit meinem Handy öffnen oder als PDF runterladen damit ich's unterwegs dabei hab, was irgendwie ganz praktisch ist, da ich ja vermutlich nicht meine Laptop dabei hab zum gucken, sondern entweder ausdrucke oder mir auf meinem Handy angucke. Und jetzt wär ich irgendwie zufrieden und würde denken, dass ich fertig bin damit.

	soviel hab ich nicht, würd ich mal durchschnittlich nach Ausschlussverfahren nehmen. Lust auf Kunst und Kultur? Etwas na wir machen mal einen gemixten Trip? Möchten Sie Berlins Nachleben kennen lernen ? Ja in ner Bar was trinken gehen am Abend. Wie aktiv fühlen sie sich heute? Sehr aktiv noch nichts getan. Möchten Sie sich gerne entspannen, ne relaxen tun wir nicht und reisen sie mit Kindern? Habe ich auch nicht.					
Decoding 10	P 10 orientates oneself by the questions P 10 gives suggestions	P 10 understands the function of figure 2a	P 10 is reading the details	P 10 finds and understands the map	P 10 experienced overview function	P 10 understands take with you function
11	Ja also erst mal durchgucken was so angeboten wird shoppen Kunst und Kultur Kinder ok. Interviewer: „Was siehst du jetzt genau auf der Seite?“ Also na wahrscheinlich kann ich meine Präferenzen setzen, nach denen mir dann später vorgeschlagen wird was für mich so für Ziele in Frage kämen. Und wenn ich jetzt einen Trip	So Frühstück also jetzt schlägt er mir einen Tagesablauf vor. Casiopeia, guck ich mir mal an was passiert wenn ich da raufklicke – White Bounce Castle ist auf jeden Falle eine gute Idee. Jetzt überlege ich ob ich durch das hin und her schalten den Tagesplan ändere, oder ob das nur Vorschläge sind, die ich	ok das sind also verschiedene Vorschläge.	Ok. Karte zeigt mir, in welcher Entfernung alles zueinander liegt. Das wär natürlich interessant, wenn man einstellen könnte, in welchem Radius man sich da befindet.	Gucken wir mal was bei der Übersicht rauskommt. Das ist sozusagen das was ich auf der Seite eingestellt habe. Kann man hier auch nochmal was verstellen? Ne. Ok dann Geht’s jetzt los.	Ein QR-Code. Kannst du wahrscheinlich gleich aufs Handy machen und da noch rumfrickeln, und noch PDF- das ist wohl die Übersicht nochmal ausgedruckt.

	nach Berlin planen würde, wäre ich auf jeden Fall schon mal auf Nachtleben aus, dafür ist ja Berlin bekannt und zwar feiern. Ok, muss ich jetzt mehrere Sachen aussuchen oder? Jetzt ist halt das eine markiert. Bisschen hip darf's auch sein. Muss man jetzt in jeder Kategorie was aussuchen? Oder ...Gibt es jetzt einen Weiter-Button, wenn ich nur etwas hip feiern möchte? Das würde ich mich jetzt fragen. Na gut dann mach ich noch was anderes ich würde auch gerne gesund essen gehen, Budget ist durchschnittlich. Relaxen will ich nicht, Kinder hab ich auch nicht dabei, fühle mich sehr aktiv bisschen Kunst und Kultur darf es auch sein, shoppen muss nicht sein, und einige Touri Ziele nehme ich auch mit. Ich nehme jetzt wieder an, dass ich äh n Toursit in Berlin bin und nicht nach Hause komme oder so.	später noch einmal bestätige. So und wenn ich jetzt weiter will –				
Decoding	P 10 orientates oneself by the questions	P 11 understands the function of figure 2a	P 11 is reading the details	P 11 finds and understands the map	P 11 experienced overview function	P 11 understands take with you function

12	Und zwar ich sehe das wir jetzt hier 2 verschiedene Fragen haben, da nehme ich mir einfach mal 1 Frage heraus – und mir springt Lust auf Kunst und Kultur ins Auge und ich nehme mal etwas Kunst und Kultur klicke drauf - passiert noch nichts – mach ich eine weitere Frage: Haben Sie Interesse an touristischen Attraktionen- ja habe ich einige und ich sehe jetzt dass ich hier wohl alle Fragen beantworten muss bevor es losgeht – möchten sie gerne shoppen – eigentlich nicht, möchte ich nicht. Wie hipp darf es sein – auf die Mitte – wählerisch beim essen: lieber vegetarisch, gesund, nicht sehr wählerisch. Äh da vermisse ich jetzt - ist mir n bisschen unlogisch skaliert hätte ich gerne noch andere Auswahlkriterien weil ich eigentlich nicht vegetarisch – muss nicht gesund sein muss halt eher sehr gut sein muss nicht gesund sondern gut sein, deswegen weiß ich nicht was ich wählen soll, und	Jetzt muss ich mich erst einmal orientieren wahrscheinlich jetzt meine Tipps die für mich ausgesucht wurden Tagesablauf is mit Nummern hier jetzt gekennzeichnet jetzt ja Reihenfolge könnte auf der anderen Seite wahrscheinlich ganz schön wenn man das bisschen durchdenken darf bekomm ich jetzt hier Infos angezeigt ich wieder zurück hab ich grad geguckt das funktioniert	kleine Beschreibung ja Häkchen. Karte kommt die Karte? Kommt nicht Ähm Preise ja Adresse ist da Karte kommt nicht gehen wir weiter nächster Vorschlag vorheriger Vorschlag äh wie komm ich jetzt hier ja Auswahl komm Zur Übersicht jetzt guck ich hier ja vielleicht bisschen textlastig und vielleicht für einen ersten Überblick da hätte ich vielleicht eher mehr Stichpunkte wenn ich jetzt hier Restaurants mir auswähle hätte ich gerne vielleicht ein paar Klick wo ich viel-	*Clicked on Card – but didn't work → gave up*	Übersicht nochmal das gleiche hier nochmal abends feiern Kater Holzig ich wollte eigentlich nur in ne Bar aber gut ich werde herausgefordert weiter los geht's	Jetzt muss ich mir das scannen hab kein Smartphone leider kann nix mit nem QR Code anfangen aber krieg zum Glück noch mal ne Übersicht als PDF zum Ausdrucken die ich dann mitnehmen kann als nicht Smartphone Nutzer gefällt mir gut dass ich hier nicht diskriminiert werde äh Interviewer: „Wo würdest du noch vielleicht ne Route des Tages vermuten?" *(participant starts to click through the whole App)* Äh ne Route ja bei der Karte vielleicht oder so aber bei der Karte kam ja nichts Route los geht's Übersicht ja vielleicht kommt das ja wenn ich die App ja ich weiß nicht vielleicht Download aber da kommt ja nicht Karte hier vielleicht

	nehme gesund vermisse aber eigentlich sehr gut Wie hoch ist ihr Budget für heute – äh ist alles dabei ja nehme ich durchschnittlich Möchten Sie Berlins Nachtleben kennenlernen – War es deine Frage dass ich nach Berlin will? „Interviewer: Ich bin gar nicht hier“ – Du bist gar nicht hier ja Wunder mich ein bisschen dacht ich kann hier irgendwo ne Stadt eingeben aber anscheinend habe ich schon Berlin ausgewählt und möchte Drink in ner Bar. Erster Tag nicht zuviel Aktivität heute bin ich auch bisschen aktiv entspannen joah Mitte, reisen sie mit Kindern ohne Kinder so jetzt geht’s weiter	Ähm Abendprogramm kunstmäßig passen dazu meiner Auswahl Kunst und Kultur vorhanden reicht mir erst einmal für einen Überblick	leicht zur Speisekarte kommen könnte nicht unbedingt ein Text sehen sondern Speisekarte kann ich vielleicht auch sehen die Preise durchschnittlich das Menü oder nur ein Gericht ja weiter noch ein Restaurant der Aufbau bleibt natürlich gleich achso das soll die Speisekarte sein soll das eine Übersichtskarte sein –			ne da is nix ach da is sie ja Mit den Buttons denkt man 2 bezieht sich auf 1 müsste nochmal aufgeteilt werden ja habe ich die Übersichtskarte auch gefunden natürlich schade habe ich verpasst ja beim PDF gehe ich mal davon aus aber ich denke mal da is nochmal das drin was ich vorhin schon gesehen habe und hoffentlich auch die Karte Interviewer“ hattest du denn das Gefühl, bei Auswahl was selektiert zu haben?“ *(participant went back to table 2a)* Äh ne hab ich nicht so das Gefühl ah achso da gibt es auch nochmal so Buttons – ja das is mir auch nicht so ins Auge gesprungen dass ich für jede Station mal gucken auswählen kann – ok kann man schließen wenn ich das jetzt auswählen

						möchte – nächster Vorschlag wäre auf der Karte hier klicken wir mal Infos Auswahl auf der 1 passiert auch nichts hier klick ich nur hin kann immer noch nichts auswählen ach hier jetzt funktioniert die Karte ach ist ja schön aber ich kann immer noch nichts auswählen da wenn man noch auf die Zahl klickt aber kann nichts auswählen.
Decoding 12	P 12 orientates oneself by the questions P 12 complaints about the choices P 12 orientates oneself by the questions	P 12 experienced information gap 1	P 12 is reading the details P 12 experienced information gap 1 & 2 P 12 is reading the detail P 12 gives suggestions P 12 is reading the details	P 12 experienced information gap 3	P 12 experienced overview function	P 12 understands take with you section P 12 finds map P 12 gives suggestions P 12 discovers the changing function in table 2 a