Continuous Service: Mobile Services for Travel Counseling

Susanne Schmidt-Rauch, Michael Keller, Gerhard Schwabe
University of Zurich
Department of Informatics
Zurich, Switzerland
schmidt@ifi.uzh.ch, m.keller@below.ch, schwabe@ifi.uzh.ch

***Abstract*— In this paper we describe a first investigation of continuous service for travel agencies that addresses an often neglected service part of a travel customer cycle: the trip itself. In a user-centred design process, we have developed a service and a system prototype to test our proposed design goals and system design, as well as the service in a realistic environment. We propose a three-level design consisting of an organizational, a user and a system level. As both the customer and agent participants indicate a high appreciation of the service and the system, both the implementation of live support on a trip and the motivational design of the prototype can be fruitful design solutions in developing new services providing continuous service provision in tourism.**

Keywords: Mobile service, travel service, travel support system, continuous service provision

I. INTRODUCTION

Travel agencies are under pressure to compete against self-service over the Internet [1, 2]. Suggested solutions to the ongoing disintermediation address supporting inter-operability, personalization, and constant networking [3], as well as strategies for acting as online intermediaries [4]. Innovative business models that accept the Internet as an opportunity [3, 5] have already been considered, but only the online distribution channel has been emphasized, whereas offline distribution, as well as the human advice, has been neglected. Although there have been numerous attempts to implement a multi-channel strategy to bricks-and-mortar travel agencies, connections between distribution channels have been built on the basis of the business logic (e.g., CRM systems) that are usually not wholly transparent to, and experienceable by, the customer. In an ongoing project with STA Travel Switzerland (Swiss division of a worldwide operating travel agency), we emphasize the customer's role as an active part in service delivery of bricks-and-mortar travel agencies, in being a co-creator of value [6]. The contact to the company and the travel agents is, from our perspective, a main pre-condition to "experience each other" and an integral part of the lively customer-company relationship targeting customer retention and loyalty. In order to adequately serve both parts of the cooperation, we involved five travel agents and 16 potential customers within the presented service construction and support system design.

A travel customer cycle (see Figure 1) usually starts with (a) a vague need for inertia breaking before a customer (b) seeks for information and receives travel advisory (planning activities), and (c) finishes with booking activities. After booking, the customer is (d) a traveller and on the specific trip, before (e) she actually begins to develop needs and ideas for future travel, which she wants to sharpen by giving and receiving feedback.

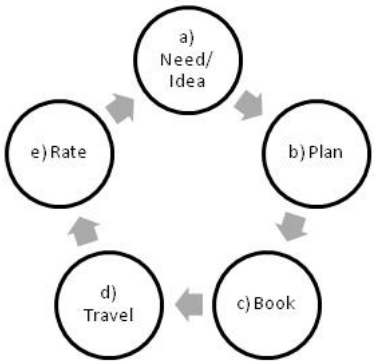

Figure 1. Travel Customer Cycle

We can find many solutions addressing parts of the travel customer cycle (e.g., (b) recommender systems, (c) booking engines). Regarding the planning phase, we investigated the co-creator role of the customer and the value she experiences in this role, and found special features as a fruitful design choice: integrating trustworthy community information with editorial content [7, 8] and providing a more direct and involving way to information reception through exploring the offering collaboratively (agent and customer share the same information access) using an interactive map and a touch-sensitive large display [9]. The transaction phase of booking is a service that agencies already process in a professional way. They take the transaction risks and provide the customer with a trustworthy environment, ease the evaluation of the trustworthiness of purchase procedures, and provide support in transaction-related issues also based on their experience and expertise as travel intermediary. But the opportunity of providing service by the travel agency when the customer is *on* her travel is usually neglected and only revisited when the customer is back home (e.g., by welcoming her with a post card that asks for feedback).

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Therefore, we suggest a new scenario of use that provides opportunities to continue travel planning (including booking activities) without media transfer. Additionally, it should support the customer on the trip itself using context-related information in a combination of professional and user-generated content. Thereby, new revenue sources, as well as new opportunities for customer retention and loyalty, evolve.

The main advantages for the customer include push and pull activities of the system and of the travel agents, accelerating information gathering and facilitating the access to additional travel products and services on the journey. Human-based advice aids negotiating the burden-of-choice and transfers the often difficult evaluation of trustworthiness of different sources as happens in Internet searches [10]. Location-based service delivery thereby filters information according to the local needs of a traveller (e.g., [11]) enabled by a mobile device that accompanies the traveller, e.g., in her pocket or hand bag [12]. A travel agency benefits from the evolving revenue opportunities (medium-term) and from the continuous contact to customers resulting in chances for customer retention and loyalty (long-term).

II. Research and Development Process

Following a Design Science methodology, we need to: identify the organizational problem(s), create and evaluate

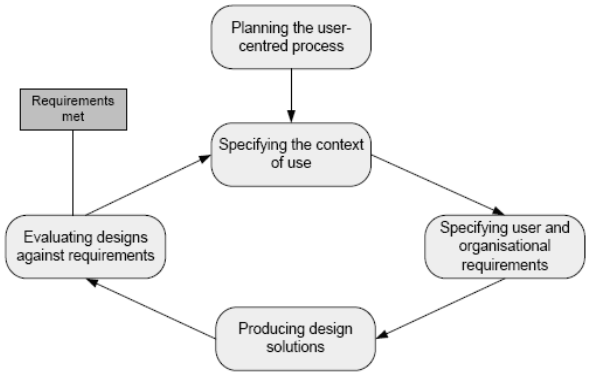

Figure 2. User-centred Design Process

IT-artifact(s) regarding the solution of the problem(s) within a given organizational context, and apply empirical and qualitative methods within a build-and-evaluate loop that is typically iterated a number of times before the final design artifact is generated [13]. We decided to contextualize this common framework with the User-centred Design process (UCD) [14] in order to map the research approach onto a development process. The UCD especially qualifies for adaption through the following three principles [15]:

(1) Early focus on users: While targeting the needs of real users, the observed organizational problem to-be-solved gains amplitude and enriches the stakeholder perspectives.
(2) Empirical: Through gathering data about the artifact, designers can learn from users whether the artifact solves the problem and the design is informed.
(3) Iteration: A build-and-evaluate loop enables designers to continuously improve design and artifact in order to gradually meet problem-derived requirements.

Following the UCD process model (see Figure 2), we first specified the context of use. In this area, our users are young and young-at-heart leisure travellers (which is the target group of our industrial partner who ensures access to the domain) and travel agents. Travellers have just booked a product configuration at an agency (independent from the distribution channel) and therefore have an itinerary and a customer profile available. This pre-condition builds on our other scenarios of use (e.g., [7], see introduction). Therefore, they are not further investigated in the scope of this paper.

The organization has a gap in service provision since there is no service the agency can provide the travelling customer in order to keep alive a customer relationship in this phase. We claim to bridge this gap with an advantage to both customers and agency. In order to concentrate on specific aspects within an iteration, we apply scenario-based development [16] in the specific phases of the UCD process. Starting with problem scenarios (short narratives), we can review the context of use with stakeholders in order to specify the context of use. Accordingly, for developing requirements, we use activity, information and interaction scenarios that provide us with immediate user feedback (something that is difficult or even impossible using UML diagrams, which need to be reviewed by non-technical stakeholders).

The user and organizational requirements broken down to task-related, pragmatic needs have to additionally address the special demand of adjusting the service-delivering system to the presenting device [17]. In line with several authors, we are convinced that a customer's pragmatic, task-related needs have to be addressed, but also her sensory needs [18, 19, 20, 17]. In previous work, we were able to provide evidence concerning these task-unrelated, hedonic features. Enhancing the user experience can be a suitable design choice in collaborative advisory situations, here, regarding the co-localized consultation situation in a travel agency within a shared large-display workspace [9]. Furthermore, also in the field of e-Commerce, evidence can be found that system or service characteristics abstracted from the usage task suitably supplement system design. Thus, not only system acceptance, but also purchase behavior can be positively influenced [21].

Beyond the pragmatic quality (i.e., usefulness through functionality, ease of use) of the emerging service system, there are two aspects that the system and the service can take advantage of: (1) wireless and mobile access becomes common and costs of mobile access decrease, and (2) the attachment of users to their mobiles increases with the personalization possibilities that products such as BlackBerry mobile phones, the iPhone or other smartphones provide [12, 22]. This enables not only an increased probability of always having the mobile on board (what allows a continual service provision), but also the expectation of enjoying its usage. As Sir Colin Marshall, Chairman, British Airways, states [23]: "[…] service is an emotional, subjective experience" and needs to be addressed in this way. In providing a unique involving experience, the system directly contributes to the

success of the transferred service. The agency gains a continuous interaction with its customers to better know them and improve the ability of tailoring other services and products to their needs.

Even for software systems that are designed for standard office work, enjoyment can increase system acceptance [24]. This effect becomes even more noticeable in environments where "emotion work" [25] is conducted as it is in travel advisory. Although travel advisory is a utilitarian environment for travel planning that should result in booking activities, there is a component of hedonic concerns [26, 9]. Apart from the essential travel information, feelings of pleasure and excitement are important information attendants [27]. Travel planning as the process of generating a highly individualized travel product is naturally a strong emotionally colored process [28]. This even progresses when customers are actually on a trip and want to experience the trip and less technology.

However, a system for a mobile scenario needs to address the limitations of mobile phones and adapt the system to the users' needs. For example, as several authors have explained (e.g., [29, 30]), there are restrictions of a mobile scenario compared to a stationary desktop scenario: limited screen size, bandwidth, computational performance and storage capacity. At the same time, there are not only technical restrictions, but also cognitive and attitudinal constraints in a mobile scenario of use, such as being in a hurry. Accordingly, in the case of travelling, the important aimed experience often takes place as a primary task (e.g., having dinner in a noble restaurant) and using the mobile is secondary and auxiliary (e.g., finding the right restaurant to have an exciting dinner).

III. Designing for Mobile Service Provision

According to the above-mentioned issues, we can describe the design goals for such travel service support systems on three levels: (1) organizational level, (2) user level and (3) system level.

We understand the organizational level as a perspective on the mobile service delivery, excluding in this paper the determination of external aspects such as partner selection in a complex network of value (e.g., [31]). This should be taken into account in future work when the service concept evolves. The organization's perspective is reduced to the perceptions of travel agents actively and visibly participating in the service delivery.

The user level summarizes the view of the service and its delivery using the system. In terms of pragmatic, task-related and hedonic, task-unrelated demands, user requirements are derived according to travellers' former experiences.

The system level reflects the system perspective and forms the basis for the other two levels. As Venkatesh et al. [17] found, the made-for-the-medium aspect of a system design is significantly important in a wireless context. Considerations about the limitations in a mobile context, as well as related system implementations, inform design on that level. The made-for-the-medium notion can be described as technical personalization that maps the expected functionality onto ease-of-use. Thus, the user level requires the system level and is itself a pre-condition for the organizational level.

A. Organizational Level

When we proposed using an interaction scenario to build a connection between the agency and customers on the trip, the interviewed five agents became highly interested although skeptical. They would appreciate the opportunity to sell additional products but expected to give tips without margin rather than sell products. The worst-case-scenario for them consists of customers who permanently call an agent or the call-center in order to receive very small-margin products or services.

However, there is a great opportunity in providing continuous service, including the trip itself. The customer is "suddenly" in a country where she does not understand the local language and "suddenly" the mobile service can become the only distribution channel to purchase additional services and products. Competitors for the agency are extremely reduced, since it is difficult for customers to organize themselves (or they do not intend to organize themselves); asking different people is exhausting and time-consuming [33]. The same is true for the common Internet competition: Seeking costs are high, there is no support regarding the burden-of-choice [10], and searching for the right service or product presumes high media- and content-related competence of the customer and is usually also time-consuming. Furthermore, uncertainties about the provider or security issues regarding payments, for instance, create a difficult situation for the customer, something that has an even stronger effect when the customer is in a foreign country in an unknown environment. Thereby, a mobile service of the trusted travel agency in the home country can produce relief. Regard the payment situation: knowing the credit card data of the customer or administering a pre-paid deposit, the agency facilitates purchasing services and products for the customer, and supports its up-selling opportunity by the mobile service provision.

B. User Level

As we were concentrating on the customer perspective as a user and service recipient, we mainly gathered information about potential customer users. Semi-structural interviews with 16 persons (potential customers of our business partner's clientele) acquired their usual trip behavior (methodologically based on user research [34]). This contextualizes the goals on the user level. We can summarize the travellers' reality as follows:

When a traveller has just started the trip, a lot of information is of interest to her: "When should I catch my flight?", "Where is my hotel?", and "What should I do this evening?" can be possible questions. Travellers usually find answers in paper-based documents (materials from the travel agency, printouts), books (travel guide), and brochures from the local tourist information offices. What the traveller really wants to experience, however, are the sights, the landscape, and the feeling at her chosen destination that she has dreamt about. In this case, this red tape is time-consuming, information is static, and sources are limited. In situations of

specific information needs, a receptionist in the hotel is asked, or the taxi driver, employees of the local tourist office or others become information sources. This can result in an awkward searching-for-service process for the traveller. But the traveller selectively wants to choose from services without contacting numerous different persons or firms [32]. Furthermore, travel guides or other paper-based travel materials are often left at the hotel room and not available when needed. A mobile service therefore integrates the service provision with travel-related information. In our eyes, reducing coordination costs at the destination by simply requesting a need to the trusted agent would positively contribute to the travel experience.

C. System Level

The range of implemented functionality in mobile applications that address travellers' issues on the trip is wide. In order to provide contextual information, the major source of related implementations can be found in the area of location-based services. The provided functionality ranges from simply marking points of interest on a map to answering natural language questions. Systems like Travelload [1], LoL@ [34], CAIPS [35] and Siri [2] allow carrying an electronic itinerary, passive location-based visualization of specific points of interest (e.g., sights, restaurants, hotels), pushing information on the mobile regarding the location and the profile of a user, or even automatically answering questions in natural language about the weather, the location of a restaurant, etc. Each of these systems implements an aspect of travellers' needs and demonstrates the importance of those needs. Integrating these baseline functions with the service provision is a main challenge of the design at the system level.

In order to adequately support the presentation of information and service, we can apply patterns for small displays and limited capabilities (e.g., [30]) based on best practices. As we focus on the interaction of the customer with the agency through the system, we concentrate on mobile interaction patterns that are especially concerned with suitable designs for mobile user interfaces. In particular, the two patterns "One True Window" and "Hide and Seek" [30] aid designers to ease the user's interaction with the system. The first one suggests to use not more than one application or application window at once in order to reduce confusion, and the system's performance demands. "Hide and Seek" is a pattern to prevent the user from getting lost in, for example, the menu hierarchy. Usually, one button on the mobile keyboard is therefore assigned to the main menu, or to the application overview.

IV. Design Instantiation: SmartTravel-to-Go

According to the tasks required for designing a mobile support system, we propose general design requirements. As a guideline through the design process, we will then base the evaluation on these derived requirements. Our first travel service support system prototype SmartTravel-to-Go builds on these generic design requirements. For the concrete system instantiation, we mapped the generic requirements onto concrete system design characteristics to be implemented (see Table 1 for an overview).

TABLE 1. DESIGN REQUIREMENTS AS GOALS AT ORGANIZATIONAL LEVEL (OG), USER LEVEL (UG) AND SYSTEM LEVEL (SG) AND CORRESPONDENT SYSTEM DESIGN CHARACTERISTICS AT ORGANIZATIONAL LEVEL (OC), USER LEVEL (UC) AND SYSTEM LEVEL (SC)

	Generic Goal Requirements	System Characteristics
Organi-zational Level	OG1. Enable a support system that provides cross and up-selling opportunities in the service-neglected phase of travelling.	OC1a. Mark products and services on a navigable map and provide direct booking. OC1b. Provide direct communication to the trusted agent. OC1c. Provide direct communication to a local agent.
	OG2. Enable additional customer care opportunities in order to increase customer retention and loyalty.	OC2. Provide direct contributing and feedback possibilities (e.g., rating, recommendations) and a communication channel to the agency (equals OC1b).
User Level	UG1. Provide a value-adding service on the journey according to customer needs in that context.	UC1a. Allow "free-style" requests from customer to agent to shorten searches. UC1b. Provide customers with a central artifact of her travel: an itinerary that she shares with the agent.
	UG2. Provide an enjoyable user experience to stimulate a positive attitude toward using the service support system to contribute to a unique overall travel experience.	UC2a. Allow agents to directly "show" a product or service offering in order to ease product/service decisions. UC2b. Visualize products and services in a shared visualization (the map).
System Level	SG1. Integrate automatic services with human-based service provision.	SC1. Equally present content, e.g., feeds from the web and agency services (e.g., marker on the map or entries within the itinerary).
	SG2. Apply implementation patterns to adequately support the user on the mobile device.	SC2. Implement "One True Window" and "Hide and Seek".

Regarding a specific part of a usage workflow, a potential customer is at a certain destination with a pre-arranged itinerary (cf. Figure 3 (a)), and hence, is acting on the following potential scenario. She wants to inspect the weather forecast and activates the system, which initially shows the menu (Figure 3 (c)) and provides a menu item for the weather. When activating this item, the display changes to the weather forecast but keeps the direct navigation possibilities to the main views of map and menu (SC2). The customer now decides to stay another three days at the destination and therefore navigates back to the menu view and chooses the contact area in order to request a demand (need a hotel for three days). Here, she can write a message to the travel agent at the home country or an available travel agent at the destination (OC1b and OC1c). Her agent at

[1] http://www.travelload.de/
[2] http://www.siri.com/

home is available and she therefore writes a message to her. The incoming message is answered by the agent (who knows her preferences from her customer profile) with a message reply and a temporary itinerary update, including the hotel recommendation as itinerary entry (UC1b). With the activation of this new itinerary item, the customer receives the map view (based on Google Maps) that visualizes product-related information in an aggregated way (UC2b, e.g., location of points of interest similar to Figure 3 (b)). The customer can inspect her geographical position, and on the map she can also access additional information from the web (e.g., Wikipedia) and the travel agency (here: hotel information from local database) (SC1). Since the product provider is an agency partner, a booking link is directly presented (OC1a).

Figure 3. SmartTravel-to-Go system prototype. (a) An itinerary. Activating an itinerary item allows a map view. (Changing to menu view or map view is also here available according to image (d) of this figure.) (b) Map view when a specific point-of-interest is inspected. The "play"-button on top opens the menu view. (c) SmartTravel menu including a button on top right to switch to the map view. (d) Exemplary chosen menu entry view, in this case for the current weather forecast, including the direct navigation opportunity to the menu or the map view.

Further, the customer is enabled to read other customers' feedback which gives her feedback on the presented hotel (OC2). In our case the customer decides for that hotel and confirms the booking to the agent by activating the booking link. The agent then transacts the booking and also settles the payment procedure before sending a booking notification back to the customer. Hence, the customer's effort to search, compare, type in the personal data, and evaluate different payment methods is reduced to a minimum. We serve two main needs by designing the interaction semi-synchronous instead of fully synchronous (UC2a): (1) the agents' worries of too frequent disruptions in daily business can be reduced, and (2) customers are more flexible in how and what they request, which economizes precious travel time (UC1a).

V. Preliminary Evaluation

We evaluated the presented service instantiated by the SmartTravel-to-Go prototype according to the introduced design requirements to verify them. On the organizational level, we assume the service to be a "tool" to encourage customers to traverse the customer cycle presented in the introduction (customer retention and loyalty [36]), but these services can also support the word-of-mouth that possibly encourages other customers to start a cycle (OG2). The system and service should therefore produce a competitive advantage compared to other retailers, and trigger a preference for travel agencies that provide such a service (OG1).

At the user level of the evaluation, we concentrate on the customer users investigating their perceived pragmatic quality, hedonic stimulation quality (based on [37]) and their overall experience reflected by their attitude toward using the system (according to [38]). This verifies whether customers perceive an added value, and whether the service and system can positively contribute to the overall travel experience (UG1 and UG2).

The underlying basis of the system (SG1 and SG2) is determined using logging data and task completion statistics, as well as indicating the ease-of-use questions (adapted from [38]) and the qualitative feedback of the users, especially addressing the implementation details (e.g., itinerary, messaging, etc.).

A. *Participants, Setting and Tasks*

Conducting the test on a voluntary basis were the 16 participants as well as the five travel agents of our partner agency. Customer participants mostly indicated a high proficiency in computer usage (ten out of 16). They were between 22 and 30 years of age (ø 25), and three out of 16 participants were female. Four out of 16 were iPhone owners, and ten out of 16 owned any Internet-enabled smartphone. There was no significant influence on questionnaire results by those characteristics.

Participants received a short manual and a verbal introduction as they would receive in a travel agency before their trip. They were given a pre-arranged itinerary and were introduced to an agent. They also received an iPhone, which had the SmartTravel-to-Go application installed. The test was located in Zurich without any further restriction on the location. Further, the test was on one specific day without limitations on the concrete duration of fulfilling the tasks. The test scenario comprised a one-day stopover in Zurich with 11 typical tasks a traveller could be confronted with. The tasks were regarding the system's characteristics (e.g., searching for additional information on a specific hotel) and the service-based binding to the travel agent (e.g., booking a hotel room for the next night, asking the travel agent for a restaurant recommendation). After the test, participants received a questionnaire and were retrospectively interviewed on their impressions.

All questions in the questionnaire were phrased as statements about the system or service and used a 7-point Likert scale reflecting the participants' agreement on the given statement (as intended and tested by [36] and [38]). We deviated from that schema only for the pragmatic and hedonic quality evaluation and used the semantic differentials of the Attrakdiff2-questionnaire [37] using seven items for pragmatic quality (e.g., simple vs. complicated) and the same number for hedonic stimulation quality (e.g., challenging vs. harmless) also using a 7-point Likert scale [37].

B. Evaluation Results at Organizational Level

One first important result addresses the often raised issue of permanent interruptions with thin-margin problems. We had explicitly informed participants of the opportunity to use the phone functionality of the iPhone to contact the agent (and the evaluation coordinator) or anyone else. However, all participants preferred to interact with the system only (searching opportunities) or with the contact area of the

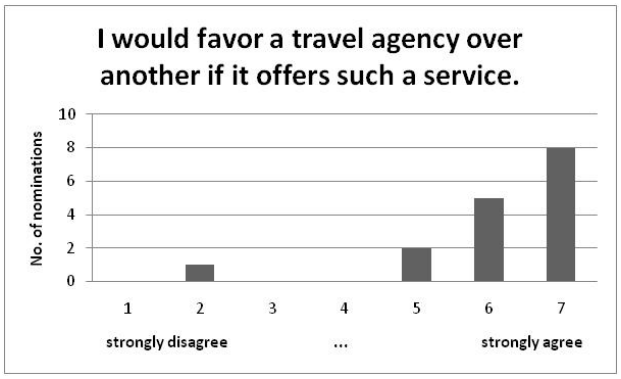

Figure 4. Customer Preference

system (contacting an agent). Agents could therefore complete any task they were working on and then start processing the on-trip request. Considering this result in conjunction with the users' high preference for a travel agency if it offered such a travel support system (ø 6.13 ± 1.72, cf. Figure 4), OG1 is strongly supported. With one exception of an overall skeptical person, participants agreed that the support of a trusted travel agency on the trip is of additional value. The service integration with map navigation functionality and electronic trip material was explicitly valued by the participants and indicates a suitable overall design.

As the word-of-mouth results indicate (see Figure 5), customers largely agreed on the recommendability of the system (ø 5.71 ± 1.62). The same skeptical participant who also rated a low preference could not imagine a trustworthy and honest service provision behind the system. Some other users pointed out the prototypical characteristics of the system but supported that, with an increasing maturity of the system, the underlying service would be very valuable. Therefore, OG2 is supported, however, we will have to emphasize the advantages of the service and more visibly transport the service concept to the customer.

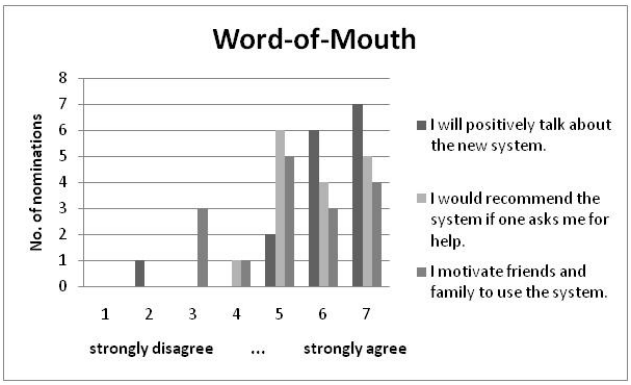

Figure 5. Word-of-Mouth Results

C. Evaluation Results on User Level

Summarizing the overall user experience regarding the customers' attitude toward using the system (see Figure 6), customer users rated the system usage: as a good idea (ø 6.31 ± 0.495), makes travelling more interesting (ø 5.13 ± 1.98), is fun (ø 5.38 ± 2.25), and they liked working with the system (ø 5.88 ± 1.98). The travellers strongly agreed on the basic idea and supported their rating in regard to system

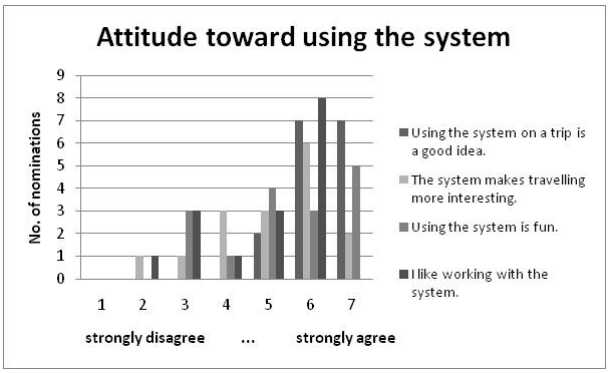

Figure 6. Customers Attitude Toward Using the System

functionality and the service of staying in touch with the trusted agency. Users explained the lower ratings especially by occurring network connection problems when localization produces wrong results. Interestingly, users explained that performance lacks (e.g., when downloading a new map sector) were of no negative consequence in these ratings.

Regarding the hedonic stimulation quality (HQ-S, ø 5.68 ± 1.84), SmartTravel-to-Go served as an involving system, with users positively mentioning that a connection to a human-being (travel agent) was established. Navigating on the map was more natural but also more challenging, compared to the menu-based navigation of the system. Some lower rating participants explained that they did not feel as if interacting with the system but with the agent when using contact area and the itinerary entries. Accordingly, they stated that while rating in the questionnaire they only recalled situations of pure customer-system interaction (e.g., navigating from one position to another) which is a very common usage with an Internet-enabled smartphone and not very innovative and novel. This decreased some ratings of the hedonic stimulation quality.

The pragmatic quality (PQ, ø 5.12 ± 2.52) was positively rated but ranged highly. These discordant results are also reflected in the qualitative feedbacks. Whereas participants with high ratings on the pragmatic quality praised the new service and the opportunity to directly book products that were marked on the map, participants with lower pragmatic quality ratings referred to the flexibility of paper-based materials and their wish to be freed from technology during their vacations. The up-to-date itinerary (semi-synchronous shared material with the agent) and the search functionality for different points-of-interest (automatic services) were the most acknowledged system characteristics.

In summary, the generic requirements represented by UG1 and UG2 are supported with one further important insight: customers need to become more aware of service opportunities because they are not limited to the customer-system interaction but can also make use of the system-mediated customer-agent interaction. This opportunity seemed to have been neglected during the evaluation.

D. Evaluation Results on System Level

Each participant was able to complete the given tasks. Although the time needed for each task differed, no participant complained about difficulties with the system or service, but instead voluntarily decided to continue the next tasks. As it was intended to allow them to complete tasks whenever they wanted to on the specific test day, the agents ran their applications the whole day and got a hint when a request came in. Logged geo data showed that each participant chose almost the same route to fulfill the tasks, as it was intended.

Learnability (effort expectancy and self-efficacy, adopted from [38]) of the system was rated high (ø 6.28 ± 1.17) and anxieties regarding the system usage were rated at a rather low degree (ø 1.81 ± 1.46). Thus, implementing patterns and involving potential users in system and service construction, as we did, preserve the designer in mapping a usage process onto an incomprehensible system workflow, and this helps in understanding the true needs of a user in a certain usage task. Users pointed out that the tool was useful und easy to use with an intuitive design, which satisfies SG1 and SG2.

VI. DISCUSSION

Interestingly, in our tests the trustworthiness of the mobile service provision was not problematic. Except for the overall skeptical person who refused the service and system in general, trust was a highly rated characteristic of both system and service. Future service generations would need to further address privacy and trust issues.

One participant noted anxieties concerning the use of the system due to her uncertainty of the accruing costs – a qualified anxiety in terms of the high roaming costs if using network services abroad. The dependence on A-GPS that on the one hand improves localization but on the other hand produces additional costs, currently limits the application of such services. But regarding the political efforts (e.g., regulations of the European Union) on limiting roaming costs, the trend continues downward, with advantage to the proposed service.

With reference to our new service concept, time-zone differences between home country and destination hamper service provision. In our case, however, our business partner operates internationally and would be able to provide such a service for most destinations and time-zones.

Overall, a limitation of this study is that we cannot be sure that high ratings were exclusively objective. Presumably, the results reflected the test participants having conducted the evaluation on a voluntary basis with the possibility of having a good time in Zurich. Generalizability of the provided data is limited due to the small sample size, and only provides basic insights.

Agents in our test were able to answer incoming requests very fast due to their high interest in doing something new. But they would need further organizational support to integrate this service with daily business. An idea is to give customers the opportunity to time their requests, e.g., "need immediate help," "need help within two hours," etc. Agents can then prioritize requests according to the schedule. Furthermore, a rotation algorithm in the travel agency is needed to determine that agents with many customers on a trip are less loaded with other activities. Accurately providing this algorithm with concrete thresholds of customer numbers is a future task for the project.

VII. CONCLUSIONS AND FURTHER RESEARCH

In this paper, we have presented a novel continuous service for travellers and a corresponding support system instantiation following pre-defined design requirements. The underlying service is based on the main notion of value co-creation business models that accept customers as partners and co-creators of value in a service provision process. The introduced design goals address three levels of service provision support systems: (1) organizational level, (2) user level, and (3) system level. Conducting a user-centred design process, we built our design instantiation prototype (SmartTravel-to-Go) on these goals and evaluated the prototype against derived requirements according to the environment of travel support. We therefore closed the travel customer cycle regarding the service-neglected section of travelling and propose a continuous service provision strategy that can enable great new revenue opportunities and customer retention and loyalty.

The evaluation was conducted with real travel agents of our business partner and demonstrated great opportunities in the scenario of using the system and service on the trip. Customers basically acknowledged always having an up-to-date itinerary and agents' support. Agents essentially appreciated the opportunity to stay in touch with their customers and sell them additional products and services in a highly individualized way. The opportunity to gather more information about the customers, how they behave while travelling and what their needs are on a trip open a new space for product and service development at destinations. World-wide acting agencies especially meet the requirements to implement continuous service provision, as proposed in this paper.

With the evolvement of our service concept and system instantiations, we need to further investigate mechanisms of

trust and other user level goals (e.g., agents' sensory needs, performance, service-awareness etc.), as well as a more comprehensive organizational perspective, including, for instance, pricing and the integration with a business model. This will also affect the basics of motivating the use of the service support system on the user level. Further, more realistic evaluations will be enabled. The high interest of our business partner and the encouraging evaluation results motivate us to start a further build-and-evaluate loop.

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REFERENCES

[1] Buhalis, D. & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. Tourism Management, 29 (4), pp. 609-623.

[2] Werthner, H. & Ricci, F. (2004). E-Commerce and Tourism. Communications of the ACM, 47 (12).

[3] Buhalis, D. & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. Tourism Management, 29 (4), pp. 609-623.

[4] Buhalis, D. & Licata, M. C. (2002). The future eTourism intermediaries. Tourism Management, 23 (3), pp. 207-220.

[5] Barnett, M. & Standing, C. (2001). Repositioning travel agencies on the Internet. Journal of Vacation Marketing, 7, pp. 143-152.

[6] Prahalad, C.K. & Ramaswamy, V. (2004). Co-creating unique value with customers. Strategy and Leadership, 32 (3), p.4-9.

[7] Novak, J., Aggeler, M. & Schwabe, G. (2008). Designing Large-Display Workspaces for Cooperative Travel Consultancy, Proc. of CHI 2008, ACM Press, Florence, Italy.

[8] Schwabe, G., Novak, J. & Aggeler, M. (2008). Designing the Tourist Agency of the Future, Proc. of 21st Bled, Slovenia.

[9] Novak, J. & Schmidt, S. (2009). When Joy Matters: The Importance of Hedonic Stimulation in Collocated Collaboration with Large-Displays, Proc. of Interact 2009, Uppsala, Sweden.

[10] Novak, J. (2009). Mine, Yours...Ours? Designing for Principal-Agent Collaboration in Interactive Value Creation, Proc. of Wirtschaftsinformatik 2009, Vienna, Austria.

[11] Küpper, A. (2005). Location-based services: fundamentals and operation. John Wiley, Hoboken, USA.

[12] Meschtscherjakov, A. (2009). Mobile Attachment – Emotional Attachment Towards Mobile Devices and Services, Proc. of Mobile HCI'09, Bonn, Germany.

[13] Hevner, A.R., March, S.T., Park, J. & Ram, S. (2004). Design Science in Information Systems Research. MISQ, (28)1, pp. 75-105.

[14] International Organization for Standardization (1999). ISO 13407 - Human-centered design processes for interactive systems.

[15] Gould, J. D. & Lewis, C. (1985) Designing for Usability: Key Principles and What Designers Think, Human Aspects of Computing.

[16] Rosson, M. B. & Carroll, J. M. (2002). Usability engineering: scenario-based development of human-computer interaction. Morgan Kaufmann.

[17] Venkatesh, V. Ramesh, V. & Massey, A.P. (2003). Understanding Usability in Mobile Commerce, Comm. of the ACM, 46(12), pp. 53-56.

[18] Lohse, G.L. & Spiller, P. (1999). Internet Retail Store Design: How the User Interface Influences Traffic and Sales. Journal of Computer-Mediated Communication, 5 (2).

[19] Lam, J.C.Y. & Lee. M.K.O. (1999). A Model of Internet Consumer Satisfaction: Focusing on the Web-site Design. Proc. of the 5th AMCIS, Milwaukee, WI, pp. 526-528.

[20] Nielsen, J. (1999). User interface directions for the Web. Commun. ACM 42 (1), p. 65–72.

[21] Bellman, S., Lohse, G.L. & Johnson, E.J. (1999). Predictors of online buying behavior. Commun. of the ACM, 42 (12), pp. 32–38.

[22] Geven, A., Sefelin, R., Höller, N., Tscheligi, M. & Mayer, M. (2008). Always-on Information - Services and Applications on the Mobile Desktop. Proc. of Mobile HCI'08, Amsterdam, The Netherlands.

[23] Barlow, J. & Møller, C. (1996). A Complaint Is a Gift: Using Customer Feedback as a Strategic Tool, Berrett-Koehler, USA.

[24] Igbaria, M., Schiffman, S.J. & Wieckowski, T.J. (1994). The Respective Roles of Perceived Usefulness and Perceived Fun in the Acceptance of Microcomputer Technology. Behaviour & Information Technology, 13 (6), pp. 349–361.

[25] Hassenzahl, M., Beu, A. & Burmester, M. (2001). Engineering Joy. IEEE Software, 18 (1), pp. 70-76.

[26] Decrop, A. & Snelders, D. (2004). Planning the Summer Vacation – An Adaptable Process. Annals of Tourism Research, 31 (4), pp. 1008-1030.

[27] Goossens, C. (2000). Tourism Information and Pleasure Motivation. Annals of Tourism Research, 27 (2), pp. 301-321.

[28] Hyde, K.F. (1999). A Hedonic Perspective on Independent Vacation Planning, Decision-Making and Behaviour. In: Consumer Psychology of Tourism, Hospitality and Leisure. Woodside, A., Crouch, G., Mazanec, J., Oppermann, M. & Sakai, M. (Ed.), CABI publishing, pp. 177-191.

[29] Baus, J., Kray, C. & Cheverst, K. (2004). A survey of Map-based Mobile Guides. In: Meng, L., Reichenbacher, T. and Zipf, A. (Eds), Map-based mobile services - Theories, Methods, and Implementations, Springer, Berlin.

[30] Noble, J. & Weir, C. (2001). Small memory software: patterns for systems with limited memory. Addison-Wesley.

[31] Haaker, T., Faver, E. & Bouwman, H. (2004). Balancing strategic interests and technological requirements for mobile services, Proc. of ICEC '04, pp. 609-618.

[32] Koskela, H. (2002). Customer Satisfaction and Loyality in After Sales Service: Modes of Care in Telecommunications Systems Delivery. Doctoral thesis, University of Helsinki, Finnland.

[33] Kuniavsky, M. (2003). Observing the user experience. Morgan Kaufmann, San Francisco, USA.

[34] Umlauft, M., Pospischil, G., Niklfeld, G., & Michlmayr, E. (2003). LoL@, A Mobile Tourist Guide for UMTS. Information Technology & Tourism, Vol 5 , pp. 151-164.

[35] Beer, T., Fuchs, M., Höpken, W., Rasinger, J., & Wethner, H. (2007). CAIPS: A Context-Aware Information Push Service in Tourism. In: Inf. and Comm. Tech. in Tourism, Springer, Vienna, pp. 129-140.

[36] Srinivasan, S., Anderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: an exploration of its antecedents and consequences. Journal of Retailing 78, pp. 41-50.

[37] Hassenzahl, M., Burmester, M. & Koller, F. (2003). Attrakdiff: Ein Fragebogen zur Messung wahrgenommener hedonischer und pragmatischer Qualität. Proc. of M&C 2003, pp. 187-196.

[38] Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User Acceptance of Information Technology: Toward A Unified View. MISQ, 27 (3), pp. 425-478.