GENERAL RESEARCH

Designing for mobile value co-creation—the case of travel counselling

Susanne Schmidt-Rauch · Gerhard Schwabe

Abstract This paper focuses on the development of a mobile service as extension of travel agencies' sales channels, fundamentally driven by the notion of value co-creation. Design goals are directly linked to the understanding of travel counselling as practical value co-creation and to the concern to progress this understanding throughout the travel customer cycle. Customers as well as travel agencies benefit from a mobile service rooted in value co-creation. Mobile service applications which target a service provision which furthermore is in line with the core competency of a travel agency (advice-giving and continuously accompany the customer) are scarce. Taking this as a starting point, we propose a mobile service and system design which provides a travel customer with continuing support on the trip, suitable to complement a lively, ongoing customer-firm interaction which enables the co-creation of value, ultimately targeting increased customer retention and loyalty.

Keywords Value co-creation · Mobile service · Travel customer support

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Introduction

E-commerce is regarded to be a main activator for re-intermediation, but also for disintermediation (Giaglis et

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al. 1999; Anckar 2003). A strategy to address disintermediation is therefore to move offline travel agencies to the online world and also open e-commerce channels to the customers (Buhalis and Licata 2002). Since travel products are especially eligible candidates to be offered through e-commerce channels (Anckar 2003), this is an obvious way to stay competitive. This strategy, however, neglects the core competency of "bricks-and-mortar travel agencies" (Novak and Schwabe 2009), which is more than offering and using perfectly operating booking engines—namely, it is personal advice and expert travel agents' knowledge for individual counselling. The travel agent as an empathic guide through myriads of products and destinations is a valuable surplus should be experienced by the customer. This paper reports about our research on how to upgrade the "helping hand" of the travel agent, by expanding the customer-agent relation to the actual travel of the customer. Such service provision characterizes a so-called mobile situation (Anckar and D'Incau 2002) which calls for anytime-anyplace services. While anytime-services can be captured by e-business services, anyplace-services demand m-business services provided through mobile device usage. Travel agencies may reach their customers in mobile situations which are otherwise unsupported (Anckar and D'Incau 2002).

We consecutively propose a new perspective on mobile services: *mobile value co-creation*, which aims to link the mobile travel customers with their travel agent in such a way that they can jointly create value. This means for example that they jointly re-plan a route or select a local tour. As typical for design science (Hevner et al. 2004), the research has a practical goal and a research goal: On the practical side, our research strives for a novel solution to improve the value co-creation between the travel agents of our partner company and their customers. This solution is aimed to support the interaction between a travel agent and the mobile traveller. The research

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contribution on the other hand abstracts from the specific solution to more generic "principles of form and function" (Gregor and Jones 2007). We present the abstraction in the form of (generic) problems, (generic) goals and (generic) design requirements according to Peffers and colleagues (2008). The validity of the approach is evaluated using the achievement of the generic goals (Peffers et al. 2008).

Introducing *mobile* value co-creation into travel agencies enables them to fill the service gap of current travel counselling. If the new service is not well designed, it might not fit into the organisation, negatively impact the client's satisfaction (Bitner et al. 2000; Cook et al. 2002) or the tool may not provide suitable functionality. A comprehensive solution has to take organizational aspects, user aspects and system properties into consideration. .

The subsequent section of this paper demonstrates the research gap: while research introduces interesting and novel services and system designs, the role of travel agencies by providing such services is neglected. Subsequently, mobile counselling is positioned as a service gap of current travel counselling. Then, the concept of value co-creation is introduced and its most important general design problems are summarized. We then introduce the design of a solution to those design problems, regarding all three levels of organization, user and system. After briefly introducing the research and development process, the 'context of use' is presented as well as generic design goals and requirements. Subsequently, a system instantiation following these requirements is presented and evaluated within an exploratory study. The paper is closed with conclusions and an outlook to future work.

Related work

Research significantly advanced the body of knowledge concerning mobile services for travellers (see Grun et al. 2008 for an overview). Mobile applications have not only made multimedia content available to travellers (Kenteris et al. 2009), but also improved access through context-aware computing (Cheverst et al. 2000; Höpken et al. 2010), especially location-based services (ten Hagen et al. 2005; Hinze et al. 2009) and recommender systems (Nhat Nguyen et al. 2003). Mobile tour guides provide personalized routes to interesting places and localized information. Research focuses on the dynamic nature of tours (Kramer et al. 2007), providing an interesting story-based game as a background (HyunJeong and Schliesser 2007) or on recording personal memories in diaries (Abowd et al. 1997; Pospischil et al. 2002). Traveller-to-traveller interaction has been improved through mobile communities (Carlsson et al. 2008) and social-context-aware mobile guides (Buriano 2006).

Human travellers also engage in face-to-face collaboration before, during and after visiting places in order to plan and organize activities, finding their way around and enjoy their stay (Brown and Chalmers 2003). Beyond, mobile travellers are used to automatic travel agencies in order to book services (Nhat Nguyen et al. 2003; Yueh et al. 2007).

However the mechanisms of how *human travel agents* can provide services to mobile travellers and how to stimulate continuous interaction between travel agent and traveller have not yet been investigated. Although researchers stress that travel agents have to focus on value added services after the primary booking (Lexhagen 2005), there is a lack of solutions. Human travel agents still have superior skills when information needs are vague or intimate knowledge of the traveller's preferences or life situation is required (Schmidt-Rauch and Schwabe 2011). Since we are convinced that this fact holds true for the mobile context, we propose the subsequent service construction as a solution candidate.

The mobile service gap in travel advisory

Considering advisory as value co-creation service in practice also means to continue these considerations to each encounter with a client. From a travel customer perspective these encounters can take place throughout the travel customer cycle (Fig. 1).

A travel customer cycle usually starts with (a) a vague need for inertia breaking accompanied by, e.g., unintended information seeking, talking to friends and family etc. before a customer (b) actively seeks for information and receives travel counselling (planning activities), and (c) finishes with
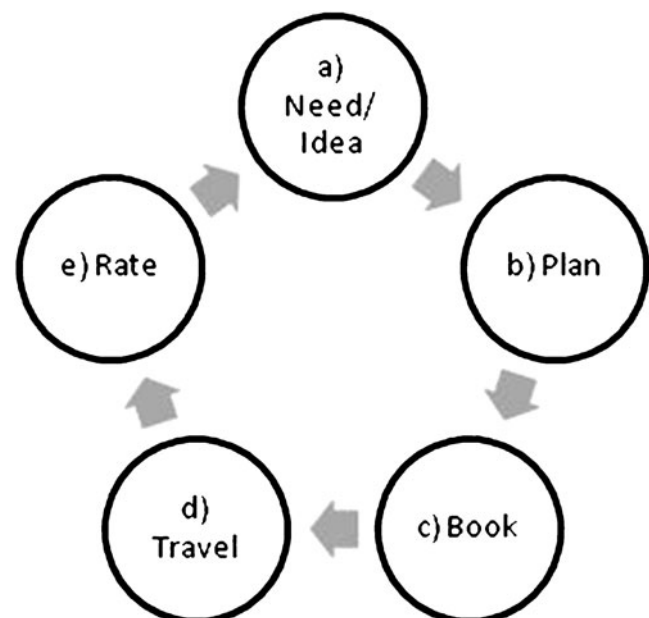

Fig. 1 Travel customer cycle

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.

Inspiring a customer (a) to elaborate her clear needs is a recognized field in research (inspiration-driven recommender systems, e.g., Ricci and Werthner 2002; Fesenmaier et al. 2003) and becomes also a practical reality within offline travel agencies (for instance Kuoni's travel compass[1]). Regarding the planning phase (b), the co-creator role of the customer and the value she experiences in this role is already investigated, and special features as a fruitful design choice are found: integrating trustworthy community information with editorial content (Novak and Schwabe 2009) 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 (Novak and Schmidt 2009).

The transaction phase of booking (c) 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 (d) 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 (e)).

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 while having access to the agency's advisors anytime and anyplace. Thereby, new revenue sources, as well as new opportunities for customer retention and loyalty, evolve.

Value co-creation service encounters

Value co-creation as a marketing perspective (such as by Vargo and Lusch (2004)) makes the case for a balanced view regarding the locus of value creation. The firm- and product-centric perspective is moved to an understanding of firms and clients co-creating value

while they interact with each other. Starting from this foundational view point, Prahalad and Ramaswamy (2004) introduced a more practical point of view. They suggest the firm's need of providing a "co-creation experience" and personalized interactions with clients since the firm's information lead as well as clients' dependence from the firm's communication decreases. Following this logic, advisory and counselling service encounters can be described as prime examples of value co-creation services (Schmidt-Rauch and Nussbaumer 2011) since their value is inherently co-created by both the advisor (and thereby by the firm) and the client. The solution of the client's problem requires active participation and information exchange from both parties. In the case of travel consultancy the created value has two components: the customer needs a solution for his travel-related problems such as destination, travel products and hints about behaviour at the destination, how to organize the needed travel-related documents (visa etc.) and others. The travel agent on the other hand receives the value from selling products and earning margins. Both value components will not be achieved without the participation of both parties and without communicating and collaborating in problem-solving and solution-finding. If the travel agent fails to find suitable products which the customer is convinced to satisfy her needs, the customer would not purchase the trip. Then both value components are not created. Thus, travel consultancy can be regarded as a classical case of value-co-creation. In a mobile scenario the situation is even worse for customers as well as for travel agents: the agent up to now has not the chance to reach her customer when she is on the trip—since the agent is not able to provide service, both value components cannot be created. Functions of providing service on the trip cannot be used by the counterparts to co-create value until communication, dialog and information exchange are established.

Prahalad and Ramaswamy (2004) use the DART-model for characterizing value co-creation services: Customers and firm representatives get involved with a *d*ialog which aims to jointly define and solve the client's problems (e.g., being on trip, needing an exciting tour). For reasonably deriving action, the counterparts need to overcome information asymmetry. This means to provide both parts with the same *a*ccess and *t*ransparency to information (e.g., tours starting the next 3 days). The firm additionally has to enhance the customer's assessment of the *r*isk-benefits of her decisions (e.g., reliability of the tour provider). The customer thereby takes some responsibility for the co-created service or product and enhances the firm's assessment of *r*isk-benefits (e.g., purchasing from

another travel agency or directly from providers at the destination).

In practice, advisory encounters regarded as co-creation situations need to solve the situational problems which undermine the co-creation experience:

1. *Problem of being limited to the verbal dialog*: Problem space (in the client's mind) and solution space (in the advisor's mind) may not necessarily overlap. A traveller, for instance, is the expert for her travelling needs and the travel agent is the expert for possible trips. For finding a solution, both communication parts need to derive a clear problem statement from needs elicitation. Being limited to a verbal conversation hinders traceability of information and action (see also Nussbaumer and Matter 2011), and therefore violates the transparency issue of value co-creation.

2. *Problem of the stickiness of information needs* (Novak 2009): The explicit expression of the client's vague needs in order to agree on a problem statement depends on her state of need and the difference of categories and terms of problem and solution space. In the case of travel counselling, a customer may feel that she really needs a vacation, but may not be able to state what she is looking for. In practice, such customers are sent home to develop a conscious state of need themselves. This negatively affects the client's access to her problem space and, at the same time, take the possibility from the firm to learn about the particular client's needs.

3. *Problem of the burden-of-choice* (Schwartz 2005): The amount of choices and the complexity of solution candidates hamper decision-making. For travelling, selectable travel opportunities are innumerable and arising combinations for planning a trip may be very complex. Risk-assessment may be difficult and easier to handle if a knowledgeable advisor supports decision-making.

4. *Problem of diverging goals:* Sales-oriented advisory settings are subject to an inherent conflict between the advisor (agent) and the client (principal), as discussed by agency theory (Eisenhardt 1989) and found in the practice of service delivery (e.g., Novak 2009). Advisors are asked to sell products and the advisory process is laid out for selling products. Led by the firm's priority contracts and margins, the sold products may not be the demanded products. Furthermore, the advisor may rush to finalize a deal although the co-creation process is not yet finished, thereby missing hidden needs or overlooking cross- or up-selling opportunities. There is also a reason for mistrust on the side of the advisor: Clients may shop for (mostly cost-free) advice and then purchase at a low-cost provider. They thereby allocate advisors' time without commitment. A bi-directional information transparency is lacking.

A mobile service can address these problems in the following way: The *problem of being limited to the verbal dialog* and the *stickiness of information needs* can be addressed by establishing a communication channel and a shared representation of the solution space—the travel itinerary. The travellers' *burden of choice* can be reduced by strictly filtering information to the local needs of a traveller (e.g., Küpper 2005) combined with the expertise of the knowledgeable and understanding advisor. The latter is particularly useful in establishing the trustworthiness of different Internet sources (Novak 2009). The *diverging-goals problem* can partially be addressed by increased information (and cost) transparency during the joint problem-solving process (Novak 2009; Nussbaumer and Matter 2011). Since information transparency is related to honesty (Flavián et al. 2006), and therefore may foster trustworthiness, such system characteristics support balancing principal-agent conflicts.

Designing for mobile value co-creation service

Research and development process

The design of Mobile Value Co-Creation Service generally followed the Design Science methodology. Thus, we identified the organizational problem(s), created and evaluated IT-artefact(s) regarding the solution of the problem(s) within a given organizational context. In doing so we applied empirical and qualitative methods within a build-and-evaluate loop that is typically iterated a number of times before the final design artefact is generated (Hevner et al. 2004).

We contextualized this common framework with the User-centred Design process (UCD) (ISO 2010) in order to map the research approach onto a development process. The UCD especially qualifies for adaption through the following three principles (Gould and Lewis 1985):

- 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.
- Empirical: Through gathering data about the artefact, designers can learn from users whether the artefact solves the problem and the design is informed.
- Iteration: A build-and-evaluate loop enables designers to continuously improve design and artefact in order to gradually meet problem-derived requirements.

In order to focus on specific aspects within an iteration, we applied scenario-based development (Rosson and Carroll 2002) in the specific phases of the UCD process. Starting with problem scenarios (short narratives), we were able to review the context of use with stakeholders in order to specify the context of use. Accordingly, for developing

requirements, we used activity, information and interaction scenarios that provided us with immediate user feedback (something that is difficult or even impossible using UML diagrams, which need to be reviewed by non-technical stakeholders). In order to receive user feedback providing deep insights, the design, represented by the derived requirements, was instantiated by a mobile prototypical system. The prototype was evaluated within an exploratory study applying experimental techniques (Stebbins 2001). We involved five travel agents and 16 customers in context specification, system design steps and in the final evaluation, following the UCD process.

Context of use

Following the UCD process model (see Fig. 2), we first specified the context of use. The general context of use is described by the travel customer cycle (Fig. 1). Taking this perspective, a service gap during the actual travel was identified. We claim to bridge this gap with an advantage to both customers and agency by putting the notion of value co-creation into the practice of service encounter on the trip. To further specify the context of use the specific potential users in the phase of travelling need to be identified. These 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, thus, builds on other counselling scenarios (e.g., Novak and Schwabe 2009).

There are two aspects that the service can take advantage of: (1) wireless and mobile access become common and costs of mobile access decrease, and (2) the attachment of users to their mobiles increases with the personalization possibilities that devices such as BlackBerry mobile phones,

the iPhone or other smartphones provide (Meschtscherjakov 2009; Geven et al. 2008). This enables not only an increased probability of always having the mobile on board (what allows a continued service provision), but also the expectation of enjoying its usage. By 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 as they co-create the value.

However, a system for a mobile scenario needs to address the limitations of mobile phones and adapt the system to the users' needs in such contexts. For example, as several authors have explained (e.g., Baus et al. (2004), Noble and Weir (2001)), 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).

Design goals and requirements

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. The organizational level provides the perspective of the travel advisor, embedded in her organizational context. The user level addresses the perspective of the traveller. In terms of pragmatic, task-related and hedonic, task-unrelated demands, user requirements are derived according to travellers'

Fig. 2 User-centred design process
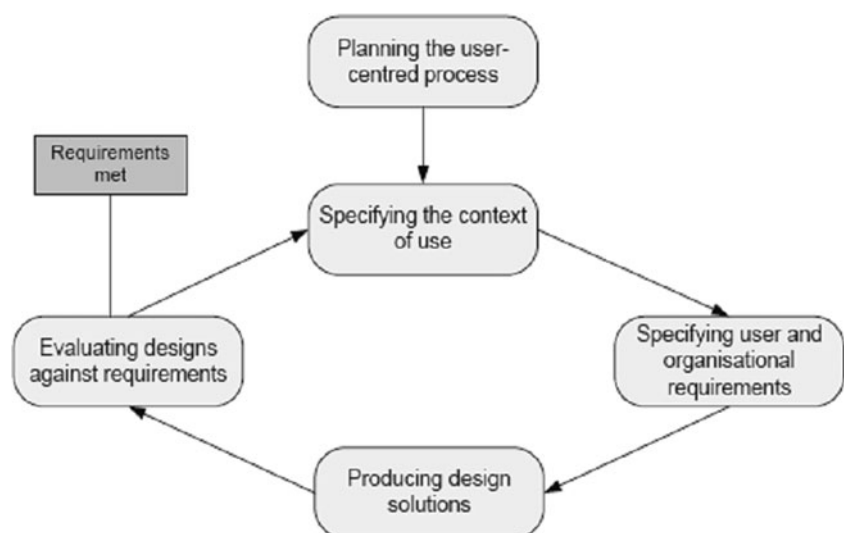
experiences. The system level reflects the technical system perspective and forms the basis for the other two levels. The made-for-the-medium notion (Venkatesh et al. 2003a) is instrumental to the system level and can be described as technical personalization that maps the expected functionality onto ease-of-use. Thus, the user level requires the system level and is itself a pre-condition for the organizational level.

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 sceptical. 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-centre in order to receive very small-margin products or services. This underscores the need for organizationally balancing the *diverging-goals* problem.

However, there is a great opportunity in providing mobile value co-created 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 (Koskela 2002). This reveals the instance of *problem of being limited to the verbal dialog* of the situation.

The same is true for the common Internet competition: Seeking costs are high, there is no support regarding the *burden-of-choice* (Schwartz 2005), and searching for the right service or product presumes high media- and content-related competence of the customer and is usually also time-consuming. Selective services such as Rick Steves' "Europe Through The Backdoor"[2] and CTrip's live support,[3] which provide outstanding counselling for specific regions, do exist but are still difficult to find and the customers' needs and current circumstances are unknown. Beyond, the service provider is not the trusted advisor which can be regarded as an advantage from the customers' perspective. The *stickiness of information needs* thereby is not sufficiently addressed. Therefore, fast and straightforward support is hampered. Furthermore, uncertainties about the provider or security issues regarding payments, for instance, can 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. This complicates risk

assessment. 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.

User level

For concentrating on the customer 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 behaviour. 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 (Koskela 2002). This constitutes her need for an effective *dialog* that fulfils the current *information needs (addressing its stickiness)* and helps to reduce the *burden-of-choice*. 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 (who has available the itinerary and needs information about the customer) would positively contribute to the overall travel experience. Accompanied by making traceable the agents' actions for the customer, communication can be equalized and the encounter-related part of potentials for principal-agent conflicts (*diverging-goals problem*) can be balanced.

Mobile travel services need to provide—from the user's / service recipient's perspective—interactive services such as communication to travel agent and making bookings, and

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plain services such as managing the own itinerary and receiving information on points of interest.

System level

The range of implemented functionality in mobile applications that address travellers' issues on the trip is wide. The major source of related implementations can be found in the area of location-based services (Küpper 2005) which implicitly address the *burden-of-choice problem*. Burden-of-choice is even more challenging for mobile services due to the needed non-trivial match of huge information spaces to be displayed and having available only limited display space. Systems like Travelload,[4] LoL@ (Umlauft et al. 2003), CAIPS (Beer et al. 2007) and Siri[5] 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 *personal* service provision is a main challenge of the design at the system level. While most of the related work is on pushing mobile services to automatic personalized services as a major trend (see, e.g., Ancker 2003), we argue that expanding the mobile interaction by personal (and not only personalized) service is a promising design choice for conquering new business cases for travel agencies. As argued above, human advisors are superior to machines if the client is unable to explicate her information need.

In order to adequately support the presentation of information and service, we can apply patterns for small displays and limited capabilities (e.g., Noble and Weir 2001) based on best practices. Since 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 (Noble and Weir 2001).

Table 1 summarizes the discussed generic design requirements as goals and corresponding service characteristics for the mobile application which provides access to the novel mobile service.

Design instantiation

According to the tasks required for designing a mobile support system, we propose general design goals. As a

guideline through the design process, we accordingly base the evaluation on these goals. For the specific system instantiation, the described prototype, we mapped the generic goals onto dedicated system design characteristics to be implemented (see Table 1 for an overview).

Regarding a specific part of a usage workflow, a potential customer is at a certain destination with a pre-arranged itinerary (cf. Fig. 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 (Fig. 3 (c)) and provides a menu item for the weather. When activating this item, the display changes to the weather forecast of her current location (UC2d) but keeps the direct navigation possibilities to the main views of map and menu (SC2). The customer now decides to stay another 3 days at the destination (as the weather will be fine, Fig. 3(d)) and therefore navigates back to the menu view and chooses the contact area in order to request a demand (need a hotel for 3 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). She writes a message to her trusted agent (UC1a). 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 (UC1c), including the hotel recommendation as itinerary entry (UC1b, UC2c). With the activation of this new itinerary item, the customer receives the map (based on Google Maps) that visualizes product-related information in an aggregated way (UC2b, e.g., location of points of interest similar to Fig. 3 (b)). The customer can inspect her and the recommended hotel's geographical position (UC2a, SC1b), 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) (SC1a). Since the product provider is an agency partner, a booking link is directly presented (OC1a).

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 (UC2c). 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).

Table 1 Generic design requirements as goals (Organizational Level Goals OG, User Level Goals UG, System Level Goals SG) and corresponding service characteristics (Organizational Level Characteristics OC, User Level Characteristics UC, System Level Characteristics SC)

	Goals	Service characteristics
Organizational level	OG1. Enable cross and up-selling opportunities in the service-neglected phase of travelling.	OC1a. Provide for extending itineraries.
		OC1b. Provide for communicating with trusted agency.
		OC1c. Provide for communicating with local agency.
	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 artefact of her travel: an itinerary that she shares with the agent.
		UC1c. Allow agents to temporarily update an itinerary, reverting to the needs elicitation which was performed during planning phase.
	UG2. Provide an enjoyable user experience to contribute to a unique overall travel experience and experienceable value co-creation.	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).
		UC2c. Provide for traceable actions from both parts of the interaction.
		UC2d. Reduce counselling complexity according to context and tasks.
System level	SG1. Integrate automatic services with human-based service provision.	SC1a. Equally present content, e.g., feeds from the web and agency services (e.g., marker on the map or entries within the itinerary).
		SC1b. Highlight agent's recommendations (temporary itinerary updates) on the map.
	SG2. Adequately support the user on the mobile device.	SC2. Implement mobile interaction patterns.

Evaluation and results

We evaluated the presented service instantiated by the described prototype, to verify the introduced design goals. On the organizational level, we assume the service to be a "tool" to encourage customers to traverse the customer cycle (customer retention and loyalty (Srinivasan et al. 2002)), 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

Fig. 3 The system prototype

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 customers investigating their perceived pragmatic quality (task-related aspects), hedonic stimulation quality (task-unrelated aspects, see Hassenzahl 2010)[6] and their overall experience reflected by their attitude toward using the system (Venkatesh et al. 2003b). 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 Venkatesh et al. 2003b) and the qualitative feedback of the users, especially addressing the implementation details (e.g., itinerary, messaging, etc.).

Participants, setting and tasks

We conducted the explorative study applying experimental techniques (Stebbins 2001). Conducting the test on a voluntary basis were the 16 customers as well as the five travel agents. Customer participants mostly indicated a high proficiency in computer usage (10 of 16). They were between 22 and 30 years of age (ø 25), 3 of 16 were female. Four of 16 were iPhone owners, and 10 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 described 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 accomplishing 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 seven-point Likert scale reflecting the participants' agreement on the given statement (as intended and tested by (Srinivasan et

al. 2002) and (Venkatesh et al. 2003b)). We deviated from that schema only for the pragmatic and hedonic quality evaluation and used the semantic differentials of the Attrakdiff2-questionnaire (Hassenzahl et al. 2003) 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 seven-point Likert scale.

The involved three travel agents who answered requests during the tests have not been systematically interviewed. Their feedback was gathered during informal discussions after the test took place.

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 or anyone else. However, all participants preferred to interact solely with the system (searching opportunities) or with the contact area of the 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. Fig. 4), OG1 is strongly supported. With one exception of an overall sceptical 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.

Customers largely agreed on the recommendability of the system (ø 5.71±1.62, cf. Fig. 5). The same sceptical participant who also rated a low preference could not imagine a trustworthy and honest service provision behind the system. Despite perceivable prototypical characteristics, the other users supported that, with an increasing
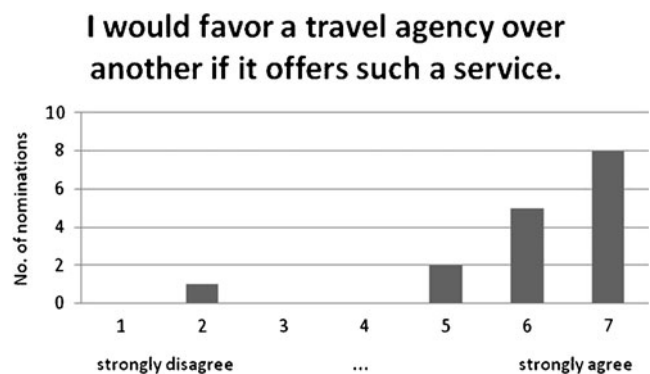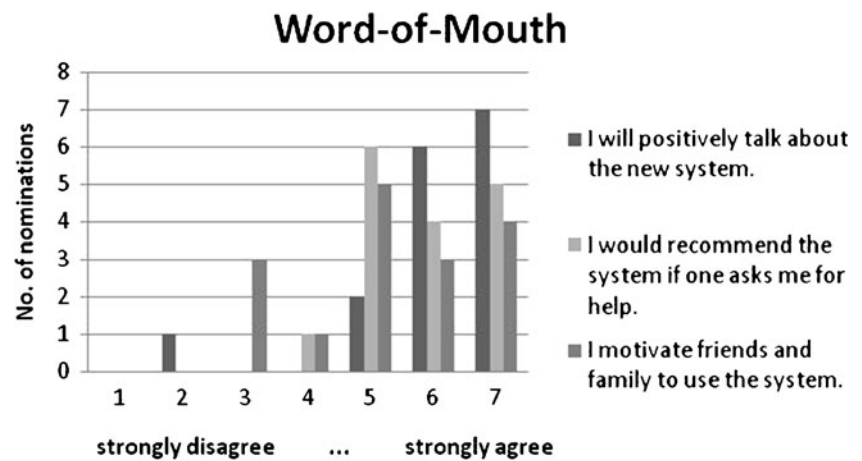

Fig. 4 Customer preference

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[6] see appendix for Attrakdiff2-questionnaire addressing pragmatic and hedonic stimulation quality (Hassenzahl et al. 2003)

Fig. 5 Word-of-mouth results

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.

Evaluation results at user level

Summarizing the overall user experience regarding the customers' attitude toward using the system (see Fig. 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 functionality and the service of staying in touch with the trusted agency. Users explained the lower ratings especially by occurring network connection problems when the localization produces wrong results. 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), the prototype 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.

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 refrain 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 the service opportunities by the system-mediated customer-agent interaction.

Fig. 6 Customers attitude toward using the system
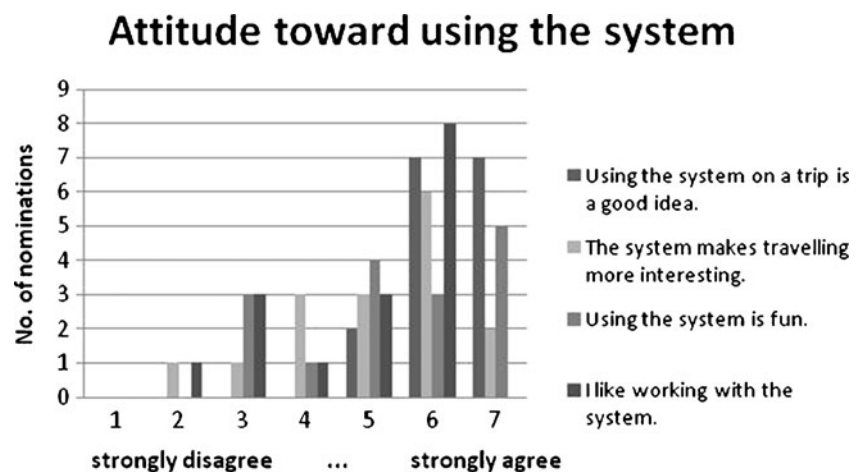
Evaluation results at system level

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. Since it was intended to allow them to complete tasks whenever they wanted to on the test day, the agents ran their applications the whole day and received a hint when a request came in. Logged geo data showed that each participant chose almost the same route to accomplish the tasks, as it was intended.

Learnability (effort expectancy and self-efficacy, adopted from (Venkatesh et al. 2003b)) 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). Users pointed out that the tool was useful und easy to use with an intuitive design, which satisfies SG1 and SG2.

Discussion on value co-creation design tasks

As the given results indicate, our introduced service concept and system design appears to be suitable for mobile service provision. Regarding the accomplishment of the design tasks given by the conceptualization as value co-creation, we aimed to solve (1) the *problem of being limited to the verbal dialog* by implementing a contact area connecting the customer with her travel agent and making the beforehand derived needs elicitation available for agents. An experienceable entry point to the mobile value co-creation may foster the impression of a continuing contact to the agency in the future. We propose to implement this entry point at the time and place when the rough itinerary is booked, i.e. the mobile application access is a bonus for booking and is directly handed over by the travel agent. (2) The *stickiness of information needs* as well as (3) *burden-of-choice problem* were addressed by implementing a communication channel, the manageable itinerary and the search functionality for different points-of-interest as a hybrid concept combining contact to a human-being with automatic services. Although test participants positively mentioned that a connection to a human-being (travel agent) was established, they indicated that they were agnostically assessing the situation regarding the difference of human-based service and automatic service. This likely can be a task for marketing or for procedural support at the entry point. Potentials for principal-agent conflicts and (4) the *diverging-goals problem* could not be fully concerned due to their origin within the organization's process design. Tapping the full potential of co-created value within customer-agent (firm representative) interactions requires a comprehensive organizational change but promises new revenue and business opportunities. Namely, enabling a new phase for service provision (on-trip), more fine-grained planning of itineraries (cross- and up-selling), and more satisfied and loyal customers (investment for the future). We cannot claim that the potentials for progressing principal-agent conflicts could be resolved regarding the one person's overall scepticism. Since these conflicts originate from advisory process layout and the organization's attitude towards advisory, we need to investigate this issue while organizational change is commencing. Interestingly, in our tests the trustworthiness of the mobile service provision was also not problematic. This underscores a limitation that this study has: high ratings may not be 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 the city.

Agents in our test were able to answer incoming requests very fast due to their high interest in doing something new. Although we did not record their feedback systematically since they were only three persons, we could collect interesting issues by informal discussions: Agents really appreciated to be the remote helping hand for the customer and providing additional service with products of interesting margins. They liked the asynchronous communication since this enables agents to first finish the current task before answering on-trip requests. Agents still have doubts about the organizational implementation since time for additional service is not yet available. Questions such as "when do I have time frames to provide on-trip services" and "what are the revenue structures for such services" need to be addressed before travel agents will be comprehensively convinced about the service. They therefore 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 2 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 dedicated thresholds of customer numbers is a future task for implementing such service concept to practice in line with the before-mentioned organizational change.

Conclusion, limitations and future work

In this paper, we have presented a novel mobile service for travellers provided by a travel agency and a corresponding support system following pre-defined design requirements, based on the main notion of value co-creation. The introduced design goals are aligned to the design tasks for value co-creation customer-firm interactions and are laid out at a

three-level design. We propose a service provision throughout the travel customer cycle that can enable new revenue opportunities and customer retention and loyalty. By doing so, we exploratively investigated our research question which we answered by the general design goals and instantiation example of the described prototype.

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 service provision throughout the travel customer cycle, as proposed in this paper. In the future, 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 shed a light on the principal-agent conflict and the diverging-goals problem and its balancing for continued value co-creation, also for the on-trip phase. More wide-spread evaluation involving more travel customers and a further developed prototype would provide additional insights to the service and system design. By taking into account a more fine-grained travel customer cycle, e.g., by splitting the travel phase into "travelling to destination", "staying at destination", and "travelling home", more service opportunities could arise and would be starting points for further develop additional features. Furthermore, it would be interesting how the service design would perform compared to travel hotlines, online travel portals and other services we specifically aimed to support and expand traditional travel agency's service provision.

Appendix

Attrakdiff2-questionnaire (Hassenzahl et al. 2003) provides, inter alia,[7] semantic differentials for pragmatic quality (PQ) and hedonic quality of stimulation (HQ-S) (see Table 2) Table. While the pragmatic quality dimension reflects characteristics that are predominantly of instrumental value and are primarily directed at supporting a certain purpose related to the fulfillment of certain tasks (Hassenzahl 2010), hedonic quality addresses general psychological needs of personal and social development beyond the pragmatic quality aspect.

Table 2 Attrakdiff2 semantic differentials

Hedonic quality of stimulation	Pragmatic quality
• conventional—inventive	• technical—human
• unimaginative—creative	• complicated—simple
• cautious—bold	• impractical—practical
• conservative—innovative	• cumbersome—straightforward
• dull—captivating	• unpredictable—predictable
• undemanding—challenging	• confusing—clearly structured
• ordinary—novel	• unruly—manageable

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[7] Items regarding the hedonic quality of communicating a certain identity by the system or through system use as well as pure attractiveness of the system have not been applied since the design was most aimed at advancing HQ-S and PQ.

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