2013

A Local Outdoor Mobile Tour Guide in HTML5 – Drivers and Barriers

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Abstract

HTML5 is by many seen as the future platform for delivery of mobile services due e.g. to its cross platform capabilities. Moreover, mobile services are becoming an essential part of providing new and enhanced ways of visitor experiences in travel and tourism. Therefore, this paper aims to contribute with a description of a local outdoor mobile tour guide developed in HTML5 and an evaluation of drivers and barriers of HTML5 as a platform for mobile service delivery in a travel and tourism context. To achieve the goal, an action research project was conducted and a holistic mobile service business model framework called STOF was utilized.

Keywords: HTML5, Mobile services, Tourism, Business models.

1 Introduction

The main goal of the MobiTourism project at Arcada University of Applied Sciences in Helsinki Finland was to look into the possibility of using HTML5, the fifth revision of the HTML standard, as a development platform for a local outdoor mobile tour guide (here referred to as MTG). HTML5 is expected by many developers to be the future platform of mobile service delivery (e.g. Charland and Leroux, 2011; Juntunen et al., 2013). However, when designing new mobile technology-based services, we must not only look at the technological aspects of the service but we need to take a holistic approach in order to understand critical success factors from both a customer and a service provider perspective (Bouwman et al., 2008). Therefore, our first aim is to briefly describe a mobile tour guide developed in HTML5 with the help of a business model design framework called STOF. Our second aim is to evaluate the drivers and barriers of HTML5 as a future platform, especially within a travel and tourism context. The experiences have been gained from fall 2011 to spring 2012.

2 The STOF-model

Bouwman et al. (2008) proposed and evaluated a high-level framework for business model design for mobile information and communication technology (ICT) services. The STOF framework includes four elements. In the (S) service domain the most crucial aspect is customer or end-user value. In the (T) technology domain the requirements are determined by the service domain. Technology design is a description of the fundamental organization of a technical system. In the (O) organization domain resources and capabilities to enable the service delivery are key issues. In the (F) finance domain financial resources are determined as the bottom line of most services to be designed. Finance design is a description of how a value network intends to e.g. capture monetary value from a particular service offer. The four business model domains are interrelated and the aim is to create value for customers and service providers. We will describe the MTG service according to these four domains.

3 Methodology

An action research-based approach fits well with using the STOF-model (Bouwman et al., 2008, p. 134). Action research is traditionally done in spiraling circles of collaborative learning activities; plan, act, observe and reflect (Zuber-Skerritt, 2001). According to Järvinen (2007) action research includes both *building* and *evaluating* artifacts (here a prototype of a mobile service). Furthermore, information systems (IS) action research aims at improving real problems (needs) and expanding the scientific knowledge and it refers to a set of research approaches rather than a single research method (Baskerville, 1999). Here, we focused on IS prototyping and principles of agile software development processes, which often include brainstorming and short but continuous feedback cycles in small teams. However, we also used organized field trials in a real context with questionnaires as method. Hence, the final evaluation of HTML5 as a platform is based on a total action-based learning experience rather than on data collected via a single method. See figure 1 for a description of our approach.

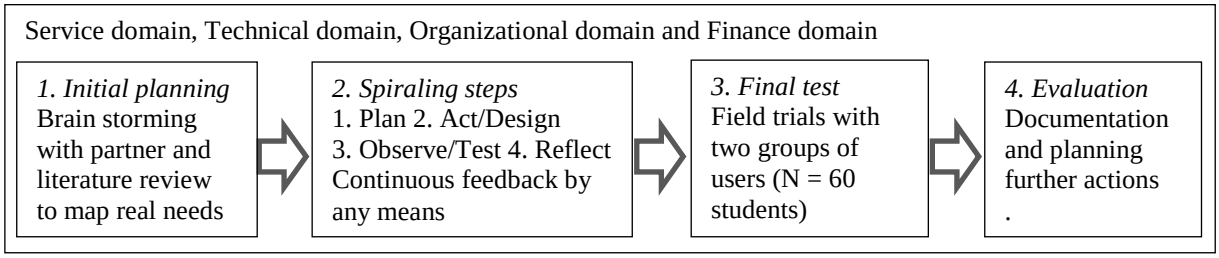

Figure 1. An activity model from the project perspective

4 Service Domain

The intended core value for travelers to use the MTG is experience enhancement in form of educational entertainment wherever and whenever visiting attractions. Guides may also work as platforms for travelers to plan attractions to visit in advance (Brown and Chalmers, 2003). However, we cannot expect all travelers to pre-plan and/or pre-install mobile services before they visit local sites. Therefore, mobile services such as mobile guides should be made easily available also in different onsite contexts. Research also suggest that independent travelers (not participating in a package tour) are likely to be the primary target group for mobile tourism services (Eriksson and Strandvik, 2009). Our focus was primarily on the wandering aspect of mobility where an actor performs activities while moving between different locations within a building or local area (e.g. on foot). To support the value proposition of wandering independent visitors the guide was decided to include (1) *map of a local outdoor area*, (2) *location features with GPS*, (3) *predefined points* of e.g. design interest and (4) *content* for each point of interest (POI).

A prototype of the service was to be set up within the context of Arabianranta[1] in Helsinki, Finland. The Arabianranta area is visited both by domestic and international travelers, which required the application to take into account language options and on-site usage costs especially for roaming visitors. Service providers of mobile tourism services should minimize transaction costs and deliver content for free (Bader et al., 2012). Moreover, providing a service onsite with map and multimedia content sets requirements on the mobile network transmission rate. Too long download times may lead to that travelers view the service as too time consuming to temporarily take into use in an onsite context (Eriksson and Strandvik, 2009). Consequently, (1) *smooth accessibility*, (2) *easy usage procedures* and (3) *minimal financial risk* are key factors in order for mobile services to succeed in an on-site travel and tourism context. It was also decided that the guide should be a free-of-charge service in order to make the area more attractive rather than trying to monetize from the service by charging the visitor. The quality of the content provided for each point of interest (POI) was also decided to be of high priority to ensure an interesting visitor experience. Therefore, 10 POIs of high relevance were initially picked out for the Arabianranta area.

5 Technology domain

Even though HTML5 (incl. HTML5.1) is not considered an official standard yet, when writing this, it is already partially supported in the latest versions of most modern browsers, both desktop and mobile ones. HTML5 is much more than a structuring language for web pages. The greatest benefit of HTML5 is the introduction of numerous application programming interfaces (API), such as canvas, video, local storage, offline web applications, localization (GPS) and more. Our guide prototype utilizes primarily two of these HTML5 APIs, offline web applications[2] for storing data on the visitor's device and the localization API for locating the visitor. The new HTML revision makes it possible to create more feature-rich web applications that resemble native applications run on the desktop (Charland and Leroux, 2011; Anthes, 2012). The main building blocks, in addition to HTML, were the PHP framework CodeIgniter and the mobile JavaScript framework jQueryMobile.

The interface views of the visitor client are shown in figure 2. The map view is a graphical representation over the area and its POIs. For example, the zoom level is locked so that the amount of tiles to download is held to a minimum to ensure short download times (*smooth accessibility*), which was a defined user requirement. When selecting the API for displaying the map to the user two criteria

[1] Arabianranta, one of the capitals most important design areas, is represented by Art and Design City Helsinki (ADC). ADC worked as a partner during the development of the MTG service.
[2] See: http://www.w3.org/html/wg/drafts/html/FPWD51/browsers.html#offline

had to be met. First the map API had to be touch capable, so that the user could pan the map by swiping the screen (*easy usage procedures*). Second it had to be possible to download the needed map tiles and scripts and at a later stage display the locally stored map tiles to ensure that *financial risk for visitors is kept at a minimum*. Offline use requires that all POIs along with required map tiles are downloaded and stored in the browser cache using a HTML5 manifest file. Once the user visits the website for the first time, all files listed in the manifest are downloaded.

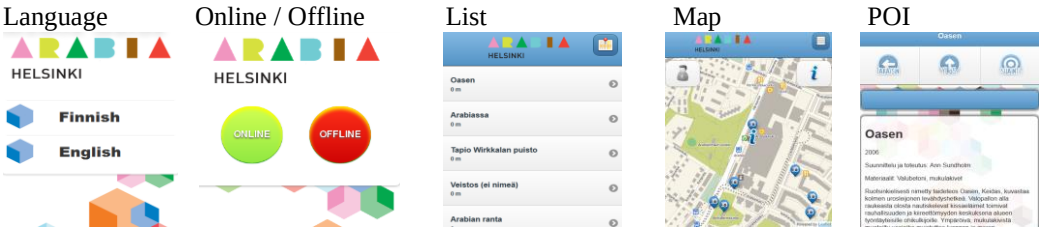

Figure 2. Interface views of the visitor client

The technological domain also included a back office client. The back-office component is designed for the actors and the value network behind the MTG and will be presented next.

6 Organization and finance domain

The back office client is built to function as a service, which means that anyone invited to use the service (e.g. travel service providers) could register and start creating maps and POIs of their own online MTG via a web browser (creating their own mobile guides for specific outdoor areas). The model is often referred to as 'software as a service' (SaaS). The intention is that e.g. the regional tourist board could use the service to build different area specific MTGs within the region in cooperation with local service providers such as ADC Helsinki. Hence, the main target group of the back-office client is travel service providers of different kinds. Therefore, there needs to be a way to customize the guides according to the needs of different types of providers. This is why the back office client contains functions for customizing maps, colors, logos, languages and POIs (see figure 3).

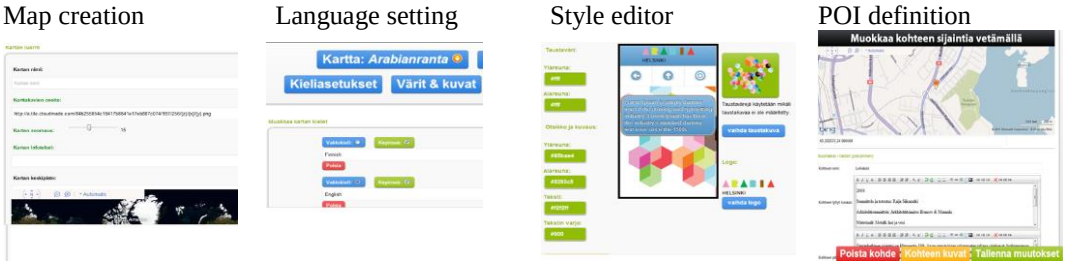

Figure 3. Back-office client interfaces

The main value proposition for service providers to use the service is to be able to provide greater customer experiences in especially unmanned locations. Moreover, the possibilities to customize the MTG and reduce print costs are also important value propositions to travel service providers. The key needs of the local non-profit organization ADC in Arabianranta were indeed: (1) provide *enhanced visitor experience* with state of the art technology, (2) *simplicity to maintain and customize* the application and (3) *potential financial savings*.

7 Evaluation of drivers and barriers of HTML5

Above we presented the MTG application according to the four domains in the STOF model. We will here focus on evaluating HTML5 as a platform for mobile services such as the MTG.

7.1 Cross-platform

One of the most important advantages of an application running on HTML5 is that it enables cross-platform operation – it works on many types of devices and operating systems. Many cross-platform development frameworks such as PhoneGap, Titanium Appcelerator and even pure HTML5 were considered. HTML5 with jQueryMobile was eventually chosen, as modern mobile phones, tablets and computers support the technology. An additional later consideration was to be able to use the MTG application from both desktop computers and mobile devices and by using jQueryMobile and HTML5 this was possible. Had a mobile only framework such as Titanium Appcelerator been chosen, it would have resulted in more work as the application would not run directly in the browser. Considering this may save an application provider effort and resources both in development and maintenance stages as the visitor client need not be optimized for different types of devices and operative systems.

7.2 Online vs. Offline

Web applications generally require an Internet connection to function. As described in the service domain section, travelers worry about financial risk when using Internet-/mobile services during a trip. The access cost may be different in different countries and also depend on the mobile subscription plan of the user. In international roaming contexts the data transmission charges may be very high. Therefore, the possibility to locally store the content on a mobile device is crucial and as shown above an important building block in the MTG service. Earlier a similar feature was only possible by using a native application.

7.3 Marketing, distribution and monetizing

As opposed to a native application, which needs to be installed on the device, an application in HTML5 works directly in the browser and requires no installation. Therefore, an user only needs to enter an URL in the browser rather than entering an application store to download and install an application. The simplicity of the access and installation procedure may be an advantage especially in an onsite (on-foot) setting like in Arabianranta. However, if a travel service provider wants to monetize on the application (i.e. charge the visitor a fee) then a native application listed in an application store (e.g. Google Play) may be better as the store provides the payment channel. With an application based on HTML5 a separate payment gateway needs to be set up to allow for in-app-purchase or pre-download payment if monetizing is crucial. Setting up such an infrastructure causes additional expenses to the service provider. Moreover, many mobile users may be used to their application stores and find native apps to be the 'real thing'. Therefore, from a distribution and marketing point of view it may be essential to be listed in a native application store. However, in our case the primary effort of marketing and distribution of the application was intended to be onsite (where the visitor arrives on foot). Moreover, monetizing was not an issue in the Arabianranta context. Furthermore, HTML5-based applications are not tied to specific application stores and can hence be monetized on without sharing the revenue with an application store (usually 30%).

7.4 The maturity of HTML5

HTML5 does not provide all capabilities a native platform may provide. For example, in our initial plans we were aiming for an augmented reality application to visualize the POIs. However, augmented reality is not widely supported in HTML5 currently, as camera support is still incomplete on many platforms. On native platforms such as Android, augmented reality is already used in many applications and efforts implementing the WebRTC API in the browser will allow us to do this also with HTML5. Even though HTML5 still lacks certain capabilities and is not an official standard, it has been widely accepted and implemented by both desktop and mobile browsers. However, some of the

HTML5 capabilities can be implemented differently depending on the browser, and it is crucial to have a good understanding of these differences. Our user trials indeed confirmed that there are differences between how browsers support HTML5. Nevertheless, HTML5 is maturing as a platform and devices with browsers that fully support it are currently purchased in their millions. Also the performance gap between HTML5 and native platforms is diminishing (Juntunen et al., 2013).

8 Conclusions

Based on the STOF model we described a local outdoor mobile tour guide developed in HTML5. We also evaluated HTML5 as a platform for mobile service delivery, especially within a travel and tourism context. The primary drivers for HTML5 are (1) *cross-platform* (can save development resources) and (2) *offline storage* capabilities. The offline storage capability is crucial in an onsite setting due to traveler concerns about usage costs. Moreover, an HTML5 based mobile service provides (3) *easy access and installation procedures* for a traveler on foot; simply enter an URL in the browser. A barrier of HTML5 may be the need to set up (1) *a separate payment gateway* for a travel service provider to monetize on an HTML5-application or its content. However, HTML5-applications are not tied to the revenue sharing models of application stores. Also (2) *the maturity of HTML5* is a question mark and it sets at least for now some limitations to the development of the user experience (e.g. due to differences in browser support). These factors we see as the primary drivers and barriers of HTML5 as a platform for similar mobile services as the local outdoor mobile tour guide. In our case the lack of payment gateway is not a barrier as the application and content is provided for free. Therefore, future actions with the MTG application should concentrate on developing the user experience. It should also be noted that our research focused on a prototype and not on a service that is available on the market. Further research could focus on different types of commercial mobile services deployed with HTML5 and compare them to similar services on native platforms.

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