THE EVALUATION OF VILNIUS TOURISMMOBILE APPLICATION

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Abstract

This study investigates the usability of a mobile guide application of the Vilnius Tourist Information Centrein order to evaluate whether it is a usable product for final users. Currently, there is a great number of researches dedicated to the usability of websites, whereas mTourism usability is not popular. Moreover, there is a lack of studies concerning mobile applications in the Baltic area, with few cases in the region. Therefore, it is interesting to study the situation of mTourism in the Baltic area, and in Lithuania particularly, by examining the usability of the Vilnius Tourism mobile application. In order to have a clear understanding and a complete overview of the issues regarding the application, heuristic evaluation and user testing were conducted. The results of this research have been formalized in order to inform further implementation of this mobile guide application.

Keywords: *mTourism, mobile application, usability, Baltic tourism market*

Resumen

Este estudio investiga el uso potencial de una guía en aplicación móvil para el Centro de Información y Turismo de la ciudad de Vilnius con el objetivo de evaluar si es un producto viable para el consumidor final. Actualmente existe un gran número de investigaciones encaminadas a analizar la potencialidad de páginas web mientras que este potencial en mTurismo no es popular. Por otro lado, hay una evidente carencia de estudios referidos a las aplicaciones móviles en el área Báltica y en consecuencia, hay pocos casos en esta región. Por tanto, la autora está interesada en estudiar la situación del mTurismo en el área Báltica y en Lituania, en particular mediante el análisis del uso potencial de aplicaciones móviles para Turismo en Vilnius. Se llevaron a cabo tanto una evaluación heurística como un testeo de mercado para obtener una buena

comprensión y una visión completa de todos aquellos aspectos relacionados con la aplicación. Los resultados de esta investigación se han formalizado para poder tipificar mejor la implementación de esta guía en aplicación móvil.

Palabras clave: *mTurismo, aplicación móvil, usabilidad, mercado turístico Báltico*

Introduction

The revolution of the Internet and Information and Communication Technologies (ICTs) is already having profound implications on the tourism industry. As a whole, the system of ICTs and especially the Internet has been rapidly spread throughout the tourism sector. According to World Tourism Organization (WTO), the Internet is revolutionising the distribution of tourism information and sales. An increasing proportion of Internet users are buying online and tourism will gain a larger share of the online commerce. In this case, ICTs become one of the external environment elements for tourism and travel. On the one hand, ICTs have noticeably changed the tourists' behaviour, specifically the means of getting and giving tourist information. On the other hand, modern technologies have provided destination and tourist organisations an opportunity to create and adopt competitive methods in order to enhance their attractiveness and competitiveness in the tourism field (Buhalis 2003:78).According to Sheldon (1997), tourism and information technologies are two of the largest and most dynamic industries in the world. Together or separately, these two industries are transforming the way in which society is organised and managed. The information industry is able to move, stock and manage a wide amount of information thanks to information technologies. Due to the rapid expansion of mobile phones throughout the world (McKinsey 2012), a great amount of people start to use them mostly during their trips (Gretzel et al. 2006)because of their context related functionalities in order to access to the Internet (i.e. mobile websites) or mobile applications. The appreciable growth of mobile applications in the tourism field is changing the general look of tourism. Mobile applications gained growing importance while supporting needs of tourists and becoming the helping handheld interactive instrument at a destination: "mobile phones become a useful tool" (Brown and Chalmers 2003:8).

Vilnius as the capital of Lithuania is one of the most frequently visited cities of Eastern Europe. It draws attention not only because of its unique architectural character, but also by its cultural events and attractions. This city is situated at the crossroads of European trade roads (Vilnius Tourism, 2012). Moreover, according to the data of the Department of Statistics, during the year 2012, in total 781,002 guests stayed in Vilnius accommodation establishments (Vilnius Tourism 2012). Vilnius visitors come from a lot of countries and belong to a wide range of nationalities. ICTs have provided Vilnius Tourism Board with a swift and low-cost method of informing tourists about Vilnius in advance, preparing them for their visit and informing them about the city news, while offering an official mobile guide application. Moreover, using Facebook, Twitter and micro-blogging represent a significant factor in increasing the quality of service provision before the visitor arrives on site.

Literature Review

mTourism

Current innovations in ICTs and the emergence of mobile technology create a large number of opportunities for organisations to enhance both product and market development. The travel industry is well placed to benefit from mobile technology. The rapid development of mobile technology, based on its portability and unique functionality, enables tourism companies to access customised services: searching for information that responds to the client's specific needs, creating individual itineraries and designing accommodated service products. Consequently, mobile technology has become increasingly important in society (Sheldon, 1997).

Mobile applications can be also understood as a personal assistant that can easily take into consideration user's location and preferences in order to filter relevant information. Some experts in the mobile technology field, such as Kenteris (2010), attempted to define mobile guide applications as "projects that use mobile devices as the key user platform offering tourist information in various forms" (2010:99).The main function of these technologies based tools is similar to traditional guidebooks, namely to mediate between tourist and destination, facilitating the visitor experience (Garcia et al.,2009); but what emerges as a key issue related to mobile tourism applications is that they facilitate the access to the information by cataloguing it in a very clear and structured way, allowing tourists to find the necessary information and directions (Brown and Chalmers,2003). This emerging phenomenon, which represents a relatively new area, is called *mTourism* (Mobile Tourism - Egger and Jooss, 2010).

Speaking about the situation of mTourism in the Baltic area, there is a sufficient amount of tourist mobile guides. These applications were mostly created in order to allow tourists to explore the Baltic region in a very individual way. Accordingly, the main goal of this paper is to study the quality of mobile communication in the Baltic region by examining the situation of mTourism by means of mobile applications.

Mobile guide applications

Mobile phones are becoming a primary platform for information access. More and more people use these communication and information access tools and functionalities in order to obtain information about interesting places provided by mobile devices (Bertele and Rangone 2007). Katz (2008) widely discussed the growing importance of mobile communication, pointing out that "mobile communication has become a mainstream and an omnipresence. It is arguably the most successful and certainly the most rapidly adopted new technology in the world: more than one in every three people worldwide possesses a mobile phone" (2008:1).

Tourism is a primary application area for mobile guides. Mobile applications based on smartphones are used in the form of city and sightseeing, museum and exhibition

guides (Höpken 2010).Thus, the main reason for the importance and relevance of mobile applications in the tourism field and their increasing success is in their ability to support tourists during all trip phases, particularly on the move and within the destination. Tourists can get available information or expect to access to relevant information at any time and anywhere. Mobile applications as a personal assistant can easily take into consideration user's location and preferences in order to filter relevant information and avoid information overload, which is especially important in the on-trip phase. Based on these advantages, mobile applications have already taken their place in strategic management and now play a significant role in tourism marketing and information distribution (Höpken et al. 2010: 175-176).

Today the vast majority of people make use of applications in order to access the web. However, according to Nielsen (2010), users download many more applications than they actually use. Since these applications are used occasionally, they must be easy to manage, especially during the initial use. Apple Store offers more than 500,000 apps, among which 25 billion applications have been downloaded by iPhone/iPod /iPad users, including tourism and travel categories, reaching more than 350,000 items (2012).The trend of increasing the number of applications, namely "the rise an apps culture", has generated new opportunities and emerging challenges in the travel and tourism industry, allowing mobile applications and devices to drive the improvement of formerly congestive area.

Some experts in the mobile technology field, such as Kenteris, attempted to define mobile guide applications as "projects that use mobile devices as the key user platform offering tourist information and the use of services in various forms" (Kenteris,2010).The main function of these mobile guides is similar to the traditional guidebooks, facilitating the visitor experience. However, compared with the traditional guidebooks, these are multimedia tools offering audio and video functions, which improve and increase the efficiency in the communication. The expert in mobile technologies for tourism communication Tjostheim observes that the aim of mobile guide applications in the tourism field is "to assist visitors in creating a better and more useful tourism experience given the time the visitor has and interests" (Tjostheim and Holmqvist 2010:131).

Particularly, today's offering of mobile guides, as argued by Bortenschlager (2010) "the future of mobile services with about 4 billion mobile phones worldwide has an ongoing big potential" (2010:149), finds increased acceptance in the tourism industry. According to the researches done in this field, the major part of tourists and travellers are using their Internet connection in order to gather tourist information about a specific destination and, as Borteschlager maintains again, support an idea that "an average of 84.97% is open-minded in buying tickets accepting restaurant recommendations or in getting a selection of places of interest using a mobile device" (2010:149). Holidaymakers are increasingly looking to take advantage of their smartphone's Internet capabilities to help them gather holiday information, find reviews and even book tickets while travelling.

Usability investigation methods

Usability is a useful method applied in order to evaluate websites or applications, considered an important tool to reach a higher return on information technology investments and to create a better image for companies (Brinck et al. 2002).Web usability becomes a key factor for online tourist services. Usability is a useful method applied in order to evaluate websites or applications (Triacca et al. 2005). Unfortunately, many companies very often do not take into consideration or even ignore quality issue on their websites. Nevertheless, these are the main causes of great troubles for final users, and by not fixing errors companies are being at risk of losing customers (Garrett 2010).

During the last decade, numerous academics (e.g. Nielsen, 2010; Cantoni and Inversini 2009; Carole 2008) have discussed and analysed usability in order to assess the quality of websites, and thus the majority of research is concentrated on the web, instead of on application for smartphones. Tourism is actually one of the domains that can take a lot of advantages for the usability investigation, most of all optimizing the conversion rate of the tourism enterprises. According to Chincolle (2002), usability for mobile devices is more complicated in comparison to websites. Due to their specific constraints, the interaction between users and mobile devices represents a challenging task. Supporting this idea, Egger and Jooss (2010) maintain that applications should provide the right information in maximum three minutes, otherwise they can be deleted without providing users with value-added information. Furthermore, mobile devices have the limitation of the reduced screen, causing problems in navigation and in the access to information.

According to Brinck (2002), the usability method is "any technique you use to create a design from a user-centred perspective". Taking into account the above-mentioned context, it is widely recognized that the issues of quality of the communication and thus the usability of mobile applications becomes a central issue (Zhang and Adipat, 2005).Therefore, summarizing the above-defined cases in academia and tourism industry, the definition of usability taken as a point of reference in this research, determines usability as "the capability of a product to be used easily" and therefore "the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use" (Cantoni et al. 2003:24-25).

Research Design

For the current research the evaluation method as usability analysis of mobile tourism application was adopted. The usability analysis combines heuristic evaluation and user testing, used in accordance with an existing usability framework namely *MiLE+* (Milano-Lugano Evaluation method) (Triacca et al. 2005).The main advantage of these methods is the relationship between costs and benefits. As a case study for the usability analysis and evaluation, a Vilnius Tourism application was selected to be created by the Vilnius Tourist Information Centre in March 2012 with a purpose to

make information about Vilnius city easily accessible for tourists before and during their visits.

The objective of the following research is to conduct a usability analysis of the mobile guide Vilnius Tourism. In order to tackle the objective of this study, three research questions were determined:

-RQ1: How is it possible to evaluate the quality of a mobile guide?

To answer this question, heuristic evaluation and user testing methods are adopted (Brinck et al. 2002). In the latter case study, participants of the target group are asked to complete a number of specific tasks to find out main usability issues, monitoring their behaviour and thoughts while doing tasks.

-RQ2: What are the main issues to be considered while evaluating a mobile guide?

In order to answer this question, heuristic evaluation and user testing are opposed and main usability issues are underlined to be examined within further researches or industry-related evaluations.

For the first stage of the research the heuristic evaluation was adopted. This method is mostly based on expert analysis and detailed examination of the application, where specialists provide evaluations due to user's personal competencies, knowledge and skills (e.g. whether the application contains mistakes and/or misunderstandings, whether it is updated: whether it is easily readable). The main intention of this method is to find usability issues and problems with the end-user interface that are not in accordance with a set of usability heuristics or generally accepted standards (Carole, 2008). For assessment, 23 heuristics out of 40 were considered from the MiLE heuristics library (Triacca et al. 2005). The MiLE+ framework provides 40 technical heuristics concerning (i) navigation, (ii) content, (iii)navigation and (iv) interface design or graphics, and associate each design dimension to a list of guidelines in order to analyse them from a technical and design perspective (Triacca et al. 2005).Furthermore, the MiLE+'s technical inspection aims at identifying design problems and implementation drawbacks. The output of this evaluation results in a number of technical problems. Therefore, during this research the author examines the mobile application taking into account 23 selected heuristics in accordance with the conducted research, assuming the expert point of view (see Paragraph 4.1 for an in-depth explanation).

For the second stage the user testing was conducted. It is a method of measuring the users' ability to complete a real-world task using a website (Carole, 2008). This empirical testing method consists of observing a group of potential users expected to use the website or application. The main intention in this method is to observe users interact with it. The challenge of this study is to adopt it for the evaluation of the Vilnius Tourism application. The test was submitted to 10 people with the following characteristics: 4 males and 6 females from 5 different nationalities. Each user was requested to perform three distinct scenarios: scenario #1: 1 goal, 4 tasks; scenario #2: 1 goal, 5 tasks; scenario #3: 1 goal, 7 tasks. The number of participants was selected

taking into consideration relevant literature. As stated by Carole (2008), for formal usability testing, usually from eight to ten participants drawn from typical user focus groups will provide great feedbacks.

Results

Outcome from the heuristic evaluation

For the current research, the heuristics library, proposed by the MiLE+, was adopted. 23 heuristics out of 40 were selected and divided into three categories: content, graphics and navigation. In the heuristic evaluation (MiLE+ – Triacca et al., 2005) three main aspects have been taken into consideration:

      1.-The number of usability problems discovered;

      2.-The most frequent issues;

      3.-The severity rating.

Initially, the MiLE+ heuristic indicators were created in order to test the usability of websites. However, the following study confirms and reveals that they can be applied to mobile applications as well. After having identified the main issues by analysing each section of the guide, several charts reporting the problem and the severity rating were filled. The heuristic evaluation on the Vilnius Tourism application revealed 44 usability problems: (i) 22 content, (ii) 13 navigation and (iii) 9 graphic issues. Most of the problems concern accuracy with four issues, text errors with five issues and followed by multimedia consistency with four issues.

One example of accessibility of target issue depicts that the page about Radisson Blu Hotel Lithuania offers a possibility to share the information about the hotel via Twitter and Facebook. Sharing via Twitter is available, however, it is impossible to send hotel's information to user's Facebook profiles – sharing reveals an error. Next problem of the content objectivity represents that the text does not describe adequately the hotel services and what it exactly offers. Moreover, it seems to be a legend about this place instead of an informative description of the Shakespeare Boutique Hotel. Infact, there is no information about how to reach the hotel and nearby places of interest.The example of visual identity reveals that the image used for Šarūnas hotel is not an appropriate one.

Outcomes from user testing

The preparation of the user testing was based on the construction of different scenarios, taking into account those aspects that according to the author were considered more problematic. They were constructed as short stories, describing possible situations. Before starting the user testing, a usability questionnaire was

submitted to the participants in order to obtain the additional information about users' general smartphone background, familiarity with Vilnius area and knowledge of the Vilnius Tourism application. according to the collected data, only two testers out of ten do not have an iPhone, while the remaining eight own one. They were asked whether they download applications and if so, how often they do it in general: the five testers owning an iPhone reported that they generally download less than ten applications on average per month. Regarding the Vilnius Tourism application, five testers out of ten declared that they have already downloaded the application. The majority of users have downloaded the application in order to check it just for curiosity.

In order to reveal the results from the user testing, the approach of average time calculation was determined. As stated in the literature, according to Egger and Jooss (2010), "successful mobile applications are those which are able to offer their usefulness to the users (obtain the relevant information with the related added value), in maximum three minutes (180 seconds). If applications result to be time-consuming, they are simply deleted by the user" (Egger and Jooss, 2010). Most users did not spend more than three minutes on each single task and 15 minutes for the scenario on average. Overall, the user testing confirmed the findings of the heuristic evaluation. Finally, in order to understand which are the areas of the application where to intervene, the list of problems was compiled, by comparing whether they were discovered during the expert review, during the user testing or in both.

Common issues identified by expert assessment and user testing:

- Content:

o Coverage: in specific pages several sections as for instance "service and facilities" are not presented.

o Text errors: some descriptions have grammatical errors.

- Navigation:

o Accessibility: it should be clear where to get the right information. Some proposals are repeated twice.

o Consistency: the navigation of the application should be consistent in all appropriate sections, especially within a specific category.

o Segmentation: several categories are not subdivided into further topics. On the contrary, they are just mixed together (i.e. list of hotels and restaurants).

- Graphics:

o Visual identity: images in some sections are not present.

o Font size: the font size is not always consistent. Some titles are written in a large size and thus, the user cannot read the whole title of the selected size.

Conversely, the small size is used in the descriptions, causing reading problems as a result.

Discussion

The usability of the Vilnius Tourism application was conceived as a challenging task, because a mobile guide on a mobile device has some features that distinguish it from a guide on a laptop or PC. The resolution of the screen on mobile devices is much smaller and typing cannot be done on a full keyboard (Tjostheim andHolmqvist,2010). Nevertheless, Nielsen maintains that some of the iPad's problems are endemic to the touch tablet format. While working on an iPhone or an iPad it is very easy to touch in the wrong place (Schofield, 2010). Therefore, the usability evaluation in the "mobile world" results extremely different from the web usability (Nielsen 2010).

Table 1. Top three usability issues for the Vilnius Tourism application

Usability issue	Description	# issues heuristics	Confirmed by user testing	Severity rating
Text errors	The written text should not present grammatical errors	3	YES	4
Accessibility	Accessibility refers to ensuring that content is accessible (can be navigated and read by everyone)	3	YES	4
Coverage	It must be clear what the text is speaking about and what it is supposed to be covered.	2	YES	4

Complied by the author

Table 1 represents three main usability issues found in the heuristic evaluation and user testing with the severity rating equal to four, where rating four stands for "usability catastrophe": imperative to fix this before product can be released" (Carole, 2008).The results of this study clearly demonstrate that apparently the Vilnius Tourism application is well-structured, however, there are some problems regarding the categorisation of single items and the quality of contents. For instance, some users expressed their dissatisfaction with the quality of the information provided. Actually, the mobile guide does not provide complete information. As confirmed by Brown and Chalmers (2003), time is frequently a constraint in the tourism experience, because tourists plan to visit specific attractions in a given timeslot. Accordingly, since tourism is often constrained in time, information should be provided in a fast and easy way. This idea was also emphasised by users performing the test, where some of them underlined that the mobile guide is not immediate and intuitive. It could be a clear indication that the application is not conceived for tourists and is not able to solve tourists' problems at a destination.

Conclusion

The conducted research aimed at providing an overview of usability studies with a special focus on mobile tourism application. As widely stated in the literature, it is possible to observe the increasing popularity in the use of smartphones. Among the great variety of smartphones, Apple with its iconic iPhone marked as the most popular one. This significant growth goes hand in hand with applications, which are currently more than 500,000 available to download from the iTunes Store. The literature review was conducted in order to understand the current knowledge on the specific topic of usability evaluation methods. As confirmed by the literature, in recent years a great variety of researches were dedicated to the usability of websites due to the novelty of these tools. However, the usability evaluation in the "mobile world" results extremely different from the web usability (Nielsen 2010).In order to have a clear understanding and a complete overview of issues concerning the Vilnius Tourism application, a heuristic evaluation was conducted, proposed by the proven methodology MiLE. There are numerous interesting findings based on the results from the heuristic evaluation: 44 usability issues were discovered and divided into: 22 content issues, 13 navigation issues and 9 graphic issues. Additionally, from the heuristic evaluation, it is possible to rate issues according to severity rating from zero to four (Nielsen, 2010) in order to provide a clear framework of the existing problems. By means of the heuristic evaluation, it is possible to assess the quality of Vilnius Tourism application, categorising the major issues, where the top three with severity rating equal to four resulted to be: *text errors and accessibility with a total three issues each and coverage with two issues*. User testing confirmed these findings and submitted the actual usage of this application.

Thanks to the methods adopted in this research, it is possible to provide some guidelines in order to improve and upgrade the Vilnius Tourism application. Actually, five points have been selected which need to be rapidly revised: (i) provide more detailed categorisation on the main screen. For instance, it would be advisable to offer a general description of Vilnius city including history, culture and geography of the region; (ii) offer a categorisation by the following aspects: prices, star ratings, reviews and personal preferences; (iii) adapt writing style: several descriptions in distinct categories appear to be redundant; (iv) place images to all pages of different categories; (v) top 20 proposals should be listed on the start screen, that could obviously draw tourists' attention and could be convenient for them.

The present research involves several limitations, which should be taken into account while discussing the main findings and guidelines for improvements. Firstly, the selection of mostly a young population for the user testing led to the incapacity of generalising findings, since the tested users may not be the best representatives of the entire population using the Vilnius Tourism application. Moreover, it should be also mentioned that conducting user testing on mobile phones results to be a difficult task due to the specific characteristics which distinguish mobile devices from PC. Therefore, further researches should take into consideration all these limitations, covering the mentioned weaknesses, because mobile usability is still an under explored field which could be considerably improved. Nevertheless, the author of this research is convinced that results and suggestions provided in this study will be useful for the further implementation of this mobile guide application.

References

Bertele, U. and Rangone, A. (2007): Rapporto mobile and wireless business, *Information Technology and Tourism Journal* 2007 (12), pp.205-231.

Bortneschlager, M. et al. (2010): Evaluation of the concept of early acceptance tests for touristic mobile applications. In Gretzel, U. et al (2010) *Information and Communication Technologies in Tourism 2010.* Proceedings of the International Conference in Lugano, Switzerland, 10-12 February. Wien: Springer-Verlag, pp. 149-158.

Brinck et al. (2002): *Usability for the web*. Morgan Kaufmann, 496 p.

Brown, B. and Chalmers, M. (2003): Tourism and mobile technology. In Kuuti, K. and Karsten, E.H. (2003) *Proceedings of the Eight European Conference in Computer Supported Cooperative Work*. 14-18 September 2003. Helsinki, Finland: Kluwer Academic Press.

Buhalis, D. (2003): *Information technology for strategic tourism management.* London: Pearson (Financial Times/ Prentice Hall), 353 p.

Cantoni et al. (2003): *Communicazione, qualità, usabilità.* Milan: Apogeo, 142 p.

Cantoni, L. and Inversini, A. (2009): Cultural destination usability. The case of Visit Bath. In Höpken, U., Gretzel, U. & Law, R. (eds) (2009). *Information and Communication Technologies in Tourism. Proceedings of the International Conference in Amsterdam.* Wien: Springer-Verlag, pp.319-331.

Carole, A.G. (2008): *User-centered library websites. Usability evaluation methods.* Chandos Publishing.

Chincolle, D. et al. (2002): Lost or Found? A usability evaluation of a mobile navigation and location-based service. Ericsson Research, Usability and Interaction Lab, Human Computer Interaction with mobile devices. *Proceedings of the 4th International Symposium, Mobile HCI 2002.* Pisa, Italy, September 18-20, 2002.

Egger, R. and Jooss, M (2010): Die ZukunftimmTourism – Ausblick auf Technologie und Dienstentwicklung. In Egger, M. and Jooss, M. *Mobile DiensteimTourismus,* pp.11-25. Wiesbaden: GablerVerlag.

Egger, R., and Jooss, M. (2010): mTourism: mobile DiensteimTourismus, Wiesbaden: GablerVerlag, pp. 45-58.

Garcia, A. et al. (2009): Intelligent Routing System for a Personalised Electronic Tourist Guide. In W. Höpken et al. (eds) (2009). *Information and Communication Technologies in Tourism*, Vienna: Springer, pp.185-197.

Garrett, J.J. (2010): *The elements of user experience: user-centered design for the web*

and beyond. 2nd edition. New Riders Pub. 192 p.

Gretzel, U. et al. (2006): The Transformation of Consumer Behavior, ed. Buhalis, D. and Costa, C*. Tourism Business Frontiers: consumers, products and industry.* Oxford, UK: Butterworth Heinemann.

Höpken, W. et al. (2010): Context-based adaption of mobile applications in tourism, *Information Technology and Tourism Journal* 2010 (12), pp.175-195.

iTunes Store, Apple.com (2012). *Vilnius Tourism* [online]. [Retrieved on: 3 June 2012].Available at: http://itunes.apple.com/us/app/vilnius-tourism/id505274797.

Katz, J.E. (2008): *Mobile Communication Studies.* Massachusetts Institute of Technology, 486p.

Kenteris, M. et al. (2010): *Electronic mobile guides: a survey*. London: Springer-Verlag.

McKinsey, Q. (2012).*Global mobile statistics 2012: all quality mobile marketing research, mobile Web stats, subscribers, ad revenue, usage, trends* [online]. [Retrieved on: 15 May 2012]. Available at: http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats.

Nielsen Group (2012). [Retrieved on: 15May 2012].Available at: http://articles.businessinsider.com/2012-03-30/news/31258792_1_smartphone-click-range.

Nielsen, J. (2010). *iPhone Apps need low starting hurdles* [online]*.*[Retrieved on: 24May 2012].Available at: http://www.useit.com/alertbox/mobile-apps-initial-use.html.

Nielsen, J. and Mack, R. (1994): *Usability inspection methods.* Wiley, 448 p.

Schofield, J. (2010). *Jacob Nielsen critiques the iPad's usability fallings* [online]. [Retrieved on: 23May 2012]. Available at: http://www.guardian.co.uk/technology/2010/jun/02/apple-ipad-usability-failings.

Sheldon, P.J. (1997): *Tourism Information Technology*. Oxford: CAB International, 240 p.

Tjostheim, I. and Holmqvist, K.A. (2010): Mobile applications and tourist information in Situ. In Gretzel, U. et al. (2010). *Information and Communication Technologies in Tourism 2010*. Proceedings of the International Conference in Lugano, Switzerland, 10-12 February, Wien: Springer-Verlag, pp.131-140.

Triacca, L. et al. (2005): Evaluating web usability with MiLE+, *Proceedings Seventh Intenational Symposium on web site evolution.* Budapest, 22-29 September 2005.

Vilnius Tourism (2012). *About Vilnius* [online]. [Retrieved on: 26 April 2912]. Available at: http://www.vilnius-tourism.lt/en/tourism/about-vilnius/.

Vilnius Tourism (2012). *Tourism Statistics* [online]. [Retrieved on: 30 April 2012].

Available at: http://www.vilnius-tourism.lt/en/tourism/about-vilnius/tourism-statistics/city-tourism-statistics/2012-2/.

World Tourism Organization (2001):*E-business for tourism. Practical Guideline for tourism destination and management,* 2001, 292 p.

Zhang, D., and Adipat, B. (2005): Challenges, Methodologies, and Issues in the Usability Testing of Mobile Applications. In *International Journal of Human-Computer Interaction*, 18(3), pp. 293–308.