

NFC-enabled City Maps Measuring their Perceived Value

Emre Ronay and Roman Egger

Innovation and Management in Tourism
Salzburg University of Applied Sciences, Austria
eronay.imte-m2011@fh-salzburg.ac.at, roman.egger@fh-salzburg.ac.at

Abstract

One of the most promising technologies for the future and currently much discussed is the Near Field Communication (NFC), which will most likely become the standard in mobile devices in the years to come. The usage of NFC in tourism is a new dimension which has been examined only by a few scholars so far. This paper presents an innovative form of NFC usage in the Tourism field: NFC enabled travel maps. A prototype of such a map was developed and tested by the authors with the aim of measuring their perceived value. Therefore a multidimensional model was implemented and tested. In addition, the customer satisfaction dimension was investigated, to comprehend its relationship with the perceived value. The results indicated that the perceived value of the map was high and that it positively influenced customer satisfaction. In addition, the map preference of tourists was clarified, as paper maps are still preferred over map applications.

Keywords: NFC, Smart Map, Perceived Value, Tourism

1 Introduction

Recently, technological progress, the increase of income and mobility as well as new norms and values in our society led to a rapid change concerning products and services. Additionally, this progress also initiated a fast and tremendous change within the tourism industry (Sawng et al., 2011). The engagement of information and communication technologies (ICT) into the tourism industry altered the structure of the whole sector. ICTs provided new opportunities and threats and started to be a competition factor for organizations in tourism (Egger & Buhalis, 2008). Currently, modern society is inconceivable without mobile devices and the consequent use of mobile services. The multitude of technologies incorporated in the tiniest space has turned mobile phones, and smart phones in particular, into the Swiss knives of our times (Egger, 2013). Mobile services are finding increased acceptance and deliver unique opportunities and challenges for tourism companies (Bortenschlager, 2010; Kim, Park and Morrison, 2008). These technologies can serve as a critical point for organizations as they force companies to keep track and deliver innovative solutions in order to survive in a very competitive market. As a result, this can lead to an increased efficiency improving the communication with customers and partners as well as improving profitability (Egger & Buhalis, 2008). A very promising technology that will most probably be integrated in our smartphones, offering a variety of new applications for the tourism industry, is the wireless connectivity technology Near Field Communication (NFC) (Egger, 2013; Pesonen and Horster, 2012). Concerning the future of mobile phones, Ryan and Rao (2008) predicted that in a near future, the usage of mobile phones while travelling will become inevitable for travelers and will make other technologies obsolete. Mobile phones will become a

cornerstone in multi-channel distribution and service strategies (Egger & Jooss, 2010). This paper introduces a prototype of the “Smart Map” with a distinctive design and divergent navigation opportunity for tourists; a regular travel map with embedded NFC tags. The paper investigates the perceived value of such a Smart Map by adopting the PERVAL model from Sweeney and Soutar (2001). Moreover, the study aims to understand whether the perceived value can be considered as a determinant that influences customer satisfaction.

2 Literature View

2.1 NFC-Technology

Innovative developments of technologies are emerging rapidly, for instance the spread of mobile devices (Canadi et al., 2010). The penetration of new mobile devices and the increasing need to establish communication between them with a simple and secure technology displays the present situation of mobile communication (Pesonen & Horster, 2012). NFC technology is a short-range wireless communication technology based on Radio Frequency Identification (RFID) technology (Ozdenizci et al., 2010). The technology creates a linkage between interoperable systems that provide a wireless short range communication between mobile phones. Hence, NFC facilitates information exchange to reach content and services in a heuristic approach (Jaraba et al., 2010). Panorama Tours is a tour operator located in Salzburg which also operates in Vienna and Budapest. They provide tours such the Sound of Music tour to their customers by travelling to all the movie-related locations. However, the buses are not allowed to enter the old city of Salzburg. Therefore, tourists receive a map and have to visit the places by themselves. This solution lacks the variety of information offered by the guided tour. Therefore the idea was to attach NFC tags to the city map in order to provide additional information about the most important points of interest (POIs) in an innovative and convenient way. Due to restricted time resources the authors concentrated on the function of providing information. In addition to routing and navigation, the possibility to buy entrance tickets and many other functionalities could be implemented on a NFC enabled city map as well.

2.2 Measuring the Perceived Value

Zeithaml (1988) defined perceived value as “The consumer’s overall assessment of the utility of a product based on perceptions of what is received and what is given”. Perceived value is a continuous measurement for building a close relationship with customers (Sweeney & Soutar, 2001). Furthermore, companies seeking the maintenance of relationship marketing have to focus on two directions when considering the perceived value of a product: the company can try to either decrease the sacrifices faced by the consumer, or to create more benefits. To reduce the sacrifices, the company needs to investigate the value chain as a whole in order to understand the wants and needs of a customer. This helps to define a convenient strategy to pursue and thus increase the perceived value. In order to increase the benefits of the product, a determinant has to be added to the core of the product which the consumer could perceive as beneficial, advantageous or prestigious (Ravald & Grönroos, 1996).

3 Methodology

In the case of the Smart Map, embedding NFC tags to a regular paper map is an attempt to enhance the perceived value with an innovative idea, simply by adding the NFC feature to the core of the product. Small Midas NFC tags (NTAG203) with 12x19mm and 168bytes memory were used and stuck on the back of the map. Each tag was placed behind the most important POIs. A website was developed with Wordpress where the information was stored. A Samsung Nexus S was used as NFC enabled Smartphone to retrieve the relevant information as soon as the mobile was held close to one of the POIs of the map. In total of 22 POIs were NFC enabled. There were hardly any misunderstandings when it came to accessing the different information, since the tags were situated next to each other. QR (quick response) codes have not been considered for the map design, as they occupy too much space on the map and reduce the visualized design of the map.



Fig. 1 and 2. Smart Map – NFC enabled City Map of Salzburg; Midas NFC tag

In this paper, the investigation on perceived value is conducted on the multi-dimensional model of Sweeney and Soutar (2001), called PERVAL. They stated that including various value dimensions is important, depending on the product type or service, as well as on the selection level (whether to buy/not buy, or which brand to buy). This model was chosen because it covers all the values which are essential in order to understand the perceived value of the Smart Map. The investigations focus on the functional (price and quality), social and emotional dimensions.

The customer satisfaction dimension was added in order to understand whether perceived value has a positive influence on customer satisfaction. The correlation between the dimensions and the perceived value for the usage of the NFC map were hypothesized as “Emotional value of the Smart Map has a significant positive effect on perceived value”, “Social value of the Smart Map has a significant positive effect on perceived value”, “Functional value in terms of the price of the Smart Map has a positive effect on perceived value”, “Functional value in terms of the quality of the Smart Map has a significant effect on perceived value” and “Perceived value has a positive influence on customer satisfaction”. The research was conducted with the customers of Panorama Tours in Salzburg, Austria. The tourists were asked to take part in the research after they came back from their bus trips. The NFC enabled device was used to show the participants how the Smart Map functions. Right after the Smart Map experience, they were asked to fill out a questionnaire concerning their socio-demographic characteristics, their mobile technology and NFC usage and the Smart Map experience. 100 people were asked in total for the purpose of this research. All participants used the same NFC enabled phone of the authors.

4 Study Results

Most of the participants, namely 76%, were not familiar with the NFC technology. Mostly they had even never heard about it. Half of the probands (54%) were between 20-29 years, 24% between 30-39, the rest was split up quite equally between the ages 40-49 and 50+. As the participants were tourists who booked the Sound of Music Tour, this naturally represents the quota allocation of Panorama Tours' target group. In a first stage the authors tried to come up with some general findings which seemed to be interesting about the Smartphone usage and the Smart Map, in order to get a better feeling on the topic. The participants were asked whether – after their experience with the technology and the Smart Map – they would prefer a NFC enabled mobile phone in the future. The comparison of brands used by tourists was necessary since iOS (iPhone) is not yet NFC enabled. The aim was to see how the NFC experience changed their choice and future preference of Smartphones. Of the 31% Apple users, 17% preferred a NFC enabled phone in the future, 3% of them remained loyal and 11% said that it did not matter to them. Another part of the research was the price of the map. Cities have been chosen according to their prosperities in terms of population and places of interest. The list started from cities with smaller number of visitor attractions where a Smart Map might not be necessary, to big cities where it would be essential for keeping a better overview of the place. The average price the respondents were willing to pay for the Smart Map amounts to 7,22 Euros. The average price, tourists are willing to pay for the Smart Map are in Salzburg 6,75 €, in Zurich 6,74 €, in London 7,59 €, in Paris 7,50 €, in Beijing 7,31 € and in New York 7,48 €. 91% of the respondents said that they were interested in further examples of NFC use, which is an important information concerning future research implications. Interesting at this point was also to investigate how the Smart Map experience changed the preference for using other types of maps when travelling. Therefore a comparison was made among the Smart Map, regular paper maps and map applications on smartphones. The results indicated a higher preference with a mean of 4,23 (on a five-point Likert scale) for the Smart Map over the paper map with 3,52. Mobile map applications with a mean of 3,19 had the lowest preference. It needs to be indicated that the regular paper map has still a higher preference than the mobile map applications, even though the highest proportion of the age ranges were young people between 20 and 29 years.

Four evaluation dimensions have been taken out of the main perceived value model of Sweeney and Soutar (2001) to get a better fit of the model. Additionally, the overall value of the map, namely the customer satisfaction, was added to the model. A correlation analysis was conducted via SPSS between the evaluated dimensions within each value in order to identify any negative or positive correlation among the dimensions, which would result in a significant effect on perceived value, so basically every dimension was correlated with the other dimensions in the same value determinant of the model. All dimensions correlated positively with each other on a 0,01 significance level. The means resulted very high and the standard deviations are very low. The quality and emotional value display a higher value than the price and social value. The “good quality” and the “good performance” dimensions rank highest with a mean of 4,41, whereas the “improved how perceived” shows the lowest rate with a mean of 3,27. The last step for testing the hypotheses was made by examining

the beta values. In order to retrieve the beta and t values, a regression analysis was conducted by taking the three dimensions of each value as independent variables and the mean of the value of the three dimensions as the dependent variable. By extracting the Beta values for each dimension, the significant effects on the values can be observed. “Good quality” ($\beta=0,27$, $t=5,96$), “acceptable standard” ($\beta=0,48$, $t=9,09$) and the “good performance” ($\beta=0,31$, $t=6,60$) dimensions have a positive effect on quality value. “Good return money” ($\beta=0,15$, $t=3,97$) has a rather low but still positive effect on price value, whereas “good for price” ($\beta=0,53$, $t=10,27$) and “reasonable price” ($\beta=0,36$, $t=8,08$) have a positive effect as well. “Excited” ($\beta=0,32$, $t=7,54$), “feel good” ($\beta=0,35$, $t=6,80$) and “pleasure” ($\beta=0,36$, $t=7,30$) have a positive effect on the emotional value. The dimensions “Made acceptable” ($\beta=0,37$, $t=8,24$), “improve how perceived” ($\beta=0,39$, $t=7,35$) and the “socially approved” ($\beta=0,29$, $t=6,92$) have a positive effect on the social value. The next step was to analyze the standardized coefficients for each value by conducting the regression analysis, where the perceived value was taken as a dependent variable. Quality ($\beta=0,21$, $t=3,47$, H4), price ($\beta=0,31$, $t=5,29$, H3), emotional ($\beta=0,31$, $t=5,25$, H1) and social ($\beta=0,36$, $t=6,35$, H2) value show all a positive significant effect on perceived value. The first four hypotheses were herewith supported. The same regression analysis was conducted with perceived value and customer satisfaction where customer satisfaction was set as the dependent variable. The results indicated a beta value of 0,525 ($t=6,10$, Sig.: 0,00) with a correlation significant at the 0,01 level and a positive significant influence of the perceived value on customer satisfaction, namely the “overall value”. The last hypothesis was therefore supported as well.

5 Conclusion

The Smart Map is a good example of an innovative idea, connecting ubiquitous ICT and tourism. The results of the measured perceived value demonstrate its salient potential. The results showed that the quality and emotional value are higher than the price and social value. Since no price range was given to the tourists, the price value was rather low and the social value was rather low due to other people not seeing the product, which would make them look better or create a better social reputation. The quality value was high due to the fact that it still looks like a regular paper map despite its NFC features. This also influenced the emotional value, because the technological features added a great value to the map. Lateral analysis between perceived value and customer satisfaction displayed a positive influence. Henceforward the configured model can be implemented for investigations on customer satisfaction, after measuring the perceived value of a certain product. The Smart Map showed high customer satisfaction and created high value in terms of quality, price, emotional and social values. However, unreliable responses concerning the questionnaire could have been made. In particular, this is relevant in the context of tourism, where the respondents are on vacation and do not want to be disturbed in their experience by filling out a questionnaire. That is why some responses might deviate from the perceptions of the tourists (Williams & Soutar, 2009) and provide misleading results.

References

- Bortenschlager, M., Häusler, E., Schwaiger, W., Egger, R., & Jooss, M. (2010). Evaluation of the concept of early acceptance tests for touristic mobile applications. *Information and Communication Technologies in Tourism 2010*, pp. 149-158.
- Canadi, M., Höpken, W. & Fuchs, M. (2010). Application of QR Codes in Online Travel Distribution. In: *Proceedings of the International Conference on Information and Communication Technologies in Tourism*, Lugano, Switzerland, February 10-12, pp. 137-148.
- Egger, R. & Jooss, M. (2010). Die Zukunft im mTourism–Ausblick auf Technologie-und Dienstentwicklung. In: *mTourism – mobile Dienste im Tourismus*. Gabler, pp. 11-25.
- Egger, R. (2013). The impact of Near Field Communication on Tourism. *Journal of Hospitality and Tourism Technology*, 4(2), 119-133.
- Egger, R. & Buhalis, D. (2008). *eTourism Case Studies: Management and Marketing issues in eTourism*. Butterworth Heinemann.
- Jaraba, F., B., Ruiz, I., L. & Nieto, M., A., G. (2010). A NFC-based pervasive solution for city touristic surfing. *Journal of Personal and Ubiquitous Computing*, 15 (7), pp. 731-742.
- Kim, D., Park, J., Morrison, A., M. (2008). A Model of Traveller Acceptance of Mobile Technology. *International Journal of Tourism Research*, 10 (5), pp. 393-407.
- Ozdenizci, B., Aydin, M.N., Coskun, V. And Ok, K. (2010). NFC Research Framework: A Literature Review and Future Research Directions. In: *Proceedings of the 14th IBIMA Conference on Global Business Transformation through Innovation and Knowledge Management*, Istanbul, Turkey, 23-24 June, pp. pp. 2672-2685.
- Pesonen, J. & Horster, E. (2012). Near Field Communication technology in Tourism. *Tourism Management Perspectives*, 4, pp. 11-18.
- Ravald, A. & Grönroos, C. (1996). The Value Concept and Relationship Marketing. *European Journal of Marketing*, 30 (2), pp. 19-30.
- Ryan, C., & Rao, U. (2008). Holiday users of the Internet—ease of use, functionality and novelty. *International Journal of Tourism Research*, 10(4), 329-339.
- Sawng, Y.-W., Kim, S.-H., Lee, J. and Oh, Y. S. (2011). Mobile service usage behavior in Korea: an empirical study on consumer acceptance of innovative technologies. *Journal of Technological and Economic Development of Economy*, 17 (1), pp. 151–173.
- Sweeney, J., C. & Soutar, G., N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, 77 (2), pp. 203–220
- Williams, P. and Soutar, G., N. (2009). Value Satisfaction and Behavioral Intentions in an Adventure Tourism Context. *Annals of Tourism Research*, 36 (3), pp. 413-438.
- Zeithaml, V., A. (1988). Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence. *Journal of Marketing*, 52 (3), pp. 2-22.