

*Abstract submitted to Cashless Society Roundtable, April 2013, Dublin*

## **Barriers to Further Commercialization of NFC Pilots in Western Europe**

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## Abstract

### 1 Introduction

Appearance and quick penetration of multifunctional smart mobile devices (smartphones) has strongly affected consumer habits. Enhanced functionality of these devices and their provided computing capability opened up wide prospects for new application areas. One of them is an opportunity of mobile payment, which is a step leading to a cashless society.

A mobile payment can be performed in various ways. For example, the Near Field Technology (NFC) integrated with mobile devices provides an opportunity of a contactless mobile payment. However, it is not only payment. The NFC can further expand functionality of mobile phones and enrich consumer experience. Indeed, added value services created by the NFC include mobile ticketing, loyalty applications, smart advertisement, informational service, physical and logical access, and other functionalities.

However, despite NFC potential to create added value we cannot witness its wide penetration and global spread unless some successful solutions are implemented on a national level. Numerous trials and pilots are being implemented in different countries, but only some of them get continuation as commercially deployed NFC services. This is especially true for Western Europe where the level of mobile phones diffusion is high, but the level of NFC based payment solutions is low. So, commercialization of NFC mobile solutions needs to overcome a range of barriers and obstacles predefined by macro- and micro-environmental conditions, and individual factors related to consumers. And this leads to the key research question:

*What are the barriers preventing NFC pilots from entering commercialization stage in Western Europe?*

The scope of the research is limited to the analysis of six NFC pre-commercial pilots implemented in Western Europe from the period from 2006 to 2011. This paper presents a qualitative study of factors slowing down the spread of the NFC payment in Western Europe based on experience of six NFC pilots implemented in Finland, France, Italy, the Netherlands, Norway, and the UK. The research is focused specifically on NFC technology not extending to any other technology.

### 2 Analysis of Related Studies

Analysis of academic literature and previous works helped to identify several main categories of factors negatively affecting further commercialization of NFC services. They can be classified into several groups: macro-environmental factors, micro-level factors, and individual factors (Arvidsson, 2013). They are briefly overviewed below:

- **Macro-environmental factors** are related to different aspects of the external environment. Indeed, NFC ecosystems operate in the macro-environment influenced by different political, economic, socio-cultural and technological forces. Threats existing in the external environment as well as changes of external conditions could become external barriers for further development and commercialization of NFC pilots. Examples are unsteady legislation, changes in consumer protection regulations, financial crisis, changes in behavioral patterns of customers or development of a new advanced technology.
- **Micro-level factors** address such questions as company's strategy, business models, relationships with partners and clients, and other related issues. The most critical micro-level factors are:
  - a. *Cooperation issues* resulting in tension about dominant position in the ecosystem, competition between parties and inability to share roles and responsibilities, to

- agree on “ownership” of consumers, and so on (Bengtsson and Wincent, 2010; Ozcan and Santos, in press).
- b. *Business model issues* leading to inability of parties to negotiate revenue streams, branding strategy, risks sharing, and so on (Ozcan and Santos, in press).
- **Individual factors** are related to consumers and comprise such individual characteristics as behaviour, habits, opinions, etc. The most significant individual factors are:
    - a. *Behavioral and psychological barriers* caused by the general complexity of the service (Boer and Boer, 2009; Constantiou and Knutsen, 2006; Mallat, 2007).
    - b. *Perceived security risks* related to mobile payment (Constantiou and Knutsen, 2006; Mallat, 2007).
    - c. *Perceived value of the NFC mobile payment* remains unclear in comparison to other types of popular mobile and electronic payments (Hayashi, 2012).
    - d. *Service switching costs* experienced due to a change of one payment method to another (Klemperer, 1995).

These identified factors were used as an analysis framework within the research.

### 3 Methodology

The qualitative method, comparative analysis and the multiple case study approach were used in order to reveal the main factors negatively affecting further commercialization of NFC based mobile services. Six NFC pilots implemented in Finland, France, Italy, the Netherlands, Norway, and the UK were analyzed and compared using specified analysis framework.

Both secondary and primary information were used. The *secondary information* was used as a background for preparation for interview execution. The *primary information* was gathered through in-depth personal interviews with executives and top-level managers representing companies participating in the selected NFC pilots. Overall 11 interviews were executed, the duration of the interviews was distributed in the range from half an hour to one hour.

### 4 Research Findings

According to the research results the role of the *macro-environmental factors* cannot be underestimated:

- One of the main challenges is a lack of uniform international or national technical service standards and specifications. The cases implemented earlier were affected the most, but this remains a problem today.
- A lack of globally agreed upon the business model is another critical threat affecting ability of parties to negotiate business model questions.
- Another important factor is a lacking legislation and regulation on mobile payment. Existing norms requiring license for provision of payment services set high entrance barriers for new actors entering the market, so, they either need to partner with banks or to look for alternative solutions, such as vouchers or prepaid accounts.
- Economic situation and economic crisis of 2008–2009 became a reason to withdraw one on analyzed pilots because during crises innovative solutions loose their priority.
- There is a strong competition from the side of other payment solutions in Western Europe due to a developed bank infrastructure, popularity of credit cards and other types of mobile and electronic payment, such as SMS, different mobile payment applications, PayPal, and others.

The *micro-level factors* represent another critical set of factors affecting further commercial deployment of the NFC mobile services:

- Significance of the *cooperation issues* were highlighted by the experience of two analyzed NFC pilots. Inability of partners to cooperate became a real barrier for further service commercialization.
- Completed research could not specify essential *business model issues* because during the pilot stage parties prioritized development of the technical NFC solution, tested its functionality, and acceptance by users.

Some of the *individual factors* proved to be critical for further NFC service deployment:

- *Behavioral and psychological barriers* were noticed from the side of the elderly people with little previous experience of interaction with mobile devices. Additionally, consumers are not willing to change the model of their smartphones and compromise just to gain NFC payment functionality.
- The executed research proved that the *perceived security risks* expressed by consumers are important factors for NFC mobile payment acceptance.
- Due to the fact that consumers in Western Europe have a wide range of payment options, unclear *perceived value of the NFC mobile payment* remains a challenge. In order to overcome it, additional value of NFC should be promoted.
- *Service switching costs* were not an issue in the analyzed cases because consumers were not experiencing any additional costs during pilots. Moreover, in some cases, consumers were getting additional incentives for participation in the trials.

Most of the analyzed obstacles and barriers are general for the most types of mobile payments, for example, lack of commonly acceptable business model, lack of legislation in the area of mobile payments, general economic factors, competition between different payment solutions, and cooperation and business model issues within a network of partners. However, there are some factors that are specifically related to NFC services. They are lacking international and national technology standards, unclear perceived value of NFC payments, and perceived security risks.

In summary, the research highlighted the main barriers for further commercial deployment of NFC pilots. The research results revealed complexity of the problem, which will be presented and discussed in-depth in the paper.

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