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Cooperation and Competition during Evolution of Technology Based Service Innovation - The Case of Development of NFC Enabled Mobile Services in Nice

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COOPERATION AND COMPETITION DURING EVOLUTION OF TECHNOLOGY BASED SERVICE INNOVATION - THE CASE OF DEVELOPMENT OF NFC ENABLED MOBILE SERVICES IN NICE

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Abstract

Concurrent cooperation and competition is an important characteristic of innovation processes. We illustrate this with reference to a case on new mobile, NFC (Near Field Communications) based services: a systemic service innovation project in Nice, named Cityzi. Cityzi is a local sub-process in the globally dispersed efforts to develop and implement mobile services enabled by the NFC technique that can be used for mobile communication. The project requires cooperation, also between competing actors, to determine technical interfaces as well as development and implementation of business models for production and use of the services in practice. Due to the heterogeneity of resources that need to be combined, actors from different industrial as well as public policy sectors participate in the project. We apply a network perspective for our analysis of cooperation and competition during service innovation processes, specifically focusing on network overlapping processes. A dynamic conceptual model is suggested to capture the complexities of implementing largescale ICT infrastructure projects, when going from trial to commercialization.

Keywords: Cooperation, Competition, Service innovation, Networks, Wireless technology.

1 Introduction

Service innovations based on mobile communication have grown in importance during the last decade. In this paper we focus on service innovations enabled by NFC (Near Field Communication), the contactless mobile technology and standard that is used, or has the potential to be used, for many services, including payment for such services and for money transfers in general. Mobile services using Near Field Communication (NFC) technology promise to change aspects of everyday life. Advocates of NFC paint scenarios where an NFC-enabled mobile phone replaces the user's keys, credit cards and public transportation travel cards as well as enables new mobile services. A large number of pilot studies and trials have been initiated globally, testing new NFC based mobile services. In the year 2012, the reality of mobile NFC services was still far from the scenarios depicted when the NFC standard was set. Instead of interoperable commercial services, an NFC mobile phone user is more likely to encounter separate NFC service initiatives, most of which have yet to reach a commercial stage. The most notable exception is the Japanese market where more than one hundred contactless services are available to the over 70 million consumers equipped with a mobile handset supporting FeliCa Networks' mobile wallet platform, a solution not compatible with international NFC standards. NFC technology enables a wide variety of services. In addition to the ticketing, payment, marketing, connectivity, and authentication applications mentioned in the introduction, NFC technology enables maximizing other wireless platform. Examples of potential mobile NFC services application areas are transport and ticketing, payments, marketing, connectivity, authentication, and more.

Mobile NFC services represent a prime example of technological and industry convergence, the coming together of previously unconnected technologies and industries. To fulfill the potential of NFC, companies from the mobile telephony industry, the finance industry, the public transport industry, and the retail industry among others need to work together. The extent of collaboration required by commercializing mobile NFC services presents the companies in the mobile NFC ecosystem with unique challenges that need to be solved before NFC will deliver on its promise of end-user value. The members of an NFC ecosystem often have very different objectives for going into NFC. Reconciling the interests of mobile network operators, financial institutions, public transport operators, retailers, and other service providers and technical partners is bound to be complex. Business model and branding questions are potential areas for difficulties and tensions, as are questions relating to managing the relationship to end-users or sharing information among actors, to name but a few of the areas.

In a research report preceding this paper, six mobile NFC pilots in Europe were studied (Andersson et al, 2012). The review of the goals and objectives of the studied pilots showed that mobile NFC pilots tended to focus on testing technology and learning about consumer attitudes. This means that business model questions were not high on the agenda for most pilots, but were left for later phases. Technological obstacles, network obstacles, customer barriers, market barriers, and external threats were identified as the main areas standing in the way of mobile NFC services. In particular, issues related to concurrent competition and cooperation strongly affected the development and collaborative work in several of the six pre-study pilots. One of the pilot studies (the socalled Payter pilot in Rotterdam) was characterized by its large scale and large number of participants, and it saw conflicts of interest and tensions emerging with indirect partners that were unhappy with eg. the account balance limitations. The negotiations on commercializing the Payter service were strongly affected by cooperation and competition issues and the inability of the parties to agree on roles and responsibilities. The pilots with less problems of collaboration were characterized by a clearer definition of roles and responsibilities. On the whole, however, the parties preferred not to develop a business model for the pilots. Later, negotiations on commercial deployment in many cases failed because the potential partners were unable to agree on business model, ownership of customer relationships, revenue sharing and cost structure.

Hence, mobile NFC services can be offered in many different actor constellations. The possibilities range from a simple NFC infrastructure with one secure element issuer and one service provider to a complex network with multiple secure element issuers and multiple service providers. The complexity of the actor networks increases as mobile NFC technology approaches commercial deployment. It has been convenient to test the technology in simple, closed systems, but success in terms of consumer and service provider adoption put demands on openness and interoperability, a complex network of actors

that need to agree on standards and specifications. Large scale NFC trials with many involved actors, from different industrial sectors, and with the ambition to implement to end consumers a large number of services that are not restricted to e.g. any single operator's or bank's service solution will face many managerial challenges when moving from a pilot to a commercialization stage. System management will be based on extensive and complex collaboration, which will involve aspects of cooperation as well as competition, and as a result, various tensions that actors need to manage as the commercialization process develops.

The French Cityzi initiative that was launched in Nice in May 2010 is one of the best examples of this type of complex processes. It is the largest commercial rollout of mobile NFC services in Europe so far. Nice residents can use an NFC-enabled Cityzi phone to access a variety of services, including card payments, tickets for public transportation, discount coupons, loyalty programs, and different kinds of information services. The project involves actors from many sectors/industries that cooperate in the project and in other contexts, but also act as competitors in Nice and elsewhere. The Cityzi project is the example used in this paper when discussing how various aspects of collaboration develops as a large NFC trial is taken into the phase of commercialization.

Since a couple of decades digitization in general has stimulated innovations based on convergence between technologies and between industries leading to a changing pattern of competition and cooperation (Bettis and Hitt, 1995; Sampler, 1998). Thus, simultaneous cooperation and competition, sometimes described as *coopetition*, a process of interaction between two or more actors (e.g. Bengtsson and Kock, 2000), is an important aspect of service innovations based on converging technologies. We argue that the phenomenon in focus, technology based service innovation processes, always take place in a dynamic network context of both cooperation and competition between some, but not all of the actors involved (cf.. Dagnino and Rocco, 2009; Kock et al., 2010). We argue that these patterns of competition and cooperation change over time, leading to various *tensions* in the actor networks, which in turn will be an important *driver for further changes* during commercialization.

Based on an in-depth case study of the Cityzi launch in Nice*, the aim of the paper* is to develop a conceptual framework for approaching and analyzing large-scale infrastructure management processes, here with a focus on how to move from one or several pilot-studies to broad scale commercialization. A dynamic, process based framework is suggested. In particular, the paper will develop knowledge on processes in which several collaborating actors are acting as drivers and process managers for the change, i.e. the change process is not dominated by one powerful actor (cf. the Felica project in Japan). Three basic questions will guide the case description, analysis and conceptualization:

1. How do patterns of cooperation, competition and coopetition develop during the course of a large-scale infrastructure commercialization process?
2. How do different industrial networks inter-connect in such large-scale infrastructure processes?
3. How can these patterns and the tensions they create act as drivers for further change and how can these be conceptualized?

Hence, the paper is explorative. The empirical data is based on a longitudinal, single case, process study. One *first contribution* of the study is to develop a general empirical knowledge and understanding the many practical challenges associated with the implementation of large-scale, ICT infrastructure projects. Based on the empirical and conceptual analysis, *a second contribution* is a set of managerial implications and propositions aimed for actors involved in complex infrastructure processes. The *third contribution* is mainly conceptual. The paper connects in parts to industrial network research on cooperation and competition as a conceptual tool to analyze inter-organizational dynamics, including research on dynamics of industrial networks (e.g. Håkansson and Waluszewski, 2007). Based on a phase divided case analysis, a dynamic conceptual framework is developed, combining industrial network theory with ideas from organizational change theory.

Next we present a dynamic network perspective for approaching our infrastructure processes in focus, including the ways different emerging tensions drive the process. In the third section, we give some notes on method and data collection for the single case study used, the Cityzi case. This is followed by a condensed and largely actor focused case study description in the fourth section. The discussion in the following sections sums up the case in three phases, laying the foundation for a tentative, conceptual discussion. A final discussion including conclusions and implications are provided.

2 Innovation and Infrastructure Implementation In a Network Perspective

2.1 A network perspective on infrastructure innovation processes

Service innovation processes enabled by technical innovations (like NFC) include further development and application of a new technique to production, distribution and use of a variety of, often related services. The process results in new resource constellations and includes actors in many different industries. Innovation processes are interlinked in the sense that a specific innovation is dependent on prior and concurrent innovation processes at a local or global level. E.g. local feasibility tests and sometimes implementation in commercial practice are performed, that influence further such local activities and/or are dependent on global standardization and affects further spatial extension of the service innovation. *Cooperation* between actors is needed to create, develop and combine resources in new ways, to standardize resources in order to achieve interoperability, to stabilize practices and to adapt new practices to old, still existing, often complementary practices. *Competition* between cooperating actors occurs during the development process because they might prefer different technical and/or business model alternatives, compete in still existing established practices and/or will be competitors when the new practices are implemented

Applying an industrial network perspective (Håkansson and Snehota, 1995) and its general perspective on innovation (Håkansson and Waluszewski, 2007), networks are characterized by direct and indirect interdependencies between interacting actors, between resources controlled by actors and between activities carried out by actors. Such interdependencies are influenced by interaction between actors. Thus networks are dynamic, including both changing and stabilizing processes. Relations between network actors are characterized by cooperation and/or by competition. To analyze networks some more or less explicit *network boundary* setting is needed. The criteria for this is a based on interdependencies judged to be important to understand the processes in focus. Criteria may be based on spatial location and extension, temporal extension, technical attributes such as industry classifications, function for users of a product/service and a combination of such criteria. We consider spatial boundaries (e.g. local projects, local market, global industry associations) and *technical* boundaries (industries, function in production of service, e.g. mobile operators, banks, retailers) and *function for user* boundaries (type of service, e.g. payment, transportation). Networks, as analysts or actors have defined them, may overlap with other networks in the sense that actors in one network are related to actors in other networks. *Overlapping* is a network process by which overlaps, and interdependence between networks increase (Mattsson, 1996). Overlapping will be associated with various *tensions* as patterns of cooperation and competition change.

2.2 Continuous reorganization and inter-contextual contradictions and tensions

One can anticipate that there are continuously emerging contradictions (Benson, 1977) in these large scale processes. Tensions emerge between a firm's individual actions and the collective actions during innovation processes (Astley and Van de Ven, 1981). To cope with this, various processes are aimed to stabilize parts of the innovation. However, new spatial, technical and function for user overlappings might serve to again increase ambiguities and tensions. ITC infrastructure implementation can be viewed as taking place in situations of multiple, interpenetrating contexts with only partial coordination between them. Contradictions and tensions result in the connections between these multiple contexts, sometimes producing incompatible forms. A longitudinal reorganization like this often emerges in an organizational context where several operations and activities can interpenetrate, creating tensions and causes for adaptation. Such situations can be the origin of contradictions and subsequent tensions in the fabric of the operations, which in turn often cause people to act and change (Benson, 1977; Van de Ven and Astley, 1981). In all organizations aiming to change large-scale organization of operations, contradictions and tensions will occur between new organizational patterns and the established structures and connected interests.

Dialectical processes emerge from the tensions between previously established structures and the ongoing social construction challenging the established form (Zeits, 1980). The ongoing processes of construction internal and external to a formal organization produce a complex array of interrelated tensions and contradictions (Benson, 1977). Accepting a general and loose sense of the term, *dialectics*

refers to any aspect of change processes having to do with conflict, paradox, mutual interaction, unintended consequences of actions etc. A central feature of dialectical interaction is that these lead to system contradictions. Social construction and enactment of organizational contradictions - accepting the loose and wide sense of the term - by actors in a large infrastructure project organization, can be an important driving force for actions and change. Enacted contradictions can be perceived as "tensions" - positive or negative - leading to actions and organizational change. This general importance of contradictions for actions and change is also indicated by Benson (1977). Contradictions provide a continuing source of tension, conflicts, and the like which may, under some circumstances, shape consciousness and action to change the present order. To sum up, our conceptual pre-understanding includes the idea that 1) large-scale infrastructure projects will encompass actors positioned in partly different, partly overlapping networks who 2) collaborate, leading to different patterns of competition and cooperation. These in turn, lead to 3) various tensions, actions, contradictions, and new actions.

3 Focal Case and Data Collection

Empirically, the paper builds on a set of finished and ongoing studies of new emerging service innovations that are enabled by a mobile technological innovation and standard, Near Field Communications (NFC). The first NFC studies in the program were initiated in 2008, and the program has since included a number of qualitative studies of how mobile technologies have resulted in a new set of innovative mobile services, and how this has been related to various shifts in the value-creating constellations and networks involved. Common to the studies conducted within the program is that several projects include case studies based on in-depth qualitative enquiry through interviews, direct participant observation, work document analysis, focus group discussions, and/or participation in projects as action researchers. For this paper, we have chosen one extensive case to illustrate the nature of competition and cooperation in service innovation processes (reported in Andersson et al, 2012).

As we are interested in developing an empirical understanding of and developing a conceptual framework concerned with how a situation changes over time, the choice of doing a single, longitudinal case study was natural. With Yin's (1984) distinction, we would label it *The longitudinal case*. (The researcher is often a participant of the organization for some time, alternatively may conduct interviews with individuals over a lengthy period, and may be able to inject an additional longitudinal element by analysing secondary information and doing retrospective interviewing.) The single, longitudinal case study also entails aspects of what Yin (ibid) calls *The revelatory case*, i.e. having an exploratory aim. Like here, much qualitative case study research that is carried out with a predominantly inductive approach to theory treats single case studies as broadly revelatory. The Cityzi case in Nice can partly also bee seen as *The representative case* (ibid) as it was chosen to represent a complex situation with several collaborating actors driving the change process rather than the single dominant firm acting as main driving force for the process. The purpose here is thus not primarily to generalize to other cases (Merriam, 1988), but to engage in theoretical analysis and development and start the process of generating (here: dynamic) theory out of the empirical findings from the single, longitudinal case (Mitchell, 1983). Theory generation is in focus rather than theory testing (although the single case study can be associated with both, see e.g. Whittington (1989).

Since 2011, interviews and secondary data have been collected with the purpose to follow the emergence and change of patterns of cross-industry cooperation and competition as mobile operators, financial institutions like banks, and several other types of firms become involved in advancing the development of new mobile services, from the test and pilot phase to the full roll-out. In the first step of the data collection procedures, the main actor groups involved in the Nice project were identified. They included: public organizations (e.g. the City of Nice), mobile operators (four operators and an industry association), banks (four banks and an industry association), card companies (two companies), retailers (more than 1000 retailers joining in the first phases, one large retail chain interviewed), companies managing security (two socalled "Trusted Service Managers"), transportation companies (one company), and mobile couponing service companies (one company). Each actor perspective is based on a set of in-depth interviews and secondary data presented by the actor.

4 A Condensed Version of the Cityzi Case

This section is a condensed summary of a longitudinal case narrative, describing the emergence and change of the Cityzi project in Nice, its prehistory, the start in 2009, and its aftermath (reported in Andersson et al, 2012). The project's objective was initially that users should have access to an assortment of day-to-day services on their Cityzi mobiles, encompassing bank payment for retail purchases, buying, fare validation and time table information for public transportation, money-off coupon services, various information services from private and public organizations for citizens and tourists. The case is divided in three phases. The sections below and the following table sum up the tensions in the Cityzi commercialization network. The key aspects of the Cityzi infrastructure – technology backed with mobile network operators' resources, the Cityzi brand, and the business model – give rise to varying reactions among network participants.

The first phase describes the Prehistory that gives a background to the Nice project on a global level and at local levels in France and in Nice. It is the pre-commercial stage devoted to standardization and testing, preceding the roll-out of more commercial projects like Cityzi in Nice. After 16 years' development in collaboration between Sony, Toshiba and Panasonic an NFC enabled service innovation using contactless cards for payment and access to railway transportation was launched in 2001. This event was fundamental for the development of NFC enabled innovations in Japan. The *NFC Forum* was formed in 2004 by Sony, Nokia and Philips to develop standards and specifications, and to ensure interoperability among devices and services, and promote NFC applications. In 2011, the Forum had grown to over 150 members from many industries affected by NFC such as telecom manufacturers, application developers, financial services and others work together to promote the use of NFC technology. A large number of mostly local pilots and trials, mostly focused on a single service, were started all over the world. NFC service application trials included identification and access services, ticketing, payment, marketing and loyalty programs. Some of these trials included many cooperating organizations, others were limited to two dominating cooperation partners. France was to be a forerunner in the launch of pre-commercial trials and in full scale commercialization of new NFC services. An important forerunner to these projects was a mobile payment project, started in 2007. AEPM, (Association Européenne Payez Mobile) had published functional and technical specifications for Payez Mobil, an NFC solution developed by the leading French banks and mobile operators. It had been tested in Caen and Strasbourg since November 2007 in a trial run by six banks and four mobile operators in conjunction with Visa and Mastercard. AEPM members were France's leading banks and mobile operators. A second important forerunner was the publication by Ergosum, a consortium of France's leading retailers, mobile operators and store card providers, of specifications for use of NFC at points-of-sale. In 2008, Ergosum announced large-scale trials in which customers would be able to use their mobile phones to pay for purchases in stores, to store and to redeem mobile coupons and to replace their existing store cards with virtual loyalty cards held and updated on their phone. Four projects in the Nice area (University, Museum, Public Transportation, Airport) were immediate forerunners to Cityzi. Relating to security aspects, there were also connections to other projects. The project predecessors laid a platform for a number of interconnected mobile services in the Nice project. The core of the planned Nice project was that users should have the chance to initially access four types daily services on their Cityzi mobiles: (1) bank payment for use at retailers equipped with compatible payment terminals, (2) public transport where passengers could buy fares remotely and validate them with their mobiles, get real-time access to bus and tram timetables, etc., (3) money-off coupons including loyalty cards for shops, and (4) interaction with the urban environment, via Cityzi tags including tourist information, on-demand advertising, etc.

The second phase describes the Cityzi project with focus on the period 2009-2011. In the overall project, focus is on cooperation in order to create compatibility between the different services. The long anticipated NFC project in Nice was launched, under the authority of Christian Estrosi, the Minister of Industry, Mayor of Nice, and Chairman of the Nice Cote d'Azur Urban Community. At the outset of the project in 2009-10, the Cityzi services only ran on a Samsung mobile phone, the especially equipped Samsung Player One Cityzi handset. The 3000 consumers normally could get this from their respective mobile operator. Project participants acknowledged that the pre-commercial pilot should go ahead without a prior plan for how revenues and costs would be split between the participants in a future

commercial roll-out. The project was initially driven by AFSCM, bringing together mobile network operators Orange, Bouygues Télécom and SFR. Cityzi partly overcame coordination problems by AFSCM's guiding role as "facilitator". AFSCM ultimately succeeded to get acceptance for its idea to put the NFC based services and applications on the secure element/SIM card of the mobile phone. To ensure that it did not become a French-only solution, AFSCM initiated cooperation with international interest organization and firms such as Visa and Mastercard. International openness was important to convince international handset makers (e.g. Samsung) to develop NFC handsets. More importantly, AFSCM started cooperation locally with the transit operator Veolia and with banks. The mass transit services turned out to be a success while payments did not succeed in the same way. While the mass transit Cityzi services were easy to use and understand, AFSCM learned that payments required more extensive work, information, and explanation. The banks had supplied more than 1000 merchants in Nice with equipment for mobile payments. Many participating retailers placed the Cityzi logo on the door. This created tensions with the banks. The latter preferred that the retailers used their payment solutions. Another problem experienced by AFSCM was the bank-credit card company relationships. Visa was in the hands of the banks, preferring that the banks bought the Visa solution. Three French banks joined the Nice project: Crédit Mutuel CIC, Société Générale and BNP Paribas. (Crédit Mutuel CIC also owns NRJ Mobile, a virtual mobile network operator, also engaged in Cityzi.) In France, Crédit Mutuel CIC was a forerunner in mobile NFC payments. To deal with the changes in the issuing process, Crédit Mutuel cooperated with actors that were new to payment services, the mobile network operators and the trusted service managers (TSMs). Crédit Mutuel CIC was also a virtual MNO, issuing SIM cards, which made them keen to use the SIM card. The handsets were subsidised and provided mainly by the operators. For Crédit Mutuel CIC, the Cityzi brand was a way to interface with the operators. It was a way to ensure consistency for the users, knowing that the services were supported by the operators. Branding created some tensions in the marketing of the mobile NFC services. Payment brands such as MasterCard, PayPass, and VISA existed. Retailers had their own brands, and public transportation used different brands in different regions. And the Cityzi brand was not familiar to users coming from abroad. As for VISA, Visa Europe started mobile NFC pilots in 2010 learning that payments by NFC were well accepted by consumers. VISA also learned to work with all the involved actors. Technical issues were easier than collaboration between actors as regards business models.

Furthermore, the involvement of the city of Nice in Cityzi was part of the city's innovation strategy. They hoped that the initial collection of NFC services would serve as a base on which other private service initiatives could be built. One idea concerned a mobile NFC enabled tourism pass allowing tourists to have access to and information about the transport network, restaurant and hotel services, entertainment, autoguided tours of museums etc. Three French firms (Inside Contactless, Connecthings and Sagem Wireless) formed a joint consortium started early to work with the city on the Smart Muse NFC tour guide project.

Gemalto and Oberthur Technologies were the main Trusted Service Managers involved in Cityzi. For Oberthur Technologies, the challenge in the emerging NFC market was to develop an interoperable and standard solution that the end-users could use irrespective of mobile operator, bank, transport operator or preferred retailer. Oberthur Technologies participated actively in the development of such specifications aimed at formulating a global standard. Gemalto offered TSM services to service providers, for example transport providers, banks and retailers. TSM services included securely provisioning applications to end-users. As an independent and trusted party, Gemalto could manage neutrally the keys stored in the SIM and validate applications before loading in order to ensure a secure environment for each party. Oberthur Technologies acted as TSM for BNP Paribas, managing the mobile payment service on behalf of the bank via an over the air platform.

As to the public transport network in the Nice region, Lignes d'Azur, was outsourced to the public transport operator Veolia Transdev. BPass+, the NFC application was designed, integrated, financed and operated by Veolia Transdev. Veolia Transdev had different types of contracts with public service buyers: as a supplier to the local public transport authority or as operator at a commercial risk. Most of the contracts put Veolia in charge of customer relationships, including the distribution of information and ticketing services. Veolia's investments in mobile NFC were motivated by operating cost reduction for information and ticketing. Also, mobile NFC was expected to improve the attractiveness of the public transport network. The commercial launch of BPass+ took place in Nice in May 2010 as part of

the launch of Cityzi. Initially, Veolia cooperated with all four mobile network operators in Cityzi, and applied only one type of handset supplied by Samsung.
One of the coupon company HighCo's key activities is to manage coupon collection and clearing campaigns for brands. They thus intermediate between retailers and brand suppliers. HighCo saw Cityzi as an opportunity to test the NFC technology based "couponing wallet" solution with regard to security and the process of transacting the coupon from the NFC mobile handset to the cash desk. Franprix, a French retail chain, agreed to work with HighCo in the trial in Nice. To comply with Cityzi specifications, HighCo needed to find a TSM to secure the download of their "couponing wallet".
The launch of Cityzi mobile contactless by Bouygues Telecom, NRJ Mobile, Orange and SFR marked the culmination of a several-year-long project with partners from the worlds of transport, banking, retail and local authorities. In early 2012, around 4,000 Cityzi mobiles were actively in use across all mobile networks and the anticipation was to have 15,000 Cityzi mobiles in operation in Nice by the end of 2012.

The third phase describes some of other local projects, mainly in France, following the Nice project. The geographical diffusion of the service innovation takes off while the stabilization and penetration of the services in Nice continues. Competing alliances between cooperating firms are created when the service innovations are diffused to new geographical regions. The Cityzi project in Nice was followed by similar projects in other cities. After the commercial NFC launch in Nice the AFSCM telecom operator members announced their aim to make Cityzi NFC mobiles widely available across France. Orange would begin introducing NFC services in the majority of countries in which it had a presence in 2011. In France, the company was to begin distributing Samsung's Player One Cityzi NFC phone nationwide and aimed to sell a total of 500,000 NFC-equipped mobile phones in France during the year. A total of thirteen cities responded to the French government's call for proposals for three to five more cities to receive funding to run large scale NFC field trials similar to the Cityzi project. In January 2011, Paris, Bordeaux, Caen, Lille, Marseille, Rennes, Strasbourg and Toulouse were announced to join Nice in the next stage of the French plan to deploy a national NFC infrastructure. The government funding was aimed to speed up the rollout of commercial NFC services in France as well as to help the country's NFC technology suppliers position themselves as leaders in the world market. After Cityzi, four banks and four mobile network operators participating in Nice were committed to roll out commercial NFC services on a national scale based on established specifications and international standards. Visa signed an agreement with AEPM that worked to develop NFC payments standards. This would allow Visa-branded payments solutions to be commercially deployed across France. Visa continued to work closely with the banks as Cityzi expanded to other cities and also with banks that had yet to introduce their solution. L'Office du Commerce et de l'Artisanat de Nice (OCAN), representing independent retailers in Nice, launched Carte Magique, an NFC-based retail loyalty programme designed to increase traffic to local retailers as a whole as well as to allow members to promote their businesses to shoppers. French banking group Société Générale signed a contract with Oberthur Technologies to provide trusted service manager services for the bank's continued roll out of NFC services. In November 2011, another of the involved banks, BNP Paribas, announced the formation of a strategic business partnership with the operator Orange to jointly launch a new, entirely mobile, banking service. From November 2011, BNP Paribas would be able to offer mobile banking to customers in all of the group's branches and through its Internet banking channel. Both BNP Paribas and Orange were heavily involved in Cityzi. For Orange, this partnership was an opportunity to explore new territories and to continue offering its customers more and more innovative services. Within AFSCM, collaboration evolved, taking the next step to reorganize the association, possibly into an operational joint venture. As stated by the organization, the two main objectives of cooperation are to reduce costs and to create a unique mobile wallet based on the Cityzi wallet. The aim is also to jointly develop simple, common Cityzi loyalty applications for small merchants. As for the cooperation and competition between the banks, some actors in the Nice project suggested that the banks seemed to be more collaborative on the card issuing side of their business, where they needed to create something new and interoperable, whereas they appeared to compete more fiercely on the acquiring side of the business. These operations were based on the standards set by Visa and MasterCard. Regarding the issuing parts, the banks are working in a coopetition situation because they need to invent very similar applications that can be managed in the same way with the different MNOs. Regarding the acquiring side, the banks compete, and the

competition is rather fierce between banks because mobile contactless payments are part of the different payments they have to propose to the merchants.

5 Discussion

1.How do patterns of cooperation, competition and coopetition develop during the course of a large-scale infrastructure commercialization process? Table 1 below sums up the major changes during the three depicted phases of test and commercialization. One type of tension was when the Cityzi project moved from the pilot stage, focusing on technical matters, to commercialization relating to actors' "business models". For the pilot stage it was agreed that focus should be on technical feasibility and not on business models and cost-revenue issues. For example, the coupon company HighCo and the banks as well as HighCo and the TSMs had problems to agree on revenue sharing and cost allocation. HighCo worked on a revenue sharing model with the mobile operators. The Cityzi brand was not used by VISA and Mastercard because they had well-known brands competing between themselves globally, and since they wanted to use both their contactless cards and the mobile phone for NFC payments. Also the banks and several retailers wanted to advertise and use their own brands for payments. Tensions were due to changed patterns of coopetition. Network boundaries are ambiguous and seen differently by different actors. The dynamics of coopetition is connected to how actors handle temporality. (In the Cityzi case, VISA and Mastercard deliberate took a "wait and see" or "wait and build power/knowledge" attitude to any more intense cooperation. Although they, as competitors, cooperated in general areas of card payments and card issuing, they both wanted to build more knowledge about NFC enabled mobile payments before any deeper cooperation in the pilot test in Nice.)

2. How do different industrial network inter-connect in such large-scale infrastructure processes? Three different forms of network overlapping processes (Mattsson, 1996) could be discerned in the Cityzi case process:

Spatial overlapping: Major service innovation processes, like the one in this paper, initially, before extensive use in practice, encompass a number of projects (experiments, tests, full scale commercialization) in delimited geographical areas and/or concerning limited services. These projects include actors that cooperate in the project but who might also be competitors outside the project. The extent to which two actors cooperate and or compete may vary over time and across projects and across stabilized practices for the new, and old, established services. Local project networks, potentially resulting in local business practice, involve business actors that may or may not participate in other local project networks. There are overlaps between local networks. The local project networks are embedded in wider networks in which both established technologies for service production and new technologies develop, as indicated in the prehistory to the Nice project. To understand technology enabled service innovation processes it is important to consider interaction in local networks, between local networks and between wider networks and local ones. Such overlapping affects how actors are related to each other along dimensions of cooperation and competition.

Technical overlapping: Development of new techniques requires inputs from different knowledge areas and different industries. Converging technologies and converging industries are concepts characterizing information technology applications to telecommunications, mass media, entertainment, financial services etc. that have been and are in focus for much interest. Preceding the Nice case is the development of contactless cards in Japan. Based on this technical development, global cooperation later began to develop technical conditions for interoperability. Three leading telecom firms organized an association/policy network, NFC Forum, initiating overlapping with other industries such as mobile operators, banks, application developers, retailers, etc. related to application of NFC techniques. NFC Forum is an example of a coopetitive network since its members include direct competitors who also cooperate to promote technical solutions and service applications. Also other policy networks, initiated by actors in one industry have, as we described in the case, attracted members from other industries to solve technical issues. Furthermore, policy network organizations interact, coopetitively, to solve technical aspects regarding specific services.

Phases (I-III)	I. Prehistory (1980-) 2000-2009	II. The Cityzi Project in Nice 2009-2011	III. After Nice 2012 -
Innovation focus	Technology development and standardization	Development of service applications	Business model development
Innovation process focus	Technical trial processes, small scale, local service pilot studies, global standardization processes	Large scale, local pilot project, integrated service development processes, and initial business development and commercialization processes	Commercialization and service diffusion processes across regions
Cooperation	-The formation of global, cooperative policy networks to set technology standards -The global policy networks enhance cooperation both within and across industries (banking, telecom) -Small, local cooperation networks are formed, trials on single applications	-Increased cooperation *between* the global policy networks -Cooperation to connect and coordinate several, local networks focused on different service applications -Cooperation between public and private organizations in order to create single standards and simplicity of services towards end users	-Cooperation to diffuse service innovations from local networks to other regions and to a national level -Internal cooperation within global organizations (e.g. mobile operators) to connect locally developed service innovations -Towards mixed intra- and inter-industry cooperation with an increasing importance of global alliances
Competition	-Competition between global policy networks associated with different industries to create dominating technical standards and solutions -Competition between companies within the same industries to be ”first to market” in testing new applications -Competition within local technology and service trials on the position in relation to end users	-Increased competition between companies for dominant network position in relations to end users when larger sets of end-user services and applications are bundled -Competition between different actors within the same industry for network positions associated with the new bundled services (e.g. banks, card companies, TSMs) -Competition between geographical regions for ”technology leader reputation” associated with the new services - inter-industry competition (e.g. operators vs financial institutions)	-Increased overall competition between companies when moving from the ”pre-commercial” to ”commercial” stage due to increased need to adapt/develop business models -From local to regional to national to international competition when local service innovations are connected to the global context via global companies -Increased competition between nets of inter-industry alliances created in order to commercialize service innovations
Coopetition focus	”Intra”- industry cooperation and ”Inter”-industry competition in parallel, simultaneous processes of pilot and test trial	Local/regional network coopetition: increased blurred boundaries between intra- and inter-industry competition and cooperation and involvement of public organizations in pre-commercialization processes	Towards stronger ”intra-net-cooperation” and alliances and ”net vs. net” competition in global markets when moving towards commercialization of service innovations

Table 1. Summary of main shifts in innovation focus, and in cooperation, competition and coopetition in the three phases

The French AFSCM took a facilitator, “overlapping initiating”, role in Cityzi to help create conditions for a commercial launch, inviting also international actors such as VISA and Mastercard. HighCo needed to extend its traditional interaction with brand owners and retailers to include mobile operators, desk system suppliers and trusted service managers. Another local example is how the participating financial actors, operators and TSMs, handset manufacturers etc. cooperated to develop a card issuing mobile process.

“Function for user” overlapping: NFC enabled mobile services make the mobile phone into a device that can perform many services, also related to other services in which the mobile phone is not directly involved. Services are “bundled”. The mobile phone initiates overlapping between networks that are defined by different types of services. Preceding the Cityzi case there were many local tests, also in Nice, of one or a few services. The aim of Cityzi was to integrate such services for personal use and to add services to the original ones. Such overlapping may initiate changes in network relationships. An added service, mobile couponing, shows that such overlapping related to added functions for user might be problematic. For that the user still had to use separate applications and procedures for retail payments and getting the coupon rebates. Overlapping between different “function for user” networks also affect *technical* overlapping.

3.How can these patterns and the tensions they create act as drivers for further change and how can these be conceptualized?
To sum up, the organizational network context in which the change episodes emerge and change is a context where we can see different types of contradictions and tensions to be immanent characteristics. Major changes and transitions in market organizations thus create what can be described as new contradictions and tensions, introducing for the involved actors a certain degree of boundary arbitrariness, contradictions in the way organizational infrastructure systems are delimited, and tensions which affect ongoing change actions and result in new actions. Each change agent enacts it’s own part of the organizational context, mobilizing other actors for the infrastructure changes. Change agents make their own interpretations of the "relevant" context. And this context will not be static. It will change, sometimes as a consequence of an agent's own actions or by the actions of other actors in the context. It can’t be expected that the border between the relevant "inner" and the "outer" context will remain stable during the course of a change process or phase. The boundaries are moving, creating a dynamic and partly *ambiguous* organizational context for change agents aiming to redirect the prcesses. There is no simple relationship between the way contradictions in the moving context combine in ways that facilitate or in ways that thwart the ongoing mobilizations of actors for change. A delimited change episode in the infrastructure change is not easily decomposable from the constantly changing context. And the change actions emerging in these ecologically complex contexts are not always easy to separate from actions elsewhere. Collecting the discussion and theoretical interpretation above in a general, simplified circular model, where change actions are placed in a process without any clear beginning or end, we can make a tentative interpretation of how they can relate. We assume that there are: 1) immanent contradictions (Benson, 1977) in organizations and infrastructure systems due to the fact that systems are open, 2) tensions between individual and collective actions (Astley and Van de Ven, 1981), 3) various ambiguities surrounding actions and decision making (March, 1988), and 4) stabilization and change of processes and contents in ongoing actions and in particular change episodes. Ongoing change processes and contents will be stabilized and/or altered in order to cope with the situation. And the process continues. Over longer time periods, attentions are redirected; contradictions and attentions move within the context.

6 Conclusions

The French Cityzi initiative represents an MNO-led approach to commercializing mobile NFC services. Technology and customer support resources leave the MNOs well positioned to offer the SIM card as the secure element and assume the infrastructure manager role. However, not all service providers rely on the MNOs’ customer support resources to the same degree. The Cityzi brand, proposed by the MNOs, is intended to solve the problems stemming from the fragmented nature of the NFC space. Some of the service providers and other partners doubt the benefits of the Cityzi brand.

Business model tensions result from the differing industry contexts of the service providers. Some service providers see the revenue sharing model suggested by the MNOs as ill suited for their existing operations. Implications from the study are that network issues have passed technology questions as the number one obstacle. Industry logics influence processes of business model negotiations. The base for secure mobile NFC services exists but branding compromises are not be enough for the infrastructure to stabilize.

Three basic questions guided the case description, analysis and conceptualization. Different patterns of cooperation, competition and coopetition develop during the course of a large-scale infrastructure commercialization process, acting as drivers for further changes. Furthermore, in large-scale infrastructure processes different industrial networks inter-connect in different forms of overlapping processes. These patterns and the tensions they create act as drivers for further change and development.

References

Astley, W.G. and Van de Ven, A.H. (1981). Mapping the Field to Create a Dynamic Perspective on Organization Design and Behavior. In: Joyce, W.F. and Van de Ven, A.H.(eds.), Perspectives on Organization Design and Behavior. Wiley, New York, 427-468.

Andersson, P. et al (2012). Mobile NFC – a network approach to service development and commercialization". Research report. Stockholm School of Economics.

Bengtsson, M. and Kock, S. (1999). Cooperation and competition in relationships between competitors in business networks. Journal of Business & Industrial Marketing, 14 (3), 178-94.

Benson, K.J. (1977). Organizations: A Dialectical View. Administrative Science Quarterly, 22 (March), 1-21.

Bettis, R. A. and Hitt, M. A. (1995). The New Competitive Landscape. Strategic Management Journal, 16, 7-19.

Dagnino, G.B. and Padula, G. (2002). Coopetition Strategy: A New Kind of Inter-Firm Dynamics for Value Creation. EURAM, Stockholm.

Håkansson, H. and Snehota, I., (eds.) (1995). Developing Relationships in Networks. Thompson International, London.

Håkansson, H. and Waluszweski, A. (eds.) (2007). Knowledge and innovation in business and industry:The importance of using others. Routledge, London.

Kock, S, Nisuls, J.E.C. and Söderqvist, A.M. (2010). Co-opetition: A Source of International Opportunities in Finnish SMEs. Competitiveness Review, 20 (2),111-125.

Mattsson, L-G. (1996). Dynamics of Overlapping Networks and Strategic Actions by the International Firm. In: Chandler, Hagström and Sölvell (eds.). The Dynamic Firm. Oxford University Press, Oxford.

Merriam, S.B. (1988). Case Study Research in Education. Jossey-Bass Inc. Publishers, San Fransisco.

Mitchell, J.C. (1983). Case and Situation Analysis. Sociological Review, 31, 186-211.

Sampler, J. L. (1998). Redefining Industry Structure for the Information Age. Strategic Management Journal, 19 (4), 343-355.

Whittington, R. (1989). Corporate Strategies in Recession and Recovery. Unwin Hyman, London.

Yin, R.K. (1984). Case Study Research: Design and Methods. Sage, Beverly Hills CA.

Zeitz, G. (1980). Interorganizational Dialectics. Administrative Science Quarterly, 25 (1), 72-88.