Establishing a New Business Area through Cooperative Nets: The Case of Finnish Mobile TV

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ABSTRACT

The paper deals with mobile TV services in Finland, where commercial TV services for handhelds will come into use in early 2007. The first phone models for mobile TV were launched on the market already in 2006 and specialized TV transmissions for handheld devices are also under way. A nationwide commercial launch has been stalled due to, for instance, licence allocation and copy right issues as well as building of the mobile TV distribution network.

The paper focuses on the focal actors forming a cooperative net with a purpose of establishing a business area for mobile TV services. The study explores how this net of actors has emerged from the very beginning to its current state during the period August 2001 – April 2007, in order to draw a picture of an emerging new business area, mobile TV. The literature of the industrial network approach (INA) will be applied in order to create theoretical understanding of the process of mobile TV net emergence and formation. Also, literature related to the concepts of role and position will be used as a base in order to describe how the mobile TV net emerges and develops.

The study applies a qualitative research approach and the aim is to develop a deep case description of the small business net in focus. The focal net, chosen for this study, involves seven actors related to the mobile TV business area in Finland. The primary empirical data was gathered through 30 personal theme interviews during 2005 and 2006. Interviewees were employees involved in designing and developing mobile TV services, such as chief executive officers, business development managers and technology development managers. In addition to the interviews, secondary sources, such as notes from seminars on mobile TV were also used.

Key words: business net, industrial network approach, mobile TV net formation, telecommunications

INTRODUCTION

For the last two decades, the conversion from analogue to digital television transmission technology has been under way. Digital television (DTV) is being developed simultaneously over three distribution platforms; satellite, cable and terrestrial that makes also "portable TV sets" possible (see e.g. Brown, 2005; Harrie, 2003). Many mobile phone models already feature a camera and an FM radio receiver, but TV has been the electronic media missing from the latest smart phones up till recently. Mobile TV that worked in the traditional analogue TV network was introduced on the market a while ago, but the quality of the image was not sufficiently good for mobile use. What was needed was digital TV technology that takes into account the special requirements of a small wireless device. Therefore, new applications have been developed worldwide. There are currently three major standards developed; ISDB-T (Terrestrial Integrated Services Digital Broadcasting) in Japan, DNB (Digital Multimedia Broadcast) and its variations in South Korea and DVB-H (Digital Multimedia Broadcast for Handhelds) in Europe and the United States. In the US non-standardised applications, like Qualcomm's MediaFLO, are also available. (Finnish Mobile TV, 13.9.2006.) In Europe, DVB-H is gaining a very strong position, and for instance Nokia is lobbying for making DVB-H the standard for mobile TV transmissions.

Mobile TV has been launched as pilots in many countries, but a real commercial market for the service is yet to be developed. In Finland, a commercial mobile TV pilot was launched during 2005. The pilot showed that 41% of the 500 user participants were potential buyers of a mobile TV service (Mäki, 2005). The first experiences revealed that people watch mobile TV while using public transport, at home and in the workplace. Users are particularly interested in the independence of location offered by mobile TV. Peak viewing times are during rush hours and in the early evening. News, weather forecasts, sports, current affairs programmes and various light entertainment serials have proved especially popular. The possibility to receive commercial mobile TV on the user's mobile phone in Finland is not far off. The first phone models for mobile TV were launched on the market during 2006, and more extensive commercial mobile TV services will come into use in 2007. (Finnish Mobile TV, 13.9.2006.) Specialized TV transmissions for handheld devices are also under way.

The mobile TV service based on DVB-H has been commercially launched mainly as trials in the major cities in Finland. A nationwide commercial launch has been stalled due to, for instance, licence allocation and copy right issues as well as building of the mobile TV distribution network. A business net composed of the engaged actors has, furthermore, not yet found its final composition. New actors will be joining in and the business net evolving as the development of the mobile TV technology and the distribution network proceeds. In this emerging mobile TV net actors seem to be "preparing" themselves in various ways for forthcoming challenges and opportunities. Hence, the roles and positions of the parties involved are evolving and developing while the actors concurrently seek lucrative roles and suitable positions for themselves in this new business area. Every one of them is fighting for a part of the possible revenue stream from viewers and advertisers by inventing new business models and reshaping the old ones. This combination creates a fruitful research field especially from the business networks' point of view.

This paper focuses on the actors in the new business area forming a cooperative net[1] with a purpose to establish mobile TV services. In order to draw a picture of an emerging new business area, mobile TV, the paper studies how this net of actors has developed from the very beginning to its current state, how the actors prepare for a new business and what are their perceptions of network roles and positions in relation to other members of the initiative. The aim of the paper is therefore to *describe how the new business area of mobile TV has developed in order to create understanding of its emergence and formation through interaction between focal actors.*

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[1] A net is defined as a local concentration within a network (Easton, 1992).

An explorative case study was conducted to investigate the issue. The emerging mobile TV net was studied in Finland in the field of telecommunications. Ideas and literature of industrial network approach (INA) was used to build up a theoretical understanding of the phenomenon. The study makes a contribution to the INA research especially on the research of net emergence and development (e.g. Lundgren 1995 and Möller & Svahn 2003). This area has been in research focus and a considerable amount of studies has been contributed on this field particularly by using the concepts of role and position. However, the media and telecommunications field has not been widely studied from the INA perspective, and the field's characteristics as sensitive to technological development and competitor strategies can offer new insights into the theory on business net emergence and formation.

The paper is organised as follows. We first offer a detailed discussion of the characteristics and challenges involved in emerging business nets, and continue by explicating the net formation through the concepts of role and position. We then describe our research strategy and the case study. We conclude the article with a discussion of our results of the case analysis.

NET EMERGENCE AND DEVELOPMENT

Even though many researchers use the concept "new network" it has been argued that there is no such thing as a new network. A new actor or a newly developed relationship does not create a new network (Ford & Redwood, 2005). When a company emerges it does so into an existing network. A new actor will, according to Ford and Håkansson (2006), not even have but a rather limited effect on the existing network. It must be kept in mind that new actors and relationships always emerge from something that pre-exist them. An actor or relationship is always related to others that already exist. INA literature (e.g. Ford & McDowell, 1999; Håkansson & Ford, 2002) contend further that the complex and interconnected nature of industrial networks makes the creation and management of intentional networks practically impossible. According to Möller and Svahn (2003) there is accumulating evidence, however, that firms are not only trying to influence emerging networks but also deliberately constructing what have been called value nets or strategic nets to pursue their goals (see e.g. Hinterhuber, 2002; Hung, 2002; Jarillo, 1993; Parolini, 1999; Spencer, 2003). In this paper we focus on an establishment of a new mobile TV business area through cooperative nets, which are intentionally formed and developed to pursue a particular aim.

Net formation

Anders Lundgren (1995) studied digital image processing in Sweden during the time period of 1975 and 1989. Lundgren (1995) came to the conclusion that new technology - and business nets - emerge in three stages, which are linked to each other, namely (1) genesis - identification, (2) coalescence - legitimation and (3) dissemination - adaptation. In the first stage the necessary changes are taken inside the net in order to develop new technology. This usually takes place through research projects, executed either independently or together with partners in the net. The changes are evident in equipment, processes and in knowledge possessed within the firms. This stage is led by the need to understand the technology and the possibilities it offers, mostly by research institutes and companies. The second stage begins when the pioneers of the new technology have identified each other and been able to mobilize cooperative relationships with partners who are needed in developing different applications. This may lead to several development nets and the stage is characterized by cooperation. In this stage competence is built and a deeper understanding for the technology is created. Möller, Rajala and Svahn (2004) note that the development projects at this stage may raise interest in the public and among financers. The legitimacy of the new business area thus grows stronger. In the third and final stage, the development network is expanded to include components necessary for commercializing the technologies, products, services or applications that have been developed. What Lundgren's research shows is that the development of innovative technologies occurs through a net process (cf. Möller et al., 2004; Miettinen, Lehenkari, Hasu & Hyvönen, 1999). Also Miettinen et al. (1999) propose that business nets are a prerequisite for creating and developing innovations. The

nature and the cooperation patterns of the net will, however, change during the development processes.

Möller and Svahn (2003) explain the emergence of new business nets, partly based on the research conducted by Lundgren (1995), by three phases (see Figure 1), namely (1) exploring for future business which is characterized by competition between the actors and collaboration in the exploration and making sense of the application potential for emerging technologies. The phase is explorative and coloured by the search of ideas, understanding and interpretation of signals. Net relationships can be of assistance, as they may increase the amount of ideas and partners may help interpret signals. The phase is completed when a specific application idea has been developed to such a degree that it offers a direction for further work on development. Phase two, (2) mobilization for applications concerns actors competing and collaborating in constructing dominant designs and applications. Actors are competing on who gets to start e.g. a strategic net, in which the focused idea is developed into one or several commercial applications. This phase is also characterized by technical cooperation. In phase three, (3) mobilization for dissemination covers actors competing and collaborating in scaling up production and distribution nets in the competition to create markets. This phase is all about developing markets and actors are building production nets and distribution channels to serve their customers. The increasing size of the ellipses reflects the expanding nets required to transform an idea to an innovation, and turn an innovation into a viable business.
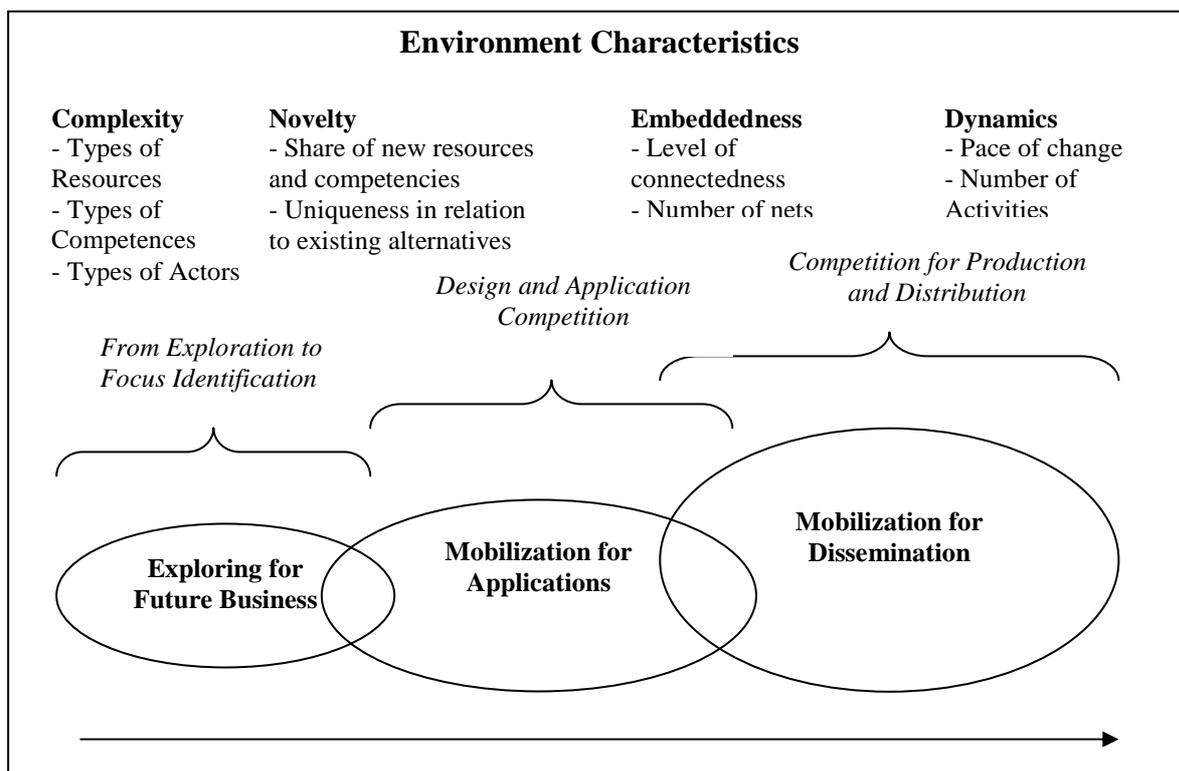

Figure 1: Stages of birth for new business nets (adapted from Möller and Svahn 2003, p. 10)

Möller and Svahn (2003) also suggest that the degree of complexity, novelty, embeddedness and dynamics, shown on the top of the framework in Figure 1 influence the execution of the meta tasks which constitute the phases of new business area emergence. The degree of complexity is determined by how many different resources, capabilities and actors are needed in developing and commercializing an innovation. The larger this combination is, the more difficult it is to realize. Novelty is determined by how many new capabilities and know-how is needed to develop an innovation and to translate it into a business model. It also involves the degree of unique applications offered to customers compared to existing products and services. Embeddedness describes which actors, on which level and how many, are needed for developing a new business model. The

3

connection to local know-how is of importance. Finally, dynamics involves the development speed of capabilities and information as well as the speed, with which new actors replace old value creation models with new ones.

Position and role

A net position is considered to be a relative concept as no two parties' positions are alike (Håkansson & Snehota, 1989). Each company in a net has a unique position in relation to the other actors, but the position of a company is perceived differently by the various actors in the net (Gadde, Huemer & Håkansson, 2003). Easton (1992) notes that position provides a language to talk about changes as positions in nets are primarily concerned with the nature of net connections. Thorelli (1986) defines position as a location of power to create and/or influence nets. According to Mattsson and Johanson (1992), position describes how the individual actors in the net are related to each other in an overall network structure. The concept offers a tool to characterize network structure and distance between actors. Johanson and Mattsson (1997) continue that positions are the result of investments in exchange relationships and that a position characterizes the actor's links to the environment. A limited definition of position refers purely to the net level while an extended definition of position refers also to the net level but in addition to the role the actors have in the production system (ibid). In addition, position has been argued to form a framework for actions (Henders, 1992). This means that firm's actions are dependent on position. A firm acts according to its position, i.e. the framework for action. This creates a view that actions, for example, might be circumscribed by position. Henders (1992) points out that an actor cannot get in position. Rather, an actor has a constantly changing position and tries to position itself better with respect to the net. Hertz (1996) notes that establishment of new relationships and changes in old ones affect a company's position.

The notion of role is widely referred to in the IMP literature, but a clear definition of it is hard to find. It can be seen as the dynamic or processual aspect of position and describes what actors intend to do and how they construct meaning from their position (ibid). As Anderson *et al.* (1998) propose; role and position are combined in order to understand change in the net. Anderson *et al.* (2000) state that position is an important measure for the structure of a net and that it is possible to describe change by comparing an actor's position at time t_0 and time t_1. The role dimension on the other hand, represents the "subjective and creative character of the actor" (ibid, p. 4), meaning that an actor has a position but acts in a role (see also Håkansson (1987) for a similar discussion). Role is therefore seen as a concept for describing what the actors intend, how they construct meaning in their situation and how they want to change it. Anderson *et al.* (1998) also explain it as position being the stability dimension and role being the change dimension.

METHODOLOGY

The case-study approach

The formation of an emerging net in mobile TV business area is investigated in the empirical part of the study. The case study research strategy is chosen, because it is preferred as the most suitable, "when the researcher has little control over events and the focus is on a contemporary phenomenon within real-life context" (Yin, 2003, p. 1). In addition, the aim of the study is to develop a deep description of the small business net in focus, and therefore the case study research strategy provides an appropriate tool (Halinen & Törnroos, 2005). The study could be described as an explorative case study (Yin, 1989). An information-rich case was selected in order to reveal the process of an emerging new business net and the way it was formatted.

Case research on business networks can be characterized as process research (Halinen & Törnroos, 2005). According to Van de Ven (1992) the meaning of process is defined in the literature as (1) a

logic used to explain a causal relationship in a variance theory, as (2) a category of concepts that refer to actions of individuals or organisations, and as (3) a sequence of events or activities that describe how things change over time. In this study the adapted definition is the latter, which takes a historical developmental perspective and focuses on the sequences of incidents, activities, and stages that unfold over time in a certain context. Pettigrew points out that the aim of a processual analysis is not to produce a case history but a case study. Based on the logic that the legacy of the past constantly shapes the emerging future (cf. Pettigrew, 1997; Sztompka, 1991), Pettigrew (1990) states that any theoretically solid and practically useful processual research should explore the context, content and process of change and dynamics together with their interconnections through time. Cycles of deduction and induction best characterize the process research (Pettigrew, 1997).

Data collection and analysis

The primary empirical data was gathered through personal theme interviews. Data collection included 30 individual interviews conducted during 2005 and 2006. In addition to the interviews, secondary sources such as notes from seminars on mobile TV were also used. The paper focuses on the state of the mobile TV business during spring 2007 and offers a snapshot view of the business net emergence and formation during August 2001 – April 2007.

The discussion on mobile TV during the interviews proceeded around the themes that covered relationships and cooperation patterns between actors involved in mobile TV, their perceptions of roles and positions, as well as the historic and future development of mobile TV. The choice of informants was based on the principle according to which the information is best gained through people involved in the phenomenon under study. Interviewees were employees involved in designing and developing mobile TV services, such as chief executive officers, business development managers and technology development managers. Interviewing people in different roles adds the richness needed in studying a multi-layered phenomenon of emerging business nets. All of the interviews were audio-taped and transcribed. The research material was analysed with the help of content coding and theme-based categorising. It was agreed with all the companies that the names of the informants would remain confidential.

Focal net

The focal net, chosen for this study involves the actors related to a mobile TV pilot in Finland. Nokia was the driver and initiator of the pilot and other actors were gathered to participate, namely mobile operators Elisa Communications and TeliaSonera Finland, TV broadcasters MTV3, YLE (Finnish Broadcasting Company) and Channel Four Finland (known as Nelonen) and the distributor of radio and television services, Digita, who during Spring 2006 was awarded a licence to build and operate the DVB-H network in Finland. Some actors in the Finnish telecommunications field chose not to participate in developing mobile TV from the very beginning. For instance, mobile operator DNA Finland chose not to participate in the mobile TV pilot due to its investments in IPTV[2], but has later decided to eventually join the development through a more neutral partner such as Digita. The seven actors constituting the focal net are briefly described in the following:

Digita is a part of the international TDF group and is a Finnish distributor of radio and television services. Digita further develops data communication networks and network infrastructure. Digita's customers include television and radio broadcasting companies, as well as mobile and broadband operators.

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[2] Internet Protocol Television means that digital television is delivered using Internet Protocol e.g. over a broadband network infrastructure.

Elisa Communications, formerly known as Radiolinja, was the first company in the world to open a GSM network in 1991. The company's main market is in Finland, but Elisa also has international operations in Estonia. Elisa focuses on providing fixed and mobile services (main focus areas) as well as Internet services. Elisa serves over 2.4 million mobile customers (Elisa annual report 2005). Elisa offers their own mobile TV service in 3G and GPRS networks and viewers can access YLE's latest news, Urheilukanava (Sport channel), MTV3 Extra, Nelonen, The Voice, BBC World and CNBC for the price of 1,90€/24h. For an additional 1,49€/24hthe games of Finnish ice hockey league are accessible. Other programs are available for the price of data transmission, e.g. Finnish Idol. The data transmission fee is 4€/month (25 Mb, within national borders).

MTV Oy is a part of the Alma Media Corporation and manages commercial television and radio broadcasting. MTV is responsible for the national channels MTV3 and Subtv. MTV reaches around 3 million Finnish viewers every day (MTV3, 12.2.2007).

Nelonen (Channel Four Finland) is a part of SanomaWSOY's Electronic Media Company, Swelcom. Nelonen reaches 2.1 million viewers every day (70% of the viewers live in urban areas) and is ranked third among the most attractive advertising mediums in Finland (Nelonen, 12.2.2007). Nelonen specifically focuses on reaching viewers through multiple channels and complements terrestrial and digital TV transmission with transmissions over the Internet and to mobile devices and the value added services available through these latter mediums.

Nokia is the world leader in market share concerning mobile communications handset sales and is actively lobbying for making its DVB-H the standard for TV transmissions to mobile devices. Other handset manufacturers have joined Nokia behind the DVB-H technology for mobile television transmissions, e.g. Motorola and Lucent. SonyEricsson has signed an agreement with Nokia for interoperability between mobile TV transmission technologies.

TeliaSonera Finland is the Finnish profit centre of TeliaSonera (Sweden) and offers products and services under the Sonera brand umbrella. TeliaSonera is the leading telecommunications company in the Nordic and Baltic regions. TeliaSonera offers fixed and mobile communications services as well as broadband services. TeliaSonera's mobile subscribers in Finland currently amount to around 2.5 million (TeliaSonera annual report 2005). TeliaSonera offers its own mobile TV in its 3G network. The service is also available in the GPRS and EDGE networks. Mobile TV costs 1,90 €/24h or 9,90€/month and is available for 19 different mobile phone models by Nokia. Sonera's mobile TV features live streaming of Nelonen, JIM, The Voice, BBC World and TV7 as well as the latest news cast from YLE and the financial newspaper Kauppalehti (part of Alma Media). Among additional services can be found sports events, music videos, movie trailers and news e.g. for hearing impaired.

YLE, the Finnish Broadcasting company is Finland's public service broadcaster. YLE is a major player in the production of content for TV and radio transmissions and is obliged to provide comprehensive broadcasting services to all citizens under equal conditions. YLE is financed by television fees paid by the viewers and operating license fees paid by commercial TV companies. In 2005 YLE's share of daily television viewing was 44.3% (YLE, 12.2.2007).

In addition several other organisations are related to the mobile TV business area in Finland. Most of them joined in later on in 2006, after Forum Virium was established during autumn 2005. **Forum Virium** is a cooperation cluster, originated by Digita, Elisa, Nokia, TeliaSonera, Finnish Road Enterprise Destia[3], TietoEnator[4], Veikkaus[5], WM-data[6], YIT-Group[7] and Finnish Broadcasting

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[3] **Finnish Road Enterprise Destia's** business area is the civil engineering sector, primarily the planning, construction, upkeep and maintenance of traffic routes and the traffic environment, as well as related products and services. Destia offers solutions and provides services to the Finnish Road Administration, other government agencies, industry, commercial enterprises, municipalities and cities.

[4] **TietoEnator** is consulting, developing and hosting its customers' digital businesses focusing mostly on areas as banking, telecom, healthcare and forest.

Company YLE. It is focusing on the development of new customer-driven digital services and contents. Its partners on the public sector are the City of Helsinki, SITRA (The Finnish National Fund for Research and Development), TEKES (National Technology Agency of Finland) and VTT (Technical Research Centre of Finland). Forum Virium's role is to act as the neutral matchmaker between the partners and to organise development activities with a view to promoting innovation and creating new business through interaction between enterprises.

Other associations that collect ICT players in Finland are called **Dimes** and **RTT**. Dimes calls for joint effort to utilize the results of R&D work for the deployment of new services benefiting the national economy. Companies can become members in the association by paying a membership fee. Dimes Association cooperates with the Finnish innovation organizations forming an effectively operating network which can represent the Finnish national actors in activities towards European Union technology opportunities. The Association offers an opportunity for mutual beneficial collaboration within the Finnish ICT cluster and challenges ICT stakeholders to intensified innovation. The association was established in 2004. The first members attending were e.g. Nokia, TeliaSonera, Teleste, Yle, Finnet and Elisa. In 2006 the association had already over 40 member-companies and several ongoing projects. One of them is "Rich Media Services" including for instance a project that experiments mobile distribution systems with DVB-H channel and content billing support (Dimes, 22.3.2007). RTT is a non-profit organization that contributes to the research and development of new radio and television technologies in Finland. The participants are Digita, Elisa, MTV Media, Nokia, TeliaSonera, Swelcom, Teleste and YLE (RTT, 22.3.2007). In relation to mobile TV, RTT has a "subjective mobile audio-visual quality testing" -project in the DVB-H environment, which started in 2004. The research questions for the first project year related to the selection of audio and video codes and the optimal bit rates for audio and video bit streams. During the second project year the target was to study the subjective acceptability and quality of audio-visual content degraded by transmission errors and the impact of different error control methods for the acceptability thresholds and satisfaction scores. In addition, evaluations of the subjective quality were done in real usage contexts and those results were compared to the results obtained in laboratory environment. The target of the third project year is to discover the relative impact of coding and transmission errors to subjective audio-visual quality (RTT, 22.3.2007).

CASE DESCRIBTION OF FINNISH MOBILE TV

The context – Finnish mobile communications

The enthusiasms of the Finns adapting to the mobile phone has been explained by the technology-oriented nature of the people and the global breakthrough of Nokia (cf. Paija, 2001). During the 1990s, Finland has been one of the leading countries in mobile penetration and today it has reached more than 100% penetration rate. The number of users in relation to population has been one of the highest in the world since the breakthrough of mobile phones. This has been due to progressive legislation, familiarity with mobile phones already in the NMT[8] era, a mood favourable to modern technology and competition waged from the very start of GSM, which also has kept call process down. The Finns have traditionally been keen on developing and testing technology, but recent years have taught actors on the market that e.g. events such as 9/11, the increasing amount of competitors both from within and outside the traditional telecommunications industry, and national competition in the form of price wars

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[5] **Veikkaus** is a Finnish lottery for Finnish players. They offer gaming entertainment producing each day over EUR 1 million of lottery revenue.
[6] **WM-data** is a part of the LogicaCMG Group and offers IT services and solutions.
[7] **YIT-Group** offers technical infrastructure investment and upkeep services for the property and construction sector, industry and telecommunications. Their main market areas are the Nordic countries, the Baltic States and Russia.
[8] Nordisk Mobiltelefon, a first generation mobile technology standard jointly developed by Nordic incumbents during the 1970s and 1980s.

hamper investments. During the beginning of the 21st century, several operators have been forced to exit the market for mobile communications (e.g. Tele2, ACN Communications) and consolidation has taken place both within mobile communications as well as the media sector (the TeliaSonera merger; Swedish Bonnier recently acquired MTV3). Concerning the mobile terminals, several versions of DVB-H enabled mobile handsets by different equipment manufacturers exist on the market, but for instance Carlsson, Hyvönen, Repo and Waldén (2005) note that even though technologically advanced handsets are available and *per se* should encourage users to try out new mobile services, the adoption rate of mobile services has not progressed as expected. Reasons for the Finnish consumers' unwillingness to use mobile services are the start-up costs and the costs of using the services, which are regarded too high (Carlsson, Carlsson, Puhakainen & Waldén, 2006). The long price war that took place between 2003 (when number portability was introduced) until the end of 2006 has forced operators to focus on mostly voice and SMS services. There is thus a need for the Finnish mobile service market to develop in terms of range of mobile services and usage patterns. Generally mobile TV is seen as the needed boost. For instance, the pilot projects presented below are direct results from the willingness and need to develop and boost the market for innovative mobile services and indirectly regain Finland's position as the leading country of innovativeness in mobile communications.

The emergence of the mobile TV business net

Nokia unofficially tested TV in mobile devices already in 1998 and started developing the DVB-H technology in 2000 as a technology project, according to respondent X1 at Nokia. According to Falck (2004) mobile TV was initially driven by Nokia's interest in bringing television transmissions into mobile devices, which was at the time the only medium missing from the terminals. The DVB-H technology was formally adopted as an ETSI standard[9] in November 2004. A number of trials were commenced in a number of countries, e.g. the UK, Germany and Finland.

Pilot I (2001 – 2003)

The first mobile TV pilot in Finland was executed between 1st August 2001 and 1st July 2003, in which the studied area was how terminals, content and services were suited to various user situations (Södergård, 2003). The pilot was initiated through a consortium consisting of content providers Alma Media/MTV3 and Sanoma WSOY/Swelcom, mobile operators TeliaSonera and Elisa (at that time Radiolinja), telecommunications operator Malibu Telecom and terminal manufacturer Nokia as well as Digita. 81 users had the opportunity to test the service between October 2002 and February 2003 in hotspot areas in the city centre of Tampere. The aim was to define what kind of interface, content and service is suited for mobile television and what kinds of business models are possible. The main funding besides the seven participating companies came from TEKES and VTT. The project was named "mobile television in fourth-generation networks" and carried out by VTT Information Technology and the University of Tampere. The first pilot was however based on WLAN[10] technology, but important for the evolution of mobile TV in the sense that it proved the existence of a demand for such services. Nokia was participating in the project merely as an observer and equipment provider, but was at the same time conducting internal studies on IPDC, which eventually would lead to DVB-H based mobile TV.

Pilot II (2003-2005)

On December 15th, 2003, a number of actors joined forces again and signed an agreement of cooperation in order to test "IP Datacasting" (IPDC), which is a mobile broadcasting technology used to bring TV-like services to mobile terminals. IPDC conforms to the DVB-H technology developed by

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[9] The European Telecommunications Standards Institute (ETSI) is officially responsible for standardization of information and communication technologies within Europe.
[10] Wireless Local Area Network; also referred to as Wi-Fi

Nokia. Actors joining the test were Nokia, Digita, media companies MTV, Nelonen and YLE and mobile operators TeliaSonera and Elisa (at that time Radiolinja). The agreement covered testing commercial broadcast services to mobile devices in a pilot project, with the aim of learning about "real end-user acceptance for mobile broadcasting services". Other goals of the pilot project were also to "support ongoing standardisation work" and to "further clarify the regulative and spectrum issues for the planned 4th digital multiplex[11] in Finland" (FinnishMobileTV, 15.12.2003). Basically, the pilot project aimed at studying the market demand for mobile TV services and to clarify the requirements concerning regulatory and standardization issues. During spring 2005 (8.3.–20.6.2005), a three-month mobile TV pilot was implemented in Helsinki, with three main transmitters providing coverage for an area between the Kehä I and Kehä III ring roads. In terms of device equipment, the Nokia 7710 phones were equipped with TV receivers and distributed to 500 pilot users, half of whom were Elisa's and half TeliaSonera's mobile customers. The pilot featured the national TV channels and foreign theme channels, including BBC World, CNN, Euronews, Fashion TV and VIVA Plus. A small number of tailored mobile TV services were also developed for the pilot. (FinnishMobileTV, 15.12.2003).

The actors involved in mobile TV all viewed the project as an opportunity that expands their business activities, rather than a competition between rivals. According to respondent X1 at Nokia, cooperation has been promoted in Finland to such a degree that all actors see the value in cooperation patterns across industry borders and among direct and indirect competitors. According to respondent X2 at Nokia the main aim of the cooperation was to establish a new business area, mobile TV. It is thus in the best interest of every member of the network to cooperate. Cooperation was also a prerequisite for initiating the project. Related to the *Pilot II (2003-2005)*, announcements on the pilot project were articulated in the following way "Elisa and Sonera are responsible for customer service, invoicing and connections to the new interactive supplementary services. Digita has designed and built the digital TV network needed for the distribution of mobile TV services and will manage the network, while Nokia will develop the mobile TV service management and smart phones that can receive mobile TV broadcasts." (Nokia, 8.3.2005).

Pilot III (Autumn 2006→): The Finnish Mobile TV project

The Finnish Mobile TV (FiMTV) project is the third pilot project and organized within Forum Virium since autumn 2006. According to respondent X3 at Elisa, the previous pilots and technical projects at RTT gave Nokia confirmation that mobile TV was in deed a lucrative business area. At this stage Nokia's focus became global as their pilot studies in various countries all showed the same results. Nokia could not invest in the national cooperation on mobile TV. Thus, Elisa took the initiative to carry on the project around mobile TV alongside Forum Virium. A reason for Elisa's activity was the fact that since mobile TV would take several years in time to be established as a functioning market, the actors involved in previous pilots could carry on the cooperation and develop the project further until e.g. a commercial market is established, terminal range supporting DVB-H broadened and copyright issues resolved. Elisa is currently the only Finnish mobile operator that is investing in research on mobile services; respondent X3 at Elisa concludes that DNA Finland does not have the financial resources to carry out research on their own and TeliaSonera's research currently takes place in Sweden. Sonera acts more or less in the role of reseller of TeliaSonera services. However, all mobile operators are involved in such organizations as Dimes and Forum Virium, under which research takes place in cooperation with universities and institutes with the aim of contributing to the Finnish ICT cluster. Respondent X3 (Elisa) further states that Forum Virium basically has taken over the role that Nokia initially had as an initiator and driver in the cooperation net. Forum Virium is currently the driving force for the continuing development of mobile TV. The goal of the project at the moment is to promote the creation of innovative and interactive services for mobile TV in cooperation with both national and international developers (see Figure 2). It should also be noted that the mobile business net has had clear boundaries during the first two pilot phases and the net boundaries are being opened up only in this third pilot, where content providers are invited to contribute to creating the mobile TV service business area.

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[11] Multiplex indicates a digital television terrestrial network.

Forum Virium is referred to as a cooperative business network that aims at supporting the emergence and development of new innovative services through cooperation among members. The members pay a fee to engage to the net. The cooperation is of non-commercial nature. Each member of the net decides in time when a service or product is ready to be commercialised and on which terms. The commercialization is referred to as the "second stage" in the Forum Virium mobile TV initiative and was started on January 1st, 2007. The first stage included non-commercial cooperation among actors who are members in Forum Virium. All members of Forum Virium have the right to use the DVB-H test network and the year 2006 was labelled as the time to try and develop infrastructure, solutions and tests for end-users (Blomberg, 2006a). According to e.g. Blomberg (2006b) the commercial stage of mobile TV occurs during 2007 (see Figure 2 below), when several smaller projects will take place, aiming at creating new concepts for interactive services. In this stage it is vital that mobile TV gives a picture of being more than just a technology. The aim is also to develop mobile TV in general, i.e. not only mobile TV based on the DVB-H technology but also on 3G technology. For instance, interactivity and Web2.0[12] are features typical for mobile TV. A closer cooperation with e.g. Dimes Rich Media Services is planned and VTT has built a DVB-H test network where different technical applications will be tested during the next five years (Blomberg 2006b).
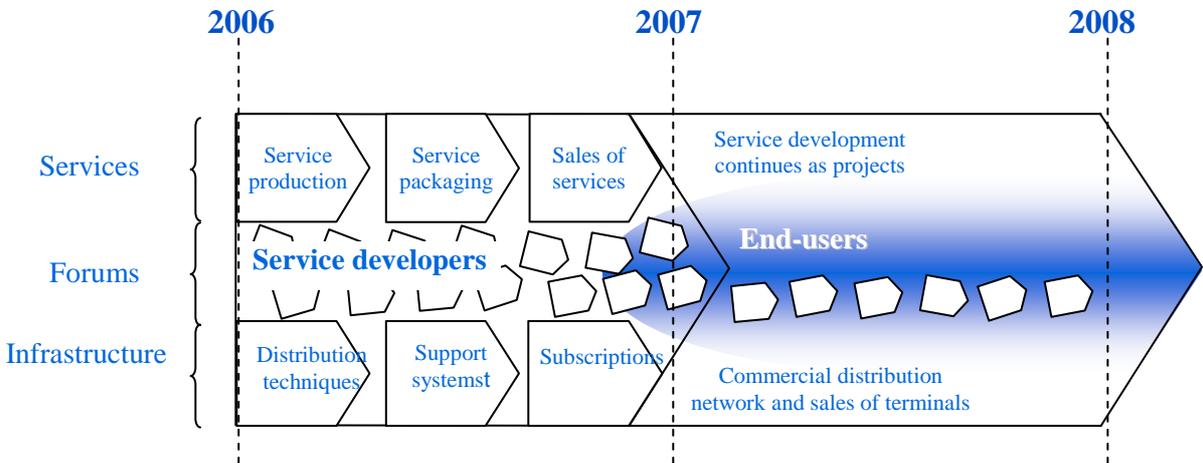

Figure 2: Development of the Finnish Mobile TV from building the infrastructure and planning the services to selling terminals and providing commercial services to end-users. (Adapted from Blomberg, 2006a)

Actor involvement within the mobile TV business area

DVB-H technology and terminal development

Nokia started lobbying for the DVB-H technology during the century shift and managed to get a number of other handset manufacturers and developers behind the technology. After a number of players were involved on a global level Nokia continued the development by initiating tests and trials on national levels. In order to test the technology in its terminals a number of Finnish players were contacted in 2003 (see Figure 3). These were media and telecommunications actors and Digita. Nokia thus initiated relationships with actors who possess the technical resources, i.e. telecommunications service providers Elisa and TeliaSonera, and actors who possess content resources, i.e. media companies YLE, MTV3 and Nelonen. Digita, on the other hand, was awarded a license to operate the DVB-H network and was therefore an important partner for Nokia in distributing radio and television services and developing data communications networks and distribution network infrastructure. When asked when other actors started participating in Nokia's mobile TV pilots, respondent X1 (Nokia) answered that they came along when Nokia needed new parties, but stressed that the regulator and the Ministry of Transport and Communications played large roles in defining the environment for acting.

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[12] Refers to a perceived second generation of Web-based services that emphasize online collaboration and sharing among users.

Respondent X1 (Nokia) does not consider the other actors' roles as "that important". It must be kept in mind that Nokia strives at making DVB-H a global technology standard. The concerns of Finnish mobile TV are relatively small in Nokia's global strategies. The piloting of services in Finland take place in a very small market and the business opportunities can be found, at least according to Blomberg (2006b), on the global markets.

Mobile operators' roles in mobile TV are twofold when it comes to providing services. Firstly, there will be free services such as TV transmissions, where the role of the operator is questioned, as the TV transmissions are accessible by end-users, without a mobile operator collecting e.g. service fees. Secondly, a content or service developer may offer paid services, such as a package of content, for example 4.99€/month, which the end-user pays via SMS. Mobile operators thus cash a percentage of that fee and the content creator receives the rest of the fee. Revenue sharing gives the mobile operators a role as a bank (Respondent X2 at Nokia). Telecom operators have a natural role for this since they have the billing connections, needed information and the mechanism is already built.

Mobile TV content and services

Attractive and high quality content is a prerequisite for a successful mobile TV service and good content providers are hard to find. YLE, MTV3 and Nelonen are the three Finnish content providers that are considered the most important actors when planning an attractive commercial mobile TV service from the end-user perspective (Respondent X4 at MTV3), since they are the most popular channels in traditional TV. Media companies thus see themselves as natural members of the mobile TV initiative. For instance, MTV3 has expressed that in the beginning of mobile TV the company is comfortable with the idea of the mobile operators taking care of billing and interactive services. In the long run MTV3 wishes that end-customers would feel themselves as customers of MTV3 and that services and specific channel packages can be e.g. downloaded directly from MTV3's home page. MTV3 stresses that in this model the mobile operators do not alone "own" the end-users. Respondent X3 (Elisa) states that the goal of all actors involved in mobile TV is to "own the end-customer" and that it is very likely that the media companies, i.e. content providers, will try to circumscribe the mobile operators in order to reach the end-customers and establish direct contact. For instance MTV3, which is a commercial channel, is currently a pure B2B actor and has little contact with end-customers. MTV3 could take a role as a B2C actor, where it would offer mobile TV content directly to end-customers (e.g. end-customers download and/or purchase content from the MTV3's Internet site) and possibly ignore revenue sharing relationships with mobile operators. However, such a strategy would become expensive if MTV3 were to bill the end-customers directly, since MTV3 does not have the required billing mechanisms and end-customer information. Building such systems is mentioned by most respondents to be very expensive and time-consuming. Mobile TV is an extension of current TV channels and MTV3 aims at reaching 30% of mobile TV viewers (Lehto, 2005). It seems like the users of mobile TV prefer domestic brands. *Pilot II (2003–2005)* showed that 75% of audience shares were dedicated to domestic brands. Sports channels received a 10%, news channels 7% and other 8% audience share (Kronlund, 2007). According to respondent X3 (Elisa) there is no business for mobile TV unless the media companies are involved in offering content; these content providers are thus considered vital for the success of mobile TV.

Also other actors such as telecom operators had some attempts to develop content formats for mobile TV, but they gave up after facing problems with television licences and content rights (e.g. Elisa). At the moment the actors are not themselves announcing any new mobile TV services and content developers are scarce. Rather, Forum Virium has initiated an extended cooperation with research groups and institutes in Finnish universities and polytechnics/universities of applied science in order to create innovative ideas and concepts for mobile TV. Respondent X5 at TeliaSonera notes that the current business net setup means that as long as only the big media companies MTV3, YLE and Nelonen are taking part in the planning of mobile TV, the customers will have to wait for innovative services. The actors simply do not know who will create new content, such as interactive services. "Now when we are pushing out standard TV programs it means that only the old players have sat

around a table and Nokia has driven this and it is in the equipment provider's interest that the terminal sells" states Respondent X5 at TeliaSonera.

DVB-H network operation license

The roles of the actors were fixed at the non-commercial stage of the mobile TV project, but not at the commercial stage (Respondent X6, formerly deployed at AlmaMedia, MTV3). In terms of role taking and role giving, respondent X7 at Swelcom mentions that none of the seven actors involved in *Pilot II (2003 – 2005)* had deliberately tried to alter the value chain and thus the roles of the actors have not changed dramatically, which also explains why the cooperation runs so smoothly. At the commercial stage of the mobile TV project the actors are vigorously seeking roles which are currently unclear. "As long as the roles in the commercial stage have not been articulated, all actors are forced to cooperate", states respondent X8 at Digita. Digita, as the DVB-H network operator, has a clear commercial role and acts based on that position. This encourages other actors to seek new types of roles such as content providers or content packagers (respondent X8 at Digita).

However, the competition over power and control is a fact since several actors within the mobile TV project applied for the licence to build and operate the DVB-H network. In March 2006, Digita obtained the DVB-H network licence from the Finnish Government. Digita thus became a network operator responsible for the broadcasting network and administration of channels. According to Digita, their role is "to be the network operator and offer capacity and services of the network to all service providers under equal, fair, and transparent terms" (Nokia, 12.5.2006). Telemast Nordic, TeliaSonera and Elisa also applied for the licence. In May 2006 Digita announced that they had signed a contract with Nokia to use its DVB-H platform for the service. The network was scheduled to be launched on the 1st December 2006. Initially the network covered 25% of the population with a coverage area consisting of Helsinki, Oulu and Turku. Commercial services started in the beginning of 2007; the only service available was Voice TV and Kiss digital radio offered by SBS Finland Oy. The first content provider in the DVB-H network in Finland was signed November 7th, 2006, when SBS Finland Oy agreed to become the first media company content provider for the commercial mobile TV network.

If TeliaSonera or Elisa would have received the license to build and operate the DVB-H network, there would have been a significant risk that any service provider that would want to offer mobile TV services in a mobile operator's DVB-H network would have to do so under e.g. TeliaSonera's brand. Thus the service provider's own brand might be left in the shadow. The Ministry of Transport and Communications chose a neutral actor for deploying the DVB-H network for a reason; it wanted to prevent mobile operators from becoming too powerful actors in the mobile TV business area. Digita offers the network capacity and aims at being a neutral partner attracting a large number of service providers that sell their services under their own brands (see Figure 3.). Digita has thus taken a risk, since it has to invest millions of euros in building the DVB-H network. Respondent X3 (Elisa) speculates that if a mobile operator would have been awarded the licence, it would have been likely that Digita would have still been the one building the network due to the fact that Digita possesses the competence, resources and knowledge to do so. However, in such a case Digita would have acted in the role of subcontractor to the mobile operator holding the license. The mobile operator would in this case have shared the risk of investment with Digita.

Figure 3 illustrates the relationships between the actors in the Finnish mobile TV business area. The seven main actors participating in test pilots were also included to the initiators of Forum Virium, which in turn has contacts with partnership organizations VTT, TEKES, SITRA and City of Helsinki. Dimes and RTT are the other two test forums for mobile TV in Finland. The types of the relationships are divided into buyer-seller, R&D and revenue sharing relationships. These seemed to be the most important ones according to the interviewees. The most common roles of the actors in the emergence and development of the mobile TV business area are illustrated with colors. The same actor can possess a number of different roles, but these were the ones recognized as the most common among the main actors from the mobile TV net emergence and development point of view.
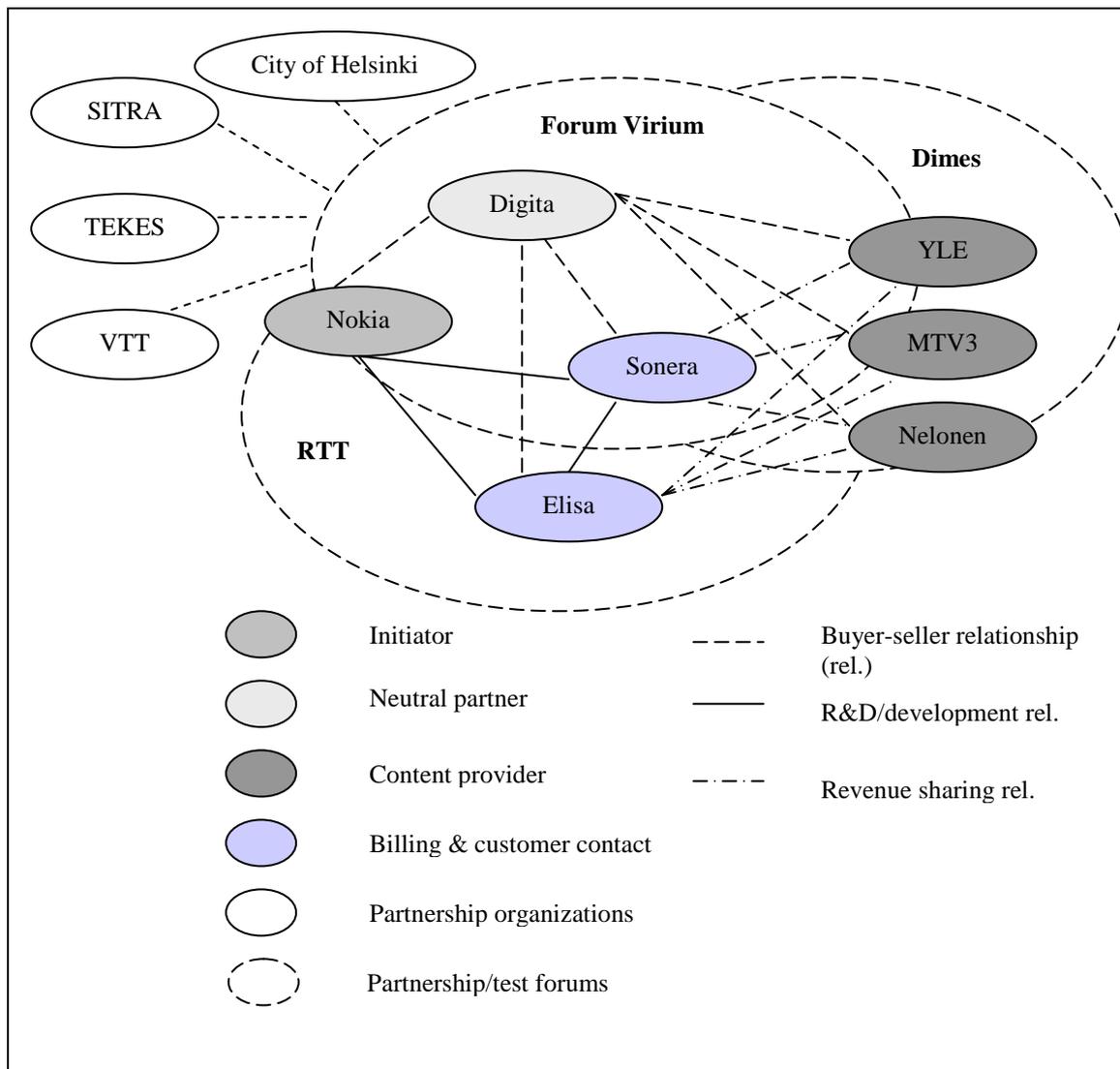
Figure 3: The focal actors' roles in mobile TV

CASE ANALYSIS:

Establishing roles and positions in a new emerging business area

According to Möller and Svahn (2003) networks emerge through three phases, (1) exploring for future business, (2) mobilization for applications and (3) mobilization for dissemination. These phases all have their specific characteristics. The phases are interlocked and overlapping in nature, which is symbolized by the over-arching ellipses in Figure 4. The mobile TV business net has developed and emerged similarly to the stage model developed by Möller and Svahn (2003). However, Möller and Svahn (2003) do not discuss change dynamics in terms of role and position and how they affect the emergence of business networks. In the early phase the search of new business opportunities led to Nokia's need to link resources, competences and actors to the development of the DVB-H technology. A business net was formed in order to develop mobile TV as an application and a mobile service. On a global level Nokia leads now the struggle concerning standardization, while the other net actors are coping with e.g. interactive service development for mobile TV, not to mention unsolved copy rights and licence agreements. The business net is about to enter the third stage, where markets are developed and a number of separate nets are being created, mostly in connection to research institutes at universities and polytechnics.
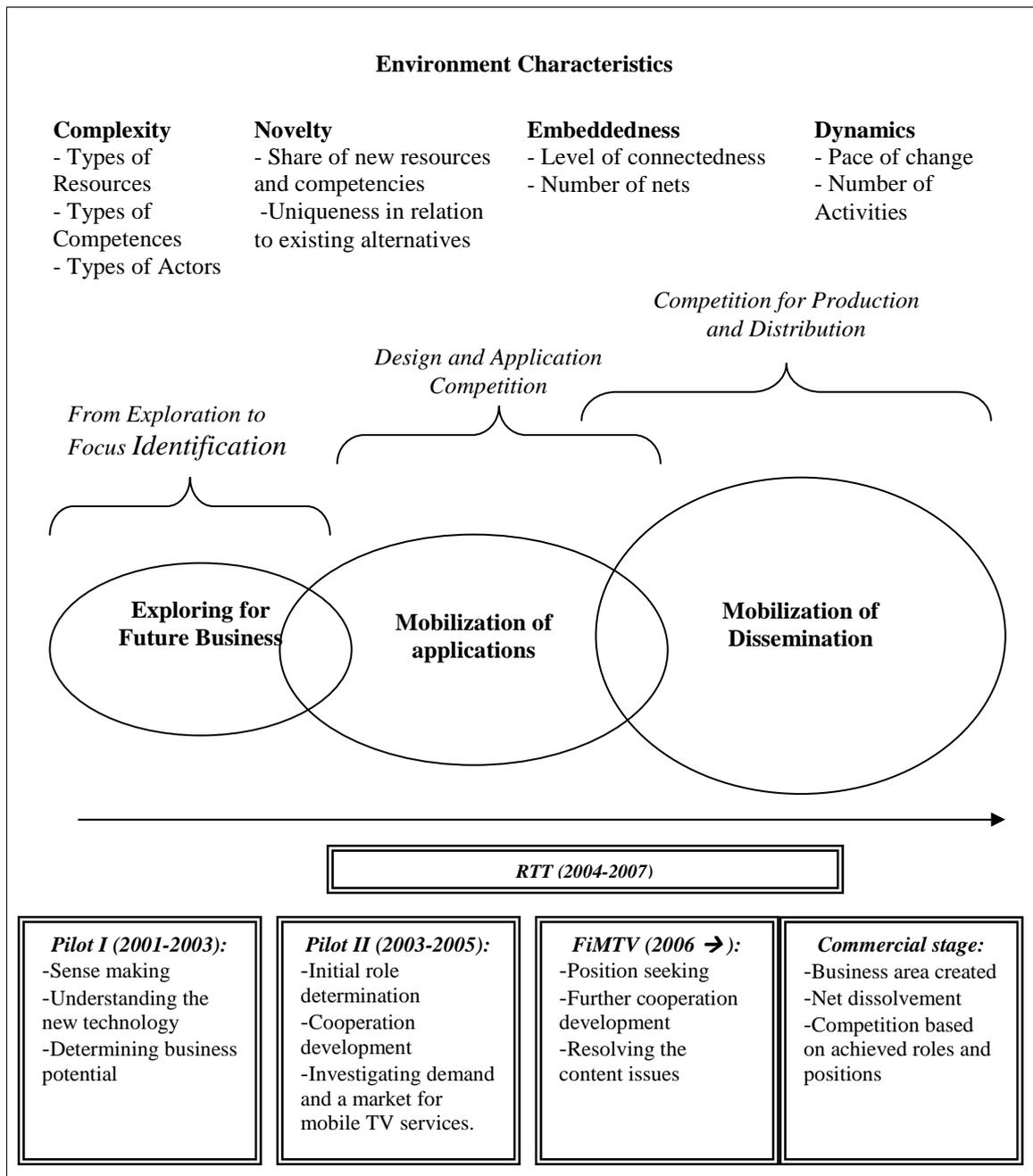
Environment Characteristics

Complexity	Novelty	Embeddedness	Dynamics
- Types of Resources	- Share of new resources and competencies	- Level of connectedness	- Pace of change
- Types of Competences	-Uniqueness in relation to existing alternatives	- Number of nets	- Number of Activities
- Types of Actors			

Competition for Production and Distribution

Design and Application Competition

From Exploration to Focus Identification

Exploring for Future Business

Mobilization of applications

Mobilization of Dissemination

RTT (2004-2007)

Pilot I (2001-2003):	*Pilot II (2003-2005):*	*FiMTV (2006 ➔):*	*Commercial stage:*
-Sense making	-Initial role determination	-Position seeking	-Business area created
-Understanding the new technology	-Cooperation development	-Further cooperation development	-Net dissolvement
-Determining business potential	-Investigating demand and a market for mobile TV services.	-Resolving the content issues	-Competition based on achieved roles and positions

Figure 4: Development of Finnish mobile TV business area.

First phase

The emergence and development of the business net took place on the initiative of Nokia. Nokia was the one who started the development of the DVB-H technology, on which mobile TV in Finland lies. According to Möller and Svahn (2003) it is usually firms that are carrying out their existing businesses through well-established networks that make up the early emergence landscape. Most of these early actors are also engaged in incremental, local technology development activity aimed at improvement of their products and business processes. In order for Nokia to further develop and test the technology a network of competence had to be built. In terms of recognizing possible partners Nokia did not really have many choices: mobile operators which own their network infrastructure amount to three in Finland and media companies are fixed in three camps. The selection process did in other words not take place on a national level, but might have been the case on a global level from Nokia's

perspective. Competences in the field of mobile communications were thus found with the mobile network operators TeliaSonera and Elisa. Nokia has cooperated with the mobile operators in Finland since the beginning of mobile communications. DNA Finland was, as mentioned earlier, not interested in mobile TV since its parent company Finnet is heavily investing in IPTV. Other actors involved in various pilots, such as VTT played a role as facilitators, as they, for instance, set up a test network and were able to conduct initial consumer tests. Dimes acted in the role of a "competence pool". Various actors are connected to Dimes and when opportunity rises and one needs special resources or competencies, Dimes has the resources to activate relationships or link actors to each other.

Mobile TV was initiated at Nokia as a technology venture with the aim of studying technical feasibility and determining whether mobile TV is a concept that actually works. The first pilot (see Figure 4), *Pilot I (2001-2003)*, was therefore technical in its nature. This pilot served as a sense making process, where the actors involved were trying to form an understanding of mobile TV and the opportunities it offers in terms of business. This process is always influenced by the fact that each actor has a specific view of the emerging opportunities which are based on their own specialization and technology base and a position in the emerging network (Möller & Svahn, 2003).

Second phase

The second pilot, *Pilot II (2003-2005)*, was of non-commercial nature; however, with the aim of investigating whether there is a demand and a market for mobile TV services. When entering the second phase in Figure 4 by Möller and Svahn (2003) the aim was to find out if the concept was financially viable. According to Möller and Svahn (2003) the core issue in the mid-emergence phase is how to turn a vision in an articulated technological concept into a realized business. The RTT's mobile TV project (2004-2007) shows the continuum of technical investigations and that it is still at this phase in the interest of all actors involved that the technology development functions smoothly. Issues resolved in this stage concerned e.g. sound and picture quality.

In the initial stages of business activity it has to be decided how things will be done. Successful Mobile TV business requires terminals, network and content, which is vital to function for any service or product. Möller and Svahn (2003, p. 19) state that this demands "[…] several interlinked networking capabilities. Actors who will have important roles in the emerging network must first be identified and then these actors must be convinced of the liability and earning potential offered by the new business, and finally, an architecture and organisation for network collaboration must be created."

In March 2006, Digita obtained the DVB-H network licence from the Finnish Government. Digita became therefore a neutral partner and DVB-H license holder, with whom Nokia now has a buyer-seller relationship in the mobile TV business net. At this time the technical part of the mobile TV business was almost complete. During the same year Forum Virium's *Finnish Mobile TV project* (2006→) was started in order to resolve mobile TV content. Content, in the field of media, was found with YLE, MTV3 and Nelonen. The mobile operators were aware of the fact that without the media companies there would be no mobile TV, since end-customers demand the type of content the media companies can provide. Thus, external forces, such as customer demand, determine in a way the composition of the business net: as long as no alternative content providers exist, the current media companies which are net members are vital for the business net and the development of mobile TV service markets.

Third phase

The *Finnish Mobile TV project* (2006→) continues and a number of new relationships are established and activated, as the development of the mobile TV business area is now entering the third phase (see Figure 4), where both technical and financial functioning is tested. At this phase, also, the development of the content side continues, i.e. attracting content developers, providers and packagers. According to Möller and Svahn (2003) this phase represents the transition to market competition from

a situation of pre-market competition. The emphasis is on the creation of a highly-effective demand-supply value system by exploiting the specialist capabilities of a variety of component and service suppliers and distribution channel members. Since the emphasis has so far been on co-development activities, but assembly and distribution activities require capacity derived from strong coordination capabilities, this may require reorganization of the net.

After Nokia came to the conclusion that the technology functions properly, their focus has been laid on global markets. As it became apparent that the cooperative business net established in Finland was not in the direct interest of Nokia to develop further, Elisa took the initiative to organize further development projects and pilots within the Forum Virium cooperative business network. Elisa will be the driver of the mobile TV as long as the commercial stage has not been fully reached. Nokia is still part of the development, but in a lesser role. The fact that Nokia sees the cooperation around mobile TV in Finland as temporal is worth noting. For instance, Ahola (2003) proposes that temporary inter-organizational networks exist only for the duration of a project at hand and names this a project network. He (ibid.) further states that project networks are short termed. The relationships are not completely terminated, but are rather left "dormant" and activated again when needed. In addition, Hadjikhani (1996) mentions "sleeping relationships", which are labels for such relationships which suffer from discontinuity in e.g. selling. This is especially true for project marketing or project networks. Dimes, as an association, is also a good example of dormant or sleeping relationships which can be activated when the need for specific resources or competencies arises. Similarly, Skaates (2000) discusses discontinuous relationships; in such situations where business activity has been terminated social elements may remain (Havila & Wilkinson, 1997). Structural and economic elements of the relationship are not present in the long-term in such situations.

In a study conducted by Södergård (2003, p. 88) expert interviews revealed e.g. that all the actors in the business net will try to make "their piece of the cake" bigger compared to their current size and broaden their field of expertise to include non-traditional core functions. Södergård thus draws the conclusion that the actors in the business net might take on other actors' roles. He (ibid.) also found that if there are to be conflicts between the actors in the mobile TV business net, they will most likely concern frequencies and distribution networks. In the current business net set-up it is quite evident that TeliaSonera and Elisa are direct competitors on one hand, and the three media companies or content providers MTV3, Nelonen and YLE are competing with each other on the other hand. What is interesting in this context is the fact that a struggle for the end-customers exists between the mobile operators and the media companies/content providers. The role of the media companies as content providers has been established through the pilot studies, which show that the consumers want to watch the content provided by exactly these media companies. The mobile operators, on the other hand, are in a position where they control the contact interface to end-customers and are equally important for the media companies if they wish to broadcast channels through alternative media. The only neutral partner is Digita, with a return on investment in infrastructure in mind. If one takes a look at mobile TV transmitted via the 3G mobile network, the situation is different: mobile operators own the 3G mobile networks and media companies own the content. Mobile operators produce no or little content themselves and are thus dependent on the media companies in order to provide mobile TV services in the 3G mobile network. The media companies need access to the 3G mobile network. This means that mobile operators and media companies have agreed on exchanging resources and establishing a mutually beneficial relationship leading to a win-win situation for both parties. Concerning the DVB-H network the mobile operators and media companies stand in a direct buyer-seller relationship or, possibly, revenue sharing relationship.

Henders (1992) notes that a position cannot exist until it is created through the interaction of actors and their resources in networks. The mobile TV business net in Finland illustrates the search for roles and positions in order to create a new business area; both the business net and the market are emerging. Through this process the roles and positions are being established. Even though roles were more or less predetermined based on the core competences that each actor possessed, they are far from being fixed. The real competition is still going on, i.e. the competition for the contacts to end-customers. According to Bengtsson and Kock (1999), competitive relationships indicate that power

and dependence is equally distributed among the competitors (actors) based on their positions in the business network. The goals of the actors are believed to be similar and can only be achieved through business (acquiring resources) with the same buyer. In this case, both mobile operators (if they wish to offer their own mobile TV services) and the media companies have to do business with Digita. The roles might be somewhat clear at this phase in the development process, but the positions in the net are not yet fully established. Positions are viewed as consequences of prior activities (cf. Johanson & Mattsson, 1985). Positions also reflect the cumulative nature of networks (cf. Forsgren, Hägg, Håkansson, Johanson & Mattsson, 1995) and balance between past and future (Easton, 1992). Future actors, such as new content developers, may change the set-up of the net and affect the positions of existing net members.

DISCUSSION AND CONCLUSIONS

The aim of the study was to describe how the new business area of mobile TV has developed in order to create understanding of its emergence and formation through interaction between focal actors. The case offers an interesting perspective on the net emergence process including both cooperation and competition. In this case, net formation provided an opportunity for the focal net actors to create understanding of a concurrently emerging market or new business area, mobile TV. As the net emerges, actors in the net are seeking the most lucrative positions and roles to act in when a commercial mobile TV service market is established. The fact that media companies see an opportunity to bypass mobile operators as the contact to end-customers indicates a fight over power and control. All the focal net actors have a goal to "own" the end-customers in the mobile TV business. The competition is at its most fierce between media companies and mobile operators. Several respondents speculate about the fact that since the actors originate from different industry areas, they might have difficulties in finding a common language. They thus also have different views on the future positions within mobile TV business area. The fact that mobile operators are now driving the developmental work on mobile TV under the lead of Forum Virium and encouraging service and content development may tell us that the mobile operators are establishing their position as the end-customer contact interface further by becoming less dependent on the media houses, which currently are the only content providers in mobile TV. The power of YLE, Nelonen and MTV3 will be diminished if alternative content providers appear and manage to offer services that align with the end-customers' preferences. The position in the net is thus coloured by a struggle over power and control over the actors and their resources. In the words of Skates (2000, pp. 9-10), "Within a given field there are power struggles, due to actors' desire to create distinction. Actors struggle to possess as large a portion of the qualities that other actors in the field view as desirable as possible". However, the struggle is not necessary of evil; Gadde *et al*. (2003) point out that the more the actors try to influence one another, the greater is the potential for development. The fact that actors try to influence and control each other constitutes the driving force for net development and this may become beneficial for the market/business area creation process in general. Henders (1992) also notes that positions are constantly changing, which indicates that the business net developed around mobile TV is constantly changing and evolving – at least until its dispersion.

Nokia is not the only actor that is deliberately aiming to exit the cooperative mobile TV business net when a functioning business area is established; also other net members see the net cooperation as temporary or on a project basis, where everybody is on their own as soon as a commercial market is up and running. The pre-commercial stage in the development of mobile TV is characterized by cooperative development projects and net formation whereas the commercial stage involves each actor offering their own services under their own brands. Also, after mobile TV is commercialized each actor may not have the resources to carry on the cooperative development within the net, since it becomes evident that resources need to be reallocated on producing and delivering competitive mobile TV services. Halinen and Tähtinen (1999) mention terminal relationships, where both actors prefer to operate independently or with someone else, but are not able to do so. Thus, dissolution of the relationship is desired and wanted. Duck (1981) establishes the notion of episodic relationships. They are created for a certain purpose and/or time period and thus dissolve when they have served their

purpose or the time period has elapsed. The relationships in the case net may be based on previous exchange relationships, but were established with dissolution possibility in mind. Only Digita has achieved a clear position where it can establish buyer-seller relationships with net members. However, even though the case has characteristics of project networks and discontinuous relationships, it does not imply that the relationships and links between net members will dissolve after the business area for mobile TV services has been created. The nature of a relationship may change or the relationship might become dormant only to be activated later. It is also possible that the cooperation activity is shifted to another level, but our data does not permit us to draw conclusions on what happens after the commercial mobile TV services are launched.

Net emergence is a process and in the case described in this paper, it has a goal to establish a new business area, mobile TV. Network cooperation is therefore required in order to create mobile TV business. The fact that mobile operators have taken on the role as drivers of mobile TV development gives them a position from where they are able to determine or at least guide the direction of the business area expansion. In this case, the mobile operators are leading the net towards the birth of new content providers and service developers. This occurs partly because only Elisa is able to invest in research and development of mobile TV at the moment, and partly because of the wish to diminish their dependence of media companies YLE, MTV3 and Nelonen.

Thus, by taking the industrial network perspective on emerging networks and analysing the case study of Finnish mobile TV, we arrive at a number of key findings:

- The INA literature has not traditionally been concerned with establishment of a new business area, but the case indicates that it is possible through acting in and forming cooperative nets. As Möller and Svahn (2003) points out, this is especially true in technology dependent industries, where service development often stems from advances in technology.

- An actor in the role of an initiator in cooperative relationship and business net formation, as Nokia in our case, is required to determine which competencies, resources and actors are required in order to form an economically lucrative business model and cooperative nets, bearing the business development in mind. This notion is comparable to description of the pre-commercial phase of business net development suggested by Möller and Svahn (2003).

- Möller and Svahn (2003, p. 12) points out that each actor has a specific view of the emerging opportunities which is based on his own specialization and technology base and a position in the network. The net position where an actor has a control over the contacts to the end-customers seems to be the most sought one in providing mobile TV services. For example MTV3, as a commercial content provider, would like to secure its revenues with end-customer contacts, since the income from advertising in mobile TV is still a question mark. MTV3 is currently relying heavily on B2B revenues in the form of advertisement. The lack of end-customer information and billing addresses and mechanisms, however, makes this goal difficult and expensive to reach for a content provider.

- Möller and Svahn (2003) do not consider the surrounding context in their model of emerging networks. The mobile TV case shows that external factors influence the formation process and composition of the net. Firstly, issues related to copyright threaten to dissolve the mobile TV business net unless agreements are reached. Secondly, the net actors have to a large extent been determined by end-customer preferences. The popularity of media companies as content providers cannot be neglected by other net members. The roles of media companies as content providers are required in order for the net to exist. For example if a popular content such as MTV3's is not shown in mobile TV, end-users have lower interest to start using mobile TV services. Thirdly, the context is determined by the current structure of the mobile communications market in Finland, which is characterized by low investments, a narrow range as well as low usage of existing mobile services and the incapability to carry out R&D in-house and independently from other actors. Thus, the surrounding context puts pressure on

actors to produce innovative services and boost the mobile communications market, but none of the actors are capable of reaching results on their own. Cooperative patterns are therefore required and nets/networks are established on purpose (cf. discussion on strategic nets by Möller and Svahn (2003)).

- Möller and Svahn (2003) do not discuss internal net dynamics in terms of change in role and position as an influencing factor for net formation. The mobile TV case shows a struggle over roles and positions which link the actors closer to the end-customers. Actors are seeking their roles and position in relation to their existing capabilities as well as future capabilities (such as e.g. MTV3 being a B2C actor in the future, or mobile operators becoming content producers), a process which is not given deeper thought in the Möller and Svahn (2003) model of emerging networks.

- The mobile TV business net in Finland can be characterized as a "project net" (see e.g. Ahola (2005), short-termed and with the purpose of being dissolved, according to our interviewees, when a commercialized mobile TV business area has been reached. This view is opposite to prevailing research on business nets and networks, which emphasize long-term commitment. Cooperative relationships in project networks are established and maintained as long as the project has not reached a fully commercialized stage, i.e. a market for mobile TV has been established. Dissolution does not necessary mean termination of a relationship, but the nature of the relationship may change or the relationship might become dormant only to be activated later. Actors do not have resources for research and development, while focusing on production and distribution. As Möller and Svahn (2003) conclude, they have to be able to shift their emphasis from R&D to the creation of an efficient dissemination net. They must, however simultaneously maintain their R&D capability and be prepared to start new research projects. In our case, Forum Virium, Dimes and RTT are interest groups for technology R&D, which can be activated when resources for new research projects are needed. All of the actors in the mobile TV net are members in these groups and thus pool their R&D resources together. Möller and Svahn (2003) do not take this kind of interest groups and project bound activities in consideration in their study, but our case clearly shows that they have a considerable impact on new business net emergence and formation. Thus, the importance of other business nets for a focal net as well as the relation between them should be discussed and included in the network emergence model presented by Möller and Svahn.

Limitations of the study and suggestions for further research

There are a number of research limitations in this study that give rise to future research opportunities. As the study is context-bound, the analytical generalizations are likely to prevail only in the specific context of mobile TV business. The study was conducted in Finland, where commercial mobile TV services are a relevant issue at the moment. The nationwide commercial mobile TV services will be launched during 2007. Future research could well focus on emerging networks and changing roles and positions in the other technology-oriented business fields, with a view to identify the challenges and driving forces that are typical for other contexts. Further research is needed, in particular, to enable the effects of various inter-organisational alliances and cooperation on the process of an emerging net to be assessed. Future studies could investigate how actors' earlier cooperative interactions support the net formation and affect on emerging roles and position in a new business area. Relationships between actors in Finnish mobile communications business nets are characterized as dormant and activated only when need arises. Also, according to the mobile TV case, relationships are said to be disseminated when mobile TV reaches a commercial stage, which raises questions on the nature of the relationships between mobile communications actors. The importance of social relationships in emerging networks thus deserves more attention. Finally, given the challenge inherent in new technology emergence, it would be interesting to consider how organisational structures support or hinder the actors in seeking lucrative and suitable positions in the future business area.

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