Coordination in innovation-generating business networks – the case of Finnish Mobile TV development

Paavo Ritala
School of Business, Lappeenranta University of Technology, Lappeenranta, Finland, and

Pia Hurmelinna-Laukkanen and Satu Nätti
Oulu Business School, Oulu University, Oulu, Finland

Abstract

Purpose – In this study the authors seek to discuss and empirically analyze coordination mechanisms in innovation-generating business networks. Their aim is to explore how these coordination mechanisms, as well as the roles of actors, evolve during the development of such networks.

Design/methodology/approach – The paper analyses an in-depth single case study on the development of Finnish Mobile TV in an innovation-generating business network comprising a heterogeneous range of actors.

Findings – The findings suggest that coordination of innovation-generating business networks combines "management" and "orchestration", both of which have their distinct roles throughout the development of the network. The latter is used throughout the case in question to communicate vision and build social capital, and the former to coordinate phases closer to commercialization.

Research limitations/implications – The study provides novel evidence in explicating how network coordination mechanisms of management and orchestration change as the innovation-generating business network evolves. However, there is a need to examine the issue further from different methodological standpoints in order to improve the generalizability of the results.

Practical implications – Managers will be able to use the lessons learned in designing different coordination mechanisms to ensure that the network evolves in the desired direction, and in considering the role of their companies in this development.

Originality/value – The paper enhances understanding of how coordination mechanisms evolve in different phases of innovation-generating business networks.

Keywords Coordination, Orchestration, Management, Innovation, Networks, Network evolution, Television, Business improvement

Paper type Research paper

An executive summary for managers and executive readers can be found at the end of this article.

1. Introduction

It is increasingly common in the contemporary business environment for firms to extract knowledge from multiple sources, and to join various networks in their innovation activities (Chesbrough, 2003; Peters *et al.*, 2010; Westerlund and Rajala, 2010). In line with this, innovation-generating business networks can be defined as constellations comprising the focal firm and its stakeholders (customers, suppliers, other partners and even competitors; Munksgaard and Freytag, 2011; Möller and Rajala, 2007; Ritala and Hurmelinna-Laukkanen, 2009), the aim of which is to generate new or modified sources of value for the participating actors and relevant external stakeholders in a sustainable way (e.g. Donaldson and Preston, 1995; Freeman *et al.*, 2004). However, bringing together different types of actors creates its own challenges, especially in terms of coordination (Ojasalo, 2008). Collaborative innovation activities simultaneously incorporate stability and dynamism (Sutton-Brady, 2008; Hedaa and Törnroos, 2008), autonomy and interdependence, additional resources but also barriers to performance (Geersbro and Ritter, 2010), a tendency to influence and to be influenced (Håkansson and Ford, 2002; Kragh and Andersen, 2009; Low and Johnston, 2010), and the protection and sharing of knowledge. Thus, coordination of innovation networks is inherently characterized by the search for balance and the need for compromise.

According to the existing knowledge, coordination in networks can take various forms (Dhanaraj and Parkhe, 2006). Two of these – management and orchestration – are taken under closer examination in this study. Network management refers to having explicit goals and timetables, as well as systems facilitating coordinated collaboration, for example (e.g. Möller and Rajala, 2007). It also includes the idea of having some type of leadership, or a leader. The leader sets the rules (in collaboration with others) that are needed in

The current issue and full text archive of this journal is available at **www.emeraldinsight.com/0885-8624.htm**

Journal of Business & Industrial Marketing
27/4 (2012) 324–334

[DOI 10.1108/08858621211221698]

Received: 8 March 2011
Revised: 9 March 2011
29 June 2011
14 December
Accepted: 2 January 2012

Journal of Business & Industrial Marketing
Volume 27 · Number 4 · 2012 · 324–334

order to reach the desired outcomes, and monitors how they are followed. On the other hand, orchestration (e.g. Dhanaraj and Parkhe, 2006; Ritala *et al.*, 2009) refers to activities that enable and facilitate (but do not dictate) the coordination of the network and the realization of the innovation outputs. In this context it is not about leading or directing the network, but more a question of discreetly influencing other firms and making sure that the premises for knowledge exchange, value creation and appropriation, and innovation are in place.

These two concepts are useful as they both incorporate issues such as trust and commitment, as well as control through contracting – often seen as complementary or supplementary governance mechanisms (Morgan and Hunt, 1994; Vlaar *et al.*, 2007; Olander *et al.*, 2010), but the emphases vary depending on the approach. For instance, while management focuses on "coordination by commanding", orchestration has its emphasis on "coordination by enabling". It is recognized in this study that the two often co-exist in practice, thereby creating a hybrid form of coordination involving the simultaneous use of both.

The problem is, however, that existing literature does not really explicitly state in which situations different forms of coordination would function best. It has been shown that networks come in different sizes and shapes, and this surely influences the need of coordination and in its implementation (Möller and Rajala, 2007). The number of involved actors, the power balance, the organization of the knowledge exchange, the aims of the network and the phase of the network evolution (together with external factors such as industry or economic context) have an effect on the possibilities to rely on certain forms of coordination as well as the efficiency of the coordination (see, e.g. Medlin, 2004; Halinen and Törnroos, 2005; Sutton-Brady, 2008; Hedaa and Törnroos, 2008; Kragh and Andersen, 2009; Claro and Claro, 2011). Of these issues, the evolutionary processes, in particular, are quite under-researched (Provan *et al.*, 2007; Olander *et al.*, 2010). Thus, there is a need for research that takes explicit focus on the interplay between network characteristics, its evolution, and the potential coordination mechanisms.

The following question is addressed in order to narrow this research gap: "How can the coordination of innovation-generating business networks be aligned with the network characteristics and evolution?" In order to find answers to this question, we conducted an in-depth case study of Finnish Mobile TV. We use the data to determine the network characteristics, and to find out how coordination appears in such a network. And more importantly, we analyze how coordination evolves, thereby obtaining evidence of the dynamics inherent in innovation-generating business networks.

This study contributes to the existing literature on business networks in following ways. First, we conceptualize the coordination mechanisms in two distinct categories: orchestration as "coordination by enabling" and management as "coordination by commanding". We also suggest that these mechanisms are not mutually exclusive, and that they vary in relative importance depending on the attributes (the central features of the network) and the phase (how close commercialization is) of the innovation/development process. Thus, an additional insight is the explicit evolutionary perspective on innovation-generating business networks used in this study, which has been somewhat neglected issue in network research (see, e.g. Quintens and Matthyssens, 2010; Olander *et al.* 2010). Second, we focus in our analysis on the network as a whole rather than on one firm's viewpoint, thereby further contributing to the discussion on network-coordination processes (e.g. Woodside and Biemans, 2005; Jack *et al.*, 2010). In doing this, the results also provide empirical evidence of how coordination is manifested as shared orchestration on the network level, as well as in terms of rotating leadership between individual actors (supporting the argument put forward by Davis and Eisenhardt, 2007).

2. Innovation-generating business networks and network evolution

2.1 Characteristics and determination of innovation networks

Innovation networks are not alike. Differences emerge in terms of how many actors are involved, is network intentionally formed or "emergent" (Powell and Grodal, 2005), the power balance between the actors (Ibarra, 1993), and the level of trust and social capital (Inkpen and Tsang, 2005). In addition, there are differences in the balance between knowledge exploitation vs. exploration (Harryson *et al.*, 2008), level of stability (Inkpen and Tsang, 2005), openness (Pisano and Verganti, 2008) and the role of contractual relations and informal ties (Powell and Grodal, 2005). Among the previous mentioned aspects are also those that change along the cooperation and developments towards both cohesion and loosening of the network (see, e.g. Reagans and McEvily, 2003; Harryson *et al.*, 2008).

There are many typologies based on addressing some or multiple of the aforementioned characteristics. In the context of this study, the level of determination of innovation networks – i.e. how determined/purposeful the network is towards certain objectives (see, e.g. Powell and Grodal, 2005; Möller and Rajala, 2007) – is the most interesting one, since it enables the investigation the evolution and change.

Innovation-generating business networks differ depending on the radicalness of innovation and looseness and cohesion of the network. In the most "fuzzy end", innovation activities are based on basic research, science and technology, and loosely connect together various actors such as universities, institutions and company-based research organizations. These networks typically generate radical innovations and influence emerging business and technological fields (Möller and Svahn, 2006; Möller and Rajala, 2007). The knowledge held in such innovation networks is often highly tacit, individual, and widely dispersed (Doz *et al.*, 2000), and there is a high level of ambiguity (e.g. Geersbro and Ritter, 2010). The relationship between existing and emergent knowledge is typically vague (Arrow, 1974; Möller and Rajala, 2007, see also Strang and Still, 2006).

Aforementioned types of networks can be seen as a "primal form" of innovation-generating business networks, which often evolve to the next level – possibly into inter-firm networks focusing on technological innovation and creating dominant technological designs (Möller and Rajala, 2007; Powell and Grodal, 2005). Such networks are more target-oriented, the aim being to establish a dominant technological design in an emerging field of business (see, e.g. Anderson and Tushman, 1990), and their existence is typically justified by the fact it is difficult for any one firm to achieve a dominant design on its own. These innovation networks typically involve

collaborating and competing companies, together with other stakeholders such as officials and financial institutions.

Finally, innovation-generating business networks can aim at creating business applications with commercial potential from technological innovations. These networks represent the most organized form of innovation networks as they are generally driven by a hub company, and are more often characterized by collaboration between complementary technology producers as well as pilot customers (Möller and Rajala, 2007), reflecting the tighter connection with actual commercialization. Moreover, the knowledge utilized becomes more explicit and codifiable.

2.2 Network evolution

The above discussion suggests that networks can evolve from one stage to another when the technologies and business models develop from highly explorative basic research to more commercially specifiable forms (see, e.g. Chou and Zolkiewski, 2010). Indeed, Jack *et al.* (2010, p. 318) note that networks can be seen "as a bundle of dynamic relationships, changing and process driven". Moreover, even if a network does not change enough to justify identifying it as a new (or the next) type of a network, continuous minor changes are likely to emerge.

Networks progress and evolve as their goals are modified or realized, as actors come and go, and as relationships are activated and deactivated (e.g., Granovetter, 1985). Expectations of the actors involved also change, and adaptations are made accordingly (Medlin, 2004). Indeed, as Hedaa and Törnroos (2008) note, it is not only the structures of networks that deserve attention, but also the processes. This is particularly relevant in the coordination of innovation-generating networks: if network coordination does not change according to the changes in the network it may be that the functioning of the network suffers, and in the worst case, the desired results are not achieved. Thus, in order to understand the potential of a single firm (or a group of firms) to coordinate a particular network, it is necessary first to identify the central characteristics and the determination phase/type of the network (see, e.g. Möller and Rajala, 2007), and then to align the coordination accordingly.

Summing up the discussion this far, it becomes evident that evolution within innovation-generating business networks includes both vaguely-defined phases and more concretely-defined phases. In other words, value which has been created is eventually also captured, if the network is to be commercially successful. While evolutionary phases certainly might go back and forth in time, the main tendency is towards eventually realizing the goals of a given network, and thus we approach network evolution from this perspective. In this sense, it could be said that the evolution proceeds naturally from explorative phases towards more exploitative phases. Adopting this perspective makes it possible to examine the role of network coordination mechanisms along the network evolution.

3. Coordination in innovation-generating business networks

The management of networks is a debated issue. Whereas researchers such as Jarillo (1988) and Gulati *et al.* (2000) suggest that management-like control is indeed possible, others (including Håkansson and Ford, 2002, Ritter *et al.*, 2004) see networks as adaptive systems that cannot be centrally directed. Accepting both of these perspectives simultaneously may be a viable approach in the context of our study: as network characteristics evolve, the means of coordination in them may vary accordingly.

3.1 Network management – "Coordination by commanding"

Whenever different organizations interact, there are likely to be differences in terms of influential power, motivation and activity. It is therefore also possible that one or two actors will be given or will assume more of a leading role – at least for a period of time (Davis and Eisenhardt, 2007). The actors in networks in which the goals are relatively clear are quite well aware of their roles, and when considerable amounts of explicit knowledge are exchanged, it may be quite possible to apply more "traditional forms" of management to ensure that the processes run smoothly (Thorgren *et al.*, 2009). Traditional management in this context means, for example, setting up schedules and structures that allow the monitoring of work phases, the allocation of tasks according to the capabilities and areas of relative advantage of the actors, and efficient project management in general (Rizova, 2006; Leonard-Barton, 2007; Möller and Rajala, 2007; McAdam *et al.*, 2008).

Management approach has also several types of alternatives in terms of innovativeness. While domineering leadership (where tight control practiced by a single actor easily leads to decline in the variety and dynamism; see Bonner *et al.*, 2002) and consensus leadership (where multiple actors have an equal say, making compromise even too pronounced) both have certain shortcomings, rotating leadership allows the decision-making to circulate among the actors in different phases of the innovation process (Davis and Eisenhardt, 2007). Rotating leadership thus has the potential to stimulate high-quality technological contributions, support variable network activation, change relationship trajectories, and mutually reinforce adaptive changes. However, in some situations it is necessary to adopt a different approach to coordination, which is discussed in the following section.

3.2 Network orchestration – "Coordination by enabling"

The inherent characteristics of the most fuzzy innovation networks restrict maneuvering potential, and trying to fight this may break the network, or at least weaken the position of the hub firm. Complexity, ambiguity (Geersbro and Ritter, 2010), vast range of required resources, loose coupling and weak ties (Möller and Rajala, 2007) does not fully comply with a traditional management approach (Fulop, 2000; Biggiero, 2001).

However, certain hub firms may possess capabilities that allow them to influence other organizations and the network as a whole in both building and coordinating the network. This discreet influence, or orchestration, has seen to operate in three main areas: knowledge mobility, network stability and innovation appropriability (Dhanaraj and Parkhe, 2006). The "orchestrator" does not concentrate so much on exercising authority, but rather provides common vision, facilitates the process of collaboration, makes sure that the necessary structures and discussion forums are in place when needed, and otherwise supports the innovation activities (see, e.g. Haga, 2009; Ritala *et al.*, 2009). In fact, actors who are

Journal of Business & Industrial Marketing
Volume 27 · Number 4 · 2012 · 324–334

the most enthusiastic about the specific purpose and wellbeing of the network, and do not let any individual company take advantage of the network, may become best orchestrators and keep fuzzy, innovative networks up and running.

3.3 Aligning management and orchestration with network evolution

Drawing the line between management and orchestration is not straightforward, but certain generalizations can be made from the existing literature. In general, manageability typically increases with clarification of the actors' expectations and with more clearly defined processes – i.e. when the network shifts towards exploitative phases. In fact, having more explicit goals may even make a stricter approach a prerequisite for the functioning of the network – and thus orchestration would seem to suit well in explorative phases of innovation network evolution and management in more exploitative ones. For example, whereas the most vague innovation networks are typically self-coordinated and cannot be managed by a single actor alone without losing the potential that active and equal interaction between network members produces new combinations of knowledge (Davis and Eisenhardt, 2007), networks with stronger commercial aims typically call for hub-firm direction and clearer responsibilities, structures (Möller and Rajala, 2007) and administrative procedures (Thorgren *et al.*, 2009). Similarly, Möller and Svahn (2008) point to the importance of management-type coordination especially during the final stages when "net management" is needed in developing and coordinating efficient demand and supply channels.

However, it should be recognized that both coordination types actually co-exist in at different stages of their evolution, but they just have different types of roles and emphases. Rizova (2006) gives an example of the thin boundary between management and orchestration, noting that formal organizational structures reinforcing social networks may be a prerequisite of successful innovation. In addition, Bonner *et al.* (2002) note in their study of new-product-development projects and teams that leader-imposed process controls do not necessarily enhance success if implemented during the project, but that early and interactive decision-making on control mechanisms is important, suggesting that management approach is viable in the explorative phases as well. On the other hand, ensuring innovation appropriability and network stability through orchestration-types of mechanisms is important in the exploitative phase in order to support the innovation aims of the whole network throughout the process (Dhanaraj and Parkhe, 2006; Ritala *et al.*, 2009).

In sum, we suggest that innovation-generating business networks have a tendency to evolve from exploratory phases towards exploitative phases (for the sake of simplicity, we discuss about these two phases here, even though there might be multiple, even overlapping phases in the network evolution). In explorative phases, networks are more loosely structured and less determined, while in exploitative phases they have clearer structures and objectives. According to the earlier literature, both management and orchestration have their specific roles in these phases (see Figure 1 for a summary).

While some suggestions exist in prior research on the different forms of coordination along innovation-generating network evolution, it seems that detailed understanding is still missing. We will examine this issue with the help of a case study, which will be presented in the following.

Figure 1 Network coordination mechanisms in different evolutionary phases

	Main coordination mechanisms in the exploratory phase	*Main coordination mechanisms in the exploitative phase*
Management	Delegating roles and tasks for network members, setting up schedules	Coordinating efficient supply and demand
Orchestration	Motivating members to join the network, ensuring knowledge sharing & mobility, communicating vision	Maintaining the network structure and innovation appropriability in order to realize the objectives

4. Case study – FIMTV

4.1 Case description

An explorative case study on the development of Finnish Mobile TV was conducted to gain empirical evidence on innovation network coordination. We focus on a particular innovation-generating network, called the Finnish Mobile TV Community (FiMTV – the official name since 2005). The common interest among the network actors was the DVB-H (Digital Video Broadcasting – Handheld) standard, related services, and complementary technologies. The core idea behind DVB-H was the broadcasting element – mobile TV content and services based on this technology would consume as much network capacity as the other options, thus providing a cost-effective way to deliver mobile TV to a large quantity of handsets.

The initial evolutionary phase of the FiMTV network started in 2001 when a group of companies (a handset manufacturer as the initiating force identifying the central players and contacting the largest telecom operators and the largest media companies) started working together. After lengthy period of pre-commercial and pre-competitive development and testing, the first large-scale commercial pilot (FinPilot) was conducted in March-July 2005. The results implied that there was a market for mobile TV and the related services. The FinPilot steering group, consisting of representatives of seven core companies, considered it worthwhile to continue the common development, and even decided to extend it to incorporate a larger developer community. In late summer 2005 one of the mobile operators assumed the key role of the development and coordination of the innovation network in terms of pushing the whole FiMTV network ahead in terms of arranging meetings, setting up schedules, and communication to both inside and outside stakeholders. Preparations by the City of Helsinki (the capital of Finland) to build what subsequently became the Forum Virium Helsinki (FVH) cluster began at the same time as it was considered that the network needed "an outsider" to bring the central players together. As a result, FiMTV became the first major project approved by the FVH.

Journal of Business & Industrial Marketing
Volume 27 · Number 4 · 2012 · 324–334

The commercial-development potential became concrete when a network operator received the DVB-H network operating license in March 2006, and when the network was opened on December 1st. It was operational in Finnish markets in January 2007 (and covered 40 per cent of the Finnish population in 2008). The second pilot project (FinPilot2) was launched in summer 2007 and ended in spring 2008. This project was lead by VTT (Technical Research Centre of Finland), and the aim was to approach the customer's with piloted interactive services, and to find out which application of the technology would attract customer attention and thus commercial feasibility. FiMTV project officially ended in spring 2008, but the collaboration among the various stakeholders continues in other projects and forums (for a more in-depth description, see, e.g. Nyström and Hanttu, 2007).

4.2 Methods and data collection

From research perspective, FiMTV provides a rich case through which to explore the characteristics and evolution of an innovation-generating business network, and its coordination. We chose to conduct a qualitative single-case study (see, e.g. Yin, 2003) given our aim to provide a holistic description of a relatively unexplored phenomenon of network evolution and coordination (see, e.g. Eisenhardt, 1989). Our approach could be defined as explorative (Yin, 2003), and also as instrumental (Stake, 1994) in that the idea is to extend understanding beyond the case in question. Moreover, the case method is particularly suitable in this research setting in that it allows a process perspective (see, e.g. Quintens and Matthyssens, 2010).

Data was gathered in interviews with business managers responsible for the mobile TV business in their respective firms, representing 13 key organizations altogether (the whole network was represented: the infrastructure provider, the mobile equipment manufacturer, two telecom operators, eight content providers, and the City of Helsinki). The interviewees typically worked as development or technology managers, business-unit directors, VPs or CEOs, and represented their firms in the FiMTV. There were two interview stages. The first, during spring 2007, comprised semi-structured interviews with 15 informants. These interviews focused on the management challenges related to service innovation development during different phases of the FIMTV project (e.g. collaboration, actor expectations, competition, contracting, and formal and informal networks), as well as on the overall network structure. This gave us the understanding on the network actors and their roles, as well as on the technology and services under development. Second, three further interviews were conducted between autumn 2007 and spring 2008 in order to deepen our insights into network coordination in particular, and to understand how network has evolved over time. The interview questions at this stage mainly concerned on how network coordination has been achieved. All the interviews lasted between 30 and 120 minutes, and they were tape-recorded and transcribed (about 16 hours of interviews altogether). Additional data was gathered from public sources such as company and project web pages, public newspapers and news archives, and from the representatives of copyright organizations. The data was coded and grouped under relevant themes for content analysis. The interpretations of the researchers on the case were discussed on several occasions with industry experts involved in mobile TV development (including personal communication as well as a larger seminar with most of the main actors present). This increased the face validity of the study, as well as provided the authors with additional insights that were not immediately evident from the data.

5. Case analysis

5.1 FiMTV as an innovation-generating business network

The first step in analyzing the evolving coordination of the FiMTV network was to identify the central characteristics of the network. It is obvious that the participants had formed an innovation-generating business network, in that the objective of the project was to develop new services with the help of novel technology. The concrete markets of mobile TV were unidentified at the time of the launch, and thus the focus was on collaboratively creating a radical innovation (new products/services for new markets). Further, FiMTV focused on identifying dominant ways of utilizing new technology, and on setting up established services and a concrete customer base, and there were recognizable hub firms involved in various stages. While the hub role of the mobile handset manufacturer was pronounced very early ideation and exploration phases, the main emphasis shifted within the hands of a larger group of actors in the later exploitation phases. In these phases, the firms recognized the need for commercialization in explicitly noting the need for interoperable technologies and services. "No one can afford not being part of it! I cannot imagine markets evolving without operators cooperating." Moreover, competitors were involved, including all the major media companies and telecom operators: "There may be openings that we both consider so valuable that there's then a need for competitor collaboration as well." Thus, the network exhibited such features that would place it in between the most fuzzy innovation networks and well-structured innovation networks, with some relatively concrete individual pilot projects and less clear phases.

In terms of network coordination both orchestration and management seemed to play a role. However, the relative importance was not the same throughout the FiMTV project. Table I summarizes the network characteristics, coordination roles, as well as the nature of the two coordination mechanisms in the three phases (we use the word "phase" to describe the most distinctive and identifiable events occurring along the network evolution). These are discussed in the following two sections.

5.2 Orchestration mechanisms

Based on the interviewees' comments, orchestration was naturally needed in the early ideation phase. The project was triggered by the vision of the handset manufacturer, who gathered the media companies and telecom operators together to discuss the emerging idea of utilizing a broadcasted TV signal as content for mobile phones. At that time (the early 2000s), mobile TV was a radical notion in that the technology required was not in use in any part of the world. Communicating a vision was essential in order to collaboratively achieve more concrete roadmaps for the future. This was quite intuitive given the ambiguity of the potential business model at that time.

Table I Coordination mechanisms and the main actors in the different network-evolution phases

	Early ideation	Technology development	Pilot commercialization
Network characteristics and evolution	Aim for radical innovation relatively clear; ways to achieve it and the roles of actors not well-known Exploration of various competing and complementary ideas dominate	Central actors identified; some ideas explicit of what each actor would gain from collaboration; distribution of work and benefits unclear Exploration of how and what technologies could be applied	More concrete roles set for specific actors; individual commercial aims emerge Exploitative commercialization issues emerge alongside explorative approach
Main coordinator actors	Mobile handset manufacturer as a clearly identifiable hub firm	Main coordination role moved from the Mobile handset manufacturer to the development forums and associations where the key players were involved in (Telecom operators, Mobile handset manufacturer, Media companies)	Coordination was focused on distinct actors leading commercialization pilots, while other central actors participated with varying emphases (Telecom operators, Mobile handset manufacturer, Media companies)
Orchestration	Mobile handset manufacturer introducing the idea; creating and communicating the vision and shared goals for mobile TV technology and content	Further developing social capital and shared goals by building and enforcing ties between the network members A variety of "outside" actors provided common, neutral platforms for working	Shared orchestration among mobile handset manufacturer, telecom operators, media companies, other stakeholders Maintaining the social capital and engagement of new value-creating actors in the network through FiMTV
Management	No centralized leadership at this stage No concrete management mechanisms	Technology-development and other forums involving the key players (e.g. Dimes, RTT, City of Helsinki, Ministry of Transport and Communications) Scheduled meetings and agreements on technology testing	The concrete management of the network's functioning by a Telecom operator (after FinPilot) and a public research organization (leading FinPilot 2)

All the orchestration mechanisms were more or less present during the process: maintaining stability, facilitating knowledge mobility, and securing innovation appropriability. In the early exploration phases the mobile handset manufacturer was the main actor orchestrating the network in terms of communicating vision and attracting interest from other key players (telecom operators and media companies). Interestingly, particularly in the latter exploitative phases these kinds of coordination mechanisms were shared in the network as a whole rather than in a distinct "hub firm". In fact, core firms pursued to orchestrate the network together in various ways, which are discussed in the following.

- *Strengthening social capital in order to maintain stability.* The orchestration type of coordination was evidently present when the actors were collaborating through technology-development forums (e.g. the RTT forum and Dimes Association, before the FiMTV organization was formed). The constant maintenance of close inter-firm and interpersonal relationships between the key actors fostered social capital. "The same people have been active in Mobile TV for a long time." This gave stability to the network because the participants were able to trust each other. "I know almost everybody involved and they also know each other", "... good guys and substance created trust". One important element of the strong social capital was the past history of the key actors in developing other technology and service solutions. On the other hand, new actors were brought on board in several development forums and initiatives during the two pilots.
- *Open platforms for open discussion.* The building of open discussion platforms facilitated knowledge mobility: "Certain openness is common to all of us [in our discussions]." Events took place in various forums, but what was common to these was that individual firms with commercial targets hung back and more "neutral" actors brought the parties together in practice. "We went to the Ministry of Transport and Communication to talk about this idea because we needed and outsider that would call the different players together [...] media companies and telecom operators regarded each other with suspicion in the beginning of 2000". In line with this, the later events included extensive discussion conducted under the name of Forum Virium Helsinki. "Without Forum Virium we would not be discussing these things any more ... it [mobile TV] would be dead". "The goal of Forum Virium ... is to foster understanding about the possibilities and about how we could explore these opportunities."
- *Securing innovation appropriability.* Contracts (e.g. NDAs) and other means of protection were used to secure the appropriability of the potential innovations of the different actors (e.g. service developers), especially in concrete projects such as FinPilot. The social capital among the network members also helped to reduce concerns related to free riding and opportunism – reflecting the focus on the subject matter rather than the commercial outcomes:

> "Research collaboration can provide a frame for the collaborative development of certain services or infrastructure, but for other things there are different arenas, where business contracts are drawn up and commitments are made. Mixing the different roles is not worth it and it may ruin the accomplishments of collaborative research."

5.3 Management mechanisms

Management mechanisms were not in place at the early ideation stage because there was basically nothing to manage (the DVB-H technology was still in its infancy, and the network had only just started to emerge). However, various technology forums and industry associations (such as RTT and Dimes) took the leading role in coordinating the development and testing the technology during the technology development phase. By that time concrete mechanisms were in place to facilitate the scheduled meetings between the participants and draw up formal agreements on technology testing. The use of other management-type coordination mechanisms was not used, since the purpose was to collaboratively test and develop potential technologies and approaches for delivering mobile TV content.

In the later exploitative phases, the FiMTV network exhibited features that resembled traditional management more than orchestration. The two commercial pilots – FinPilot focusing on customer preferences and FinPilot 2 focusing on services – both had a clear hub actor managing the network, and they also were target-oriented: "Arriving at a common understanding of who will do what and how the responsibilities are shared in the pilot was one of the key challenges." "Cooperation was very active in FinPilot … there was a concrete goal and a tight schedule." The first FinPilot was led by a mobile operator taking a managing role in orienting the actors towards a common goal. The idea was to have a single actor coordinating the meetings, promoting the development events, and taking care of the press releases and so on. A large applied research organization led the second FinPilot, the purpose of which was to pilot the services of different firms and actors in the commercial network. In both cases the role of the single actor was more dominant than in the orchestration phase of the overall coordination process. It also seemed that the actors could change roles and rotate the leadership during the developmental process: "After the pilot the hats were basically changed again". Without stricter management covering project coordination it would not have been possible to pursue explicit goals with clear deadlines.

6. Discussion and conclusions

The aim of this study was to analyze how innovation-generating business networks and their coordination evolve over time. In pursuance of this aim we distinguished between two types of coordination – network management as "coordination by commanding", and network orchestration as "coordination by enabling". Based on the earlier literature, we put forward a conceptual framework suggesting distinct roles for management and orchestration along the network evolution from exploratory phase towards more exploitative, goal oriented phases. We analyzed the evolution and usage of these coordination mechanisms with a case study focusing on a long-term innovation and development project focusing on mobile TV services in Finland. The main contribution of our study to the research on business networks lies in the explicit recognition of the evolutionary element inherent in innovation-generating networks and their various coordination types, which is an important, yet under-researched perspective (see, e.g. Hedaa and Törnroos, 2008; Quintens and Matthyssens, 2010).

Overall, our findings suggest that the characteristics of the Finnish Mobile TV project (FiMTV) place it between the fuzziest forms of innovation networks and the networks with the clear commercial targets. However, closer examination of the network evolution indicates that while in the beginning, uncertainties were more pronounced, at times (during pilot projects), quite clear goals and structures emerged. Thus, network coordination needed to develop accordingly. In particular, we found that network orchestration and management were emphasized differently during different evolutionary phases, and they had different roles. Orchestration ranged from creating the vision of mobile TV and communicating that vision at the beginning, to influencing actions of the key actors later on in terms of developing social capital, network structure and the operating principles that enabled them to collaborate and share knowledge, as well as to attract new members to the network. Management focused more on those aspects of the project that came closest to the commercialization of the emerging services (in line with the suggestions of Möller and Svahn, 2008). This also reflects suggestions in previous studies advocating the absence of network management during the initiation phases (Fulop, 2000; Biggiero, 2001), and a large administrative function (comprising participants from various network organizations) when the innovation network is established and operating (Thorgren *et al.*, 2009). As a whole, it can be said that hybrid form of coordination moving fluently between orchestration and management was beneficial when the network evolved from exploratory towards more exploitative phases.

The study also shows that there may be shifts in which the company takes the role of a "hub firm" during the evolution of the innovation network, suggesting that the positions of various focal actors evolve along the network. In particular, different actors can assume the coordination roles according to the emerging needs. The implication in this is that rotating leadership (as discussed in Davis and Eisenhardt, 2007) may indeed be a viable way of keeping innovation-generating networks alive and developing. Another interesting observation is that when the network coordination resembles orchestration in its purest form, it might reside more on the network level than on the level of the individual "hub" firm. This became evident in the later phases of the network evolution when various actors started to engage in shared orchestration, and the whole business model was taken forward by the network and not by an individual firm (as it was in the earlier phases). Taken together, the evidence on rotating leadership and shared orchestration provides new insights on network coordination literature, potentially helping to unwind some of the conflicting approaches regarding to the manageability of innovation networks.

6.1 Managerial implications

Innovation-generating business networks are constantly evolving, and require careful managerial attention. The main managerial implications of this study are related to

aligning and matching the central characteristics of the network and the coordination type as the network develops. In particular, both orchestration and management can have distinct and separate roles in the coordination of innovation-generating business networks – but it should be remembered they should both be used in order to reap the full benefits of such networks. Thus, managers should carefully evaluate the evolution and features of the network when making coordination decisions.

Orchestration – i.e. coordination by enabling – should be used throughout the network evolution to communicate the vision and build social capital, given the need for knowledge sharing, appropriability and open collaboration. In fact, if traditional management had been forced in the beginning of FiMTV, it is likely that some important actors would not have joined or would have soon dropped out. Useful mechanisms for network orchestration could be common platforms for discussion, seminars, and other types of communicative areas (physical or virtual) where the common vision and social capital can be facilitated. These are likely to be useful also in latter phases, where orchestration may bring out new innovative ideas even when things seem to be quite settled.

On the other hand, management – i.e. coordination by commanding – is needed to coordinate the phases that are closer to commercialization because the exploitation of any possible results requires stricter project control. In the FiMTV case, the pilot projects would have likely failed if no one had taken a clear responsibility of carrying them out. In this type of network coordination, management mechanisms such a separate project manager, clear deadlines and requested deliverables can be useful in this regard.

6.2 Limitations and further research

The limitations of this study lie in its explorative, case-based approach, which limit the generalizability of our results. Future qualitative and quantitative studies are needed to further elaborate the evolution of innovation-generating business networks and their coordination, and they will reveal more generalizable results. In particular, there is a need for research on how management and orchestration differ in terms of actor roles, suitability for different types of networks, and effectiveness. Thus, different types of business networks should be examined. Furthermore, since the influence possibilities and power of an individual actor on the network is central to the discussion on network coordination, studies assessing this issue both formally (quantitative approach) and qualitatively are needed.

References

Anderson, P. and Tushman, M.L. (1990), "Technological discontinuities and dominant designs: a cyclical model of technological change", *Administrative Science Quarterly*, Vol. 35 No. 4, pp. 604-33.

Arrow, K.J. (1974), *Organization and Information. The Limits of Organization*, W.W. Norton & Co., New York, NY.

Biggiero, L. (2001), "Self-organizing processes in building entrepreneurial networks: a theoretical and empirical investigation", *Human Systems Management*, Vol. 20 No. 3, pp. 209-22.

Bonner, J.M., Ruekert, R.W. and Walker, O.C. Jr (2002), "Upper management control of new product development projects and project performance", *Journal of Product Innovation Management.*, Vol. 19 No. 3, pp. 233-45.

Chesbrough, H. (2003), "The logic of open innovation: managing intellectual property", *California Management Review*, Vol. 45 No. 3, pp. 33-58.

Chou, H. and Zolkiewski, J. (2010), "The arrival of technological changes at the business net: a learning process", *Journal of Business & Industrial Marketing*, Vol. 25 No. 6, pp. 443-53.

Claro, D. and Claro, P. (2011), "Networking and developing collaborative relationships: evidence of the auto-part industry of Brazil", *Journal of Business & Industrial Marketing*, Vol. 26 No. 7, pp. 514-23.

Davis, J.P. and Eisenhardt, K. (2007), "Rotating leadership and symbiotic organization: relationship processes in the context of collaborative innovation", MIT Sloan School of Management Working Paper 0708, MIT Sloan School of Management, Cambridge, MA.

Dhanaraj, C. and Parkhe, A. (2006), "Orchestrating innovation networks", *Academy of Management Review*, Vol. 31 No. 3, pp. 659-69.

Donaldson, T. and Preston, L.E. (1995), "The stakeholder theory of the corporation: concepts, evidence, and implications", *Academy of Management Review*, Vol. 20 No. 1, pp. 65-91.

Doz, Y., Olk, P. and Ring, P. (2000), "Formation processes of R&D consortia: which path to take? Where does it lead?", *Strategic Management Journal*, Vol. 21 No. 3, pp. 345-67.

Eisenhardt, K. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-50.

Freeman, R.E., Wicks, A.C. and Parmar, B. (2004), "Stakeholder theory and the corporate objective revisited", *Organization Science*, Vol. 5 No. 3, pp. 364-9.

Fulop, L. (2000), "A study of government-funded small business networks in Australia", *Journal of Small Business Management*, Vol. 38 No. 4, pp. 87-92.

Geersbro, J. and Ritter, T. (2010), "External performance barriers in business networks: uncertainty, ambiguity, and conflict", *Journal of Business & Industrial Marketing*, Vol. 25 No. 3, pp. 196-201.

Gulati, R., Nohria, N. and Zaheer, A. (2000), "Strategic networks", *Strategic Management Journal*, Vol. 21 No. 3, pp. 203-15.

Granovetter, M. (1985), "Economic action and social structure: the problem of embeddedness", *American Journal of Sociology*, Vol. 91 No. 3, pp. 481-510.

Haga, T. (2009), "Orchestration of network instruments: a way to de-emphasize the partition between incremental change and innovation?", *AI & Society*, Vol. 23 No. 1, pp. 17-31.

Håkansson, H. and Ford, D. (2002), "How should companies interact in business networks?", *Journal of Business Research*, Vol. 55 No. 2, pp. 133-9.

Halinen, A. and Törnroos, J.-Å. (2005), "Using case methods in the study of contemporary business networks", *Journal of Business Research*, Vol. 58 No. 9, pp. 1285-97.

Harryson, S.J., Dudkowski, R. and Stern, A. (2008), "Transformation networks in innovation alliances – the development of Volvo C 70", *Journal of Management Studies*, Vol. 45 No. 4, pp. 745-73.

Hedaa, L. and Törnroos, J.-Å. (2008), "Understanding event-based business Networks", *Time & Society*, Vol. 17 Nos 2/3, pp. 319-48.

Ibarra, H. (1993), "Network centrality, power, and innovation involvement: determinants of technical and administrative roles", *Academy of Management Journal*, Vol. 36 No. 3, pp. 471-501.

Inkpen, A.C. and Tsang, E.W. (2005), "Social capital, networks, and knowledge transfer", *Academy of Management Review*, Vol. 30 No. 1, pp. 146-65.

Jack, S., Moult, S., Anderson, A.R. and Dodd, S. (2010), "An entrepreneurial network evolving: patterns of change", *International Small Business Journal*, Vol. 28 No. 4, pp. 315-37.

Jarillo, J. (1988), "On strategic networks", *Strategic Management Journal*, Vol. 9 No. 1, pp. 31-44.

Kragh, H. and Andersen, P.H. (2009), "Picture this: managed change and resistance in business network settings", *Industrial Marketing Management*, Vol. 38 No. 6, pp. 641-53.

Leonard-Barton, D. (2007), "Core capabilities and core rigidities: a paradox in managing new product development", *Strategic Management Journal*, Vol. 13 No. 1, pp. 111-25.

Low, B. and Johnston, W.J. (2010), "Organizational network legitimacy and its impact on knowledge networks: the case of China's TD-SCDMA mobility technology", *Journal of Business & Industrial Marketing*, Vol. 25 No. 6, pp. 468-77.

McAdam, R., O'Hare, T. and Moffet, S. (2008), "Collaborative knowledge sharing in composite new product development: an aerospace study", *Technovation*, Vol. 28 No. 5, pp. 245-56.

Medlin, C.J. (2004), "Interaction in business relationships: a time perspective", *Industrial Marketing Management*, Vol. 33 No. 3, pp. 185-93.

Möller, K. and Rajala, A. (2007), "Rise of strategic nets – new modes of value creation", *Industrial Marketing Management*, Vol. 36 No. 7, pp. 895-908.

Möller, K. and Svahn, S. (2006), "Role of knowledge in value creation in business nets", *Journal of Management Studies*, Vol. 43 No. 5, pp. 985-1007.

Möller, K. and Svahn, S. (2008), "How to influence the birth of new business fields – network perspective", *Industrial Marketing Management*, Vol. 38 No. 4, pp. 450-8.

Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *Journal of Marketing*, Vol. 58, July, pp. 20-38.

Munksgaard, K. and Freytag, P. (2011), "Complementor involvement in product development", *Journal of Business & Industrial Marketing*, Vol. 26 No. 4, pp. 286-98.

Nyström, A.-G. and Hanttu, N. (2007), "Establishing a new business area through cooperative nets: the case of Finnish mobile TV", *Proceedings of the 23rd IMP Conference, Manchester Business School, Manchester, UK, 30 August-1 September, 2007*.

Ojasalo, J. (2008), "Management of innovation networks: a case study of different approaches", *European Journal of Innovation Management*, Vol. 11 No. 1, pp. 51-86.

Olander, H., Hurmelinna-Laukkanen, P., Blomqvist, K. and Ritala, P. (2010), "The dynamics of relational and contractual governance mechanisms in knowledge sharing of collaborative R&D projects", *Knowledge and Process Management*, Vol. 17 No. 4, pp. 188-204.

Peters, L.D., Johnston, W.J., Pressey, A.D. and Kendrick, T. (2010), "Collaboration and collective learning: networks as learning organizations", *Journal of Business & Industrial Marketing*, Vol. 25 No. 6, pp. 478-84.

Pisano, G.P. and Verganti, R. (2008), "Which kind of cooperation is right for you?", *Harvard Business Review*, December, pp. 78-86.

Powell, W.W. and Grodal, S. (2005), "Networks of innovators", in Fagerberg, J., Mowery, D.C. and Nelson, R.R. (Eds), *Oxford Handbook of Innovation*, Oxford University Press, Oxford, pp. 56-85.

Provan, K., Fish, A. and Sydow, J. (2007), "Interorganizational networks at the network level: a review of the empirical literature on whole networks", *Journal of Management*, Vol. 33 No. 3, pp. 479-516.

Quintens, L. and Matthyssens, P. (2010), "Involving the process dimensions of time in case-based research", *Industrial Marketing Management*, Vol. 39 No. 1, pp. 91-9.

Reagans, R. and McEvily, B. (2003), "Network structure and knowledge transfer: the effects of cohesion and range", *Administrative Science Quarterly*, Vol. 48, pp. 240-67.

Ritala, P. and Hurmelinna-Laukkanen, P. (2009), "What's in it for me? Creating and appropriating value in innovation-related coopetition", *Technovation*, Vol. 29 No. 12, pp. 819-28.

Ritala, P., Armila, L. and Blomqvist, K. (2009), "Innovation orchestration capability – defining the organizational and individual level determinants", *International Journal of Innovation Management*, Vol. 13 No. 4, pp. 569-91.

Ritter, T., Wilkinson, I.F. and Johnston, W. (2004), "Managing in complex business networks", *Industrial Marketing Management*, Vol. 33 No. 3, pp. 175-83.

Rizova, P. (2006), "Are you networked for successful innovation?", *MIT Sloan Management Review*, Vol. 47 No. 3, pp. 49-55.

Stake, R.E. (1994), "Case studies", in Denzin, N. and Lincoln, Y. (Eds), *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA, pp. 236-47.

Strang, D. and Still, M.C. (2006), "Does ambiguity promote imitation or hinder it? An empirical study of benchmarking teams", *European Management Review*, Vol. 3 No. 2, pp. 101-12.

Sutton-Brady, C. (2008), "As time goes by: examining the paradox of stability and change in business networks", *Journal of Business Research*, Vol. 61 No. 9, pp. 968-73.

Thorgren, S., Wincent, J. and Örtqvist, D. (2009), "Designing interorganizational networks for innovation: an empirical examination of network configuration, formation and governance", *Journal of Engineering and Technology Management*, Vol. 26 No. 3, pp. 148-66.

Vlaar, P.W.L., Van den Bosch, F.A.J. and Volberda, H.W. (2007), "On the evolution of trust, distrust, and formal coordination and control in interorganizational relationships: toward and integrative framework", *Group & Organization Management*, Vol. 32 No. 4, pp. 407-29.

Westerlund, M. and Rajala, A. (2010), "Learning and innovating in inter-organizational network collaboration", *Journal of Business & Industrial Marketing*, Vol. 25 No. 6, pp. 435-42.

Woodside, A.G. and Biemans, W. (2005), "Managing relationships, networks, and complexity in innovation, diffusion, and adoption processes", *Journal of Business & Industrial Marketing*, Vol. 20 No. 7, pp. 335-8.

Yin, R. (2003), *Case Study Research: Design and Methods*, 3rd ed., Sage Publications, Thousand Oaks, CA.

Further reading

Heikkinen, M. and Tähtinen, J. (2006), "Managed formation process of R&D networks", *International Journal of Innovation Management*, Vol. 10 No. 3, pp. 271-98.

About the authors

Paavo Ritala, DSc (Econ. & Bus. Adm.), is a Post-doctoral Researcher at the School of Business and a Research Manager at the Technology Business Research Center at Lappeenranta University of Technology. His recent research interests are in the areas of inter-organizational networks, services, business models, innovation and coopetition (collaboration between competing firms). He has published on these topics in journals such as *British Journal of Management*, *Technovation, Journal of Service Management*, and *Journal of Business Strategy*. Paavo Ritala is the corresponding author and can be contacted at: ritala@lut.fi

Pia Hurmelinna-Laukkanen, DSc (Econ. & Bus. Adm.), is an Assistant Professor at Oulu Business School, University of Oulu. Her recent research is placed in the areas of appropriability issues, intellectual property, innovation, and inter-organizational networks. She has published her work in journals such as *Technovation, R&D Management, International Journal of Production Economics, Journal of Service Management*, and *International Journal of Technology Management*.

Satu Nätti, DSc (Econ. & Bus. Adm.), is a Researcher at the University of Oulu, Finland. Her main research interests relate to professional services, customer-related knowledge management, innovation net management and brand management in small and medium-sized companies. She has published, in such journals as *Journal of Business & Industrial Marketing, Journal of Product & Brand Management, Journal of Service Management* and *Service Industries Journal*.

Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of the article. Those with a particular interest in the topic covered may then read the article in toto *to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefit of the material present.*

Innovation-generating business networks are constantly evolving and therefore require careful managerial attention. They have a tendency to evolve from exploratory phases towards exploitative phases. In explorative phases, networks are more loosely structured and less determined, while in exploitative phases they have clearer structures and objectives.

In an attempt to analyse how such arrangements and their coordination evolve over time, in" Coordination in innovation-generating business networks – the case of Finnish mobile TV development", Paavo Ritala *et al.* distinguished between two types of coordination: network management as "coordination by commanding", and network orchestration as "coordination by enabling".

Following a study of a long-term innovation and development project focusing on mobile TV services in Finland, they put forward a conceptual framework suggesting distinct roles for management and orchestration along the network evolution from exploratory phase towards more exploitative, goal oriented phases.

Of the two types of coordination considered in the paper, network management refers to having explicit goals and timetables, as well as systems facilitating coordinated collaboration. It also includes the idea of having some type of leadership, or a leader. The leader sets the rules (in collaboration with others) that are needed in order to reach the desired outcomes, and monitors how they are followed. On the other hand, network orchestration refers to activities that enable and facilitate (but do not dictate) the coordination of the network and the realisation of the innovation outputs. In this context it is not about leading or directing the network, but more a question of discreetly influencing other firms and making sure that the premises for knowledge exchange, value creation and appropriation, and innovation are in place.

These two concepts are useful as they both incorporate issues such as trust and commitment, as well as control through contracting – often seen as complementary or supplementary governance mechanisms but the emphases vary depending on the approach. "Coordination by commanding" and "coordination by enabling" often co-exist in practice, thereby creating a hybrid form of coordination involving the simultaneous use of both. But in which situations would different forms of coordination function best? As networks come in different sizes and shapes, this surely influences both the need for coordination and how it is implemented. So the question arises: "How can the coordination of innovation-generating business networks be aligned with the network characteristics and evolution?"

Both network orchestration and network management can have distinct and separate roles in the coordination of innovation-generating business networks – but it should be remembered they should both be used in order to reap the full benefits. Consequently, managers should carefully evaluate the evolution and features of the network when making coordination decisions.

Orchestration – i.e. coordination by enabling – should be used throughout the network evolution to communicate the vision and build social capital, given the need for knowledge sharing, appropriability and open collaboration. (In fact, if traditional management had been forced in the beginning of the case study network, it is likely that some important actors would not have joined or would have soon dropped out.)

Useful mechanisms for network orchestration could be common platforms for discussion, seminars, and other types of communicative areas (physical or virtual) where the common vision and social capital can be facilitated. These are likely to be useful also in latter phases, where orchestration may bring out new innovative ideas even when things seem to be quite settled.

On the other hand, network management – i.e. coordination by commanding – is needed to coordinate the phases that are closer to commercialization because the exploitation of any possible results requires stricter project control. In the case study, the pilot projects would have likely failed if no-one had taken a clear responsibility for carrying

Journal of Business & Industrial Marketing
Volume 27 · Number 4 · 2012 · 324–334

Journal of Business & Industrial Marketing
Volume 27 · Number 4 · 2012 · 324–334

them out. In this type of network coordination, management mechanisms such as a separate project manager, clear deadlines and requested deliverables can be useful.

The study also shows that there may be shifts in which the company takes the role of a "hub firm" during the evolution of the innovation network, suggesting that the positions of various focal actors evolve along the network. In particular, different actors can assume the coordination roles according to the emerging needs. The implication in this is that rotating leadership may indeed be a viable way of keeping innovation-generating networks alive and developing.

Also, when the network coordination resembles orchestration in its purest form, it might reside more on the network level than on the level of the individual "hub" firm. This became evident in the later phases of the network evolution when various actors started to engage in shared orchestration, and the whole business model was taken forward by the network and not by an individual firm (as it was in the earlier phases).

Taken together, the evidence on rotating leadership and shared orchestration provides new insights, potentially helping to unwind some of the conflicting approaches relating to the manageability of innovation networks.

(A précis of the article "Coordination in innovation-generating business networks – the case of Finnish Mobile TV development". Supplied by Marketing Consultants for Emerald.)