Managing Emerging Business Ecosystems – A Knowledge Management Viewpoint

Full paper

Elina Annanperä
University of Oulu, M3S Research Unit
elina.annanpera@oulu.fi

Kari Liukkunen
University of Oulu, M3S Research Unit
kari.liukkunen@oulu.fi

Jouni Markkula
University of Oulu, M3S Research Unit
jouni.markkula@oulu.fi

Abstract
Technology-based services are increasingly being developed in business ecosystems. Business ecosystems benefit companies by enabling shared goals and resources through collaboration, but a successful business ecosystem also requires internal management of knowledge. Strategic funding is currently being offered for the formation of new business ecosystems in the ICT industry to develop new digital business. We followed two such emerging business ecosystems developing new technology-based services in the health and well-being domain that were funded by research programs in Finland. Applying a knowledge conversion model to the analysis of activities aimed at facilitating the formation of business ecosystems, new directions for emerging ecosystems management research are explored. We present the knowledge capture, sharing, and creation practices and activities used in these two cases. By analyzing the knowledge conversion perspective, we add to the understanding of formation of emerging business ecosystems as well as possibilities for improving it.

Keywords
Business ecosystem, knowledge management, small and medium enterprise, research programs

Introduction
In current, competitive service markets, a successful business strategy requires development of new innovative technology-based services to bring maximum value to the customer. Developing technology-based services is increasingly done through the collaboration of organizations that each contribute to the added value of the service. Moore (1996) suggests the use of business ecosystem as a term to better describe organizational collaboration that produces for instance service of value to the customer. Business ecosystem as a phenomenon comprises actors beyond the confines of traditional industry. Organizations in these business ecosystems aim to benefit from each other’s capabilities and competencies in order to achieve goals that they could not reach alone (Mäkinen & Dedehayir 2012). Different kinds of actors are needed, and a successful business ecosystem demands different kinds of expertise, resources, and knowledge. The purpose of a business ecosystem is to create business for companies as well as value for customers: value being generated in the complementarities of a business ecosystem that are enabled by the technology (Rao & Jimenez 2011). Typically, both cooperation and competition are needed to create value through innovation (Xiaoren et al. 2014).

In traditional information and communications technology (ICT) field, business ecosystems form around a large leader company, with a platform whereby several smaller actors complement the business ecosystem. For example, mobile device manufacturers such as Apple rely on complementary service companies to develop solutions that bring added value to their mobile devices. However, new type of business ecosystems, wherein the actors are mainly SMEs without the presence of a large companies, have
Managing Emerging Business Ecosystems – A Knowledge Management Viewpoint

become important for the economy and global business, and are being purposefully formed these days. Business ecosystems offer a chance for small and medium enterprises (SME) to benefit from other organizations’ resources and capabilities and contribute to the business ecosystem in return. Small companies often lack resources that may prevent a good service or product from gaining more relevance in the market. Collaborating with other SMEs and organizations can create the leverage needed to make a globally viable product or service. For instance, the European Commission (2016) has claimed that SMEs are the key to economic growth and innovation in the European Union (EU).

The formation of new, viable technology-based business ecosystems is increasingly supported by public strategy funding. For example, the EU funds the creation of “entrepreneurial ICT ecosystems” through its H2020 program (ICT Innovation in Horizon 2020, 2016). Funding research programs that aim to create facilities for new, innovative businesses by intentionally forming business ecosystems around various ICT topics has been a strategic funding target in Finland as well. In particular, the ICT and digital service business has been the focus area of the Finnish Strategic Centre for Science, Technology, and Innovations (DIGILE).¹ These research programs bring together interested organizations, companies of different sizes, and research organizations to collaborate and create value for business ecosystem.

The joint value creation in a business ecosystem creating service innovation requires collaboration, knowledge sharing, and ecosystem-wide knowledge generation. In the formation and life cycle of business ecosystem there are also challenges, in particularly in the capturing and creation of new knowledge. The size of the organizations involved in key positions can affect the shared change process in the ecosystem. (cf. Iansiti & Levien 2004). SMEs are typically the companies that create the added value in the business ecosystem. In an ecosystem of SMEs, one of these companies need to take the leader position. However, the small companies may not have the needed resources or capabilities to actively manage the knowledge creation during the business ecosystem formation in particularly if the organizations are less familiar with each other.

Knowledge management in a business ecosystem formation is a critical issue. Creating common understanding among collaborating business ecosystem organizations can be challenging. Efficient knowledge creation between the organizations, if captured and made explicit, can help to understand and improve business ecosystem management and its value creation. There are challenges in communication in the emerging business ecosystems that can inhibit the knowledge creation. The organizational knowledge creation theory by Nonaka and Takeuchi’s (1995) offers a means to see and analyze the ecosystem management and related activities in its formation. We adapted it as lens to analyze the knowledge management related activities in the formation of an ecosystem. In order to do this, we need first to understand the knowledge creation and conversion in emerging business ecosystems. With these two research questions we aim to increase the understanding: How knowledge is created in emerging business ecosystems? and What are the key activities that help in the knowledge creation? By investigating knowledge management in business ecosystems, we can analyze its implications for managing emerging business ecosystems and which factors should be taken into account.

We participated in the formation of two separate business ecosystems in national research programs in Finland. The organizations involved in this study came together to create new business in the technology-based health and well-being services market. In this paper, we present the relevant activities that were used for the formation of business ecosystems. The two cases are presented, and relevant aspects of their formation are analyzed. In order to analyze, understand, and further improve knowledge capture and creation in business ecosystems, we explored the addition of a knowledge management framework as an analytical lens. As a discipline, knowledge management traditionally contextualizes knowledge creation, capture, and sharing in the context of an organization (Dalkir 2011). We investigated knowledge conversion based on Nonaka and Takeuchi’s (1995) knowledge spiral, and examined its adaptation to business ecosystem knowledge management by evaluating the performed ecosystem formation activities against the knowledge management model. We aimed to evaluate the integration of knowledge within our emerging business ecosystems.

The rest of the paper is organized as follows. First, we discuss the relevant literature about business ecosystem formation. In addition, we introduce the knowledge management framework as a way to

¹ http://digile.fi/en/
understand knowledge conversion across and within organizations and the importance of knowledge management in emerging business ecosystems. We present the two business ecosystem cases and the researcher-lead activities that were aimed at facilitating value creation and business ecosystem formation. As results, we present our analysis of knowledge conversion and creation in light of the activities in the emerging business ecosystems. Lastly, we discuss the results, present our conclusions, and suggest future research directions.

**Business Ecosystems and Knowledge Management**

In his work, Moore (1993) uses business ecosystems as an allegory of natural ecosystems in order to present the way companies should do business together. The business ecosystems can be defined a set of actors, who contribute to the core purpose of the business ecosystem, by producing value for its customers through innovation. Other defining features of business ecosystems, according to Harland and Wüst (2012), are the strategic requirements, platform, and strong brand that are led by one leading company. Business ecosystems are typically seen as large networks of actors (i.e., distributors, manufacturers, and customers) who link together products, services, and technologies (Qu et al. 2010; Ruokolainen et al. 2011). The use of a business ecosystem analogy has the value of being able to account for the change dynamics, and the strategic implications of those changes, for organizations; key aspects of business ecosystems are their members and their roles, their coevolution, the dynamics of change, and company strategies for business ecosystems (Mäkinen & Dedehayir 2012). As a term, business ecosystems can also be seen to cover other types of ecosystems: service ecosystems, digital business ecosystems, or innovation ecosystems, for instance. Also, since the formation of specifically SME ecosystems has so far not been widely studied, we applied the business ecosystem framework as a background in our research.

The management of the formation phase of ecosystems has its recognized aspects. Factors affecting to entry into an ecosystem, according to Wnuk et al. (2014), include end-customer demand, organizational relationships, open environments, and expected future possibilities. In addition, Ramos et al. (2013) found that organizations are in part collaborations, such as ecosystems, because of inter-linkages and personal connections as well as the complementarity of resources. There is a need for creating a common understanding of the roles of partners and aligning motivations for participating in a business ecosystem (Lin et al. 2012). Awareness of the motivation of other participants and their capabilities, roles and resources help companies to connect and create better value together for the customers. Structured decision making should be based on an understanding of the core capabilities and value creation potential within the ecosystem (Mäkinen & Dedehayir 2012). It can direct management and joint service innovation, but also poses a challenge to business ecosystems that encompass various organizations with different cultures, roles, interests, and resources.

In many perspectives, traditional knowledge management can be extended to also analyze knowledge capture and creation in emerging business ecosystems. The knowledge management discipline was defined to deal with the capturing, codifying, and sharing of knowledge within an organization leading to creation of new knowledge (Dalkir 2011). From the organizational perspective, there are activities for capturing and documenting both the tacit and explicit knowledge of an individual. The other side of knowledge management is the dissemination of knowledge across an organization. This way the knowledge is transferred and converted within the organization. Business ecosystems are comprised of organizations, but the same needs for the transfer and conversion of knowledge apply. However, business ecosystems add cross-organizational complexity to the knowledge conversion.

At the organizational level, the transition from knowledge capture and creation to knowledge sharing and dissemination that leads to the application of knowledge is often seen as a cyclic, continuous process between individuals and expands to the organizational level (cf. Dalkir 2011). One of the classic frameworks of knowledge management is Nonaka and Takeuchi’s (1995) knowledge spiral. It can be understood as a model that outlines the tacit-to-explicit conversion of knowledge and vice versa. Nonaka and Takeuchi’s (1995) spiral includes the following knowledge creation dimensions: socialization, externalization, combination and internalization of knowledge. Sharing tacit knowledge through social interaction, or socialization, aims for the arrival of mutual understanding and shared mindset between individuals. Successful transfer of tacit knowledge is an effective way to share the knowledge, but it is often difficult to disseminate in a systematic way. In the externalization of knowledge, knowledge is converted from tacit to explicit. This part of knowledge creation involves the articulation and
concretization of knowledge. The *combination* of knowledge is often visible in the synthesizing and recombining of existing knowledge in order to create new knowledge. Lastly, the *internalization* of knowledge makes explicit knowledge tacit via a process through which shared experiences and knowledge are made useful at the individual level.

Looking at knowledge creation and conversion in the business ecosystem context, where organizations complement each other, collaborating and contributing to a common interest, the knowledge spiral may help in recognizing relevant aspects. At the beginning of business ecosystem formation, organizations need to share their capabilities, expertise, and knowledge. In sharing the organizations’ knowledge, similar needs of making the tacit knowledge explicit are brought to the ecosystem level. This is done using methods that help make knowledge within the organizations visible and accessible to others. Linking together the tacit and explicit knowledge, can be achieved through collaborative activities that we will explore next. Finding linkages between actors, envisioning common goals, and concretizing them by identifying possible collaborations among organizations can pave the way toward investing in a business ecosystem and its vision.

### Emerging Health and Wellness Business Ecosystems

We studied the formation of emerging business ecosystems in two different cases with the aim of developing new, innovative technology-based health and wellness services. In the role of researchers, we actively participated in the formation of the business ecosystems. The formation of these business ecosystems was supported by public strategy funding from the Finnish Funding Agency for Technology and Innovation (TEKES) and took place in two separate large Finnish national research programs operated by DIGILE. The first research program was the Devices and Interoperability Ecosystem (DIEM), which ran from 2008 to 2012 and included over 40 organizations. The second research program, Digital Services, ran from 2012 to 2015 and involved over 80 organizations.

The aim of both research programs was to bring together companies and research organizations and support the formation of new business ecosystems. The programs offered support for joint R&D activities between companies and research organizations from the early R&D to point when the new technology-based service was ready for commercialization. In both research programs, a health and well-being business ecosystem was formed. Although the companies involved in these ecosystems were different, the research organization, represented by us, was the same. Our role in these emerging business ecosystems was to participate in and offer our capabilities for service innovation, design, and testing, as well as to act as facilitators in the business ecosystems’ formation activities. The DIEM program involved a *health-exercise ecosystem* and the Digital Services program involved a *wellness ecosystem*.

The *health-exercise ecosystem* consisted of one research organization and four companies: a manufacturer of wearable exercise computers, such as heart rate monitors; a company providing rehabilitation services based on research and monitoring; a health club chain that offers exercise and personal training services; and a manufacturer of exercise and gym equipment. The organization came together to develop a new type of technology-based exercise concept: an entire smart exercise environment.

The starting point was technology-based, as new directions for technology development were sought. The wearable exercise computer manufacturer was considered to be in the central position in this ecosystem. However, the approach used to generate these R&D directions involved identifying the needs of potential customers. Following principles of open innovation (cf. Chesbrough et al. 2006), two innovation competitions were arranged and used to collect user scenarios for new exercise concepts (reported in Järvelä et al. 2010). Participants included both potential users and some company employees from the health-exercise ecosystem. As a data collection method, the innovation competitions were complemented by arranging user workshops where group interviews and user diaries were used for recording scenarios (reported in Tulppo et al. 2012). The ecosystem then chose which of these they regarded most interesting in terms of its organizations’ existing interests, capabilities, and overall vision.

The user scenarios were designed from innovations to concrete business models and service concepts (reported in Annanperä et al. 2015). Investigating the commercial potential and potential success of service design choices was performed by using a business model canvas tool to concretize the business models of the service concepts. It took two iterations of business model development working together...
with the ecosystem’s core actors in addition to other actors that the ecosystem’s companies regarded as relevant, such as other health industry professionals and business development experts. At the same time, the companies collaboratively developed technical solutions for a novel health-exercise concept. The health club chain took the ownership of the concept, thus assuming the leadership role in the health-exercise ecosystem. The concept was based on interoperable smart gym technology that used a smart card for moving the user data and was aimed at users who, for example, need short exercise as a break from work. This concept was piloted in a carefully selected location.

The wellness ecosystem was formed of six companies and four research organizations. The companies involved in this ecosystem included a company offering a service (and a technical platform) in occupational well-being and recreational services; two companies developing different mobile applications for personal wellness; a developer of personal medical and wellness information database-related services; an activity sensor manufacturer; and a company that was in the process of developing a scorecard-type organizational wellness measurement solution. The other research organizations focused on areas related to well-being management, sensor and measurement technology, and usability design. Our organization’s focus was on service design in business ecosystems and the formation of the business ecosystem. The companies engaged in the wellness ecosystem were interested in jointly developing a service offering targeting occupational well-being (for more information, see Annanperä & Liukkunen 2014).

During the formation of the wellness ecosystem, we organized four workshops with different themes and working styles to help the companies recognize their competencies and to facilitate collaboration. First, the organizational actors needed to get to know each other. This was facilitated by arranging a workshop with all the participants, who worked in groups to express their goals and concerns for the overall ecosystem. They had already identified some potential collaborations at this point, as well as complementarities among each other’s services and products.

At this stage in the formation of the wellness ecosystem, the companies started to notice that they had some conflicting interests and expectations of each other and the whole outcome: the unified service. This became visible, while the possible technological and service integrations were outlined together in the following workshop. The conflicts in expectations emerged partly because some of the companies were recent start-ups with few resources and their own products were still in development. The workshops attempted to resolve these issues by clarifying the support available from the researchers and by using interviews aimed at separately recording the expectations, needs, and solution suggestions from all the organizations. In addition, the companies’ key persons were interviewed to gather more detailed information about their expectations and ideas for the overall picture of the common service offering.

In the fourth workshop, all of the solutions were finally discussed together, and the next steps toward technology and service integration were identified. The mobile platform developer clearly took the leading position in the ecosystem, and the services started to align. The idea was that, as far as possible, there would be technology-level integrations for the platforms that some of the companies had. In addition, some of the services would be offered as tie-ins on the side as part of a wellness concept, but would also operate as separate systems or services. As the business logic, it was intended that the ecosystem’s service offering formed a service catalogue, where the customer would be billed based on the features or services it chose to offer its employees. The role of the researchers as facilitators diminished as the leader organization started to manage the wellness ecosystem. Finally, a selection of services and technologies were integrated in the mobile platform, but not as many as was originally intended.

**Formation of the business ecosystems**

In both cases, the business ecosystems were comprised of SMEs and research organizations. They were also similar in that neither had a clear leader among the companies when the formation of the business ecosystem began.

In both cases, some of the companies and research organizations were already familiar with each other; some had even worked together before. In the health-exercise ecosystem, existing connections were tighter than those in the wellness ecosystem. For the latter, the researchers took the role of facilitating the collaboration and helping ideas to form into a more concrete direction for the ecosystems. To achieve this, the researchers used several methods. The overall research strategy was action research, applied to each
of the cases. The close involvement of the researchers in the formation of both ecosystems allowed us to make observations based on, for instance, matters discussed in meetings. The tools and methods used for collecting and analyzing the data were selected to reflect the progress of the formation and value creation. In the beginning of the formation, more unstructured and probing methods were required; but as the ecosystems’ targets became more focused, the methods used became more precise. A summary of the methods used is provided in Table 1.

<table>
<thead>
<tr>
<th>Business ecosystem</th>
<th>Methods</th>
<th>Aims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health-exercise ecosystem</td>
<td>Innovation competitions; (used twice for different user bases); thematically mapped and analyzed</td>
<td>Find radical new ideas for exercise</td>
</tr>
<tr>
<td></td>
<td>User diaries and group interviews (used twice for different user bases); thematically mapped and analyzed</td>
<td>Understand the potential user base’s needs for the health-exercise concept</td>
</tr>
<tr>
<td></td>
<td>Workshop with business model tools (used twice); qualitative analysis</td>
<td>Health-exercise concept development</td>
</tr>
<tr>
<td>Wellness ecosystem</td>
<td>Workshops (4 separate); qualitative analysis, service integration model building</td>
<td>(1) Introductions, target setting; (2) Potential integrations; (3) Resource allocation, expertise recognition, problems; (4) Finalizing integrations, user identification</td>
</tr>
<tr>
<td></td>
<td>Interviews (11 persons, 10 organizations); qualitative analysis</td>
<td>Organizational expertise, expectations, service alignment solutions</td>
</tr>
</tbody>
</table>

Table 1. Summary of the Used Methods

In both cases, ecosystem formation started by establishing the common goals for the ecosystem. While a positive attitude toward the collaboration was vital for the ecosystem to start its work together, the formation of a concrete outcome took time. Without clear leadership, challenges can become disruptive, and as can be seen in the case of the wellness ecosystem, some companies started to lose interest in a common vision. Also in the health-exercise ecosystem the leadership needed to change; service finalization could not have continued otherwise.

Overall, the management of both the formation of an emerging business ecosystem and its value creation process are almost indistinguishably linked together. The described activities were mainly planned and executed with the ecosystem formation and common design activities in mind. Plenty of rich data was however collected at the same time. The information needed to proceed with the main functions also served to capture the relevant knowledge from the knowledge management point of view in these ecosystems.

Emerging Business Ecosystems from the Knowledge Management Viewpoint

In the following analysis, we explore the suitability of Nonaka and Takeuchi’s (1995) Knowledge spiral based knowledge creation and conversion thinking into business ecosystems’ knowledge management. When integrating the formation activities of emerging business ecosystems to Knowledge spiral (see Figure 1), we can see that it offers possibilities for further analysis and understanding of business ecosystem dynamics and key aspects. The common interests, and the goals established around them, are the deciding factors that determine what knowledge needs to be shared and in what level of detail, as well as how the sharing is best accomplished.
As business ecosystems are comprised of separate organizations that need to understand each other in order to create new value together, the knowledge contained inside these organizations needs to be made visible. **Externalizing of knowledge** was achieved by elaborating the relevant knowledge within the organizations and explicating them together. In the context of the wellness ecosystem, a workshop was arranged to bring the organizations together for the first time, introduce them to each other, and collect their main interests. As a result, all of the organizations were able to identify what kind of knowledge resided in each organization. This knowledge included technical expertise, but also the focus area expertise of the wellness business; the service and business logic that was developed in each organization. Also, the main interests of the organizations regarding the wellness ecosystem were tied into the overall target setting of the ecosystem.

In the health-exercise ecosystem, the organizations were already familiar with each other, and they recognized the need for innovative ideas from outside of the core ecosystem. It was commonly agreed that new innovative ideas could be collected from outside rather than inside the organizations. Innovation competitions and user diaries and interviews were used to collect new ideas. New ideas were indeed identified, and in particular the innovation competitions helped to concretize these into a usable form, while the user diaries helped making users’ tacit knowledge explicit. Through innovation activities, the health-exercise ecosystem generated much more than just one coherent idea; it also generated ideas and voiced desires for services that did not exist yet, and the ecosystem together then chose which of these it regarded as interesting in terms of the health-exercise ecosystem’s existing interests, capabilities, and overall vision. Those ideas that seemed the most interesting and achievable were taken into further consideration.

**Combination of knowledge** in the business ecosystems was linked with the potential for value creation in the business ecosystems. It can be seen as aiming for the pooling of knowledge from each organization by making possible integrations in technological and service levels visible to all of them. The possible technological and service integrations were outlined together in the second workshop. First, this allowed for integrations of technological- and service-level knowledge to be linked between the organizations in the wellness ecosystem. Second, the business model related knowledge was also to be linked to the service value and to the other organizations. The linking of knowledge made some of the problems in the wellness ecosystem visible; companies had some conflicting interests and expectations of each other and the whole outcome: the unified service, as mentioned in the case description. On the other hand, there were different views about who the leader of the ecosystem should be, since there was as of yet no clear leader company.

In the health-exercise ecosystem, two knowledge combination activities were identified. The service concept started to come into focus as the companies combined and internally tested the technology development that had been done based on the results of the innovation and user workshops. The result was a new type of health-exercise concept where smart technology could assist the user in performing a small daily exercise on two or three gym machines and receive feedback based on his or her activity. Investigating the commercial potential and potential success of service design choices was part of the
service design process, and working together with the ecosystem’s core actors in addition to other actors that the ecosystem’s companies regarded as relevant helped in knowledge combination within the health-exercise ecosystem.

**Internalization of knowledge** became visible in the wellness ecosystem after it was able to solve some of its issues. First, in a workshop we tried to resolve these issues by clarifying the support available from the researchers. Second, interviews that separately collect the expectations, needs, and solution suggestions from all the organizations also sought to resolve these issues. Some suggestions for service-level packaging solutions were made and presented in the final workshop arranged for all of the wellness ecosystem organizations. The organizations worked together to take the solution suggestions further and provided tangible next steps in their integration. Here, the key driving aspect was that once the mobile application developer company clearly took the leading position in the ecosystem, the services started to align. They assumed platform-type thinking, and were able to integrate many of the technologies and services offered by the other companies. The mobile application developer company took the lead in starting to finalize the services and pilot them with customers, in addition to forming policies for customer relationships. However, it should be noted that at this point two of the companies did not want to be part of the wellness ecosystem, and continued on different avenues from there on out.

In the health-exercise ecosystem, collaborative work toward identifying an interesting and investment-worthy new service innovation began to take shape through collaboration with stakeholders and potential customers. In the middle of the R&D and design process, at the point where technology and user-based approaches were completed and the business concept design had begun, the ecosystem experienced a change in leadership. The wearable exercise computer manufacturer was not interested in investing or being the leader. Thus, the new service concept needed a stronger leader, and the health club took the lead in the further design of the concept. Only after the health-exercise ecosystem was stabilized and led by a company with an interest in business development was there the possibility for integrating knowledge through real investments in the business. The companies started to prepare for the commercialization of the health-exercise service.

**Socialization of knowledge** was not particularly examined in the progress of our study. The transfer of tacit knowledge of one organization to tacit knowledge of another organization was something that was assumed to happen via practical integrations between individuals who, for instance, completed the technical integrations. We can assume that as the organizations became more familiar with each other and worked together during the program’s timespan, tacit knowledge was transferred between them; again, however, it was not feasible to focus on this in our study.

**Discussion and Conclusions**

Companies try to remain competitive by collaboratively creating new technology-based services in business ecosystems. Creating new business is important for the global economy, and therefore public funding aims to support companies in this endeavor. In these business ecosystems, companies are able to benefit from a shared knowledge base, capabilities, expertise, and resources. By collaborating with others, they are able to create more appealing services or expand existing markets and customer bases. In the case of an emerging business ecosystem consisting of SME organizations and research organizations in a research program, there is a need for understanding its formation as well as how to control and facilitate it.

By adapting the knowledge management viewpoint to the analysis of knowledge creation and conversion in emerging business ecosystems, we can add to the understanding of how these business ecosystems are formed. Analyzing knowledge conversion in business ecosystems concretizes the transfer of knowledge needed for the creation of value and helps stabilize the emerging business ecosystem. The relevant aspects of the emerging business ecosystem revealed in this study were its strategic vision and target, the visibility of its capabilities and expertise, and the rise of strong leadership that lead to a change in initial roles. Creating linkages at the product level, through technical integrations, service design levels, and the development of business logic, combined the existing knowledge in the business ecosystems. In particular, the new knowledge and expertise the organizations create together directly benefits everyone, and such knowledge may be applicable to other contexts and ecosystems. As a business ecosystem’s
knowledge conversion and creation of new knowledge progresses over time, its companies can work faster and better by reusing the best practices and ultimately reducing work.

Making the knowledge inside the ecosystem visible requires tools and strategies. In our research, we used several face-to-face methods in workshop formats that allowed all the participants to first interact and then later gain a summary and analyzed version of their interactions and decisions. Concretizing the interactions by using these tools and distributing the analysis (of the workshops and interviews) helped in the knowledge conversion process. However, as Nonaka and Takeuchi (1995) state, knowledge creation is a social process and tends to involve spiraling interaction rather than being straightforward. It was our observation as well that the more familiar the companies became with each other’s competencies, the faster the integrations of all levels became. On the other hand, there were situations, especially in the wellness ecosystem facing its problems, when we needed to clarify the needed knowledge. It seems that as companies build trust between each other, they are better able to share their visions and prepare for the integrations. Finding the leader within the business ecosystem was not necessarily the direct outcome of knowledge conversion, but increased understanding between the companies probably did help the leadership take form. A strong leader does, however, help other aspects of knowledge to transfer by setting clear targets that help focus the knowledge conversion. Similarly, the researchers acted as facilitators to help knowledge conversion take place in the business ecosystem, and as the business ecosystem stabilized, the role of facilitation was not as necessary; the companies started to interact more informally with each other.

We have analyzed two cases of emerging business ecosystems that were formed by strategic funding in a research program. Both business ecosystems consisted of SMEs and research organizations, and both operated in the technology-based health and wellness service business. We conclude that some generalizations to similar contexts can be made, but further study would be needed to make generalizations to very different business areas and among larger companies.

Furthermore, in our research, following the conversion of tacit-to-tacit knowledge in the socialization of knowledge was not easy. In the business ecosystems, the socialization of knowledge can be difficult but is possible when the organizations work in close collaboration. This in particular is an asset for SME companies and start-ups, since the linkages between organizations really become linkages and collaborations between people that work together within these organizations. The transfer of knowledge across, between, and within organizations should be easier. However, future studies should follow this part of knowledge conversion in the context of emerging business ecosystems.

Acknowledgements

This work was supported by TEKES (Finnish Funding Agency for Technology and Innovation) as part of the DIEM and Digital Service research programs in DIGILE (Finnish Strategic Centre for Science, Technology, and Innovation) in the field of ICT and digital business.

REFERENCES


