Business Models as Enablers of Ecosystemic Interaction: A Dynamic Capability Perspective

Julius Francis Gomes, University of Oulu, Oulu, Finland
Marika Iivari, University of Oulu, Oulu, Finland
Minna Pikkarainen, University of Oulu, Oulu, Finland
Petri Ahokangas, University of Oulu, Oulu, Finland

ABSTRACT

A business ecosystem supports relationships between its stakeholders. Although it has been recognized that ecosystem stakeholders neither solely compete, nor collaborate, but rather co-develop their capabilities, empirically-based research evidence on this interactive co-development in ecosystems remains scarce. The interaction among ecosystem stakeholders is approached from the business model perspective. Accordingly, this article builds on business model literature, and on empirical data gathered within an emerging connected health ecosystem. This article conceptualizes business models as dynamic capabilities that enable ecosystemic and symbiotic interaction through opportunity exploration and exploitation, value creation and capture, and, advantage exploration and exploitation. This article argues that co-developing business models through sensing, seizing and transforming is a key enabler for ecosystem’s success and sustainability.

KEYWORDS


INTRODUCTION

In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise more effectively have prevailed – Charles Darwin – The Descent of Man.

In more than 25 years of research on business ecosystems, most of the studies have explained the concept from definitional and descriptive viewpoints, and why business complexity is viewed analogous to ‘biological’ ecosystems (Moore, 1993; Iansiti & Levien, 2004; Adner & Kapoor, 2010; Mäkinen & Dedehayir, 2012). Moore (1993) pointed out parallel dynamics with natural and business ecosystems, as both are formed partly intentionally, and partly accidentally. A business ecosystem is defined as “an economic community supported by a foundation of interacting organizations and individuals - that is, the organisms of the business world” (Moore 1993). Business ecosystems can be viewed as organizations that create value by combining their skills and assets, characterized by non-linear value creation processes, where groups of companies deliver integrated solutions for customers (Clarysse et al., 2014).

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Just like biological ecosystems, business ecosystems are characterized by high levels of interdependency, complexity, collaboration and co-evolution (Moore, 1993; Iansiti & Levien, 2004). The kind of sophisticated market dynamism that takes place in business ecosystems, and continued resource evolution, contributes to temporary competitive advantages (Ahokangas et al., 2010). Organizations can solidify those temporary competitive advantages through managerial selection, cooperation and market competition. As opposed to the resource-based view that focuses on combining valuable, rare, inimitable and non-substitutable resources and capabilities to create sustainable competitive advantages (Barney, 1991), temporary competitive advantages are rooted in dynamic capabilities (Teece, 2012). Dynamic capabilities are high-level strategic competencies that are required to manage resources in addressing turbulent environmental shifts. Business ecosystem members ought to co-evolve symbiotically through simultaneous collaboration and competition to ensure the existence of the system as a whole. Yet research evidence on how the co-development of capabilities occurs remain nascent. This paper contributes to this gap in literature by theorizing how organizations in business ecosystems can co-develop and co-evolve by using business models as a dynamic capability.

The importance of business relationships and firm competitiveness has been recognized in many studies (Amit & Zott, 2001; Gadde & Håkansson, 2001). However, the perspective of business models as dynamic capabilities is only emerging (Teece, 2017; Juntunen, 2017). Scholarly works focusing on business ecosystems through the lens of business models are also scant but advancing (Gomes et al., 2017; Iivari et al., 2016; Jansson et al., 2014). Teece (2017) points out the interdependence between business models, dynamic capabilities and strategy. Business models have increasingly been considered as a “boundary-spanning unit of analysis” (Zott et al., 2011). A business ecosystem can, therefore, be viewed as a network of multiple business models (Jansson et al., 2014), where companies seek bundled or hybrid business models to combine or aggregate services from different parts of the ecosystem (Iivari et al., 2016).

Looking at ecosystemic contexts from a business model perspective is somewhat recent since business models have been mainly examined as a firm-specific phenomenon (van der Borgh et al., 2012). Thus, there is not yet enough understanding of the dynamics of the business ecosystems (Alajoutsijärvi et al., 1999; Håkansson & Waluszewski, 2002; Lundgren, 1991) or capabilities needed in the development of businesses (Juntunen, 2005). In line with Teece (2017), in this study, business models are therefore conceptualized (Teece, 2010; Chesbrough & Rosenbloom, 2002) as a dynamic capability (Teece, 2007, 2017) that enables and fosters the interaction (Zott & Amit, 2008) in business ecosystems.

This paper aims to create a conceptual framework around the primary question of how business models can be viewed as dynamic capabilities in ecosystems, to contribute to the discussion on how ecosystem players may calibrate interdependent activities through their business models (Teece 2010). In doing so, business models of individual firms are considered as ‘practical implementation of abstract strategies’, thus a dynamic capability which enables firms to sense, seize or transform in response to environmental changes (Teece, 2007, 2017). This study also seeks to mark how business model as a dynamic capability helps to create a congruent ecosystem through the activities of opportunity exploration and exploitation (OEE), value creation and capture (VCC), and advantage exploration and exploitation (AEE).

**THEORETICAL BACKGROUND**

This section briefly reviews the literature on dynamic capabilities and provides insight on business models as a dynamic capability. First, the origins of dynamic capabilities is briefly explained. Then, the authors discuss how business models as a concept is relevant to dynamic capabilities.
**Dynamic Capabilities as an Approach**

Dynamic capabilities are higher-level competencies that define an organization’s ability to integrate, build, and reconfigure both internal and external resources/competencies to address, and potentially alter the rapidly changing business environment (Teece, 2012). Decisions related to the alignment of resources and competencies both inside and outside the firm boundaries become vital for an organization in regard to when, how, and why to form alliances and with whom. Dynamic capabilities are most prominently categorized as three broad clusters of activities and adjustments: 1) identifying and assessing an opportunity (sensing); 2) mobilizing resources to address opportunity and capture value (seizing); and 3) continuous renewal of routines (transformation) (Teece, 2007, 2012).

Teece (2012) adds that if and when dynamic capabilities are stacked on top of ordinary capabilities, organizations can develop, maintain or extend competitive advantage. Ordinary capabilities concern how organizations execute and manage current operations. In contrast, dynamic capabilities are more future-oriented and tends to adjust resources and competencies to address environmental fluctuations through suitable business models (Teece, 2016). Teece further states, organizations with resilient dynamic capabilities often have their “signature” process which on the one hand is difficult to imitate and on the other hand can be a catalyst for competitive advantage.

Yrjölä et al. (2017) observe that resources and capabilities can be organized as hierarchical constructs. Resources are considered as zero-order elements, which are at the bottom of the hierarchy. On top of that, operative capabilities are skills required in using resources, as first-order elements. Then, the second-order elements, core capabilities are key to an organization’s business. Core capabilities are required for sustainable competitiveness. Finally, at the peak of the hierarchy, dynamic capabilities are needed to develop new ways of doing business and transforming existing processes and resources.

**Business Models as Dynamic Capability**

The notion of business models as dynamic capability has emerged with significant importance due to research advancements (Teece, 2017; Juntunen, 2017). Teece (2007) identifies business models as a key micro-foundation relevant to “seizing” dynamic capabilities, and reaffirms (Teece, 2017) the interdependence between the concepts of business models and dynamic capabilities. In this vein, Juntunen (2017) explored how business model change can be viewed as a dynamic capability.

The business model is conceptualized in various ways; as a check-list of items (Teece, 2010; Osterwalder et al., 2005), as a conceptual tool (Osterwalder et al., 2005), as a cognitive map (Chesbrough, 2003, Shafer et al., 2005), as a set of interrelated activities (Amit & Zott 2001, Zott & Amit 2010); and so on. While all of these conceptualizations remain relevant in specific contexts; for ecosystemic contexts, business models are considered much broader than only as a checklist of different items (Iivari et al., 2016).

A business model can be defined as a boundary-spanning unit of analysis (Zott et al., 2011) from conceptual perspective or, practically, as a vehicle to exploit a business opportunity (Zott & Amit, 2010), and it is related to opportunity exploration and exploitation, advantage exploration and exploitation, as well as value creation and capture (Ahokangas & Myllykoski, 2014). While most business model research focuses on it as a firm-level phenomenon (Timmers, 1998; Amit & Zott, 2001; Chesbrough, 2003; Osterwalder et al., 2005; Shafer et al., 2005; Teece, 2010), the potential of the concept in solving more complex business environmental (i.e. business ecosystem) issues remain somewhat ignored (Iivari et al., 2016; van der Borgh et al., 2012). The importance of interaction with business environment along with knowledge creation, exchange and transfer has been mostly overlooked and the few business model studies conducted have utilized an abstract level of analysis (Haslam et al., 2015).

A business ecosystem consists of different types of governmental, non-governmental, financial, academic, profit-oriented and non-profit-oriented stakeholders (Adner & Kapoor, 2010; Iyer & Davenport, 2008). Some key roles in a business ecosystem are categorized as - keystone/platform leader/ecosystem leader/orchestrator, niche player/complementor, wannabe, and dominator (Moore,
1993; Iansiti & Levien, 2004; Mäkinen & Dedehayir, 2012). Therefore, there are business models that can be classified based on their core value creation activities in business ecosystems. These activities can relate to, for instance, providing connectivity among ecosystem members, offering services related to content, creating service-oriented contexts and commercial activities in different types of contexts (Wirtz et al., 2010). These four types (connection, content, context, commerce) of business models, also referred to as 4C (Wirtz et al., 2010) are often observed as important layers of a business ecosystem where each preceding layer acts as enablers for the following ones (Gomes et al., in press; Yrjölä et al., 2015), addressing how different kinds of services can be bundled as an ecosystemic solution (Livari et al., 2016).

Business models connect abstract-level strategy (theoretical thinking) of an organization to its implementation on a practical level (action). Similarly, this study recognizes business models connect a firm with ecosystem partners through one or more of the following three broad activities in combination: opportunity exploration & exploitation (OEE), value creation & capture (VCC), and advantage exploration & exploitation (AEE). Considering business models as a set of interdependent activities (Zott & Amit, 2010), a firm’s business model features OEE, VCC and AEE. This study argues that the business model has a higher-level strategic capability that can serve as a tool for sensing, seizing and transforming through OEE, VCC and AEE activities to respond to environmental changes. Through these activities, firms can approach business models as a dynamic capability in ecosystems to identify suitable means for collaboration and alignment of activities. Based on when, how and why a firm is forming an alliance with another participant in the ecosystem, they need to assess through which activity combination the alliances should be formed, i.e. OEE, VCC, AEE.

RESEARCH METHODOLOGY AND DATA COLLECTION

In this section, the research methodology is presented first. The case ecosystem is introduced next, with an explanation of how the empirical data was gathered and analyzed.

Research Methodology

To study the complex and dynamic paradigm of business ecosystems, researchers need to be equipped with flexible and versatile methodological tools (Mason 2002). Qualitative methods provide researchers with needed flexibility and sensitivity to the context that is less explored, and assist in understanding how things work in a particularly complex setting (Mason 2002). Therefore, a qualitative research approach was chosen. A case study approach helps researchers gather an understanding of a complex phenomenon using multiple data sources, examined through several lenses in a real-life context (Ozanne & Anderson, 2010; Yin, 2013; Baxter & Jack, 2008). The process of building theory from case study research is therefore considered to be an iterative process that generates continuously new ways to understand the data (Eisenhardt, 1989).

While this study looks at the overall interactions that take place in a business ecosystem as a whole, it is nevertheless generated from multiple participating stakeholders within. Thus, a multiple case study (Stake, 2013) approach was employed to make sense of the wider picture - the business ecosystem.

Data Collection

This study relies on empirical data collected from a large complex connected health business ecosystem. Connected health refers to collecting data from care providing and care receiving parties as well as services that use different IoT (Internet of Things) technologies and or elements of ‘eHealth’, ‘telecare’, ‘telemedicine’ or ‘telehealth’ (Galbraith et al., 2008). The data were gathered over a two-year period within a project which aimed to deliver the first operational version of a business ecosystem for connected health. The focus was to support technological innovations in pediatric surgery and emergency care domains. The ecosystem involved stakeholders from academia,
Table 1. Data collection for the research

<table>
<thead>
<tr>
<th>Event</th>
<th>Purpose</th>
<th>Duration and date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting- Telecommunications operator</td>
<td>Understanding BM, role in ecosystem</td>
<td>1.25 hours 12.02.2016</td>
</tr>
<tr>
<td>Meeting – Hospital Information system provider 1</td>
<td>Understanding BM, role in ecosystem</td>
<td>2 hours 15.02.2016</td>
</tr>
<tr>
<td>Meeting – Network infrastructure company</td>
<td>Understanding BM, role in ecosystem</td>
<td>1.25 hours 18.02.2016</td>
</tr>
<tr>
<td>Meeting – Global technology leader (also offers healthcare products)</td>
<td>Understanding BM, role in ecosystem</td>
<td>1.20 hours 18.03.2016</td>
</tr>
<tr>
<td>Meeting – SME (major products: sensors and sensor-based devices)</td>
<td>Understanding BM, role in ecosystem</td>
<td>1.75 hours 29.03.2016</td>
</tr>
<tr>
<td>Meeting- Startup (communication platform for healthcare)</td>
<td>Understanding BM, role in ecosystem</td>
<td>1 hour 29.03.2016</td>
</tr>
<tr>
<td>Meeting – Project researchers</td>
<td>Ecosystem building potential related discussion</td>
<td>1.5 hours 08.04.2016</td>
</tr>
<tr>
<td>Meeting – Startup (secure private video conferencing)</td>
<td>Understanding BM, role in ecosystem</td>
<td>2 hours 28.04.2016</td>
</tr>
<tr>
<td>Meeting – Project researchers</td>
<td>Ecosystem mapping initiation</td>
<td>2.5 hours 03.05.2016</td>
</tr>
<tr>
<td>Meeting – Network infrastructure company</td>
<td>Present initial findings and receive feedback</td>
<td>2 hours 20.05.2016</td>
</tr>
<tr>
<td>Meeting – Hospital Information system provider 2</td>
<td>Understanding BM, role in ecosystem</td>
<td>1.5 hours 26.05.2016</td>
</tr>
<tr>
<td>Meeting – Global technology leader</td>
<td>Further understanding of the company’s participation in the ecosystem</td>
<td>2 hours 06.06.2016</td>
</tr>
<tr>
<td>Workshop- Overall project consortium</td>
<td>Present findings, receive feedback</td>
<td>2 hours 07.06.2016</td>
</tr>
</tbody>
</table>

industry, healthcare professionals, end users, and a hospital-environment test lab. At the premises of the test lab, new services can be demonstrated and evaluated with genuine end-users – patients and health professionals. The goal was to speed up the co-design of future hospital services together with healthcare professionals, and thereby facilitate the adoption of innovations in hospitals, that are otherwise characterized by strict regulations and ethical constraints. One specific aim of the project was hence to support companies in the co-development of ecosystemic business models to create new solutions for future hospital programs.

In the project, two business incubators, 16 companies (startups, SMEs, large corporations), two university hospitals, one hospital-environment testing laboratory, and researchers from different disciplines and backgrounds were involved. Altogether, 14 business modeling meetings and workshops were organized with ecosystem actors. Table 1 describes the data collection.

All the interviews and workshop materials were recorded and transcribed. The “4C business model framework” (Wirtz et al. 2010) was used as an analytical tool (Zott et al., 2011) to identify different players in the ecosystem. By using this tool, the intention was to understand business models as dynamic capability through a cluster of activities and adjustments (i.e. OEE, VCC, AEE for Sensing, Seizing and transforming) as described by Teece (2012). The findings of our analysis are presented in the following chapter.
FINDINGS

In the studied emerging business ecosystem, the core objective was “innovation sustainability” through new service creation, integration of services and testing for the health sector. Considering innovation for the sector-at-large rather than business growth of specific organizations as the aim, the hospital-environment testing laboratory as a non-profit organization holds a central role in the ecosystem.

Various ecosystem actors were identified, all involved in different ways and different roles. As described earlier, these participants were classified based on the 4C business model by Wirtz et al. (2010). According to the analysis, there are companies who solve the need for connectivity that is a key requirement for connected health services and solutions, i.e. mobile network operators and network infrastructure vendors. Furthermore, for the connected health context, individual health data is concerned as key content. There are actors in the ecosystem for collecting and analyzing health data, such as IoT device providers, IoT platforms providers and wearables providers. There are also companies already established in the healthcare business that offer healthcare information systems and platforms for managing electronic health records. In addition, emerging services that automate communication between patients and health professionals, and among health professionals are extant. These services solve both physical and virtual context issues in the ecosystem. Finally, it was observed that there are additional opportunities to create third-party commercial businesses using the collected data by making additional senses, i.e. health big data businesses and data analytics. Among all the roles identified in the ecosystem, a good mix of early-stage startups (companies who have been in the market for up to five years), SMEs and larger corporations can be observed. Since the ecosystem focuses on innovation and integration of services, there are multiple larger organizations participating in the alliance too.

The core business opportunity that the business ecosystem addresses relates to the growing availability of health data collected through connected health devices and services. Predominantly connected health is considered a lifestyle management approach, but nowadays services and technologies are becoming mature to offer data with clinical applicability. Therefore, this business ecosystem in a way facilitates the bridge between lifestyle focused connected health and contemporary healthcare through hospital collaboration. Through the business model discussions with the participants, different motives on why and how they partake in the ecosystem were identified. Value creation for end users came as one of the key motivators since the companies feel that the more value created for end users will result in more value captured for the business. Furthermore, the notion of co-creation and co-capturing, and sharing of value in ecosystems is considered advantageous.

Some of the larger corporations involved in the ecosystem offer an open platform for incoming early-stage ventures in the ecosystem. By doing so, these organizations are in a way locking-in other firms/services to their platform and thus creating and extending a market advantage. Additionally, the incentive for businesses participating in the ecosystem who are far from healthcare business (i.e. IoT device manufacturers, sensor manufacturers, mobile network operators, and network infrastructure vendors) is relevant to opportunity exploration and advantage extension by entering to a new market. However, the motivation for early-stage startups and SMEs is more towards identifying market opportunities and exploiting them, rather than immediate value capture.

During the two years of the research project, all of the entities were performing their business-as-usual activities besides contributing to the business ecosystem. However, due to ecosystem participation, all of the participants considered innovating their business model periodically. While radical business model innovation was not detected, minor incremental changes were observed.

CONCLUSION

Combining our theoretical understanding with empirical analysis, Figure 1 visualizes how business models as a dynamic capability help to develop ecosystemic interaction. Business models as firm-
specific (Timmers, 1998; Amit & Zott, 2001) strategic vehicles (Zott & Amit, 2010) enable the firm to create alliances through interactions with other firm’s business models in the ecosystem (Jansson et al., 2014).

Business ecosystems are complex; a minor change in one of the ecosystem participant business model might enquire adjustments from other participants to ensure continuous alignment. Furthermore, the agendas and the motivation to participate may differ and commitment levels of different actors change as the innovations are further developed (Pikkarainen et al., 2017). Business models can be approached as a dynamic capability, meaning business models in ecosystems should be agile enough to sense, seize and transform as a mean to respond to environmental turbulence. This study deduces that ecosystem participants tend not to radically transform business models so that it does not affect the synergy in the ecosystem as a whole. Since business models are considered as a means to implement abstract strategies, radical business model innovation would need changes in strategy as well.

To have a true interactive business ecosystem, co-developing of business models is necessary. To achieve this, like business models, business ecosystems need also to be organized around a specific broad business opportunity. To address that opportunity, organizations can then utilize their business
model as a dynamic capability to sense, seize or transform internal resources and competencies. As reflected in the empirical findings, organizations can assimilate into the ecosystem through different means and motivation: opportunity exploration and exploitation (new market entry, product testing, etc.), value creation and capture (profit maximization, product innovation, etc.), and advantage exploration and exploitation (service integration, open platform, etc.).

Theoretical Contribution

According to Haslam et al. (2015), a firm’s business model is built on interactions and the information that arises from the relations between the complex networks of participants. “A business model exists particularly when information attributes congeal to establish a broad boundary within which firms can be situated” (Haslam et al., 2015). With the thematic presentation of our findings, this paper has illustrated how business models work as a dynamic capability for ecosystemic interaction and presents research evidence on how the co-development of capabilities may occur in the context of ecosystems.

This study contributes to the business model literature by identifying necessary elements that increase the dynamic capabilities of business ecosystem participants. While recent literature has pointed out that companies involved in ecosystemic interaction typically to increase understanding of the end-user needs, and to gain continuous feedback and priorities for their solutions from experts (Pikkarainen et al., 2017), it remains unclear how organizations cooperate and participate in ecosystems in which the financial boundary of the firm is not stable but malleable (Haslam et al., 2015).

The main argument of this study is that business models can be used in this type of situation to increase dynamic capabilities to interact with ecosystem partners in different kinds of co-development activities. Thereby, this paper further develops and contributes to discussions on the relationship between business models and ecosystems (Gomes et al., 2017; Ivari et al., 2016; Jansson et al., 2014; van der Borgh et al., 2012) from the dynamic capabilities perspective. The findings discussed in this paper have implications for practitioners as well as for theory development and future research on business models.

Practical Implications

The results of this paper have been derived from challenges that are important for practice. Through empirically grounded study, this paper presents key activities any organization, both public and private, need to take into account when collaborating in ecosystems, which helps them better understand their position and how to interact within the business ecosystem. As reflected in the empirical findings, this study can aid organizations to assimilate into the ecosystem through different means and motivation: opportunity exploration and exploitation, value creation and capture, and advantage exploration and exploitation.

Additionally, from a practice point of view, since the case studied in this research involves the healthcare business ecosystem and also hospital management, managerial decision makers from such contexts will get key insights on how to create efficient business/innovation ecosystems around their interests. Companies working in the connected health domain will also benefit by understanding how they can harvest business models as a dynamic capability to better calibrate and interact within a healthcare business ecosystem, and what are the dynamics in data driven ecosystems especially.

Limitations and Future Research Directions

This paper presents a framework based on the first iterations of analysis, within a two-year research project. At the time, the ecosystem was still emerging, and therefore longitudinal studies on its evolution could not be conducted. This study is mainly conceptual and lacks wider empirical validation. However, this limitation also relates to potential future research directions.

First, a longitudinal study on the evolution of an ecosystem would be of high value. Evolution has been stated an important part in business ecosystems research (Moore, 1993). Yet, as of now,
most studies do not seek to capture the change and development that is taking place. This would have a high practical relevance to ecosystem orchestrators for steering and influencing interactions.

Second, there is a need for more research on ecosystem-level business models, and especially on the emerging theme of dynamic capabilities to capture how business models can be used to make sense of change and disruption in a complex research context such as healthcare. Especially in the case of data and technology, for instance how the use of different technologies along with IoT, such as blockchain or 5G mobile networks and wireless systems may enable further innovations across the healthcare industry.

Third, especially from social constructivist perspective, it would be interesting to understand how do the dynamic capabilities of individual ecosystem participants change and evolve within the ecosystem over time. What is the role of power and control? Will the main goal of the ecosystem drown under conflicts and misalignment? How are complex business models governed and business ecosystems orchestrated? Large-scale comparative, cross-industrial ecosystem studies would be most welcome.
REFERENCES


Julius Francis Gomes is pursuing his PhD in international business from the University of Oulu. He currently works at the Oulu Business School as a Doctoral Student to research futuristic business models for entities mainly involved in the tech oriented business arena. His research focuses on using business models as a mean to look into future industries. He is interested to research business ecosystems in different contexts such as cyber security, healthcare, and future mobile networks, with a business model perspective. He received his M.Sc. (2015) in international business from the University of Oulu. Prior to that he acquired MBA (2011) specializing in managing information systems in business applications. Francis Gomes has enjoyed about three years in a top tier bank in Bangladesh as a channel innovator.

Marika Iivari (Econ & Bus. Adm.) is a Postdoctoral Researcher within Martti Ahtisaari Institute at AACSB accredited Oulu Business School, Finland. Her research has focused on business models and open innovation, innovation ecosystems, and inter-organizational and inter-industrial collaboration. In this field, she is currently focusing on ecosystemic business models and the governance and orchestration of ecosystems. Her expertise is within future digital business and the digitalization of healthcare domain, ICT industry and smart cities, and she has been involved both in national and EU level projects. Currently she is serving as an expert on Urban Agenda for the EU, Digital Transition partnership, within Business Models working group.

Minna Pikkarainen is a joint Connected Health professor of University of Oulu / Oulu Business School, Martti Ahtisaari Institute and Faculty of Medicine, and VTT Technical Research Centre of Finland. As research professor she is working as a program leader and as a collaborator between different units and departments in University of Oulu, VTT and other OuluHealth (http://www.ouluhealth.fi/) ecosystem players from both public and private sector. Currently Minna is focusing on her research in the service transformation and data driven service co-creation in health and wellbeing sector. During 2010-2012, Minna Pikkarainen has been working as a business developer in Institute Mines Telecom, Paris and EIT (European Institute of Innovation & Technology) network in Helsinki. Her key focus areas as a business developer have been in healthcare organizations and digital cities. Before, Minna’s research has been focused on the areas of software development, agile development and service innovation.

Petri Ahokangas received his M.Sc. (1992) and D.Sc. (1998) degrees from the University Vaasa, Finland. He is a senior research fellow, adjunct professor, and the leader of Futuralis research group at Oulu Business School, University of Oulu, Martti Ahtisaari Institute, Finland. He is also an entrepreneur. Prior to his university career he worked in the telecoms/software industry. His research interests lie in how innovation and technological change affect international business creation, transformation, and strategies in highly technology and software-intensive business domains. His specific research area is business models. He has over 130 publications and works actively in national and international research projects. Currently he is serving as an expert on Urban Agenda for the EU, Digital Transition partnership, within the Business Models working group.