

Ecosystemic Business Model Scenarios for Connected Health

Julius Francis Gomes, Laura Kemppainen
Minna Pikkarainen, Timo Koivumäki
Petri Ahokangas

*Martti Ahtisaari Institute of Global Business & Economics, Oulu Business School,
University of Oulu, Finland.*

Abstract

Business ecosystems are evolutionary business environments that go through various life-cycle stages. Ecosystemic business models are rather complex in emergence and evolution in comparison to incumbent organizations' business models. Ecosystemic business models are needed especially in the area of connected health (i.e., for the efficient utilization of heterogeneous data and efficient improvement of service delivery to support timely decision making) where there is an urgent need to overcome boundaries between the different actors in public-private partner ecosystems. This empirical research portrays four scenarios for ecosystemic business modeling for connected health. The study adopts a qualitative case study approach.

Introduction

As more non-digital aspects of human society become intertwined with digital interventions (Turber & Smiela, 2014), prevalent bricks and mortar industries are adopting characteristics common in ICT domains, i.e., systems of distributed innovation, or "business ecosystems" (Baldwin, 2012). The healthcare sector is continuously

being transformed by multiple waves of digitalization (Gomes & Moqaddemerad, 2016). Baldwin (2012) suggests that past are those days when innovation took place solely within the boundaries of single organizations in all industries. Thus, one challenge is how to efficiently manage the shared or distributed forms of innovation that takes place in modern business ecosystems.

Keywords: Ecosystemic business model, business ecosystem, connected health.

Acknowledgements: This research is supported by a grant from Business Finland as part of the Icory Project - Intelligent Customer-driven Solutions for Orthopaedic and Pediatric Surgery Care.

Please cite this paper as: Gomes et al. (2019), Ecosystemic Business Model Scenarios for Connected Health, Vol. 7, No. 4, pp. 27-33

Connected health is a relatively new conceptual model that overarches prevalent health digitalization models and is inherently multi-stakeholder oriented (Iglehart, 2014). The focus of connected health interventions are on efficiently utilizing collected data, efficiency improvement in service delivery, supporting timely decision making, and activating feedback loops between stakeholders (Agboola, Ball, Kvedar, & Jethwani, 2013; Dowd et al., 2018). As a multi-stakeholder and ICT driven business environment, connected health displays the characteristics of a business ecosystem.

Moore (1993) identified business ecosystems to be evolutionary environments that go through four phases during their life-cycle: birth, expansion, leadership, and self-renewal or death. Jansson, Ahokangas, Iivari, Peälä-Heape, & Salo (2014) defined business ecosystems as networks of business models where incumbent stakeholders interact through their business models by connecting and collaborating with the business ecosystem.

The business model literature focusing on business ecosystems is still nascent and emerging (Demil, Lecocq, & Warnier, 2018; Iivari, 2016). In this research we adopt and extend Zott & Amit's (2010) definition of a business model to the ecosystem. We perceive an ecosystemic business model to be a system of interdependent activities that transcends organizations in the ecosystem and spans their boundaries. The activity system enables organizations, in concert with their partners, to create value and to appropriate a share of that value with other stakeholders.

Business ecosystems are complex in nature and comprise blurred boundaries; this makes designing the ecosystemic business model more complex in practice. Although the ecosystemic business model continuously evolves in each phase of the business ecosystem life-cycle, the practical aspect of implementing the business model depends on the negotiations and interactions with the stakeholders through the choice or design of the business model (Demil et al., 2018). Gomes, Iivari, Pikkarainen, & Ahokangas (2018) identified three broad properties of business models that trigger negotiations and interaction between stakeholders in a business ecosystem. These are: 1) opportunity exploration and

exploitation (OEE), 2) value creation and capture (VCC), and 3) advantage exploration and exploitation (AEE). In this empirical paper, we study the above-mentioned aspects of business models to facilitate identifying an ecosystemic business model for an emerging connected health business ecosystem by developing four (4) alternative integral scenarios.

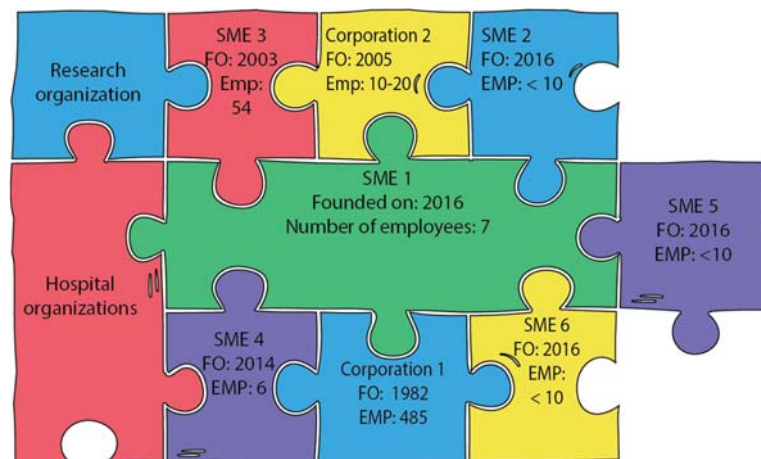
Approach

This empirical paper adopts a qualitative case study approach to develop alternative integral scenarios (Amer, Daim, & Jetter, 2013; Provo, Ruona, Lynham, & Miller, 1998; Yin, 1981). Among the various applications of case study methodology, Stake (1978) points out that in social and human sciences it helps to describe phenomena that are complex, holistic, and which involve countless not well-isolated variables. The research data was collected in eight (8) semi-structured interviews with industrial experts in December 2018 (Appendix 1). All of the participants in the interviews represented individual industrial partners of an emerging connected health business ecosystem. Each of the interviews was recorded with the permission of the interviewees, transcribed and qualitatively analyzed. Besides the interviews, each of the industrial partners was invited to complete an individual exercise concerning their existing business model and their business model for the ecosystem. For this exercise, we adapted to use the business model wheel (Ahokangas et al. 2014) that is used for ecosystemic and future-oriented contexts.

The studied emerging business ecosystem consists of eight (8) industrial partners, two (2) university hospitals, and three (3) research organizations (Appendix 2). The objective of the emerging business ecosystem for connected health is to iteratively co-design and accumulate data-driven and patient-centric solution/s for orthopedic and pediatric surgery care. In practice, the ecosystem aims to deliver a coherent data-driven solution that will facilitate the patient journey for orthopedic (children and adults) patients, pediatric patients, and healthcare professionals. The intended solution is being co-developed by the participating stakeholders of the business ecosystem. Although each of the participating stakeholders have their own business models for their own services, an ecosystemic business

Offering in the business			
Organization	ecosystem	Interview date	Interview duration
CEO - SME 1	Digitize care pathways for surgery patients (home-hospital-home) through a platform	21.11.2018	2 hours 10 mins
CEO - SME 2	Gamifying physiological rehabilitation	28.11.2018	44 mins
Sale director - SME 3	Software-as-a-service, quality registers	12.11.2018	2 hours 10 mins
CEO - SME 4	Remote, video appointment system	10.12.2018	1 hour 24 mins
CEO - SME 5	Gamifying physiotherapy	27.11.2018	1 hour 15 mins
CEO - SME 6	Gamifying psychological wellbeing, dashboard for physicians	27.11.2018	1 hour 28 mins
Program manager, Lead architect - Corporation 1	Artificial intelligence, machine learning, robotics in surgery journey	29.11.2018	1 hour 17 mins
Business partner manager -Corporation 2	Technology provider (device, software, storage, etc.)	28.11.2018	1 hour 29 mins

Appendix 1: Summary of data collection



Appendix 2: Map of the connected health business ecosystem

model in the business ecosystem is required to create a coherent and scalable solution. This research facilitates the empirical need by developing alternative integral scenarios for ecosystemic business models.

Key Insights

In practical examples of business ecosystems, large corporations are usually observed to lead business ecosystems as keystones, e.g., Apple, Google, Airbus, Sony (PlayStation), etc. Although the studied emerging

business ecosystem comprises eight (8) industrial partners, six (6) of them are comparatively small or medium-sized. However, unlike other business ecosystems, one of the smaller industry partners seems to act as the keystone of the business ecosystem as an industry partner. This is because the value that the organization delivers is deemed to be a good product-market fit by the potential clients of the solution: the hospitals. This unusual phenomenon, on one hand, might lead to discomfort between other stakeholders, and on the other hand, it provides confidence for

young organizations concerning their value and contribution to the business ecosystem. However, since the ecosystem is still emerging and is in its birth phase, the number of participating stakeholders are relatively small, leading to a state of non-competition between the stakeholders for the time being.

Furthermore, in the interviews, it was revealed that a business ecosystem addressing the needs of hospital organizations need not stick to any single service as a platform, which could lead to the business proliferation of only one industry partner. This, in turn, could hamper the shared goals of the business ecosystem and service creation for a broader customer. In such a case, the business ecosystem could consider a modular approach by accumulating different connected health interventions in a portfolio that will be available for the customer to choose and purchase.

Based on the collected data, we designed four alternative integral scenarios for an ecosystemic business model. The ability to implement business models in

business ecosystems depends on the negotiations and interactions between the incumbent stakeholders (Demil et al., 2018). We observed that the business model properties of OEE, VCC, AEE (opportunity exploration & exploitation, value creation & capture, advantage exploration & exploitation) triggered negotiations and interaction in the studied business ecosystem. So, for developing alternative integral scenarios, we plotted these OEE, VCC, AEE properties of the business model in a four-quadrant scenario matrix (Figure 1).

The vertical axis comprises opportunity exploration (OE1), value creation (VC1), and advantage exploration (AE1) perspectives. We plotted the marketing types (OE1), platform types (VC1), and innovation strategy types (AE1) on opposite ends of this axis. The horizontal axis comprises opportunity exploitation (OE2), value capture (VC2), and advantage exploitation (AE2). The opposite ends of this axis are selling types (OE2), pricing strategy types (VC2), and IPR strategy types (AE2). While the alternative business model scenarios presented in this paper show four distinct business models,

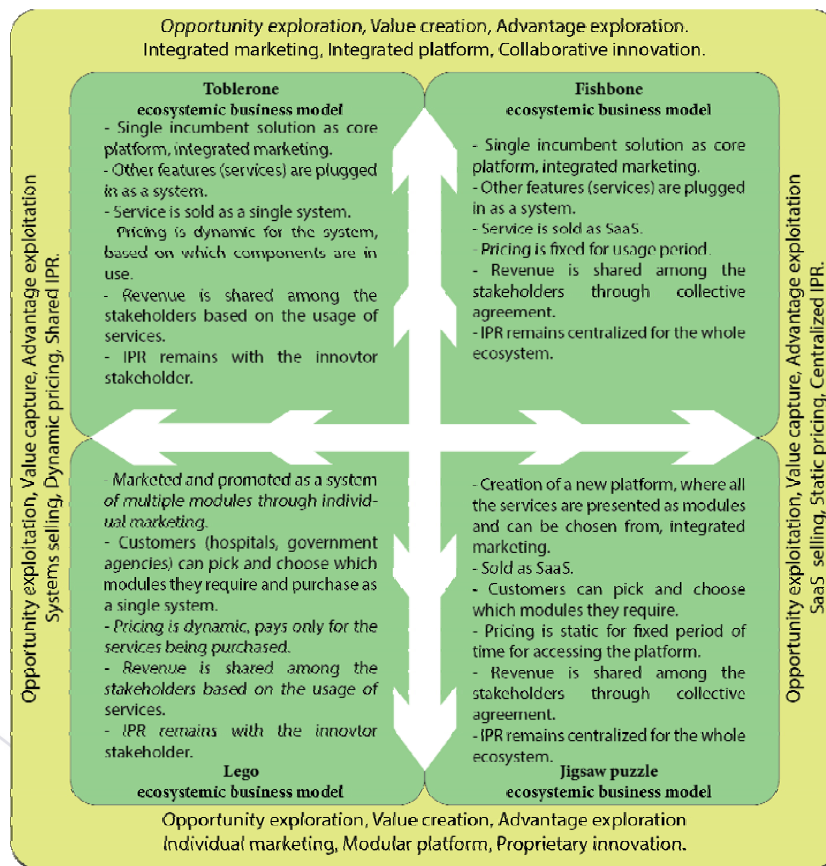


Figure 1: Alternative Integral ecosystemic business model scenarios.

the stakeholders in the emerging business ecosystems negotiated and interacted to choose and deploy the business model. The studied emerging business ecosystem did not need to adopt either one of the four alternatives presented here as a final ecosystemic business model. Preferably, the two axes can be considered as continuums and the stakeholders can interact and negotiate to identify the ecosystemic business model that will benefit all collaborating stakeholders while serving the customer value with competitive prices. In designing the scenarios, this research considered the common opportunity that the ecosystem addressed, the value propositions of the stakeholders, the supply side of the ecosystem (e.g., sales and marketing, resources, and IPR issues) and the demand side (e.g., the customer group and innovation types) of the ecosystem.

The studied ecosystemic business model aims to bring together all of the collaborating stakeholders. An additional outcome of the emergence of this business ecosystem is that each of the stakeholders identified potential for new shared business models with the partnering stakeholders. Besides, in the emerging business ecosystem, three (3) industrial partners operated in the same field of operation: health gamification. However, because all of three industrial partners were small in size and young in age their product focus was very specific, and the portfolio was not very broad. For this reason, although they were all operating in the same field, due to their different target customer segments they were not competing against each other, instead, they are considering future collaboration.

Discussion and Conclusions

Identifying and designing an ecosystemic business model is more complex compared to designing an incumbent stakeholder business model. The aim of this paper is to show how to facilitate ecosystemic business modelling within a methodological approach. The practical implications of this research are twofold. First, the four alternative integral ecosystemic business model scenarios presented here can be used as a baseline for conceptualizing potential ecosystemic business models for emerging business ecosystems, especially in the connected health domain. Second, the framework utilized for developing the scenarios by bringing together opportunity the dimensions of exploration and exploitation,

value creation and capture, and advantage exploration and exploitation will allow ecosystem stakeholders to create additional scenarios by focusing on different elements compared to those we have used in this paper (selling/marketing, platform/pricing, innovation/IPR).

The relationship between business models and business ecosystems is well-established in the business model literature (Gomes, Pikkarainen, Ahokangas, & Niemelä, 2017; Jansson et al., 2014; Xu, Ahokangas, & Reuter, 2018). However, there are unanswered questions relating to the business model of business ecosystems, business models in the business ecosystem, and even whether the business ecosystem has its own business model. According to our findings, business ecosystems that aim to bring together stakeholders to solve specific problems with an ecosystemic solution will need ecosystemic business models. These ecosystemic business models are evolving and dependent on the business models of the stakeholders in the ecosystem (Demil et al., 2018). Further, opportunity-centric business models of the incumbent stakeholders (e.g., using the business model wheel tool) are seen as a proper starting point to initiate the discussion and negotiation for designing the ecosystemic business model (Ahokangas, Juntunen, & Myllykoski, 2014).

This case study has shown that participating stakeholders in a business ecosystem can find potential collaboration points for their business models by identifying the complementarities and non-complementarities of the business models. While complementarities in business models help strengthen future collaboration, non-complementarities help to address and reduce the possibility of direct future competition. The limitation of this research is that the studied case is in its early phase of emergence or birth (Moore, 1993); thus, the focal elements for ecosystemic business model scenarios will be different for business ecosystems in phases further along in their lifecycle. There is a need for longitudinal research that explores deployment of the ecosystemic business model in the connected health context in the long run. Moreover, it would be essential to understand what level of fidelity (i.e., the degree to which the solution is implemented as intended by its developers) and performance impact the ecosystemic business model and the participating actors have in connected health ecosystems.

References

- Agboola, S. O., Ball, M., Kvedar, J. C., & Jethwani, K. (2013). The future of connected health in preventive medicine. *Qjm*, 106(9), 791–794. <https://doi.org/10.1093/qjmed/hct088>
- Ahokangas, P., Juntunen, M., & Myllykoski, J. (2014). Cloud Computing and Transformation of International E-Business Models. *Research in Competence-Based Management*, 7, 3–28.
- Amer, M., Daim, T. U., & Jetter, A. (2013). A review of scenario planning. *Futures*, 46, 23–40. <https://doi.org/10.1016/j.futures.2012.10.003>
- Baldwin, C. Y. (2012). Organization Design for Business Ecosystems. *Journal of Organization Design*, 1(1), 20–23. <https://doi.org/10.7146/jod.6334>
- Demil, B., Lecocq, X., & Warnier, V. (2018). “ Business model thinking ”, business ecosystems and platforms : the new perspective on the environment of the organization, 21(4), 1213–1228.
- Dowd, W. N., Cowell, A. J., Regan, D., Moran, K., Slevin, P., Doyle, G., & Bray, J. W. (2018). An Exploratory Cost-Effectiveness Analysis of the Connected Health Intervention to Improve Care for People with Dementia: A Simulation Analysis. *Health Services and Outcomes Research Methodology*, 18(1), 47–62. <https://doi.org/10.1007/s10742-017-0175-y>
- Gomes, J. F., Iivari, M., Pikkarainen, M., & Ahokangas, P. (2018). Business models as enablers of ecosystemic interaction: A dynamic capability perspective. *International Journal of Social Ecology and Sustainable Development*, 9(3). <https://doi.org/10.4018/IJSESD.2018070101>
- Gomes, J. F., & Moqaddemerad, S. (2016). Futures Business Models for an IoT Enabled Healthcare Sector: A Causal Layered Analysis Perspective. *Journal of Business Models*, 4(2), 60–80. Retrieved from <http://journalofbusinessmodels.com/vol-4-no-2-2016/vol-4-no-2-pp-60-80/>
- Gomes, J. F., Pikkarainen, M., Ahokangas, P., & Niemelä, R. (2017). Towards business ecosystems for connected health. *Finnish Journal of EHealth and EWelfare*, 9(2), 3–95. <https://doi.org/10.23996/fjhw.61004>
- Iglehart, J. K. (2014). Connected health: Emerging disruptive technologies. *Health Affairs*, 33(2), 190. <https://doi.org/10.1377/hlthaff.2014.0042>
- Iivari, M. (2016). *Exploring business models in ecosystemic contexts*. ACTA UNIVERSITATIS OULUENSIS.
- Jansson, N., Ahokangas, P., Iivari, M., Peälä-Heape, M., & Salo, S. (2014). The Competitive Advantage of an Ecosystemic Business Model: The Case of OuluHealth. *Interdisciplinary Studies Journal*, 3(4), 282–295.
- Moore, J. F. (1993). Predators and Prey: A New Ecology of Competition. *Harvard Business Review*, (September), 73–88. <https://doi.org/10.1097/MPG.0000000000001280>
- Provo, J., Ruona, W., Lynham, S., & Miller, R. (1998). Scenario building: an integral methodology for learning, decision-making, and human resource development. *Human Resources Development International*, 1(3), 327–340. <https://doi.org/https://doi.org/10.1080/13678869800000041>
- Stake, R. (1978). The case study method in social inquiry. *Educational Researcher*, 7(2), 5–8.

Turber, S., & Smiela, C. (2014). A Business Model Type for the Internet of Things. *Twenty Second European Conference on Information Systems, Tel Aviv*. Retrieved from <http://ecis2014.eu/E-poster/files/0670-file1.pdf>

Xu, Y., Ahokangas, P., & Reuter, E. (2018). EAAS: Electricity as a service? *Journal of Business Models*, 6(3), 1-23. Retrieved from <http://journalofbusinessmodels.com/vol-6-no-3-2018/vol-6-no-3-pp-1-23/>

Yin, R. K. (1981). The Case Study Crisis : Some Answers. *Administrative Science Quarterly*, 26(1), 58-65.

Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. *Long Range Planning*, 43(2-3), 216-226. <https://doi.org/10.1016/j.lrp.2009.07.004>