

# This is an electronic reprint of the original article.

Please cite the original article:

Sorama, K. 2020. The role of university in the regional innovation ecosystem. In: L. Gómez Chova, A. López Martínez & I. Candel Torres (eds.) INTED 2020 Proceedings: 14th International Technology, Education and Development Conference 2-4 March, 2020 – Valencia, Spain. Valencia: IATED Academy, 1629 - 1634.

DOI: 10.21125/inted.2020.0528



# SeAMK

SEINÄJOEN AMMATTIKORKEAKOULU  
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

# THE ROLE OF UNIVERSITY IN THE REGIONAL INNOVATION ECOSYSTEM

**K. Sorama**

*Seinäjoki University of Applied Sciences (FINLAND)*

## **Abstract**

The key factor in the formation of business ecosystems is the development of information technology and the opportunities it provides for the development of global collaboration within and between companies. In this study, digital business is at the heart of business ecosystems, but the development of digital business is supported by the whole system of ecosystems.

The performance of a business ecosystem is based on a well-functioning entrepreneurship ecosystem aimed at supporting the creation of new businesses. Conversely, the growth and development orientation of established companies depends on the performance of the entrepreneurial ecosystem. The innovation ecosystem, in turn, orchestrates innovation clusters and smart specialization between companies and regions. Digital innovation refers to ICT-product innovation or in a broader sense, to ICT-enabled innovation

In this study, a theory-based ideal model of the innovation ecosystem was constructed. Thematic interviews with 10 companies aimed to provide a description of the current state of the regional innovation ecosystem. Using the ideal model and this description, differences and discrepancies between the two are identified. Based on this, development proposals will be prepared especially for universities in order to develop activities so that possible deviations between practical activities and the ideal model can be eliminated.

The study shows that while companies have collaborations and partnerships to develop digital business innovations, collaboration is not regional but rather national or even global. Collaboration with a regional university involves participation in regional development projects and is not specifically related to innovation or the transfer of globally significant digital expertise. This kind of expertise is one of the foundations of the ideal model. According to the interviews, business cooperation was specifically related to the training of personnel, especially technical experts.

If the innovation ecosystem is defined by theory as in this study, companies of significant business ecosystems do not have a broad interface to the regional innovation ecosystem or the region does not have an innovation ecosystem that meets the criteria of an ideal model. In order to develop the role of the regional university, it should revise the logic of operations from a new perspective. Particular attention should be paid to the university's technological expertise in relation to global expertise. The University of Applied Sciences already has a strong role in the regional entrepreneurship ecosystem and entrepreneurial ecosystems and thus, is able to help in developing a regional innovation ecosystem. In addition, partnerships with international universities and the ability to attract internationally high-level experts with globally applicable expertise are needed. This supports the development of a regional innovation ecosystem and the strengthening of the role of the University of Applied Sciences as a part of this ecosystem. However, university-business cooperation should be flexible and take into account companies developing their skills as well as those that have already become global players.

Keywords: Innovation ecosystem, system of ecosystems, digital business, role of university.

## **1 INTRODUCTION**

The encouragement of collaboration between regional stakeholders is increasingly emphasized in innovation policy as a way to activate natural activity in the regional innovation system ([1]). Studies have identified partnerships of diverse stakeholders critical because they can design and implement development pathways that will bring change to the region ([2]). This phenomenon of stakeholder partnerships is referred to as regional innovation networks ([3]), regional innovation coalitions ([4]) or multilevel partnerships ([5]). These theories are related to a set of similar action-defining factors such as smart specialization. However, the problem is regional expertise, which is dispersed, decentralized and regionally distributed ([6]). Activation approaches are based on the idea that actors in different coalitions combine their decentralized knowledge to identify and implement micro-level solutions that

are instrumental in macro-level regional development paths ([7]). The key properties of any biological or social ecosystem, such as diversity of actors and their network ties, co-evolution, self-organization and disequilibrium are increasingly used for describing the innovation ecosystems ([8]).

The concept of the innovation ecosystem is receiving increasing attention worldwide. It is considered as an indispensable component for enhancing the innovation capabilities of individual corporations, industries, regions, and nations ([9]). Governments and industrialists are particularly interested in creating innovation ecosystems that connect multiple innovation actors (e.g. universities, research institutes, business firms, etc.) to cultivate favorable environments for innovators to pursue value synergistically ([10] [11]). In addition, these organizations are expected to generate value in concert and co-evolve in sustainable ways ([12]).

The ecosystem approach has gained increasing attention for decades from Moore's definition of the business ecosystem in the 1980s ending with a variety of rising trends in recent years, such as the circular economy ecosystem and the digitalization ecosystems. Due to diversity, the concept of the ecosystem has also been defined in different ways. In the present study, in creating the ideal model of the regional innovation ecosystem, we have described previously defined ecosystems as a system, at the heart of the digital business and the business ecosystem. An innovation ecosystem is formed around business ecosystems, with companies and other actors, including universities, as key players in innovation. This ecosystem derives its power from a well-functioning regional entrepreneurship ecosystem that supports start-ups and, from growth and development-oriented entrepreneurial spirit, that lays the foundation for the regional entrepreneurial ecosystem.

By developing the ideal model in theory and describing its practical operation on the basis of the ideal model, a holistic view of the ecosystem is created. Such a holistic view helps to understand the functioning of the ecosystem as a whole and thus clarifies e.g. the diverse involvement of universities in these ecosystems. In the innovation ecosystem, the knowledge is important, and this is where the role of universities can be seen as a key provider of globally applicable knowledge and networking of international expertise, which will be one of the key drivers of the regional innovation ecosystem development in the future.

The adoption and use of Information and Communication Technology (ICT) will increase productivity, green and inclusive growth through digital innovation. Digital innovation means 1) in a narrower sense, a new or significantly improved ICT product (good or service), i.e. an ICT product innovation; and 2) in the broader sense, the use of information and communication technologies (ICT) for new or significantly improved product, process, marketing or organizational methods, i.e. ICT-based innovation. However, there are some barriers to ICT diffusion particular for SMEs. The lack of trust in the digital economy is related especially to security risks, privacy, and intellectual property rights. Despite the obstacles, the share of business adopting ICTs is higher among innovators. ([13])

## **2 METHODOLOGY**

The aim of this study is to: 1) create an ideal model of regional innovation ecosystem, 2) describe the current state of regional innovation ecosystem, 3) compare the ideal model and the current state, and 4) submit development proposals to the university of applied sciences to strengthen its role so that the current state evolves towards the ideal model.

In this study, the digital business is at the heart of the business ecosystem. The goal of the business ecosystem is to develop strategic business in collaborative networks, which are based on digital business and the utilization of digitalization in business. The development of digitalization is supported by the whole system of ecosystems.

The performance of the entrepreneurship ecosystem and entrepreneurial ecosystems is a prerequisite for the formation of business ecosystems. The innovation ecosystem acts as a mediator between them. The evolution of the business ecosystem and its strategic development requires both the emergence of innovative start-ups and entrepreneurial growth firms. The innovation ecosystem orchestrates innovation clusters and smart specialization among companies and regions.

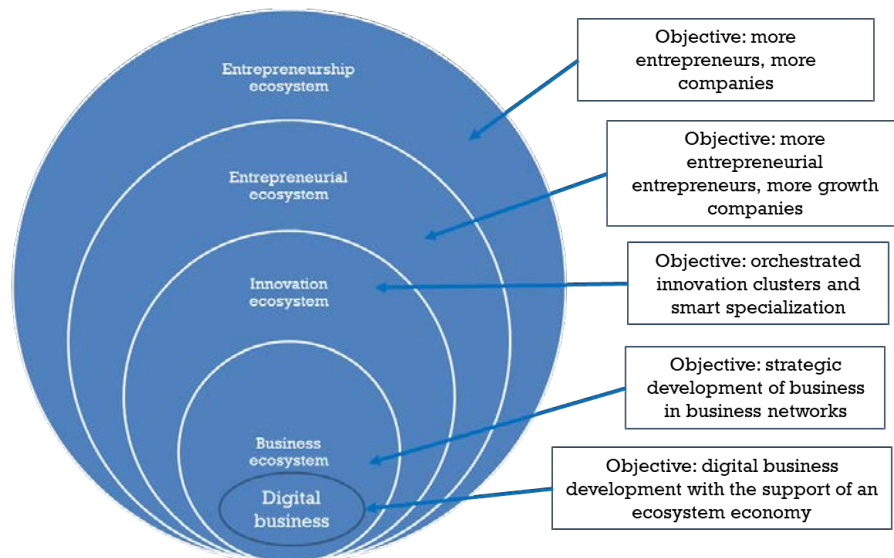


Figure 1. The system of ecosystems.

At the heart of the innovation ecosystem are companies, universities, and colleges, as well as public actors. The ecosystem is built up networks, research and development teams, and their jointly-steering organizations. The starting points are physical, social and virtual development spaces. New hybrid organizations such as technology business incubators, science parks, and other business incubators are emerging in the innovation ecosystem. The purpose of the innovation ecosystem is the transfer and co-development of knowledge and know-how. This includes research institutes, universities and colleges, incubators, investors, and knowledge-intensive business services companies, as well as innovation, invention and patenting services. This is made possible by policies including legislation and taxation, new financial instruments, investors, intellectual property measures and reforms, and support for cooperation. ([14].)

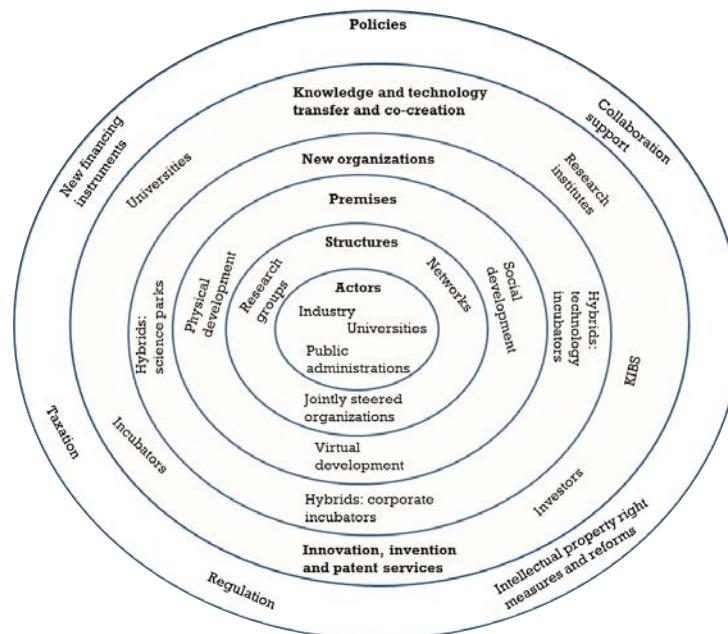


Figure 2. The innovation ecosystem (according to Markkula and Kune 2015).

All innovation ecosystems have four factors in common: 1) they have globally valued special expertise and corporate activities based on this expertise, 2) they create new knowledge that is applied on a global scale, 3) the hub attracts international expertise, competencies-driven business and investments, and 4) they have companies of excellence that operate both locally and globally ([14]).

It can thus be stated that in substantive innovation ecosystems, operators are subject to high requirements in terms of knowledge and technological capability. To be truly part of, for example, regional innovation ecosystems, universities also need international know-how and global technological expertise. The current state description was started by identifying companies in the area that meet or could meet these criteria.

Theme-interviews was chosen as the method. The theme interview focuses on understanding the business of companies and especially the role of digitalization. Special attention is paid to the company's know-how and technological sophistication, too. In addition, the company's position and role in various collaborative networks is an important part of the current state description. Particular focus is on cooperation in the development of digital business, which will also explore cooperation between the universities.

The companies involved in this study were selected on an expedient basis, following the ideal model of the innovation ecosystem constructed from the literature: 1) the companies have a digital business, 2) their expertise can be applied globally, 3) the company operates successfully regionally and globally by its excellence. The company also has to be a hub in its own business ecosystem and attracts international experts and investors.

### **3 RESULTS**

In the autumn of 2019, we conducted an interview with ten companies to analyze the current state of the innovation ecosystem. Five of the interviewed companies are manufacturing companies and five of them are software design companies. In both group has one company employing over 300 people. Otherwise, manufacturing companies were larger than software companies. The turnover of manufacturing companies is from EUR 2 million to over 100 million. Software companies have turnovers from 68,000 (Year of Establishment 2018) to 22.5 million euros. Even the customers of the smallest manufacturing company (in terms of turnover) are large global companies, so the market is global. Their exports account for between 60% and 95% of the turnover. In software companies, the market is either national or even mainly regional (two companies). For two software companies, the market is mainly in the Nordic countries, although the product is global in many different language versions. The largest software company has a global sales network and its customers are multinationals with global operations. Software companies are characterized by private ownership - the two largest are employee-owned. Two are part of a domestic group and one has not only Finnish owners but also private international investors. Two of the manufacturing companies are part of an international group and the owner is an international company. One is a family business but has subsidiaries in three EU countries. One company is owned by a venture capitalist, which the interviewee describes as a too-small player for the international market. The smallest manufacturing company is owned by private individuals but is ready to seek new international investors to strengthen growth and expertise.

As expected, international software companies rank their digital skills quite high, which, on the other hand, reflects the level of Finnish expertise. On a scale of 1 to 5 (1 = basic business knowledge... 5 = internationally significant knowledge in digital business), two companies have 5, one has 4.5 and one has 4. One company did not give a numerical rating but considered the company to be quite high in digital expertise. Of the manufacturing companies, only the two largest estimate their skills to be at least 4. Of the three smallest companies, one assesses their expertise to level 1 and two to levels 2 to 3.

All of the companies interviewed have various partnerships and cooperation in developing digital business. It is noteworthy, however, that the development cooperation does not appear to be particularly regional in nature but national such as Business Finland (Innovation Funding Agency) and VTT Technical Research Centre of Finland Ltd as well as universities from all over Finland. Software companies have cooperation with Microsoft and Siemens, too. The most significant regional cooperation with the University of Applied Sciences has been the acquisition of skilled employees, but also participation in various development projects.

### **4 CONCLUSIONS**

The concept of the ecosystem has been transferred to the business context a few decades ago. The original purpose of the ecosystem concept was to describe natural ecosystems and their evolution. The business ecosystem defined by James Moore has, over the years, attracted other definitions and concepts. Of these, the focus of this study is the innovation ecosystem. However, delimiting and examining one ecosystem is not very rewarding because different business-related ecosystems

together create a system in which there are interfaces through actors. Almost every ecosystem have the same actors, at least the regional ecosystems have, but not every actor may have the same role in every ecosystem in the system. The role and status of the actor may vary according to the objective of the ecosystem under consideration.

When the study aims specifically to understand the role of the university of applied sciences in the innovation ecosystem, the university's own expertise and technological expertise are particularly emphasized. University has other roles in ecosystems, too, such as boosting ([15]) student entrepreneurship and thus supporting start-ups. The University of Applied Sciences has a role to play in providing development-oriented and development-capable (entrepreneurial) experts to support business development and growth, which relates to Autio and Rannikko (2016) defined buffering, one of the concepts of support. Business ecosystems, on the other hand, particularly need collaboration experts to support the business development and co-development of ecosystem-based businesses.

As Markkula and Kune (2016) state, the role of the university in the innovation ecosystem is related to 1) connection, which is related to bridging as defined by Autio and Rannikko (2016) as the third form of support in the ecosystem. University can connect generations, people to processes, knowledge to processes and ecosystem partners to each other; 2) infusing the region with knowledge and understanding, and enhancing smartness and intelligence; 3) making learning accessible throughout the ecosystems; 4) anticipating by proactive foresight, fore-search, and early-warning facilities for the regions and communities they serve, and 5) helping young people to prepare for opportunities of many possible futures as they are emerging by guiding, coaching, conditions-creating, competence-enhancing, and capacity building.

It can be said that the innovation ecosystem poses the greatest challenges for the regional university of applied sciences. Universities should be part of a regional ecosystem where knowledge and technological capabilities are globally significant. To achieve this, the university must be able to attract international partners as well as international experts with globally applicable expertise. In addition, such know-how must be made available to regionally significant companies, creating win-win situations and sharing knowledge and capabilities. So new ways of working are needed in universities to support the regional innovation ecosystem and its development.

## ACKNOWLEDGEMENTS

We thank the Finnish Ministry of Education for the support we received for our project "More startups and Growth through Digitalisation and Artificial Intelligence".

## REFERENCES

- [1] M. Grillitisch, M. Sotarauta, "Regional growth paths: from structure to agency and back", Papers in Innovation Studies, Lund University: Lund, 2018.
- [2] P. Cooke, "Regionally asymmetric knowledge capabilities and open innovation, Exploring "globalization 2" – A new model of industry organization", *Research Policy*, vol. 34, no 8, pp. 1128-1148, 2005.
- [3] C. Rodrigues, F. Teles, "The fourth helix in smart specialisation strategies: The gap between discourse and practice. In S. De Oliveira Monteiro & E. Carayannis (Eds.), *The Quadruple Innovation Helix Nexus: A Smart Growth Model, Quantitative Empirical Validation and Operationalization for OECD Countries*: Palgrave Macmillan US.
- [4] P. Benneworth, *Leading Innovation. Building effective regional coalitions of innovation*, Research report, Nesta, 2007.
- [5] K. Morgan, C. Nauwelaers, *Regional innovation strategies: the challenge for less-favoured regions*, London: Routledge, 2003.
- [6] D. Foray, "On the policy space of smart specialization strategies. *European Planning Studies*, vol. 24, no. 8, pp. 1428-1437, 2016.
- [7] L. Nieth, P. Benneworth, D. Charles, L. Fonseca, C. Rodrigues, M. Salomaa, M. Stienstra, "Embedding entrepreneurial regional innovation ecosystems. Reflectin on the role of effectual entrepreneurial discovery processes", Workin paper 06, 2018.

- [8] G. Jucevicius, K. Grumadaite, "Smart development of innovation ecosystem", *Procedia - Social and Behavioral Sciences* 156, 125 – 129 2014.
- [9] D.J. Jackson, "*What is an innovation ecosystem*", National Science Foundation, Arlington VA, 2011. Researchgate.net
- [10] A. Frenkel, S. Maital, *Mapping National Innovation Ecosystems. Foundations for Policy Consensus*, Cheltenham UK, Edward Elgar, 2014.
- [11] M. Iansiti, R. Levien, *The Keystone Advantage. What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Boston, Massachusetts, Harvard Business School Press, 2004.
- [12] R. Adner, R. Kapoor, "Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations", *Strategic Management Journal*, vol. 31, no 3, pp. 306-333, 2010.
- [13] OECD publishing, "Stimulating digital innovation for growth and inclusiveness. The role of policies for the successful diffusion of ICT", *OECD Digital economy papers*, no. 256, 2016.
- [14] M. Markkula, H. Kune, "Making smart regions smarter: smart specialization and the role of universities in regional innovation ecosystems", *Technology Innovation Management Review*, vol 5, no 10, pp. 7-15, 2015.
- [15] E. Autio, H. Rannikko, "Retaining winners: can policy boost high-growth entrepreneurship", *Research Policy*, vol. 45, pp. 42.55, 2016.