

ZALAZONE INNOVATION ECOSYSTEM CONCEPT

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Abstract

As the role of innovation and R&D strengthens, researches on innovation ecosystems are also more and more extensive. The purpose of this article is to summarize the initial conclusions from the researches launched based on the challenges related to the development of the ZalaZONE research and innovation ecosystem. The introductory section provides an overview based on some of the key researches of the innovation ecosystems. The publication presents a specific literature keyword search method and its results in the field of science park. The general model of the ZalaZONE science park, which can be used as a basis for further research, is also introduced.

Keywords: science park, innovation, ecosystem, new technologies, keyword research

1. INTRODUCTION

Innovation is considered to be a fundamental source of significant wealth creation within the economy. As high-tech industries have greater growth potential, the best way to stimulate job creation and economic growth is to help transfer innovation more effectively from the research economy to the commercial sector. An important feature of the innovation ecosystem is that the resources available to the research economy are linked to the resources produced by the commercial economy. Another characteristic is that units within an ecosystem are either geographically localized or strategically linked to focus on the development of a particular technology. (See Westhead & Batstone, 1998)

Over the past 15 years, the concept of innovation ecosystems has become popular among an ever-expanding range of related research (Gomes, et al., 2018), with typically business and strategic origins and focus. The history of the concept of innovation ecosystem differs significantly from the conceptual history of the innovation system. The more intensive use of the term (Adner, 2006) began after the publication of a Harvard Business Review article, which also contains a definition of probably the most widely used definition of innovation ecosystems. It defines the innovation ecosystem as “cooperation agreements through which businesses combine their offerings into a coherent, customer-oriented solution”. The main roots of the concept lie in the related concept of business ecosystems used by Moore (1993) and others. Empirical descriptions of innovation ecosystems often identify the importance not only of cooperating but also of competing actors (e.g., (Rohrbeck, et al., 2009, Hannah & Eisenhardt, 2018) and products (e.g., Carayannis & Campbell, 2009, Nambisan & Baron, 2013) and the importance of competing technologies and standards (Arthur, 1989). It seems that the shift from the concept of business ecosystems to innovation ecosystems may have shifted the emphasis too much from competition to collaboration.

Granstrand & Holgersson (2020) introduce a new definition of innovation ecosystems in their publication. According to this, the innovation ecosystem is sum of the actors, activities and product, as well as the institutions and relationships, including complementary and substitute relationships, that are important for the innovative performance of an actor. In this definition, the content include products and services, tangible and intangible resources, technological and non-technological resources, and other types of inputs and outputs of a system, with key focus on innovations. In other words, the innovation ecosystem may include a system of actors with cooperative (complementary) and competitive (substitute) relationships with or without a focus company, and a product system that includes complementary and substitute relationships. The innovative performance is used rather than innovations or innovativeness to incorporate related imitations into the system and to facilitate operationalization from an economic point of view, thus also avoiding loopholes.

The innovation ecosystem approach provides the conceptual foundation for science and innovation parks. The “Triple Helix” knowledge model developed by Gomes, et al. (2018) emphasizes three “helices” that are related to the innovation system: academia/universities, industry, and state/government. Etzkowitz and Leydesdorff talk about “university-industry-government relations” and networks, with particular emphasis on triangular and hybrid networks, where these helices overlap. As an extension of the Triple Helix model, some authors (Carayannis & Campbell, 2009) have proposed the “Quadruple Helix” model.

Katri (2015) provides a good overview of different approaches to business, innovation, and knowledge ecosystems (see Figure 1). This is important to understand because the positioning and content implementation of a Science Park is usually not based on a pure model, but it can also carry different characteristics of different types of innovation ecosystems. There can be distinguished three different types of economic ecosystems. The literature on business ecosystems as well as service or industrial ecosystems highlights economic outcomes and business relationships between actors. The discussion of innovation (eco) systems and regional clusters focuses on mechanisms and policies that facilitate the creation of innovative startups around regional centers or clusters. The main interest and outcome of knowledge ecosystems is the creation of new knowledge through joint research work, collaboration, or the development of the knowledge base.

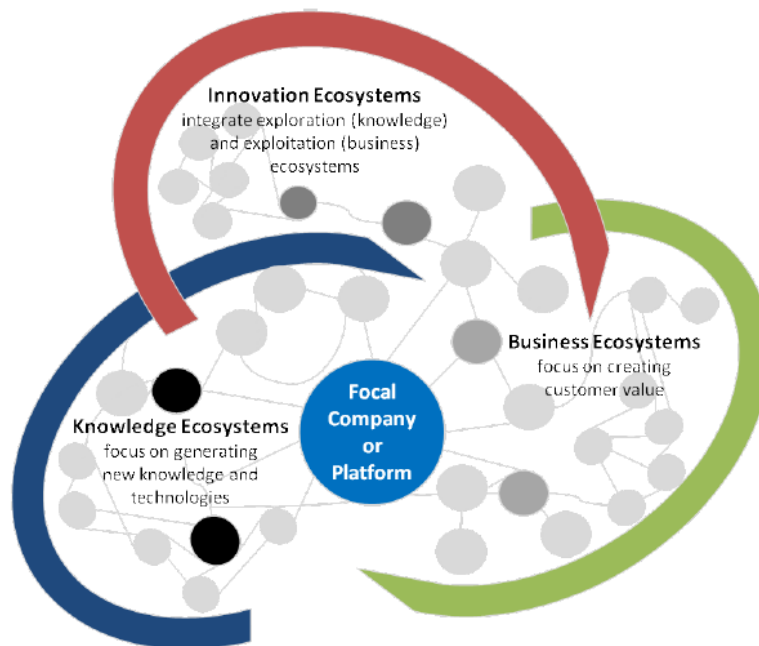


Fig. 1. Types of ecosystems

Source: Katri, 2015

2. RESEARCH TRENDS

The main outcome of the knowledge ecosystem is new knowledge, which can be shaped by drawing attention to the network nodes where knowledge is created and retained (Quin, et al., 1998). Open source communities are well-known examples of this type of ecosystem based on knowledge exchange (Koening, 2012), so recent research suggests that colocation can also mean virtual proximity, thus creating the ability to collaborate between actors. According to the innovation ecosystem approach of Engel & del Palacio (2011), fostering growth, interaction and the creation of innovative startups around so-called knowledge centers is emphasized.

It is generally accepted that ecosystems require providers of complementary innovations, products or services that may belong to different industries and are not obliged to enter into contractual agreements, but nevertheless have significant interdependence. In this sense, ecosystems do not fit into the classic company-supplier relationship, the “porter” value system.

The aim of the research was to examine the tendencies related to the research of the Science Parks, which shed light on which topic area was more strongly researched, and which topics may be related. Based on these contexts, it is tried to draw conclusions about the concentration points of related research, which may identify key areas for further research.

2.1. Preliminary result of keyword research

VOSviewer software was used to examine the correlations of keywords related to the research topic. VOSviewer is a capable tool for visualizing network relationships of keywords. The analysis is based on the range of keywords in the titles and abstracts of published scientific publications from a previously searched scientific database. In the course of the research, about a thousand publications published in the last ten years per keyword search have been searched.

The graphs (relation maps) that show the search results, with the help of the software, different clusters of keywords are created, illustrated with different colors. Major keywords have a larger “bubble,” which means that the word has appeared more times in publications throughout the set under study. Based on the software setup, a minimum of five times the incidence was set. The figure also illustrates the relationship strength of the keyword “science park,” with thickening bubbles suggesting a more common correlation (Figure 2).

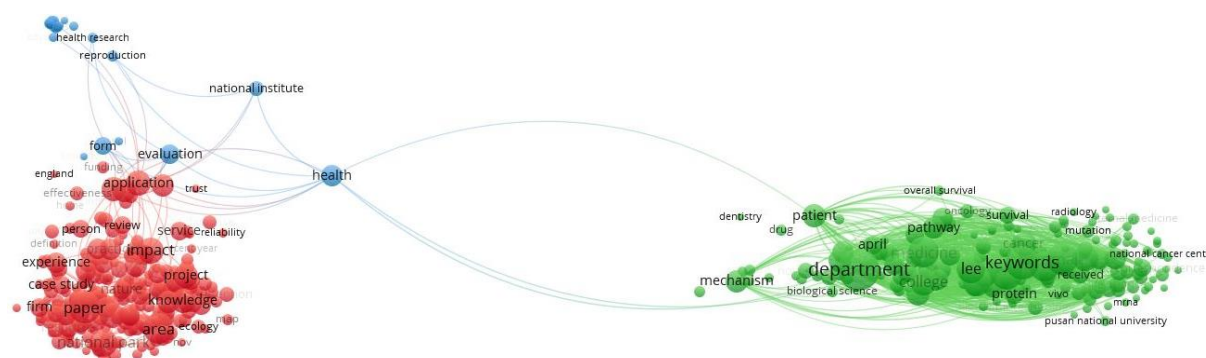


Fig. 2. Keyword search of “Science Park”

2.2. Discussion

For sake of better interpretation, dividing the resulting figure into two parts (Figure 3 and Figure 4), it can be seen that bubbles of almost similar size are formed between the topics affecting the “science park”. So there is no area or theme that has an extremely prominent influence on the structure of red circles. There are several keywords of similar size (impact - knowledge - survey – project), which are more typical, but overall there is no salient direction. And the bubbles marked in blue show an orientation in other directions, which in the current case is not closely related to the science park concept.

The analysis shows several and intertwined sub-cluster groups, which may indicate the nature of a lot of interdisciplinary and cross-thematic research active nowadays in the subject. The topics of the planned research can be widely observed in the network of contacts, therefore there are many additional research opportunities for placing each topic into a unified research system.

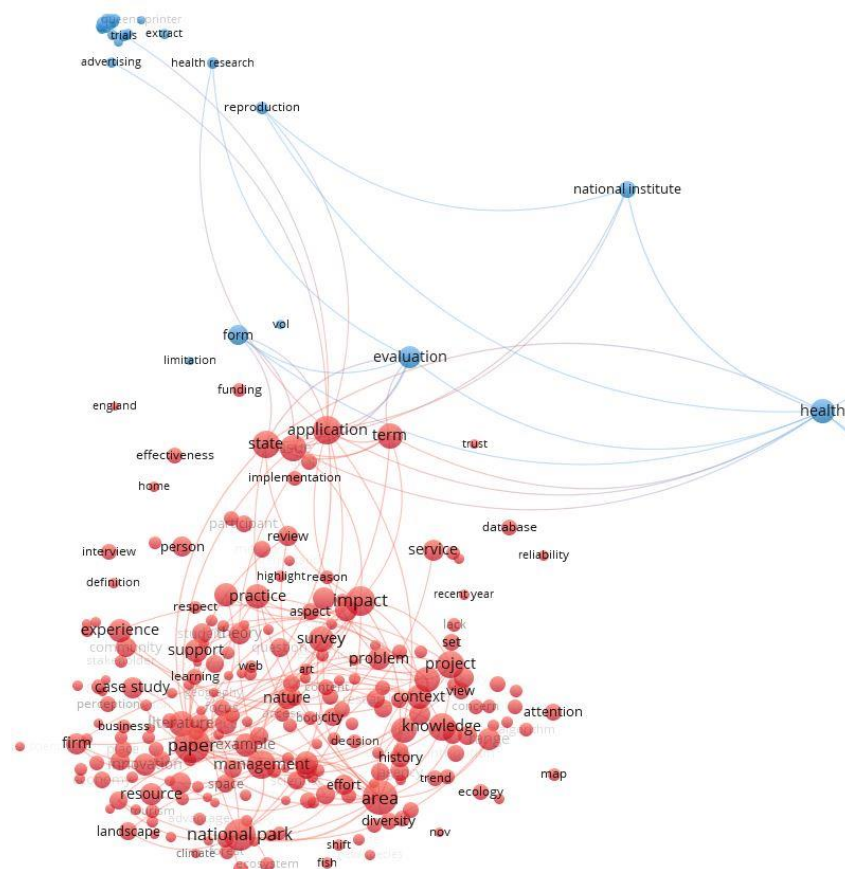


Fig. 3. Paper keyword search – Part A

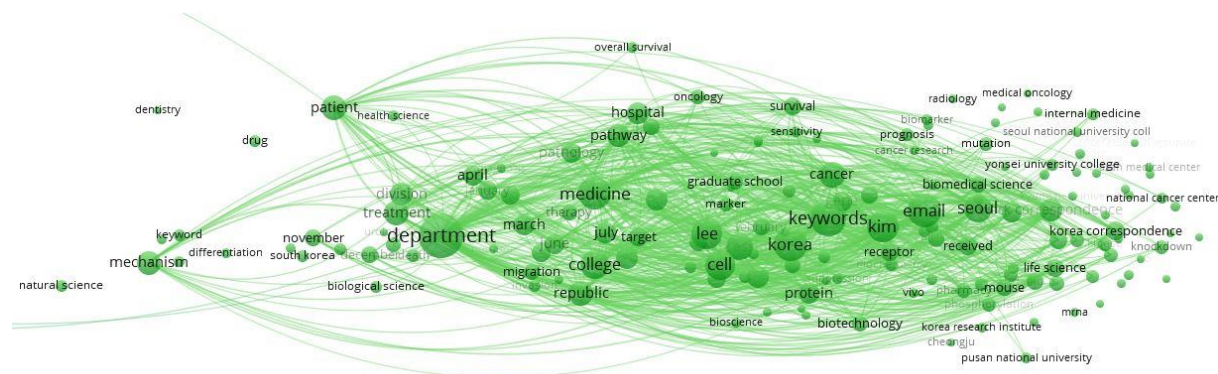


Fig. 4. Paper keyword search – Part B

3. GENERAL MODEL OF ZALAZONE SCIENCE PARK

3.1. Introduction of ZalaZONE

Given the increasing trends of automated driving and driving-assistant technologies, both manufacturers and developers face up to a challenge of limited vehicle testing and validation capacities. While traditional testing facilities are exclusively available for the OEMs, open testing tracks are mostly booked. Furthermore, testing facilities in Europe seem not be be prepared for high-tech demands in a constantly evolving environment.

There is clearly a high demand for cutting edge testing environment on the market. Most facilities are outdated and others have to cope with full occupancy. Only a few of them are able to host complex demands for self-driving and automated mobility solutions where multiple functions can be tested in various technical situations in a safe environment.

Thus, ZalaZONE automotive testing facility and its environment (www.zalazone.hu) in Hungary, Zalaegerszeg addresses a considerable market gap. Based on the decision of the Hungarian government in 2016, the project had been following a rapid realization as a strategic project of the Hungarian government.

By ZalaZONE, the Hungarian Government intends to create an outstanding European testing hub for industrial and scientific researches on autonomous vehicle development. In order to achieve this, the project is firmly based on the expert knowledge and feedback from cutting edge industry members following global trends. ZalaZONE is a state-owned investment on 260 hectares of land in the Zalaegerszeg Technology Park having the potential to attract further R&D businesses and scientific research. Currently, the project involved hundreds of industrial players and more than 40 research institutes globally and all around Europe. The test track project at Zalaegerszeg is unique in integration of classic vehicle dynamic tests and possibilities for testing autonomous vehicle functions as well as validation tests of electric vehicles.

The primary users of the proving ground are development units of vehicle industry OEMs, Tier1 and Tier2 companies from passenger car, commercial vehicle, bus segments, and also companies from communication technologies sector.

As a multiplication impact of the proving ground already partly in operation (Figure 5), further investments have been generated locally: the ZalaZONE Research & Technology Center, R&D projects, further industrial investments in the park, an upgrade project from industrial park level up-to science park level.



Fig. 5. ZalaZONE automotive proving ground

3.2. Model elements

Based on experiences, needs and researches, Figure 6 summarizes the ZalaZONE Science Park model with generalizable elements.

- Development centers with industrial players: it is advisable to involve companies that are either pursuing activities that fit into an important development chain (as a development company) or operating on high value-added activities.
- University-industrial work: it is expedient to involve an industrial-oriented research activities, in addition to the service activity. The research goal also serving this can use the local research infrastructure for their value creation, their activity can extend beyond the park.
- Incubation and start-up program: it is advisable to provide space for start-up business developments that fit into the ecosystem and cooperation system of the science and innovation park.
- Strengthening the human and intellectual background: the aim is to ensure the successful functioning of the ecosystem and the necessary human background and its continuous development.
- Involvement of SMEs and partners into running and new projects: the aim is to promote the radiation of the ecosystem in the region and together along SME networks, providing an incubation and learning environment that allows the local economy and SMEs to develop also towards high value-added activities.
- Strengthening international cooperation: the aim is to ensure involvement in the international circulation through cross-border, European and global research and professional cooperation.

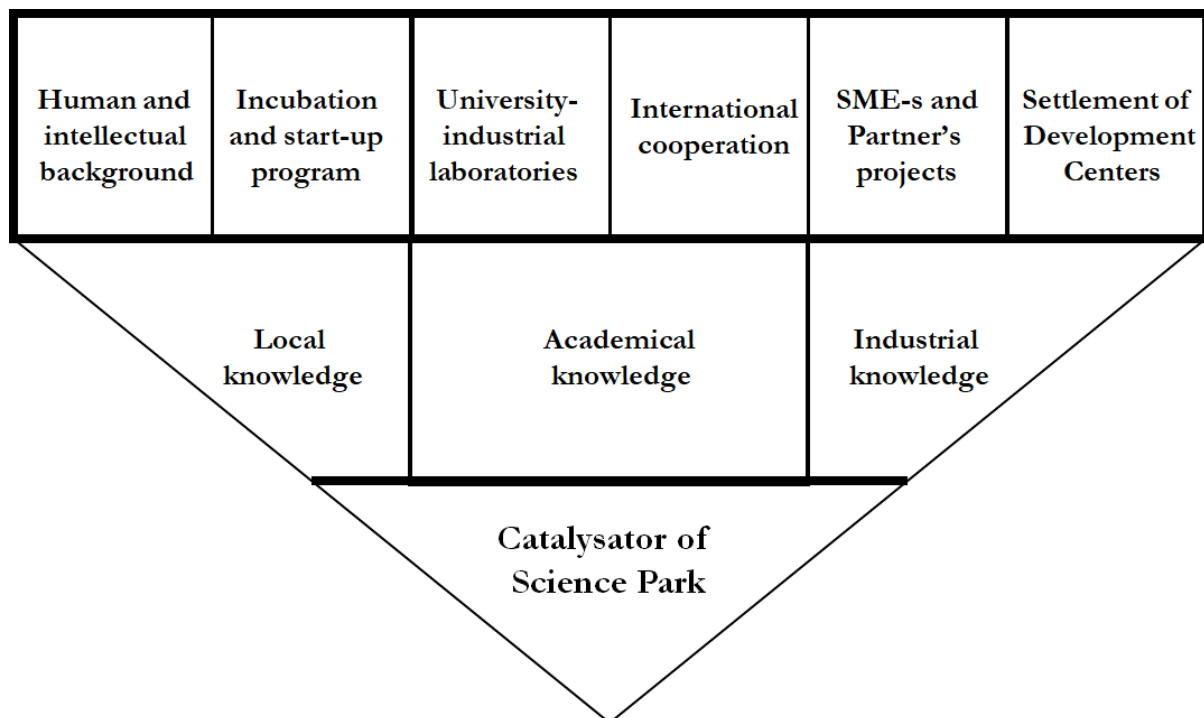


Fig. 6. Science Park Concept Model

4. SUMMARY

The purpose of this article is to summarize the initial lessons learned from the research launched based on the challenges related to the development of the ZalaZONE research and innovation ecosystem. In the introductory part, an overview have been provided based on some of the key research related to innovation ecosystems. A specific literature keyword search method was presented with its preliminary results in the topic of science park.

Finally, a general model of the ZalaZONE science park was introduced, which is suitable for further researches.

REFERENCES

1. Adner, R., 2006. Match your innovation strategy to your innovation ecosystem. *Harvard Business Review*, 84(4), pp. 98-107.
2. Arthur, W. B., 1989. Competing technologies, increasing returns, and lock-in by historical events. *Economy Journal*, 99(394), pp. 116-131.
3. Carayannis, E. G. & Campbell, D. F. J., 2009. 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International Journal Technology Management*, 46(3-4), pp. 201-234.
4. Engel, J. & del Palacio, I., 2011. Global Clusters of Innovation: The case of Israel and Silicon Valley. *California Management Review*, 53(2), pp. 27-49.
5. Gomes, A. d. V. és mtsai., 2018. Unpacking the innovation ecosystem construct: evolution, gaps and trends.. *Technol. Forecast. Soc. Chang.*, Issue 136, pp. 30-48.
6. Granstrand, O. & Holgersson, M., 2020. Innovation ecosystems: A conceptual review and a new definition. *Technovation*, 90-91. kötet, p. 201098.
7. Hannah, D. P. & Eisenhardt, K. M., 2018. How firms navigate cooperation and competition in nascent ecosystems. *Strateg. Management Journal*, 39(12), pp. 3163-3192.
8. Katri, V., 2015. Business, Innovation, and Knowledge Ecosystems: How They Differ and How to Survive and Thrive within Them. *Technology Innovation Management Review*, 5(8), pp. 17-24.
9. Koenig, G., 2012. Business Ecosystems Revisited. *Management*, 15(2), pp. 208-224.
10. Moore, J. F., 1993. Predators and prey: a new ecology of competition. *Harvard Business Review*, 71(3), pp. 75-86.
11. Nambisan, S. & Baron, R. A., 2013. Entrepreneurship in innovation ecosystems: entrepreneurs' self-regulatory processes and their implications for new venture success. *Entrepreneurship Theory Practice*, 37(5), pp. 1071-1097.
12. Quinn, J., Anderson, P. & Finkelstein, S., 1998. New Forms of Organizing In H. Mintzberg & J.B. Quinn (Eds.). *Readings in the Strategic Process*, Upper Saddle River, NJ: Prentice Hall. kötet, pp. 362-374.
13. Rohrbeck, R., Holzle, K. & Gemunden, H. G., 2009. Opening up for competitive advantage: how Deutsche Telekom creates an open innovation ecosystem. *R. D. Management*, 39(4), pp. 420-430.
14. Westhead, P. & Batstone, S., 1998. Independent Technology-based Firms: The Perceived Benefits of a Science Park Location. *Urban Studies*, Vol. 35(No. 12), pp. 2197 - 2219.