

Bottlenecks in Regional Innovation Ecosystem: A Case on Region with Extremely Low RDI Activity

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Abstract: The benefits of innovation ecosystems and the knowledge they contain have long been studied as part of business innovation and their importance has been recognized as vital for regional vigour. Ecosystems always involve different kinds of actors and their mutual roles and dialogue form a complex system. This study examined the performance of an innovation ecosystem in the region in southeast Finland through a single-case study method. The region is known for the fact that very little innovation activity takes place within it. The study used a group interview as the primary data collection method. The main findings indicated that factors hindering RDI activities in the region include a lack of trust in the actors' relationships, which made organizations less willing to collaborate, and a weak innovation culture, which appears to be caused in part by the region's blue-collar traditions and low education levels. Furthermore, the innovation funding received by local higher education institutions had not resulted in a significant increase in company RDI activity. Another problem appeared to be that companies were not ready to commit to long-term co-development and were more interested in achieving short-term benefits by focusing on ongoing projects.

1 INTRODUCTION

Research, development and innovation (RDI) activities are widely acknowledged as pivotal drivers of economic progress, catalyzing big leaps in productivity by creating and implementing new technologies and refined practices. At a concrete level, effective RDI activities create, inter alia, new employment opportunities, especially for people with a higher education qualification, and enable a shift towards the production of sophisticated, higher-value products and services, which leads to economic growth. This critical role of RDI is also reflected in the European Union's collective target of allocating 3% of GDP to RDI investment. Increasing the amount of RDI investments is especially integral for smaller regions, ensuring their vitality in the long term and establishing resilience to address wicked challenges. In particular, the development of regional innovativeness helps small regions that suffer from a poor reputation and hence a lack of skilled labor (Asheim & Coenen, 2005).

A well-functioning innovation ecosystem fosters cross-sector idea generation for new products and combinations, while also cultivating an atmosphere of trust among ecosystem participants, mitigating uncertainty and aligning with prevailing perceptions, values, and visions (Harmaakorpi & Melkas, 2005). The convergence of diverse organizations and communities within the ecosystem enriches both explicit and tacit knowledge accessible to all individuals (Schienstock & Hämäläinen, 2001, p. 144).

From a regional economic point of view, today's innovation ecosystem functionality holds greater significance than it did 30 years ago when mega innovations were less frequent. Industrial regions can no longer rely on a robust forest industry and paper production as the production of both has declined sharply in Finland during the 2000s (Metsäteollisuus, 2023). This shift, combined with growing globalization, deregulation, and the emergence of modern megatrends like the heavy usage of social media and political instability has led us to the age of temporary advantage, where sustainable advantage

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rarely if ever exists (D'aveni, Dagnino & Smith, 2010). Therefore, all regional actors must adapt to these rapid changes and establish an ecosystem that enables innovative operations in this dynamic landscape, aiming to attain at least a temporary advantage for a limited duration.

2 THEORETICAL BACKGROUND

Ecosystem has rapidly become a buzz word in various academic arenas. Innovation and regional development are no exception in this regard, and especially in the context of innovation, the ecosystem paradigm has completely overtaken the traditional systems discourse. Granstrand and Holgersson (2020), for example, define an innovation ecosystem as: “an evolving set of actors, activities, and artifacts, and institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors.” The main objective for these actors is to leverage the interdependencies to create and capture shared value (Adner, 2017). Regardless, the innovation ecosystem can be viewed as a complex, evolving construct with a distinct identity that resists replication across different environments. It can be considered as a combination of networks and systems (Durst & Poutanen, 2013). As such, innovation ecosystems appear to be extremely diverse and heterogenic entities. Due to this complex and heterogeneous nature, the weakness of the concept is that there are many definitions of the innovation ecosystem, and it is not possible to give a completely unambiguous description (Oh, Phillips, Park & Lee, 2016).

At a regional level, innovation ecosystems have been studied for over 30 years. One of the first to study regional innovation ecosystems was Scott (1991), who analysed relations of economic systems within regional innovation ecosystem in US. In Europe, Fagerberg and Verspagen (1996) engaged in comparable research, categorizing various types of growth regions, each with distinct growth rates and differing dynamics. Cooke et al. (1997) identified key dimensions of a regional innovation system and tried to make the concept more operational. More recent regional ecosystem or network studies have focused on knowledge flows and management (Harmaakorpi & Melkas, 2005; Laihonon & Lönnqvist, 2015; Radziwon et al., 2016), the role of regional development officers (Sotarauta, 2010), value-

capture and creation process (Radziwon et al., 2016 and regional policy measures (Morgan, 2007).

Some have also researched the topic with a systematic literature review approach. One literature review was written by Durst and Poutanen in 2013, who recognized multiple factors affecting the innovation ecosystem performance: governance, strategy and leadership, organizational culture, human resource management, technology, partners, and clustering.

This paper builds upon Durst's and Poutanen's (2013) framework, enhancing it through the layered classification of different levels in the ecosystem and the incorporation of Chaudhary' et al., 2022 and van der Panne, van Beers, and Kleinknecht's (2003) literature reviews to this approach. Chaudhary et al. (2022) specifically emphasize the open innovation paradigm, thereby reinforcing the collaborative aspects of Durst and Poutanen's (2013) innovation ecosystem concept. Van der Panne et al.'s (2003) study on the other hand offers a broader perspective on factors promoting successful innovation.

The three papers have been combined to create a collection of factors that evaluate ecosystem performance at the individual, inter-firm, intra-firm and ecosystem levels. Some of the factors from the literature review by Durst and Poutanen (2013) have been shifted to lower levels because they fit there better. The following paragraphs and figure 1. provide a summary of the factors drawn from these three literature reviews affecting the performance of the innovation ecosystem on different levels (Durst & Poutanen, 2013; Chaudhary et al., 2022; Van der Panne, 2003).

Within the innovation ecosystem, the wise use of resources is crucial for economic development. Thus, within the ecosystem, the ability of ecosystem actors to manage (Watanabe & Fukunda. 2006) and allocate (Tassey, 2010) resources efficiently across different business operations is at the core of a well-functioning system. However, this is not sufficient on its own. The ecosystem must also have access to different funding possibilities (Tassey, 2010; Samila & Sorenson, 2010) such as through national or international financial instruments that can be utilized to boost the RDI activities in the ecosystem. Funding should be directed toward all actors and their activities, spanning organizational barriers (Durst & Poutanen, 2013).

In evaluating the efficacy of ecosystem operations, the role of governance must be highlighted. Governance is a multifaceted construct and therefore has several sub-categories affecting the ecosystem functionality. For example, it should be

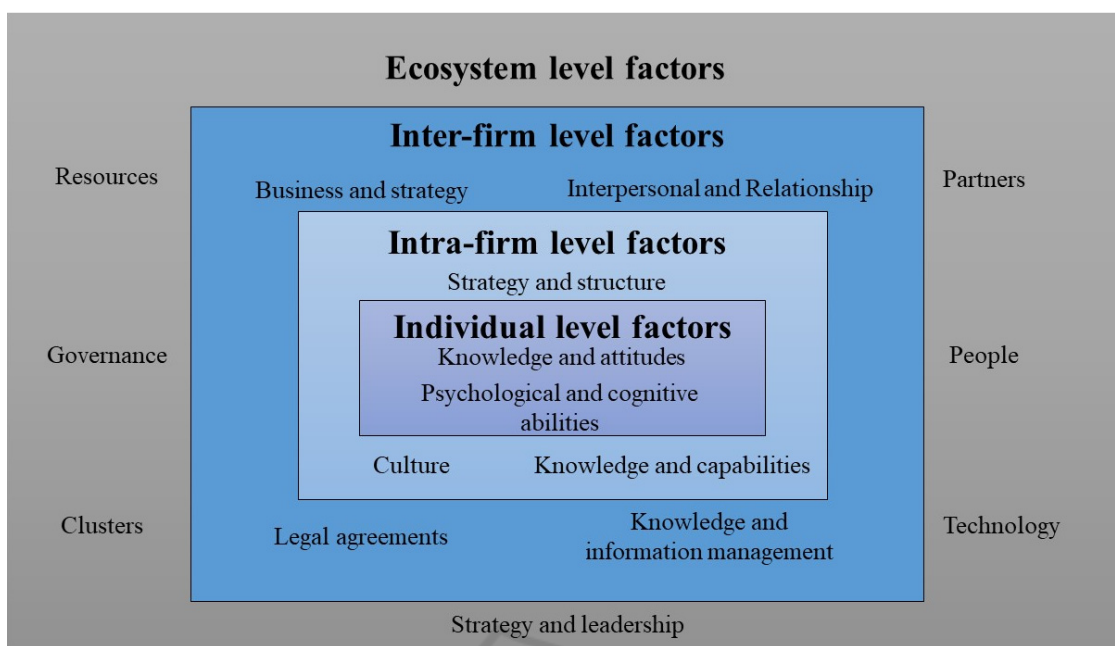


Figure 1: Factors affecting successful innovation (adapted from: (Durst & Poutanen, 2013; Chaudhary et al., 2022; Van der Panne, 2003).

clear to all participating organisations what their role is within the system (Tassey, 2010) and that there are democratic Carayannis & Cambell, 2012) and data-driven elements (Iyer & Davenport, 2008) included in the decision-making process. These factors also help in conducting timely decisions that make it possible to act cohesively in the innovation process (Adner, 2006; Watanabe & Fukunda, 2006). For the infrastructure to function effectively, it is important that there is a continuous financial investment in the ecosystem (Iyer & Davenport, 2008) and that systems are flexible in a sense that they allow for smooth interaction and expansion of the ecosystem whenever necessary (Rohrbeck et al., 2009). Furthermore, well-planned architectural control enables the goals and objectives of partners to be aligned and systematic risk assessment (Adner, 2006) helps mitigate potential disruptions and setbacks in the ecosystem.

Strategy and leadership include subfactors that affect day-to-day life in the ecosystem, particularly when things do not go as planned. It is critical that the ecosystem's actors have faith in their strategy and remain patient (Iyer & Davenport, 2008) even when things get tough. Hence, it is also important that the leadership keeps the ecosystem's purpose clear to participants, pays attention to detail (Iyer & Davenport, 2008), and remembers to take at times a distanced view to innovation (Mezzourh & Nakara, 2012).

It is also essential for ecosystem that novel information is brought into the ecosystem by different people, especially researchers (Rohrbeck et al., 2009) who are in touch with foreign research networks and, thus, possess up-to-date knowledge from the scientific fields. Moreover, a diverse array of partnerships enhances the ecosystem's resilience. While deeper partnerships are primarily established at the inter-firm level, their impact resonates at the ecosystem level, shaping collaborative dynamics and diversity (Rohrbeck et al., 2009; Carayannis & Campbell, 2012). One way to increase diversity is to include university-industry collaboration in the ecosystem (Mercan & Göktas, 2011).

While the ecosystem is a very abstract concept and not limited to a particular cluster, there are still benefits of such focus, particularly in terms of the ease of interaction with other organisations and their members when operating from the same physical location (Mercan & Göktas, 2011). Technologies (Carayannis & Campbell, 2012), on the other hand, are the final factor that has an impact at the ecosystem level. Their usefulness emerges, for example, through the flexibility they bring to knowledge management and the reduction in the need for human resources.

At the inter-firm level, interpersonal and relationship factors include trust (Veugeliers et al., 2010; Rochford & Rudelius, 1997), commitment in action (Rojas, 2018), and cultural differences (van de Vrande et al., 2009). Knowledge leakages (Greco et

al., 2019) also fall into the same category. They can be either intentional or accidental.

The effectiveness of cooperation at the inter-firm level is also influenced by business and strategic factor. This factor includes subfactors such as how business models fit together (Brunswicker & Chesbrough, 2018); Zhu, Xiao, Dong, & Gu (2019) and how resources complement one another (Pullen et al., 2012; Maidique & Zirger, 1984; Stuart & Abetti, 1987) It is frequently the case that complementary resources are required for productive innovation activity. The companies' goals (Pullen et al., 2012) should support each other properly in order to guide the ecosystem in the appropriate direction at the inter-firm level. However, sometimes the issue is that certain organizations are more willing to take risks whereas others are more risk-averse (Veugelers et al., 2010).

Legal factors and knowledge and information management factors are two other sets of factors. The first is primarily concerned with defining IPR rights (Salge et al., 2013) in such a way that their absence causes problems. In terms of knowledge management, it is mainly a question about creating, storing, and sharing knowledge optimally (Rouyre & Fernandez, 2019) and being able to transform knowledge (Katila & Ahuja, 2002) in the proper form.

At the intra-firm level, three main categories of factors can be identified: knowledge and capabilities, culture, and strategy and structure, the first of which emphasizes matters like experience from previous co-development activities with other organisations (Cohen & Levinthal, 1990; Maidique & Zirger, 1985; Zirger, 1997). Similarly, intra-firm R&D capabilities (Greco et al., 2019; Sofka & Grimpe, 2010) and intensity (Kleinschmidt & Cooper, 1995; Stuart & Abetti, 1987; Brouwer et al., 1999) are both important and fundamental capabilities that enable smooth collaboration with others in the creation of innovation. Also strongly linked to these subfactors is the organisation's ability to acquire and integrate external knowledge smoothly for its own use (Lichtenthaler, 2011; Salge et al., 2013)

When it comes to culture, the culture of the organization (Ekvall & Ryhammar, 1998; Lester, 1998) is at the heart of everything the organization does, and at its best, it enables smooth co-creation of innovation. On the other hand, a culture of resistance to change (Keupp & Gassmann, 2009) or the not-invented-here (NIH) syndrome (Schaarschmidt & Kilian, 2014), can be slowing factors. Similarly, the commitment of the organisation's management (Lester, 1998) has a major impact. If it does not show

real commitment to collaborative action, it is likely that lower levels of the organisation will not do so either. The strategy and structure on the other hand focus on the company's strategy towards innovation (Cottam et al., 2001) and whether the organization's internal structure (Stuart & Abetti, 1987; Lester, 1998) promotes co-creation activities and is flexible enough to make it possible.

Individuals have also an impact on the ecosystem's ability to innovate. Factors include things like knowledge and attitudes, and psychological and cognitive abilities. The capacity to effectively apply existing knowledge to advance an innovation (Laursen & Salter, 2020) and attitudes toward external knowledge and open innovation (Lichtenthaler, 2011) are part of the first factor. The latter, on the other hand, includes individuals' emotional competencies and sense of self-efficacy (McQuilken et al., 2018), and cognitive limitations (Dahlander & Gann, 2010; Dahlander et al., 2016) which both have an impact on the functionality of the ecosystem.

3 RESEARCH DESIGN

This study centers on the region of Kymenlaakso in Finland, which can be termed as an “extreme” due to its heavy lack of RDI investments. There, RDI investments amounted to only 0.5% of the region's GDP in 2021 (Neittaanmäki, 2023). This is the lowest quotation of all Finnish regions. In the case of Kymenlaakso, we can therefore speak of a real crisis area, with serious problems in all areas of RDI activity. Of particular concern, however, is the fact that the level of business RDI investments in Kymenlaakso has fallen by 14 percentage points between 2017 and 2021 (Neittaanmäki, 2023). Thus, Kymenlaakso not only starts from a disadvantage, but it also faces the additional challenge of declining regional innovation activity from its primary innovation ecosystem actors - companies.

The study examined innovation ecosystem in Kymenlaakso through a qualitative single case-study method. A single case-study method was particularly well suited for this paper, due to its capacity to facilitate a synthesis and resolution of multiple cases with the usage of diverse set of data sources. Furthermore, it allowed the paper to address important issues such as defining the essence of the case and recognizing the knowledge that can be obtained and learned from its in-depth analysis (Eriksson & Kovalainen, 2008). Figure 2. portrays in more detail the process behind the methodology of

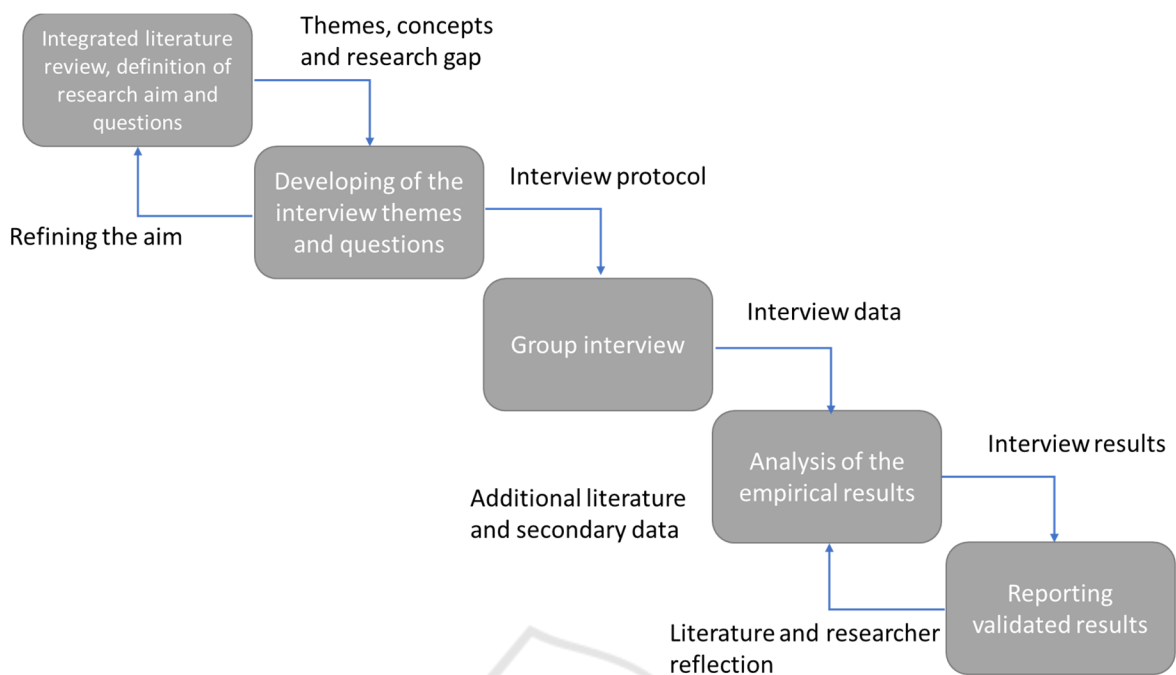


Figure 2: Development path of the study's methodology.

this study. Next, the stages of the research design for this paper are further explained.

In practice, the first step was to conduct an integrated literature review to support the definition of the purpose of the study and the research question. However, these were further refined afterwards, once clear themes had been established and the final interview questions and questions decided. The main research question then became:

What factors hinder the functioning of the innovation ecosystem in the region with extremely low RDI activity and the emergence of new innovations?

After determining the research question, the interview protocol and data selection were defined. It was decided that primary data would be gathered through a group interview technique in which one of the authors of this study served as a facilitator and led the discussion using the interview questions shown in Appendix 1. Thus, the interview technique could be considered as a semi-structured interview in which the facilitator asked open-ended questions from the interviewee group, allowing the interviewees to engage in a free dialogue on each topic.

Data selection followed an information-oriented approach aimed at maximizing the informational value from a limited sample size (Flyvbjerg, 2011). The selected case subjects possess a high level of expertise by default, given their pivotal roles within the Kymenlaakso region's innovation ecosystem.

Consequently, they offer current insights into the ecosystem's functioning, challenges, and trends. This selection strategy is also particularly conducive to gathering data on critical cases, which are cases of significant magnitude that address well-known issues (Flyvbjerg, 2011). Kymenlaakso serves as such a critical case due to its limited innovation activity, and this method can yield crucial insights and findings that complement conventional perceptions of the ecosystem's bottlenecks.

The interview took place via Teams, involving an event facilitator and seven interviewees, whose professional titles and organizations are detailed in Table 1. This comprehensive interview, spanning approximately 2 hours, covered predetermined topics outlined in the interview protocol. Following the interview, both authors reviewed and transcribed the event recording. Subsequently, the authors engaged in discussions to reach a consensus regarding the bottlenecks identified by the interviewees. Furthermore, the collected data was cross-referenced with the findings from a study conducted by Finnish Entrepreneurs, focusing on innovation network activities across various Finnish regions. This study was published during the finalization of this research. Subsequently, the results from both primary and secondary data sources were analysed, with researchers reflecting on the interview transcriptions and secondary data. Ultimately, all the analysed primary and secondary data were compared with the

existing literature, and the authors synthesized their findings.

Table 1: Interviewees information.

Interview subject's job title	Organisation
Chief executive officer	Vocational institute
Competence development manager	Project consultancy company
School director	University of applied sciences
Regional development specialist	Regional council
Regional director	Project consultancy company
Communication manager	Regional chamber of commerce
Chief executive officer	Regional chamber of commerce

Triangulation was used to increase the validity and reliability of the study. Practically, it means that several different data sources were used in the study to develop an understanding of the complex phenomenon. Firstly, the primary data gathering was conducted as a group interview to collect the experts' views on the situation in the region. On the other hand, an external research paper that also addressed the innovation ecosystem situation in the area was utilized and compared with the experts' views. Finally, the study used its authors' professional knowledge consisting of innovation management on the one hand and logistics, in particular supply chain management, on the other. By combining this knowledge with the literature and research data collected, a high-quality reflection of the state of the region's innovation ecosystem was achieved.

4 ANALYSIS

This section of the paper analyses the qualitative group interview results about the networked RDI activity in the region and addresses Finnish Entrepreneurs' (2023) barometer results at the end of the chapter. During the interviews, several aspects arose to highlight the poor network and culture in the regional RDI that hinders the functioning of innovation ecosystem. Overall, bottlenecks to develop the culture of RDI were seen to hinder in several aspects, especially in terms of inter-industrial and university-company-level collaboration, in the regional regulatory perspective, in personal and organizational level trust. Especially the latter one

seemed to be a clear bottleneck in the larger RDI actions which would require vast expertise from different fields and thus difficult to manage by individual organizations.

The lack of inter-firm and university-industry level collaboration was restricted to customer relationships in particular projects with strict focus on certain outcome. The collaboration within the project was typically active and it was seen fruitful between the companies, however the collaboration was closed by nature and limited to the short-term goals of the project, and typically formally sealed with NDAs. Overall, the companies did not practice collaboration beyond formal contracts and especially collaboration between organizations with different natures such as university or university of applied sciences were seen non-relevant. The more strategic perspective of the possible competitive advantage between was not identifiable for the companies and in many ways even starting such collaboration seemed risky in the current economic situation as a comment from a regional project consultancy company revealed:

"Anything else than our own RDI activity is foreign to us. We don't see it as a part of our operations. Our role in the projects is rather to be a stooge and we don't consider ourselves as such a strong actor which would consider wider and long-term RDI activity to be natural"

Apart from the challenges in industry collaboration, significant gaps existed between the two universities in the region. The university of applied sciences had a long-standing presence in the region and played a substantial role in securing regional development funding. In contrast, the university unit in the region had been a much smaller entity, with only a few researchers based there. However, the university had expanded its presence in a neighbouring region through mergers with two universities of applied sciences. In the past, there had been discussions about a potential merger with the regional university of applied sciences, but this idea had been met with resistance. While collaboration between these two institutions functioned at some levels, significant difficulties arose at the upper management level. The university of applied sciences did not view strategic collaboration as relevant and, instead, regarded the university as a competitor, especially because the university had become more active in the region lately. The problematic relationship between these two was also seen in the interview, from the comments of the university of applied sciences that were directed to undermine the university's collaboration with the companies:

“In the university, they are focusing just on writing academic papers”

This was referring to the fact that one of the university's main functions was to produce scientific publications, and the companies would not benefit from the collaboration. This was one of the examples which indicated the lack of trust in the RDI network. Similarly, the lack of trust was seen to be relevant among the companies and universities as well, as one of the comments from the companies revealed:

“We would like to see examples of projects on how our confidential data is being used, and how the collaboration with companies is handled”

The utilization of public funding was lacking in the region. While the region was considered low developed and thus received relatively high regional development support, it was underutilized by the companies. While the university of applied science had a strong project funding portfolio, in fact the largest in the country compared to other universities of applied sciences, alone it did not seem to make enough impact to the culture. From the companies perspective the regional RDI funds were not seen that relevant to their functions and especially the reports were seen as cumbersome:

*“We are bad in utilizing public funding as it entails reporting. Economic cycles also have an effect. When the economy is booming, we are too busy and when its falling, we don't have enough money for RDI”*The structure of the regional industry was one of the most mentioned problems in the region. The old brick-and-mortar heritage, where there had been always someone who told managers what to do and how had stuck into culture. The once-vital pulp and paper giants, which had long served as the backbone of local businesses, were now in decline, with factories shutting down and their local RDI functions relocated to other regions. Some optimism emerged from the prospects of green transformation, along with the potential investments in hydrogen and battery industries slated for the region. However, these new industries encountered regulatory challenges at the regional level, with lengthy complaints lodged against their projects. Overall, the local attitude towards RDI was seen difficult:

“The local opinion and culture for RDI activities is not easy. We've experienced often rounds of complaints against development projects”

The regional RDI-activities had risen as a concern for different players in the region in the previous years, as one of the recent activities a college association was founded to fund professorships and to strengthen the RDI activities in the region. The association had also collected funds to establish

renewable energy and cyber security professorships in the region to help in the local RDI. The chamber of commerce and the regional council had noticed a gap in knowledge of how academic research is done in the region and ordered a consult to investigate this. In addition to the association, the local chamber of commerce had recently activated to facilitate the collaboration and discussion around RDI.

While there was a severe bottleneck in the regional RDI network, a recent study by Finnish Entrepreneurs (2023) revealed the strength of the inter-organizational collaboration between the companies. In the study, the region was ranked as the best in Finland. Therefore, it can be argued, that while the wider RDI collaboration is lacking, companies are focusing on direct contract-based relationship management.

5 CONCLUDING DISCUSSION

RDI activities are the essence of long-term competitiveness for companies, and thus one of the keys to regional development as well. While Finland is considered one of the most innovative countries in the world, and the Research and Innovation Council of Finland has set up a vision for Finland to become the most attractive and competent environment for experimentation and innovation by 2030, there are major regional differences within the country (Rinkkala et al. 2019; The Research and Innovation Council, 2017). This research focused on one of the lowest RDI-funding receiving regions in Finland to study the bottlenecks for ecosystem and networked innovation activities. The study revealed that there are several factors contributing to the lack of innovation activity in the region, especially the lack of networked innovation seemed to suffer in the region.

As one of the most important factors, the lack of trust in the ecosystem, inter-firm, and individual levels seemed to hinder the collaboration activities between the companies. This relates to the literature, as several other studies have also identified trust and its lack as a problem that hinders cooperation among actors that participate in RDI activities (Veugelers et al., 2010); Rochford & Rudelius, 1997). The lack of trust was relevant to the company-university collaboration as well.

The organizations interviewed were suspicious about the confidential information being delivered to the universities and in some ways did not understand what kind of benefits there could be in the collaboration, likely because of a lack of prior

knowledge and experience with the university cooperation. Other research literature recognizes that sharing information and building trust takes time and does not happen instantaneously (Schartinger et al. 2001; Nsanzumuhire & Groot, 2020). Similar indications can be seen in this study as the university in Kymenlaakso is only now beginning to take a greater role in regional development. On the other hand, the research field has also found that clear and wide contractual agreements regarding knowledge sharing can improve trust in university-industry collaboration (Hemmert et al., 2014), which could also be a way to ease the collaboration in this case where no long-term relationships are established yet.

While public RDI funding was available for the companies, they considered the reporting required by the funding to be excess work and therefore did not apply it. In other studies (Tassey, 2010; Samila & Sorenson, 2010), additional funding was found to have a positive effect on innovation activity in the ecosystem level, but in this research, the effect was more neutral, as even if funding was available, firms did not possess resources or skills to apply for it due to the time limits and effort required, showing that the lack of experience and capabilities prevented effective action. This is in line with (Sanchez-Vidal & Martin-Ugedo, 2005) finding that firms, especially SMEs lack of knowledge on how to approach different sources of funding prevents them from gaining more funding.

In addition, the poor innovation culture related to the old industrial traditions in the region opposed challenges for the proactive thinking and mindset of the people. The region's innovativeness suffers from the reasonably low education of the people and the working population comprises mostly from blue-collar workers. The old industrial plants have been closing in the region and shifted their RDI functions to other regions. Similarly, the region has one of the lowest in-house investors lists as well. The companies in the region typically focus on closed customer-related dyadic RDI projects and were struggling to see the benefit of developing their competencies through ecosystemic collaboration with other organizations or institutions.

The role of the university in the region is still limited due to the fact that there is no established university campus in the region, rather smaller research units, with scarce resources. The role of the university of applied sciences has been however larger in the region and in many ways, and it has been responsible for the RDI activities. Indeed, the funding received by the local university of applied science is the highest in the country (XAMK, 2019). As the

main actor the university of applied science however does not seem to be sufficient to lift the RDI activity in the region. Moreover, the funding received by the university of applied sciences did not seem to help the local companies and their RDI activities or increase funding. A somewhat similar case can be found in the city of Twente, which, like the Kymenlaakso region, has a long history as an industrial area. In Twente, the local university has been able to create some level of transformation in the innovative capacity of the region (Hospers & Benneworth, 2012). Nevertheless, this study shows that always local university actors cannot translate the abundant RDI funding into increased regional innovation capacity.

The role of different actors in the networked RDI activities is relevant especially when trying to develop the culture of innovation. Some regional actors had been introduced in order to boost the RDI activities, however the overall collaboration was still in its infancy. The regional council had introduced smart specialization fields according to which the strategic RDI funding were allocated, however a clear roadmap about the collaborative arrangements toward these were lacking. With clear lack of trust among members and some of the actors still seeking their place in the ecosystem, the maturity of the overall RDI ecosystem was still in its infancy.

This text has several scientific and managerial implications: Firstly, the paper sheds light on the networked innovation activities at a local level by assessing different aspects of the innovation indicators. In doing this especially the bottlenecks of the current case illustrate how the long-term strategic collaboration with different types of organizations and institutes suffers as the companies only focus on short-term benefits in the ongoing projects and also while showing how the lack of trust and the fear that sharing information is more bad than good contributes to business fragmentation and hinders ecosystem innovation (Tassey, 2010; Rojas et al., 2018). Secondly, the study provides information about an extreme case of a low innovation activity region and how historical weight and resistance to change can be hindering the development of innovation culture and activities (Keupp & Gassmann, 2009; Schaarschmidt & Kilian, 2014). Finally, the paper illustrates how limited understanding of different organizations roles and activities can be a bottleneck for the regional innovations (Tassey, 2010).

In the future, more research should be focused on the network types and roles of different organizations, and how homogenous the ecosystem is. Some researchers have already started this work (Sotarauta,

2010; Laihonon & Lönnqvist, 2015; Radziwon et al., 2016). More research is also needed on innovation culture change management. It would benefit similar types of regions, networks and organizations in them. In addition, more knowledge is required on how to transform an industrial region into a more innovative one and how the university or university of applied science can play an effective role in enabling this via ecosystemic development.

Organizations and managers should acquire more knowledge on how wider and long-term innovation projects are managed and what kind of benefits could be expected from participating actively in innovation ecosystems. Moreover, distrust (Westergren, 2011) and competitive positions between different organizations and institutions can be harmful to organizations, and in order to develop an innovation culture management support is essential (Lester, 1998). On the other hand, active regional actors must make every effort to lower the barriers to attending innovation ecosystem and thus enable trust to develop between the actors in the region (Hemmert et al., 2014; Nsanzumuhire & Groot, 2020).

Finally, as a source of competitiveness and growth, managing and developing the regional innovation ecosystems is essential. Currently, new technologies and many other changes and trends are increasing the necessity for companies to develop their operations and value production accordingly. With low innovation areas, the changes are more difficult to implement and without changes, the organization's competitiveness will most likely fall and with that the regional one falls as well.

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APPENDIX

Interview Questions

1. How is information shared within the ecosystem and networks? Does information reach all actors?
2. What hinders active networking?
3. Are companies successful in forming partnerships with businesses in the region?
4. Are the different actors communicating effectively with each other?
5. Do the actors trust each other?
6. How do personal chemistries work within the ecosystem?
5. Do actors within the ecosystem work only with established partners or do they cooperate on a broad scale?
6. What is the culture of the regional innovation ecosystem?
7. What is the role of higher education in the region and is there cooperation with businesses and other actors?
8. Do the actors within the ecosystem share similar goals and objectives?
9. Are there enough resources in the region to maintain ecosystem functions?
10. Are different funding sources widely used?
11. How well do ecosystem actors tolerate risk in general?
12. Is innovation part of the business culture and strategy of companies in the region?
13. Do firms have experience in innovation?
14. Are firms closed or open to co-creation?
15. Are there sufficient R&D resources in the region's enterprises?
16. Are firms' organizational structures generally supportive of innovation?