



Innovation capability in small firms:

A case study in a Finnish region

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Full Research Paper

Abstract

The paper examines strong and weak elements in small firms' innovation capabilities, testing a modified assessment method. The data was collected from five small firms in the region of South Ostrobothnia. The results suggest that networks indeed play an important role in small firm innovation capability, as does openness to new technology. Market and customer interface was a relative weakness. The assessment tool tested worked well. Future studies should seek to establish connection between innovation capability and innovation performance.

Keywords: innovation capability, small firms, case study

Introduction

SMEs' innovation models often differ from those of larger firms, as they may lack resources and capabilities to cover all the aspects of innovation (Bigliardi and Galati, 2018; Spithoven et al., 2013). At the same time, small firms have well-known advantages in terms of flexibility (Vossen, 1998), albeit those may be off-set by technological lags or scale effects.

Sustainability is currently recognized as a key driver of innovation (Nidumolu et al., 2009), with both stakeholder pressure and increasing regulation having an impact (Dasgupta, 2021), but lack of RDI capabilities can hinder development of green innovations e.g. in supply chains (Gupta et al., 2020). The region of South Ostrobothnia in Finland is characterized by high entrepreneurship but low RDI density (Regional Council of South Ostrobothnia, 2022). The region has placed emphasized both innovation and sustainability in its Smart Specialization strategy (ibid.). Hence, there is need to leverage innovation capacity of SMEs to support these aims. Innovation and RDI in small firms remains, however, a relatively little studied area.

The present paper utilizes data collected in context of the project "GreenGrow – facilitating green and inclusive growth in South Ostrobothnia". The main objective of the project is to facilitate green and inclusive growth among SMEs in South Ostrobothnia by strengthening networks and RDI activities. The exploratory study described in this paper modified and tested a model for assessment of innovation capabilities in small and micro firms. The research objective addressed is: What are the strong and weak elements in small firms' innovation capabilities?

Although generalization from the results suffers the common limitations of case study research, suggestive commonalities were discovered. Furthermore, the study provides some evidence on the utility of the innovation capability assessment method described in the context of small and micro firms.

Innovation in small firms

Dodgson and Gann (2010) define innovation as "*what happens when new thinking is successfully introduced in and valued by organizations*". According to them, there are numerous approaches to comprehend innovation, which offer diverse and valuable viewpoints and understandings: whether change is incremental or radical, how it sustains or disrupts existing ways of doing things, and if it occurs in whole systems or their components. According to McFadzean et al. (2005), innovation is "*a process that provides added value and a degree of novelty to the organization and its suppliers and customers through the development of new procedures, solutions, products and services as well as new methods of commercialization*". Innovation is seen as one of the main ways to enhance economic growth and thus create prosperous nations and regions (see e.g. Fagerberg et al., 2005; Ljunggren et al., 2010). Innovation is also considered crucial for technological development within industries and sectors (e.g. Malerba, 2002).

Small firms play a crucial role in the growth of regional and national economies by providing a substantial number of jobs and creating new employment opportunities. Economies that have thriving small businesses enjoy various advantages, such as economic progress and an enhanced quality of life for the residents of those businesses' communities (Ahluwalia et al., 2017). In an increasingly competitive environment, innovation has been recognized by researchers as a crucial tool for firm survival and maintaining a superior level of performance (D'Aveni, 2010; Burns, 2016). Thus, innovation in small firms is crucial both for the economy as well as for their own survival.

However, small firms are usually considered to be more resource constrained than larger firms (Anderson & Eshima, 2013), which can affect their ability to innovate. Freel (2000) proposed that insufficient access to external sources of information and a lack of suitable internal competencies restrict the potential for small firms to innovate. In addition, there are a range of other factors that influence small firms' innovativeness, such as managerial priorities, documented innovation strategies, collaboration with external networks, market research, and inter-firm partnerships (de Jong & Vermeulen, 2006). As small firms often lack internal resources needed for innovation, boundary spanning and external networks are important for SME innovation (Spithoven et al., 2013; Zahoor and Al-Tabbaa, 2020).

Innovation capability and its assessment

SME innovation capability is a complex concept with a variety of components. Saunila (2020) notes that, depending on the conceptualization, innovation capability can be viewed as consisting of different kinds of capabilities and having multiple dimensions. However, the association between innovation capability and small business performance is, by and large, found positive in prior literature. (e.g. O’Cass and Sok, 2014; Oura et al., 2016; Dadfar et al., 2013). Sustainable innovation has similarly been linked to positive outcomes (e.g., Le and Ikram, 2022).

Lawson and Samson (2001) define innovation capability as the ability to continuously turn knowledge and ideas into new products, processes, and systems that benefit the firm and its stakeholders. Dani and Gandhi (2022) consider innovation capability as an outcome of organizational practices, i.e., various drivers implemented throughout the organization. Their extensive literature review concludes that creativity, motivation, and leadership are innovation drivers at the individual level, and strategy, culture, knowledge management, structure, R&D expenditure, learning, support and business processes and practices are the drivers at the organizational level. Zastempowski et al. (2020) find altogether 19 variables with a positive or negative impact on innovation capability.

Various authors have also addressed the question of how to assess an SME’s innovation capability. Castela et al. (2018) developed, using cognitive mapping and analytic hierarchy process, a procedure for evaluation of SME innovation capability, with the expert panel highlighting infrastructures, external factors, organizational factors, employees, and management/CEO as overall innovation capability dimensions, to each of which numerous sub-criteria are related. Grillo et al. (2018) also utilized cognitive mapping in connection with use of the strategic option development and analysis, with their expert panel ending with two nexuses, organization (consisting of human capital, CEO/manager profile and structure and organizational culture) and external factors (consisting of environmental conditions and customer behavior), each with various attributes weighted against each other according to agreed-upon decision rules. In both Castela et al. (2018) and Grillo et al. (2018) the authors underline the process-oriented nature of their effort and caution against direct extrapolations.

Raghuvanshi et al. (2018) in their study develop a model innovation capability with 20 measures divided into four categories, namely resources, risk taking, networking and involvement. This is of particular interest since their focus is on micro firms especially. Bullinger et al. (2007) conclude that existing approaches to measuring innovation capability differ in scope, underlying conceptual models and measurement approaches. They present a three-stage approach to improving innovation capability, with an innovation audit followed by a design phase and, in the third phase, implementation. The approach based on Fraunhofer innovation management model addressing nine key areas in innovation enabling aspects and outputs of the firm’s innovation system.

Methodology

Research approach

As our research approach, a case study was chosen because we wanted to have detailed and in-depth information about a few companies. Our goal was not to create generalizable results on the topic, but rather to delve into the characteristics of these certain cases. For this reason, the case study approach was well suited for this research. With a case study, it was possible to investigate individual companies’ strengths and weaknesses in innovation capability.

Case study is a study of social phenomenon, conducted within the boundaries of a single or a few social system(s), such as individuals, organizations, groups, communities, or nation-states (Swanborn, 2010). In a case study, either a single case (*single case study*) or a bounded set of cases (*comparative case study*) is investigated. In this study, five companies were selected as individual cases.

Case study is a suitable approach when the aim is to investigate phenomena and answer questions about what, how, and why. In a case study, the research question can evolve during the process of data

collection. Due to the nature of a case study, our research is not generalizable. As in all qualitative research, our own subjective experiences as researchers may influence the outcome of the study.

In a case study, it is common to employ various data collection methods, such as interviews, observations, media materials, statistics, and other types of documents (Yin 2018). The data can also be interpreted using multiple methods. In contrast, in our study, we solely used the data accumulated during the workshops as our primary source of information. In this research, any other data sources were not used. Thus, case study provides rather a helpful context, than a strict methodology in the present research.

Research process

Developing the innovation capability assessment method and using it in exploratory research took place in context of the project “GreenGrow – facilitating green and inclusive growth in South Ostrobothnia” funded by European Regional Development Fund. The main objective of the project is to facilitate green and inclusive growth among SMEs in South Ostrobothnia by strengthening networks and RDI activities. As part of the project, the research team undertook to produce an assessment tool for innovation capability that small firms could use independently. The objective was to support firms’ understanding of their own strengths and weaknesses in innovation.

The process started by comparing different existing methods of assessing innovation capability in small firms. As the objective was to make the tool usable also without an external facilitator, the procedure had to be simple enough to comprehend and apply, and it could not rely on extensive software. After evaluation of prior models (Castela et al., 2018; Grillo et al., 2018; Raghuvanshi et al., 2018; Bullinger et al., 2007), the research team chose a part of the three-stage Fraunhofer model described by Bullinger et al. (2007) as the starting point.

The tool includes six areas that all influence firm’s innovation capability: Innovation vision, processes, customers and market, technology, expertise, and networks. Each area includes 3-6 separate subcategories.

The tool provides five answer options for each subcategory, and the option that best describes the company at the moment is selected. The options are numbered from one to five, five representing the most advanced situation in the section.

For testing and further development of the tool, five companies from the region were selected. These companies had expressed their interest in developing their RDI processes. All companies were also keen to develop green innovations.

The study group organized a workshop with each company separately. The number of attendees varied between cases. In two companies, two persons attended and in three companies, one person attended.

If more than one person participated in the workshop, each person first chose the best suitable answer option in their opinion. The choices were then discussed together. Finally, one option was agreed upon the attendees.

The results were entered into an Excel spreadsheet included in the tool. Excel creates a graph of the results which can be used to examine the strongest and weakest areas in relation to each other.

The areas and their subcategories are as follows:

1. Innovation vision.

- Vision – Does the company have a clear vision of the innovations needed in the future?
- Roadmap – Has a roadmap been created to support innovation?
- Innovation culture – What is the innovation culture in the company like?

2. Processes.

- Systematic process for evaluating ideas – Is there a process for evaluating new ideas?

- Systematic process for product and service development – Is there a process for product and service development?
- Level of project management – Is there a systematic approach to managing processes?
- Budgeting – Is there a separate budget for innovation projects?
- Continuous product development – Is the product development continuous and how are customers involved in the process?
- Success evaluation of projects – Is the evaluation of completed projects systematic and what are markers?

3. Customers and market.

- Continuous market evaluation – How systematically is market development monitored?
- Systematic process for determining customer needs – What tools are used to determine customer needs?
- Anticipation of future changes and needs – Which methodologies are being used?
- Launching expertise: Are market research, pre-testing or marketing communication being utilized?"

4. Technology.

- Existing technology – Is the technology used up to date?
- Systematic monitoring of new technologies – Is the monitoring regular and are the responsibilities clear?
- Desire to utilize the newest technological solutions – How are new technologies viewed?
- Resources – Is there enough time and sufficient expertise?

5. Competences.

- Strengths and weaknesses – Do we recognize our own strengths and weaknesses?
- Increasing company's knowledge capital – How is expertise managed and developed?
- Training – How is employee training and competence development perceived?
- Knowledge exchange – How is internal knowledge exchange organized?

6. Networks.

- Utilization of external partners – Is there cooperation with external partners in innovation projects?
- Cooperation with higher education institutions / developer organizations – Are HEIs and developer institutions utilized in innovation?
- Using external expertise – Are external experts used in innovation projects?
- Cooperation with subcontractors and suppliers – Are subcontractors and suppliers included in innovation and product development processes?

Cases

The tool was tested with five small firms, with the workshops held between September 2022 and March 2023. Table 1 presents an overview of the case companies. Two were manufacturing firms, two were service firms and one was an import wholesaler. Firm size varied from 2 to 39 employees.

Table 1. The case companies.

Company	Industry	Number of staff (including entrepreneur(s))
Company A	Manufacturing	3
Company B	Commerce	2
Company C	Technical services	39
Company D	Expert services	3
Company E	Manufacturing	38

Below short descriptions of the cases are given.

Company A

Company A was the first one to test the tool. The entrepreneur himself participated in the workshop alone. In addition to him, there are two hired employees in the company.

The strongest area that emerged in the evaluation in this company was networking. Networks were used in various ways. External partners and university collaborations were utilized extensively, and external expertise was acquired. Close collaboration was also established with suppliers and subcontractors.

In processes, continuous product development emerged as a strength. New products were designed, and studies were conducted, including regarding more sustainable raw materials. The company was also interested in utilizing the latest technology in its operations and constantly monitoring technological developments.

The clearest areas for development in this company were customers and marketing. The company faced the most challenges in identifying customer needs. There was a general need for more systematic and planned approaches in all operations, as well as a more proactive approach towards partners.

Company B

Company B is a family business of two entrepreneurs. There are no hired employees in the company. Both entrepreneurs participated in the workshop. This was considered beneficial because the involvement of multiple people sparked more discussion about the options, and sometimes compromises had to be made in the selection of response options.

In this company, same strengths and development areas were identified as in Company A. The strongest areas were networking and expertise. The weakest area was identified as customers and markets.

One of the strengths of this company was particularly the identification of their own expertise and regularly reflecting on it. External help has been sought regularly, but finding the right experts has been difficult. However, they actively tried to utilize networks.

As with Company A, the biggest area for development in Company B was customers and particularly identifying customer needs. The need for systematic and planned processes also emerged as a development area.

The entrepreneurs mentioned that they had expected the tool to be more related to product development. The discussion highlighted how well companies ultimately understand what RDI means.

Company C

Company C is a company that employs nearly 40 people and provides installation services in heating, ventilation, and air conditioning industry. The entrepreneur participated in the workshop alone.

In this company, the strongest areas were networking and technology. The entrepreneur had strong personal networks that were very beneficial. In addition, they worked closely with suppliers and subcontractors. The entrepreneur was very knowledgeable about new technological opportunities and actively followed the development of technology.

The most significant area for improvement was processes. This may be due to the recent change in ownership and the fact that the individual had not been in the company's management for very long. New processes were still in the refining stage. Areas for development were particularly in creating schedules, scheduling projects, and creating criteria for evaluating operations.

Company D

Company D is a digital services provider that was founded less than a year ago. The entrepreneur attended a workshop with one of their employees. The company's strongest area was networks, for which they received full marks. Despite their young age, the company is actively seeking collaboration with various entities and has been actively searching for new partners. The company also scored high marks for technology. They are proficient in using social media and artificial intelligence and are eager to leverage new solutions.

The company needs to improve their processes, which is natural since they are a new company and their processes have not yet been refined. Implementing the innovation vision from the entrepreneur to the employees also requires more work.

Participants reported that the workshop was very useful for them. The issues that were raised were not surprising, but they helped prioritize what needs to be addressed in future development work.

Company E

Company E is a long-standing family business that operates in the manufacturing industry. The entrepreneur participated in the workshop alone.

The strongest part in the assessment for this company was technology. New technologies were systematically monitored, and sufficient time was allocated to several different individuals. Additionally, the utilization of networks was at a strong level. The networks were extensive, and collaborations were made in many different directions.

Most development was needed in the innovation vision. The company's vision was well known among managerial staff, but there was still work to be done in implementing it among other employees. There was a need for more precise scheduling and more systematic monitoring for the implementation of innovations. Also, recognizing their own strengths emerged as a development area - the company identified its weaknesses perhaps too well, but its strengths were not very clear.

Analysis and results

Table 2 gives an overview of the scores of the case companies in the six assessed areas of innovation capability. Highest scores are related to networks and the lowest to processes and customers and markets. Scores showed variance both within and between firms.

Table 2. Scores of case companies. *

	Innovation vision	Processes	Customers and market	Technology	Competences	Networks
Company	Scores	Scores	Scores	Scores	Scores	Scores
A	3,0	3,4	2,5	3,5	3,3	4,8
B	3,3	3,0	2,6	3,4	3,5	3,5
C	4,0	2,8	3,0	4,3	3,0	4,3
D	3,0	2,2	3,5	4,8	3,3	5,0
E	3,3	3,7	3,8	4,5	3,5	4,3
average	3,3	3,0	3,0	4,1	3,3	4,4

*The questions were customized for each company, and not all companies were asked the same set of questions. For example, “employee training” was left out if the company did not have any hired staff. Therefore, the averages are not entirely comparable.

Next, we present findings concerning each area of innovation capability.

Innovation vision

The workshop session started by going through the innovation vision. Average scores from innovation vision were 3,3. Among case companies, it was common that the way of innovating was not very systematic. All case companies had some kind of vision but in some companies, it was clearer than in others. However, visioning was not particularly very well planned in any company, and innovation processes were not very well documented.

"We are monitoring the development of the market and doing a lot of work, but we do not schedule it, and it is done little by little all the time. Let's say we aim to identify opportunities as they come, but we do actively work on it within the limits of our resources. However, we may not have a long-term roadmap. Partly, this is because the market has undergone such radical changes that we do not dare to go too far ahead. We are more focused on sniffing out opportunities." – Company B

The situation may have also been that the company's vision was very clear in the CEO's head, but it had not been communicated to the company's employees.

"We have a roadmap, but I haven't communicated it to the employees. However, I want to bring it more to the attention of the employees so that everyone knows what we are aiming for." – Company D

The lack of resources in small companies seems to be the biggest reason for unsystematic innovation visioning. It was clear that the entrepreneurs would have wanted to take more risks, but limited resources restricted their risk-taking ability. Then again, the CEO of company C stated, that *"one cannot be an entrepreneur if they don't take risks. We don't fear failure, because you cannot succeed if you're afraid."*

Processes

Among the case companies, processes was the weakest area of innovation capability in average, together with customers and market. None of the companies reached 4 or higher in this area. There was variation in terms of which subcategories companies had managed well. Some had focused on continuous product development, while others had systematic budgeting. However, none of the companies evaluated themselves as being at the highest level (5) in any subcategory.

Company E, which has been operating for almost 100 years, received the highest scores in processes. Instead, Company D, which was established less than a year ago, had the most room for improvement in

processes. Around the time of the workshop, the processes of the company D were still being formed, but the CEO understood the importance of having functioning processes:

"Without a clear service process description, we don't have anything in the company. If we ever consider selling, for example, nobody wants to buy a company that doesn't have clear processes." – CEO, Company D

In the discussions it became apparent that companies do indeed work a lot in processes, and in many companies, continuous product development and ideation, for example, are active. However, all case companies lack, at least to a degree, systematic approach, planning, continuity, and documentation of the processes. As in innovation vision, also in processes, scarce resources are the main reason for lack of systematicity. Also, the uncertainty caused by COVID-19 pandemic and the war in Ukraine has made it difficult to make long term plans, and earlier plans have had to be revised.

"We do make plans and schedules, but last years' events have changed them. We have been more optimistic than what has been possible to achieve. Sometimes we even get a bit too excited in relation to our size. On the other hand, it's better that way." – CEO, Company E

Customers and market

The average total score between case companies in this area was 3,0. Together with processes, companies gained least scores in this area.

Continuous market assessment was a strength for all case companies. All companies stated that they conduct market and competitor analysis by monitoring competitors' websites, financial information, and social media sites. This is how the CEO of company C describes their competitor analysis:

We do monitor competitors, yeah. I do look at financial information, and I hear about who won the contract and how much we lost in public procurements. But I want to look forward and not focus on what competitors are doing. I want our company to be completely different from the competitors. – CEO, Company C

Many case companies were facing challenges in determining customer needs. According to the CEO of Company E, e-commerce creates its own challenges in identifying customer needs, as there is no direct contact with customers. The CEO of Company A states that they have very little information about end-user needs since product sales are conducted through retailers. Consequently, launching new products has been challenging for them. The CEO of Company D explains that customer needs are indeed investigated, and there is some sort of process in place. However, the process is solely known to the CEO, and others are not very aware of the process flow. The CEO of Company C also conveys the same information. They, too, do not conduct systematic customer needs assessments through customer surveys. However, the CEO personally contacts all customers and assesses their satisfaction with the progress of the project.

Anticipating future needs was challenging for many companies. Entrepreneur A explains that the business used to be planned more on strategic level and there was more emphasis on foresight when there were also external members on the board. Company B is a family business that manufactures zero-waste and ecological household supplies. One of the entrepreneurs describes, how they find that value-based business conflicts with strategic business.

"If I think about my own operations in relation to where I have previously worked, I had a much more strategic mindset. Nowadays, the situation is such that our values tend to drive our business even too much, so I don't look at things from a strategic perspective as much as before." – Company B

It seems that among the case companies, the operations made related to customers and market are often not firmly based on the strategy, but rather things are done as they have always been done. Sometimes, the success of sales is also very random, tells the CEO of company E. They have, for example, suddenly gained a lot of visibility and increased sales when a well-known social media influencer featured their product on their own account. As an expert services business, company D found that launching new products was relatively easy. Some companies were more familiar with social media advertising than others.

Technology

On average, companies achieved the second-highest overall scores in the technology section. Every company reached 3 or higher, and the average was 4,1. The strongest subcategories were "systematic monitoring of new technologies" and "willingness to leverage the latest technological solutions," with all companies rating themselves 4 or 5. Up-to-date technology was important for all companies.

"Of course, we are eager to use new technologies if they provide benefits. We have made small improvements in our machines, ones that we would have known if we had visited the manufacturer. Often it is like that we are thinking if there's another way of doing things." -CEO, Company A

"We have a great software that integrates invoicing, accounting, and tracking. Thanks to this software, we are probably at a four. But if we talk about the lower level of technology, I'm proud that we have the best tools in use. I emphasize that those tools are what our employees use to do their job, so it's essential to have them in good condition." -CEO, Company C

All companies were also eager to utilize the newest technological solutions. On the other hand, several companies mentioned that limited resources restrict the time available for familiarizing themselves with the newest technology and keeping up with it. Entrepreneur from company B described that on the other hand, the courage to embrace the latest technologies also acts as a barrier:

"I rated us as a 4 because we are not overly cautious but not necessarily the most eager either. It's about taking the leap to move forward. There is a desire, but a lack of courage. Of course, limited resources also restrict us when there are only two of us and we don't have enough time for it." -CEO, Company B

Overall, the case companies seemed to have a good understanding of the type of technology they currently have and the technologies they may need in the future. In some companies, time was clearly allocated for familiarizing themselves with technology, while for most, it was done alongside other work and during leisure time.

"It comes naturally to us, and so far, we haven't needed separate resources for it. What unites us is a curiosity towards new things." -CEO, Company D

Competences

Competences ranked at an average level of all six areas, with an average score of 3,3.

Several of the case companies have conducted identification of weaknesses and strengths using methods such as SWOT analysis. The companies had a fair good understanding of their own strengths and weaknesses. Only the CEO of Company 3 mentioned that their current level of competence identification is still weak, as he had recently assumed the leadership position in the company through an acquisition just a few months ago.

All case companies have a positive attitude towards increasing their intellectual capital. They recognize and anticipate the needs for skill development.

The young start-up company D is strongly growth-oriented and emphasized that increasing expertise is of utmost importance to them, both now and in the future, as the company is likely to expand.

"We are strongly considering the needs of our customers and the required expertise from a strategic perspective. We have been reflecting on it, but we understand that these needs can quickly change. Therefore, we have been mapping external expertise that can be quickly utilized." -CEO, Company D

However, they acknowledge that investing in competence growth and employee training requires financial resources, which can often pose a challenge for companies.

"It is understood that expertise needs to be expanded, but it requires financial capital. One engineer costs 100,000 per year." -CEO, Company C

"Certainly, support for your further education is provided. However, the resources are currently limited, so it is not possible to allocate funds for external training services. But once the returns start coming in, prioritizing investment in education will be of utmost importance." -CEO, Company D

Networks

With average of 4,4 networks was the strongest of all areas. Four out of five case companies reached their highest scores in networks. All companies said that they actively strive to strengthen their external networks and leverage external assistance.

“Yes, it is quite common [to actively seek external assistance] when developing new innovations. You cannot do very much just on your own.” -CEO, Company A

All companies also reported that they engage in close collaboration with their suppliers.

“I can only answer 5. The suppliers force us to actively stay in touch. They contact us regularly and we have weekly check-ins.” -CEO, Company C

All case companies had interest in higher education collaboration. In Company A, collaborations had been established with several different universities. They had, for example, employed a thesis worker, and with another university, they had conducted a product lifecycle analysis. Company B had also utilized interns and thesis workers, but the entrepreneur mentioned that it took a long time before they truly knew how to leverage the collaborative opportunities offered by higher education institutions.

Even though this area was strong for every case company, there were also challenges to be found. Not everyone had either found suitable experts, or the company did not have enough financial resources for external expert work.

“We have this ongoing idea that we should have external experts, but we haven't found any that would fit our challenge. We haven't been successful in finding such experts.” -CEO, Company B

Interestingly, company D, which is the youngest of the case companies, reached the highest scores of all companies in this area with average of 5,0. This demonstrates that a company doesn't need to have been in operation for years to achieve strong networks.

Conclusions

Discussion

The aim of the study was to examine the strong and weak elements in small firms' innovation capabilities. The analysis shows that networks and technology are relative strengths in the examined small firms, whereas process and market interface are relative weaknesses.

Earlier studies suggest that small firms compensate for lack of internal resources for innovation with boundary spanning and external networks (Spithoven et al., 2013; Zahoor and Al-Tabbaa, 2020), and our results support this suggestion. In our cases we found little indication of the insufficient access to external information sources discussed by Freel (2000), however, the lack of suitable internal competencies and resources was demonstrated to a degree. It is also noteworthy that all cases exhibited utility of university–SME cooperation, which is an important factor in advancing SME innovation (Adams and Comber, 2013). Pereira and Franco (2022) note in their review that SMEs' lack of knowledge about what universities can offer is limiting factor in establishing such cooperation. Our results may be skewed to focus on firms with clear interest in sustainable innovation.

Technology was also a relative strength in our case firms. Lack of absorptive capacity has an impact on technological innovation capabilities (Cohen & Levinthal, 1990; Aljanabi, 2018), but despite their small size, the case companies exhibited high interest in and positive attitudes towards new technologies. This may be due to the fact that all case firms were development-oriented and actively seeking support in sustainable innovation.

Processes were a weak area in innovation capability. It is unsurprising that the case firms lacked systematic idea assessment and product/service development processes, since SMEs in general tend to be less formal in their new product development processes (Iqbal and Suzianti, 2021; Robbins, 2016). Furthermore, processes in the innovation capability assessment tool applied here included also budgeting. While budgeting is a highly efficient tool in new product development (Munck et al., 2020), small firms

tend to use fairly unsophisticated capital budgeting methods due to resource constraints (Danielson and Scott, 2006; Sarwary, 2019) and perhaps indeed are justified in this: gut-feeling decisions are informed by experience (Ekanem and Smallbone, 2007). One may consider lack of clear processes a characteristic rather than a fault in small firms, yet from the perspective of innovation development, it is a less desirable characteristic: systematic approach to innovation is more likely to produce results.

In the area of customers and market, the case companies showed weaknesses in identifying customers' current and future needs. This relates to market orientation of the firm, which can be defined as a set of behaviors and processes creating superior customer value (Kohli and Jaworski, 1990), which includes e.g. obtaining and using customer information in responding to customer needs (Ruekert, 1992; Deshpande and Webster, 1989). Keskin (2006) showed that market information has an important role in influencing firm innovativeness through learning orientation, thus, market orientation serves as one of the bases for innovation capability. In addition, market orientation and innovation capability can both contribute to different aspects of firm performance (see e.g., Kolbe et al., 2022; Borah et al., 2023). Hence, it is important for small companies to develop their ability to gather customer information in innovative ways and use it in product/service development as this enhances both their market orientation and innovation capability, which in turn affects their performance.

Limitations and future directions

As a qualitative study with a small sample, our results can have only limited general application, although the results are suggestive of some patterns. Further studies, both qualitative and quantitative, are needed to establish the relative importance of the areas of innovation capability and their impact on performance. Although innovation capability is linked to performance in prior literature, Saunila (2020) concedes that small firms are far from uniform, and most studies so far have concentrated on manufacturing firms; our results are drawn from a more mixed group of firms.

It is however noteworthy that the sample consisted of firms with an interest in innovation and development, which may have an effect on the results: less development-minded small firms might have different strengths and weaknesses. However, as innovation capabilities of innovation-oriented firms are of greater general interest, we feel that this does not negate the utility of the results. Future studies could however validate the tool with less innovation oriented – and less networked – firms.

According to our exploratory study the simplified tool for assessment of innovation capability in small firms appears to work quite well in the sense that it shows variance among small firms. Using the tool in a facilitated workshop format contributes to owner-managers' own understanding of their capabilities and hence encourages improvement. Further, it works as a good initial approach to university cooperation with small firms, which may have difficulty recognizing the benefits of dialogue with universities. The research team plans to further apply the tool in connection with the HEI Initiative project EcoAction, funded by the European Institute of Innovation & Technology, with the aim of supporting small firms in the regions in their innovation development.

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