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Understanding innovation performance measurement in SMEs

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UNDERSTANDING INNOVATION PERFORMANCE MEASUREMENT IN SMES

Abstract

Purpose – This paper focuses on the challenges and characteristics of innovation performance measurement in small and medium-sized enterprises (SMEs).

Design/methodology/approach – This study is exploratory-descriptive and uses mixed-method research. Quantitative and qualitative methods for collecting data are utilized.

Findings – The paper contributes to the current understanding of innovation performance measurement by clarifying how this measurement is used and by defining what must be improved.

Originality/value – Appropriate measures can contribute to a significantly better understanding of innovation. However, studies on how innovation performance measurement is used in practice are scarce. The current state of knowledge of performance measurement in SMEs seems to be limited to studying SMEs from traditional performance measurement perspectives.

Keywords: Innovation, Performance, Performance measurement, SME

Introduction

Innovation performance measurement is a research challenge that has received increasing attention (Bititci et al., 2012). Innovation has been considered one of the main business processes of an organization (Kaplan and Atkinson, 1998), and today, managing and measuring innovation is seen as a structured process instead of a hope-based strategy (Janssen et al., 2011). Adams et al. (2006) observed that measurement of innovation performance does not appear to take place routinely within management practice in organizations. What it comes to small and medium-sized enterprises (SMEs), the measures are often limited to production (Freel, 2000). However, scholars have shown that innovation performance measurement is a broader concept, and measuring various aspects, including innovation strategy, ideas and ideation, customer and market, organizational learning and knowledge management tools, and organizational culture and leadership is important (Adams et al., 2006; Crossan and Apaydin, 2010).

Contextual differences among SMEs (e.g., Garengo et al., 2005; Hudson-Smith and Smith, 2007) have hindered the adoption of performance measurement. Scholars have suggested that SMEs require tools specifically designed based on firms' characteristics and needs (Cocca and Alberti, 2010). In addition, innovation can be considered non-linear, fuzzy, or ill defined, instead of following a cause-and-effect rationale (Ford, 2000). This is challenging for SMEs, as a balance must be maintained between the need for innovation and the issues that can hinder it, such as scarcity of resources, lack of skills, skepticism toward formal training, the need for flexibility, and the lack of systematic innovation performance measurement (Lee et al., 2000; McAdam et al., 2010). As pointed out by Neely et al. (2000), performance measurement must not be seen as disruptive and contradictory within innovation. Innovation can help SMEs become more competitive, and one way is to pay attention to innovation performance measurement (Gorton, 2000; McAdam and Keogh, 2004). Performance measurement can contribute to a significantly better understanding of innovation when the measurement has been conducted properly (e.g., Saunila and Ukko, 2012, 2013). In the context of innovation in particular, the dynamic nature of adopted measures is emphasized. The measures should be changeable and developed based on the experience of developing innovation (Neely et al., 2000; McAdam and Keogh, 2004). Innovation performance measurement must be given more strategic and operational importance in order to obtain benefits. Additionally, a wide range of measures of innovation should be adopted to reflect its diversity (McAdam and Keogh, 2004).

Performance measurement has traditionally concentrated on studying SMEs from traditional performance measurement perspectives (Bititci et al., 2012), such as production and finances. Research related to innovation performance measurement in particular remains limited. Although it is recognized as difficult, innovation performance measurement is vital for driving innovation (Adams et al., 2006; Carpinetti et al., 2007). The objective of this research is to examine the challenges and characteristics of innovation performance measurement in SMEs. This objective is attained by clarifying how innovation performance measurement is used and by defining what need to be improved for innovation performance measurement.

Overview of innovation performance measurement

Innovation capability as a measurement object

Firms with appropriate internal characteristics are more in favor of generating innovations (Aragón-Correa et al., 2007). This means dedicating resources to the innovation task in order to achieve the benefits of the innovation (Rosenbusch et al., 2011). Further, the routines and processes that determine the state of innovation need to be in order. Innovation capability, thus, is not a separately identifiable construct; instead, it is composed of reinforcing routines and processes within the firm. These processes are a key mechanism for stimulating, measuring, and reinforcing innovation (Lawson and Samson, 2001). In this study, innovation capability is defined as a firm's capability in the aspects that affect an organization's ability to achieve

innovations (Saunila, 2016). Innovation capability is based on multiple and simultaneous influences of individual and collective aspects (Aragón-Correa et al., 2007). These aspects include leadership practices, employees' skills and innovation, processes and tools for managing ideas, support culture, external sources for information, development of individual knowledge, employees' welfare, and links to strategic goals (e.g., Calantone et al., 2002; Romijn and Albaladejo, 2002; Bessant, 2003; Tidd et al., 2005; Perdomo-Ortiz et al., 2006; Akman and Yilmaz, 2008; Smith et al., 2008; Laforet, 2011; Martinez-Roman et al., 2011; Saunila, 2014). These aspects and references for them are presented in Table 1.

Table 1. Aspects of innovation capability

Aspect of innovation capability	Description	References
External knowledge	The exploitation of external networks and knowledge—their importance in enhancing the organization's overall innovation capability	Lawson and Samson, 2001; Neely et al., 2001; Romijn and Albaladejo, 2002; Martensen et al., 2008; Smith et al., 2008; Saunila, 2014; Saunila and Ukko, 2014
Structures	The structures and systems that successful innovation requires—the generation, development, and implementation of ideas, the ways in which the organization's work tasks for innovation are organized	Tang, 1998, 1999; Lawson and Samson, 2001; Neely et al., 2001; Wan et al., 2005; Smith et al., 2008; Martínez-Román et al., 2011; Saunila, 2014; Saunila and Ukko, 2014
Regeneration	The organization's ability to learn from experience and to use that experience to create and develop innovations	Wan et al., 2005; Smith et al., 2008; Laforet, 2011; Martínez-Román et al., 2011; Saunila, 2014; Saunila and Ukko, 2014
Leadership	The overall atmosphere of the organization that supports and motivates innovation, and a leadership culture that facilitates innovation	Tang, 1998, 1999; Lawson and Samson, 2001; Wan et al., 2005; Martensen et al., 2008; Smith et al., 2008; Martínez-Román et al., 2011; Saunila, 2014; Saunila and Ukko, 2014
Employee activity	The employees' individual innovation capability as well as motivation and activity to foster innovations	Tang, 1998, 1999; Lawson and Samson, 2001; Wan et al., 2005; Smith et al., 2008; Martínez-Román et al., 2011; Saunila, 2014, Saunila and Ukko, 2014
Work well-being	Employee well-being and the work climate for innovation development	Tang, 1998, 1999; Lawson and Samson, 2001; Neely et al., 2001; Wan et al., 2005; Martensen et al., 2008; Smith et al., 2008; Laforet, 2011; Saunila, 2014; Saunila and Ukko, 2014
Know-how	The expertise of one's work plays, includes knowledge as well as improvement in employee skills	Tang, 1998, 1999; Romijn and Albaladejo, 2002; Smith et al., 2008; Saunila, 2014; Saunila and Ukko, 2014; Foroudi et al., 2016; Perunović et al., 2016

These aspects are also areas on which innovation performance measurement should focus. In this study, Neely et al.'s (1995) definition is adopted. Performance measurement is the process of quantifying the efficiency and effectiveness of action (Neely et al., 1995). The term

performance measurement cover quantitative and assessment-based aspects of the action. Innovation performance measurement is used to highlight the wider scope of the process. In this study, the process (innovation performance measurement) deals with quantifying the efficiency and effectiveness of exploiting innovation capability (Saunila, 2014), and innovation capability covers the following aspects: external knowledge, structures, regeneration, leadership, employee activity, work well-being, and know-how. Based on prior literature, these aspects are proposed to exist, to some degree, within firms that possess high innovation capability.

Measurement of innovation

According to Kaplan and Atkinson (1998), innovation is one of the main business processes of an organization. Today, managing and measuring innovation is seen as a structured process instead of a hope-based strategy (Janssen et al., 2011). Appropriate measures can contribute to a significantly better understanding of innovation (e.g., Breunig et al., 2014; Saunila, 2016). For example, identifying an idea that becomes the seed for a new company or a new product requires a particular motivational environment. Different control systems, such as performance measurement, are important in shaping this environment (Davila et al., 2009). Innovation measures can help the managers responsible for innovation make informed decisions based on objective data and assist in aligning goals and daily endeavors for near- and long-term innovation goals (Skarzynski and Gibson, 2008). Nilsson and Ritzén (2014) found the following roles for innovation performance measurement: Measuring has a triggering role, especially for management, to take actions. It supports reflective sessions on results, motivates the setting of goals, and provides information about goal fulfillment; and it spurs a discussion about what creates value and highlights and guides new behaviors such as cross-functional collaboration. Scholars also emphasized that innovation measurement must be given more strategic and operational importance (McAdam and Keogh, 2004; Carayannis and Provance, 2008) in order to get the most benefit from the use of such measures. To be effective, the measures should focus on the critical success factors in a particular company and its processes (Birchall et al., 2011). If the prime aim of innovation is to create new, better value for the customer or end user to gain improved return on investment, then the factors likely to provide that success are key areas for innovation performance measurement (Birchall et al., 2004).

From the literature, four types of innovation performance measurement can be identified: those that concentrate on inputs, process, outputs, or outcomes. Inputs include the resources provided for innovation, for example, personnel, funds, equipment, and ideas (c.f., Skarzynski and Gibson, 2008; Janssen et al., 2011). Process measures indicate how the mechanism between the inputs and outputs of innovation occurs (Carayannis and Provance, 2008). Process measures can include time, cost, and quality, as well as the project's progress. Outputs are the direct results of innovation activities (i.e., new products or generated knowledge). These measures help clarify trends and developments over time. Outcomes are the performance

implications of innovation: reflections on innovation success in the market and focus on revenue, profit, market share, and customer satisfaction (Janssen et al., 2011). According to Carayannis and Provance (2008), proper measurement requires the consideration of input, process, and output measurement simultaneously. Additionally, Janssen et al. (2011) show that a balanced set of innovation measures should be adopted, because this increases the extent to which innovation performance measurement is used. Links to cause-and-effect relationships and mixtures of implications and the drivers (a.k.a. leading and lagging measures; c.f. Janssen et al., 2011; Dewangan and Godse, 2014) are needed to communicate how the implications are to be achieved (Kaplan and Atkinson, 1998). In other words, innovation performance measurement should provide a multidimensional picture of the issue (Dewangan and Godse, 2014).

The current literature has focused on measures that reflect results but not measures that reflect the reasons for the results. These measures measure innovation performance instead of the ability to innovate. They oversimplify the complex nature of the sources of innovations (Neely and Hii, 1998). The challenge is to find measurement methods that predict measures of innovation performance (i.e., leading measures) to provide a holistic picture through innovation performance measurement.

As SMEs differ from large companies in terms of models of performance measurement (Cocca and Alberti, 2010; Taticchi et al., 2010), and especially in innovation performance measurement (Saunila and Ukko, 2012; Saunila, 2016), there is need to study the specific measurement characteristics of SMEs. Folan and Browne (2005) divided performance measurement design studies into structural and procedural studies and found that the research emphasizes the structural area. In addition, innovation has been acknowledged in structural performance measurement frameworks and considered a determinant of actual performance. In SME innovation studies, two main categories exist: the relationship between innovation and performance and different types of innovation in SMEs (Oke et al., 2007). Innovation in SMEs has been studied as a one-dimensional construct without taking into account the various aspects that constitute innovation (Saunila, 2016).

Research methodology

The present study is exploratory-descriptive and uses mixed-method research (cf. Creswell, 2003; Teddlie and Tashakkori, 2009). Quantitative and qualitative methods for collecting data are utilized. First, a survey was conducted to trace the use of different areas of innovation performance measurement. Second, interviews were conducted to clarify how innovation performance measurement is used and what is needed to improve innovation performance measurement.

Quantitative methods

Variable measurement

A quantitative data set was gathered using a structured survey questionnaire from a cross-section of manufacturing firms in Finland. The survey included nine items that measure innovation performance measurement. There was no comprehensive scale on which to measure performance measurement of continuous innovation; therefore, the scales used had to be developed first. The typology presented in Table 1 describes the aspects of innovation capability that should be taken into account in innovation performance measurement. For each of the seven items used (Table 2), the respondents were asked to indicate their opinion on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 2. The survey on innovation performance measurement

Aspect of innovation capability	Item	Relevance for innovation performance measurement	References
External knowledge	1 Exploitation of external (customers, competitors, etc.) knowledge is evaluated or measured in the company	Measures that assess external links (c.f., collaboration with suppliers and customers) exist	c.f., McAdam and Keogh, 2004; Crossan and Apaydin, 2010; Saunila, 2016
Structures	2 The functionality of internal processes is evaluated or measured in the company	Internal processes and structures that support and reflect continuous innovation are measured	c.f., McAdam and Keogh, 2004; Adams et al., 2006; Saunila, 2016
Regeneration	3 The development of methods of action is evaluated or measured in our company	There are measures that assess communication and collaboration methods	c.f., Adams et al., 2006; Saunila, 2016
Leadership	4 Leadership practices are evaluated or measured in our company	Leaders' orientation toward continuous innovation is measured	c.f., Adams et al., 2006; Crossan and Apaydin, 2010; Saunila, 2016
Employee activity	5 Employees' ideas are evaluated or measured in our company	Measures that assess approaches for generating ideas exist	c.f., McAdam and Keogh, 2004; Adams et al., 2006; Crossan and Apaydin, 2010; Saunila, 2016
Work well-being	6 Employees' work well-being is evaluated or measured in our company	Organizational well-being and climate are measured	c.f., Crossan and Apaydin, 2010; Adams et al., 2006; Saunila, 2016
Know-how	7 Employees' expertise is evaluated or measured in our company	It is important to measure employees, especially their development and skills	c.f., Adams et al., 2006; Crossan and Apaydin, 2010; Saunila, 2016

Sample and data gathering

Data were collected with a structured survey questionnaire targeted to a cross-section of firms in the manufacturing sector in Finland. The initial sample was 2,400 SMEs that employ 10–249 individuals and that have less than €50 million in revenue. The sample was randomly selected with three restrictions: First, the firm had to have more than 10 employees to ensure that the routines and processes of innovation capability could take place. Second, the survey was sent to management representatives and employees to make sure that both views would be represented in the study. The second restriction was used because, according to Neely and Hii (1998), collecting data only from senior executives of organizations does not provide a true measure of the entire organization's behavior regarding innovation. Third, a valid e-mail address for each selected respondent was required, because the survey was web based.

Bias

The potential for non-response bias was assessed by comparing the means of the responses in the last quartile to those of the responses in the first three quartiles. It was assumed that those who were among the last to respond most closely resembled non-respondents (Armstrong and Overton, 1977). No significant difference was found among the four groups. Thus, non-response bias was not considered an issue in this study. In addition, several methods were used to improve the reliability of the self-reported information. For example, the items were constructed as unambiguously as possible, closed items were used to collect comparable data, and respondents were allowed to skip an item if they did not have enough information to answer. The sample was selected randomly, which minimized voluntary response bias and under-coverage bias. When a single key respondent for an organization is used, the potential effects of the common method bias must be minimized. In the cover letter, the respondents were encouraged to answer the items as truthfully as possible. Respondents were allowed to answer anonymously, which meant they were less likely to edit their responses to be more socially desirable. Another way of reducing common method biases is careful construction of the items. Attention was paid to wording and clarity, and the items were reviewed and revised by a group of researchers familiar with the topic. In addition, overall reliability was achieved by following an exact procedure in performing the statistical analysis, from data collection to interpretation. Thus, the reliability of the scales is considered good.

Respondent demographics

A total of 139 responses were received from SMEs that employ 10–249 persons and that have less than €50 million in revenue. The demographics of the respondents are presented in Table 3.

Table 3. The survey on innovation performance measurement

		No.	%
Revenue	€2–5 million	55	40
	€5–10 million	43	31
	€10–50 million	41	29
No. of employees	10–50 people	97	70
	50–249 people	42	30
Position	Manager	105	76
	Employee	34	24

First, the data were analyzed by calculating the means and standard deviations. Then the differences between responses were analyzed by using analysis of variance.

Qualitative methods

In the second part of the study, five individual and group interviews were conducted. The companies operate in various industries, such as concrete construction, steel, energy, and furnishings. The interviewees included three managing directors, an R&D director, and a product manager. The interviews focused on the same aspects of innovation performance measurement as in the survey: external knowledge, structures, know-how, regeneration, leadership, work well-being, and employee activity. The interview questions were chosen in advance, but the discussions were informal and were facilitated using supporting questions and comments made by the researchers. The interviews were conducted by one or two researchers, who made notes and observations. All interviews were recorded and transcribed to enable in-depth analysis. The interviews were analyzed with content analysis. The results were analyzed case by case, and then cross case analyses were performed.

Findings

Based on the survey, the extent that innovation performance measurement was used was identified. The means and standard deviations of the items are presented in Table 4. The results for the different aspects of innovation performance measurement seem to be on a satisfactory level, because the means are above 3.00, except for the items “leadership practices are evaluated or measured in our company” and “employees’ ideas are evaluated or measured in our company,” where the means are under 3.00. The item “exploitation of external (customers, competitors, etc.) knowledge is evaluated or measured in our company” is only 3.03, which indicates that it is on a satisfactory level. Thus, exploitation of external knowledge, leadership, and employee activity are less measured aspects. In other aspects, the means are between 3.25 and 3.55.

Next, differences between the size of organizations and between managers and employees were examined. The differences were studied with a comparison of means, where the analysis of

variance was utilized. First, differences between firms that have 10–49 employees and firms that have 50–249 employees were examined. As Table 4 illustrates, significant differences were found only in two items. Firms that employ more than 50 people seemed to use more measures of leadership practices and work well-being. However, the evaluation of leadership practices on the whole was poor. Second, the differences between managers and employees were examined. As Table 4 shows, statistically significant differences were found in all but one item. In all statistically significant differences, managers' perceptions were more positive than employees' perceptions. Especially, employees' perceptions of the measurement of work well-being were statistically significantly lower than the managers' perception.

Table 4. Innovation performance measurement in manufacturing SMEs

Item	Mean	Std. Dev.	Variance	Mean			Mean		
				10–49 employees	50–249 employees	F-value	Manager	Employee	F-value
1	3.028	1.089	1.188	2.969	3.167	.963	3.114	2.806	1.955
2	3.546	1.044	1.090	3.474	3.714	1.556	3.657	3.129	6.249*
3	3.253	.996	.994	3.206	3.366	.738	3.346	2.968	3.485+
4	2.804	1.079	1.166	2.701	3.049	3.034+	2.913	2.516	3.300+
5	2.941	1.073	1.152	2.895	3.049	.588	3.068	2.567	5.172*
6	3.550	1.053	1.111	3.433	3.829	4.169*	3.714	2.900	15.573***
7	3.601	.850	.723	3.542	3.738	1.565	3.663	3.355	3.141+

Sign. *** $p \leq 0.001$, ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$, +$0.05 < p \leq 0.1$

Next, interviews were conducted. The interviews revealed the same aspects as the survey regarding the less measured areas of innovation performance measurement: exploitation of external knowledge and leadership. An overview of the measurement of innovation performance in each firm is presented in the Appendix.

None of the companies directly or systematically measured the exploitation of external knowledge. However, closer investigation revealed that this area was measured indirectly, and attention was paid without actual measures. Most of the companies had potential indirect measures to monitor this area, although actual measurement did not occur. A manager at company A stated,

"We observed a number of signals that are round, what kind of activities our competitors have had. A significant part of the external data comes from customers who will tell you what is needed."

The interview results revealed that another less measured area was leadership. None of the companies measured it directly, and finding suitable measures (direct or indirect) was difficult. Three of the five companies paid extra attention to leadership without actual measurement. In addition, two companies revealed that there was a need for managers to participate in development work and the companies need leadership measures. For example, a manager at company B stated,

"Management's participation in innovation in product development has been increased, for example, the product strategy level when deciding which products are going forward."

For organizational structures, the most frequently used indicators were the number of ideas and initiatives, as well as the number of rewards given to employees based on ideas. All companies except one used the first measure. The companies used many measures related to ideation structures and employee activity, especially medium-sized companies. Smaller companies did not measure those areas directly, but there was potential for constructing indirect measurements for the area. All five companies aimed at guiding and activating personnel regarding correct tasks based on measurement results. This happened, for example, by training employees in their core tasks and by aligning resources to strategically important issues. All companies used the measurement results for compensation purposes, if the results match subjective observations. The reason for rewards may have been initiatives and inventions, activities in relation to the development of the company's operations, particular success in conducting tasks, and development of one's skills. Company E carefully checked that an idea was beneficial and revenue is expected. An interviewee stated,

"If, on the basis of the idea, clear savings are generated, so there will be fees paid, which can be substantial. It must be able to show that it will produce (revenue) before it can be accepted."

The companies clearly saw work well-being as the most important area of innovation performance measurement. All companies actively measured this area and used diverse measures. One reason for the measurement efforts was that the companies saw the work environment and well-being as an important role in business development. The companies believed that communicating the results throughout the company was important. The interviewee from company B stated,

"The survey related to employee well-being and atmosphere was carried out on a regular basis. The results are analyzed and published for everyone."

The companies also saw measurement related to know-how development as very important. Three of the five companies used the measurement results for learning purposes. This happened, for example, by evaluating the need for training, learning new ways of action, training employees to manage larger entities, and aligning the key persons to the right jobs. All but the smallest companies measured know-how development either directly or indirectly with various measures. The measurement tools included formal practices of tracking the progress of skills and expertise. However, not all companies thought concrete measures were needed to evaluate this aspect of innovation capability. An interviewee stated,

“Learning and development take place constantly, but it is not actually measured. However, we follow what the work quality is, how certain things are taken care of, and how different tasks go through.”
“We aimed at monitoring the impact of development policies through plans and objectives, whether we have advanced and reached the set targets.”

Three of the companies had suitable metrics for measuring regeneration. However, the interview results revealed that this area was not a focus. A manager at company B stated,

“Measuring relies on perception and evaluation. Later, it can be seen what kind of success the product is and how we have succeeded in prioritization and assessment.”

The interviews also investigated how the companies could utilize innovation performance measurement better to benefit from the measurement. Use of measures that deal with employees’ activity became particularly apparent. This meant monitoring the importance of wider exploitation of the initiatives and employees’ ideas for the benefit of the business at the group and team levels. In this context, there was a need for measures of work climate and well-being to monitor how supportive an atmosphere was in relation to the production of ideas, that is, if the climate will induce renewal or is mastered by resistance to change. An interviewee stated,

“We would need measures to assess innovativeness of groups and teams in addition to individuals.”
“They could measure if the work atmosphere favors renewal or resistance to change. Meters will improve the observation of these areas, and the staff could experience more success and be motivated to work better.”

Interviewees saw that not only the number of ideas and initiatives needed to be counted but also the value added to the company. In this context, suitable indicators for assessing wider outcomes and the importance of development initiatives and ideas are required. This means leading indicators to monitor ideas all the way to a product’s development and its success. Overall, measures are needed to monitor the success of product development projects in the early phases. Rewarding employees could be considered more frequently. Interviewees also considered this type of measure for indicating the capability to renew. In particular, the interviewees saw valid measures that assist decision-making in the early phases of the development process as crucial. By developing this leading indicator, the validity of go-no go decisions would improve. This means that based on previous success stories and their measurements, one must learn to continue to make the right decisions and learn from past mistakes. Information that describes the impact of leadership was also pronounced. However, this was seen as part of general management practice, and the need for separate measures for this area was not emphasized.

Discussion

Today, innovation performance measurement is seen as a comprehensive process that uses various measures for managing the company. This study aimed to deepen the current understanding of innovation performance measurement by investigating the extent this measurement is used in SMEs, by clarifying how it is used, and by defining what needs to be improved. The analysis showed that innovation performance measurement promotes innovation capability and helps assess the practices related to innovation capability for SMEs.

The investigation showed that all areas of innovation capability were measured somewhat in different companies, but none of the companies measured innovation capability directly. However, all companies used indirect measures for innovation capability and its determinants. Innovation performance measurement took place indirectly without a comprehensive measurement system. Instead, monitoring innovation capability was seen as a part of general management practice and was not necessarily needed for actual measurement systems. This finding indicates that innovation performance measurement should be a part of the business performance measurement system comprised of various financial and non-financial measures. This is in line with Saunila and Ukko's (2012) study, which showed that innovation performance measurement cannot be separated from other performance measurement practices. Further, Dewangan and Godse (2014) showed that in innovation performance measurement, a mixture of the implications and drivers is needed to communicate how the implications are to be achieved.

The idea of combining innovation performance measurement with business performance measurement is also supported by the result that innovation performance measurement is most needed to assist decision making during the early phases of innovation development. Nilsson and Ritzén (2014) found that innovation performance measurement supports reflective sessions on results and motivates one to set goals and provide information on goal fulfillment. This became apparent in this study, because all of the companies actively used the measurement results in management, for example, by directing employees' behavior toward the right things based on rewards and supportive decision making. However, fostering innovation in the early phases is not enough if there are no proper measures for assessing and selecting the best ideas for further development. By measuring the early phases of innovation process, companies can make time- and money-saving decisions based on the measurement information. Measurement of later phases of innovation development can be assisted by a business performance measurement system (cf., Saunila and Ukko, 2012).

Another finding from the analysis was significant differences between managers and employees regarding innovation performance measurement. Managers consider innovation performance measurement is more widely used. This indicates that innovation performance

measurement is not properly implemented by the management level for lower levels. This could be due to the difficulties communicating the measurement results and converting the measurement results into an understandable form. This difference between managers and employees indicates that one option for SMEs is to move from measurement to evaluation. As Bititci et al. (2012) stated, performance evaluation, not measurement, could provide an indication of trust. Moreover, evaluation could facilitate the development of innovation capability. Utilizing measures in facilitating innovation capability is challenging because the same measures can result different implications depending on the actor who interprets the results. In addition, differences in the baseline and target levels make it difficult to compare the measurement results, a crucial requirement of learning from them. Similarly, the company results indicate that instead of using actual measures reporting success stories could be useful. This indicates that performance measurement is not always the best means for facilitating information sharing regarding innovation capability.

Conclusion

This study examined the challenges and characteristics of innovation performance measurement in SMEs. The findings indicate that the innovation performance measurement promotes innovation capability, as well as helps assess the practices related to innovation capability. More specifically, the findings show that 1) innovation performance measurement should be incorporated with a comprehensive business performance measurement system, and 2) innovation evaluation, not measurement, is more suitable in certain situations when the results must be communicated at different levels of the firm.

In terms of theoretical implications, this study extends earlier research by providing new understanding about the relevance of innovation performance measurement. As a first theoretical contribution, the study enhances knowledge about the state of SMEs innovation performance measurement. Second, this study enhances knowledge about SMEs' current innovation performance measurement practices, and SMEs' needs for innovation performance measurement for the future. This is realized through the demonstrations of what managers wish to develop as regards innovation performance measurement.

In terms of managerial implications, actors in SMEs should carefully consider the state of and need for innovation capability before designing an innovation performance measurement. In addition, the case examples will help practitioners avoid pitfalls. This study assists this task by explaining what measures are used in different types of SMEs.

Due to the nature of the data, several limitations should be acknowledged. The study was conducted in the context of SMEs. The results are not generalizable to large firms. Further, micro-firms (fewer than 10 employees) were excluded from the sample, and thus, the results cannot be generalized to micro-firms. Another limitation is that the study is based on data from

a single country. The specific country characteristics should be taken into account when the results are applied to practice or to further studies. In the qualitative part of the research, data were collected from five companies. The small sample limited the generalization of the results. More research with a larger sample is needed to validate the results.

However, this study led to interesting findings that could provide a good starting point for further studies. First, in-depth case studies could be conducted to provide more insight into how innovation performance measurement is used as part of management practice in SMEs. Second, further qualitative studies are needed to understand the causal relationships between different measures.

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APPENDIX. Overview of innovation performance measurement in studied firms

	Case A	Case B	Case C	Case D	Case E
External knowledge	No direct or indirect measures, but measured based on perception	No direct or indirect measures, but measures which could be utilized exist Examples: New products of competitors	No direct or indirect measures, but measures which could be utilized exist Examples: Customer satisfaction, Lost contracts/won contracts (factors that influenced the outcome)	No direct or indirect measures, but measures which could be utilized exist Examples: New products, Revenue from new products, Patents, Customer visits and contacts, Customer satisfaction, Market shares, Marketing input	No direct or indirect measures, but measures which could be utilized exist Examples: Customer visits
Structures	No direct or indirect measures, but measured based on perception	No direct or indirect measures, but measured based on perception Examples: New products	Indirect measures Examples: Ideas/employee, Rewarded ideas	Indirect measures Examples: Ideas, Patent applications, Patents, Product protection methods, Invention applications	Indirect measures Examples: Ideas, Rewards
Regeneration	No direct or indirect measures, but measured based on perception	Direct measures Examples: Revenue, Improvement in results	Direct measures Examples: Implemented solutions	No measures	Indirect measures Examples: Projects, Benefits from projects (Improvement in results)
Leadership	No measures	No direct measures, but considered important	No measures	No direct measures, but management group participates in project meetings and follows decision making in project	No direct measures, but management supports development of new business, as well as by assessing their viability
Employee activity	No measures	No direct measures, but measured based on perception Examples: Customer acquisition, Inputs of customer acquisition, In relation to benefits	Indirect measures Examples: New products, Production costs, Development of production processes, The share of ideas and the ones that have been executed	Indirect measures Examples: Ideas, New products, Revenue, Tracking of back-end processes	Indirect measures Examples: Ideas, Rewards/benefits
Work wellbeing	Indirect measures	Direct and indirect measures	Direct and indirect measures	Direct and indirect measures	Indirect measures

	Sick leaves, Sick leaves in relation to the mean of industry	Examples: Information flow, Feedback, The comfort of working environment, Role clarity, Work burden, Manager-employee relationship, Relationships, Work benefits	Examples: Wellbeing and comfort, Sick leaves, Atmosphere	Examples: Sick leaves, Efficiency, Satisfaction, Communication, Stability, Working years	Examples: Wellbeing and comfort, Work equipment, Trust in employer
Know-how	No direct or indirect measures, but measured based on perception	Direct measures Examples: Skill and knowhow development criteria	Direct measures Examples: Skill levels and their progress	Direct and indirect measures Examples: Skills tests, Days of training, Expert articles, Manuals	Indirect measures Examples: Days of training