

24th Nordic Academy of Management conference
23 -25 August 2017 Bodø, Norway

Exploring the link between firm strategy and knowledge management in SMEs´

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Work in progress

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Abstract

Knowledge management (KM) in SMEs has received increasing attention in recent years. SMEs' KM processes are said to be rather informal and more systematic approach has been suggested. However, the link between firms' strategy and knowledge management is not established. Therefore, the research questions are comprised of the following two parts: What are the working practices for strategic knowledge management in SMEs? and How systematic analysis of competences and qualifications affect knowledge management practices in SMEs? The qualitative data was collected from seventy SMEs and included interviews and survey for the participating companies, reports from the competence and qualifications mapping and field notes. Tentative results indicate that having written human resource management strategy in SME is scarce and KM practices and tool are somewhat unsystematic and would benefit from clearer link to firm's strategy. However, systematic competence and qualification mapping made the knowledge visible and supported SME managers to conduct strategy related decisions related to KM and HRM in more general.

Introduction

Micro and small firms have an acknowledged role in economic growth and innovation (e.g. Nartisa, 2012). Knowledge, in turn, is a key resource in competitiveness and therefore knowledge management has an important strategic role in ensuring success and competitive advantage for a firm (Hanhinen, 2010; Richbell et al., 2006). Previous research focusing on human resource management (HRM) in small firms has demonstrated, that the liabilities of both smallness and newness are likely to manifest themselves in how these firms address human resource issues. Firstly, because of resource scarcity the number of formal HRM departments or professionals is small (Cerchione et al., 2015; Gold, Malhotra & Segars, 2001). Secondly, lack of financial resources may exhibit itself as difficulty in recruiting and retaining employees (Cardon & Stevens, 2004).

Due to reasons described above, SMEs may not have practices or resources to develop knowledge management (KM). Instead they are likely to be reactive and base their KM on intuition (Chell, 2001). Furthermore, although many studies describe specific KM systems used by SME's, the KM tools and practices used by SMEs are not described comprehensively (Cerchione et al., 2016). Thus there is need for research that identifies the practices for strategic knowledge management especially in micro and small firm context and highlights the best of

them. The aim of this study is to explore the link between strategy of the firm and knowledge management. More precisely, the research questions are: *What are the working practices for strategic knowledge management in SMEs?* and *How systematic analysis of competences and qualifications affect knowledge management practices in SMEs?* Data consists of interviews, observation and written reports and was gathered in development process where 70 SMEs operating in various industries – including the field of trade, health and social services, leisure and travel, professional services, and manufacturing – engaged in systematic competence analysis.

This paper is organized as follows; in the theoretical perspective section we introduce the prior literature relevant to our research topic focusing on characteristics and challenges of knowledge management in SME's. After the descriptions of data and methods, the findings of the study are presented. The paper concludes with discussion and both managerial and theoretical contributions as well as ideas for future research.

Theoretical perspective

There is a wide uniformity that knowledge in SMEs is embedded in human resources (Cerchione et al. 2015). Accordingly, in this study we understand the KM as a part of the HRM. KM includes management of working skills which, on its behalf, consists of qualifications required in the work and employees competencies as well as expertise that reflect employees' ability to apply his/her knowledge to meet the requirements of the job (Hanhinen, 2010). (Figure 1)

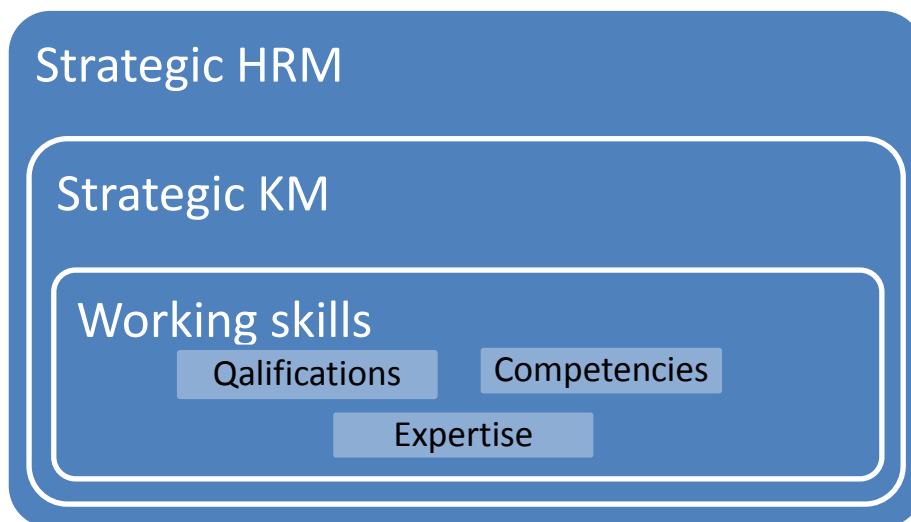


Figure 1 Framework for strategic KM in this study.

So far the main body of KM literature consists of the studies related to large companies while there has been arguments that KM in large and in SMEs are not alike (see e.g. Wong & Aspinwall, 2005). Only recently there has been growing interest to study KM in SMEs. Nevertheless, it is still not clear in which ways SMEs differ from large organizations (Cerchione & Esposito, 2017). Handzic (2006) reports about an Australian study which suggests that KM practices are partly the same in large organizations and in SME's while there are also differences. Compared to large organizations, successful SME's tend to be for example agile, willing to learn from customers, clients, competitors, suppliers and providers. In addition,

SMEs tend to be well integrated to surrounding networks consisting of e.g. professional and industrial associations.

The use of knowledge management practices is said to significantly support firm's performance (Cerchione et al., 2015) and the firms that adopt KM practices obtain better results than those who do not (Marqués & Simón, 2006). In addition, the use of KM practices can positively affect e.g. economic and financial performance, market performance, technical performance, human performance as well as organizational performance (Cerchione et al., 2015). Although, the actual correlation between performance and KM might be difficult to establish, some intermediate indicators has been suggested by which KM's effect on performance could be evaluated, such as project performance measurements, employees' capacity to carry out knowledge related tasks and generation of ideas and innovations. Despite the correlation between KM practices and performance, SMEs are said to operate without having a strategy which would address KM (Cerchione & Esposito, 2017) instead they are likely to adopt informal KM processes (Hutchinson & Quintas, 2008). Orientation towards the development, transfer and protection of knowledge as well as competence development and management based on competencies, were recognized as factors that support the adaptation of KM (Cerchione et al., 2015).

Adoption of KM practices is, however, said to be challenging (Wong & Aspinwall, 2005). According to Liebowitz (1999), senior management's support for KM strategy is crucial in KM adaptation. Similarly important are a nominated chief for KM, KM infrastructure, KM repositories, systems and tools as well as incentives for knowledge sharing and organization culture that supports KM. Wong and Aspinwall (2005) conducted a literature review and suggested eleven factors that are important in KM particularly for SME's. According to them, the factors, in order of importance, are; management leadership and support, culture, strategy and purpose, resources, processes and activities, training and education, human resource management, information technology, motivational aids, organizational infrastructure and measurement. Furthermore, important elements for introducing KM in firms are orientation towards the development, transfer and protection of knowledge as well as continuous learning in the organization. In addition, an understanding of the organization as an overall system, development of an innovative culture to encourage R&D project, approach based on individuals and finally competence development and management based on competencies are important elements when introducing KM. (Marqués & Simón, 2006.)

Liebowitz (1999) refers to Liebowitz and Beckman (1998) and suggest that KM process should be started with determining the core competences and formalizing the existing knowledge. Furthermore, in the beginning of the KM process relevance, value and accuracy of the knowledge should be evaluated. In order to ensure the organizations' competitiveness and success, Handzic (2006) encourages organizations' to combine developing new knowledge and utilizing existing. She reports about the Australian study, which provides practical guidelines particularly to SME's for conducting KM and suggests to start with building KM awareness, aligning KM with business strategy and auditing knowledge, such as assets and resources. Finally SMEs are recommended to develop and implement KM solutions that are best suitable for firm and add value to it.

In their literature review Cerchione et al. (2016) found several KM practices reported in the literature. These were, for example, formal groups, formal meetings, seminars, communities of practice and sharing, informal groups, project teams, storytelling, interactions with clients, suppliers and partners, job rotation as well as training. KM tools that were found to be used

included e.g. collaborative and communication tools entailing electronic ones such as social media, databased, document management systems. It seems that SMEs tend to use more traditional KM tools instead for more current ones, such as, information technology (Cerchione & Esposito 2017), which would have potential to alleviate SME's reported challenges related to scarce resources.

Methodology

Research context and data collection

The aim of this work-in-process study is to explore the link between strategy of the firm and knowledge management in small and medium sized context. More precisely, the research questions are: What are the working practices for strategic knowledge management in SMEs? and How systematic analysis of competences and qualifications affect knowledge management practices in SMEs? To be able to identify the practice of knowledge management and also to explore the implications of qualification definitions and systematic analysis of competencies for knowledge management in small and medium sized firms – a phenomenon that is not thoroughly structured or analyzed in existing research – a qualitative research design was chosen (Eriksson & Kovalainen, 2008). The idea is to collect in-depth data and thus be able to utilize in-depth insights from SMEs. In the research process different activities are intertwined. While we are analyzing the collected data we are also going back to the field and continuing with data collection. During our research process, we have followed the process of systematic combining where our theoretical framework has directed us in our data collection and provided us with preconceptions (Dubois & Gadde, 2002). Our data collection is ongoing and next we will describe our case context and data in more detail.

In the Table 1 the overview of the participating companies is presented. The total number of participating companies will be 70. The recruitment of the companies is still ongoing and at the moment we have 60 companies, which have been interviewed and in which qualification definitions and competence analysis has been conducted and the development plan for the future has been made. The participating companies operate in several industries: manufacturing, travelling and tourism, professional services, social and health services, ICT-services, trade (wholesale and retail), printing and publishing, construction and renovations, transportation, food industry and restaurants. At the moment we have data collected from 39 micro firms, nine small firms and 12 medium sized firms. The important decision to make at the beginning of the research process was the choice between focusing on certain industries or to select firms from industries more widely. We decided that including firms from different industries will enable us to explore and identify recurring patterns, that is, identify the practices of knowledge management used by SME's, irrespective of the industry. This in turn enables the justifications of the findings for their wider implications. Also it is important to note, that all the participating companies were interested to a) engage in systematic analysis of their strategic competencies and capabilities and b) willing to pursue the path of continuous development of the knowledge management.

Table 1 Characteristics of the participating companies

Industry	Firm size		
	Micro (1-10)	Small (11-50)	Medium (51-250)
Manufacturing - e.g. equipment rental, plastic packaging design and manufacturing, boat building, polymers and coatings, heat transfer, plastic product manufacturing	1	3	4
Travelling and tourism/leisure	7	1	
Professional services - coaching, management consulting - professional guidance - workplace development - market research - advertising - work coaching (supporting employment) - human resource consulting - IPR - consulting and training for sustainable development	22	1	1
Social and health services - child welfare services - physiotherapy - elderly care and services	2	1	2
ICT-services - ICT services and solutions for healthcare - information modeling for building and construction - fiber optic network building and maintenance	1	1	2
Trade (retail and wholesale)	3	1	
Printing and publishing	1		1
Construction and renovations	1		1
Transportation	2		
Food industry and restaurants		1	1
Total 61 (recruited at the time of writing this paper)	40	9	12

Our research data consists of interviews, observation and written reports (the results of the competence analyses in participating firms). The research data was collected during a process, where SME's operating in various industries engaged in systematically developing their knowledge management by defining the qualifications required and analyzing competencies in the firm by utilizing software especially designed for it. Based on results they decided about next steps on how to develop or acquire the competencies found strategically most important.

Interviews were conducted in each participating company prior to competence analysis.

The informants in participating companies were mostly CEOs or human resource managers (if the firm had appointed a person especially responsible for HRM) and in micro firms the owner-managers (entrepreneurs). The CEOs, entrepreneurs and human resource managers were chosen as interviewees, since they have a key role in knowledge management and strategic decision making in the companies. The thematic interviews were (semi)structured and focused on the themes of: vision, purpose and benefits of strategy for the firm, challenges that the business will face in the future, the importance/benefits of human resource strategy, processes of knowledge management, and importance/benefits of systematic competence analysis for business, both for today and for the future. The interviews served two purposes, firstly to get an overview of the company by focusing on the aforementioned themes during the discussions. Secondly, the aim was to define the qualifications that are strategically most important for a firm in question and competencies needed to implement its strategy successfully.

Following the interviews, the competence analyses were conducted in the participating companies and we will now describe the process, which is presented in the Figure 2, in more detail. First during the discussion with the interviewees, the strategy and values of the firm were discussed. Based on the discussion the essential competencies to realize the strategy were identified. After that it was decided, which work role/s would be in focus in competence and qualifications mapping. The rationale behind the software used for the mapping is that, working skills consists of qualifications required in the work and employees competencies as well as expertise that reflect employees' ability to apply his/her knowledge meet the requirements of the job (Hanhinen, 2010). Each employee conducted the analysis by using the IT-based software designed for competence and qualifications analyses and evaluated his/her competences in the pre-defines areas of work. After that the evaluation was made by their superiors.

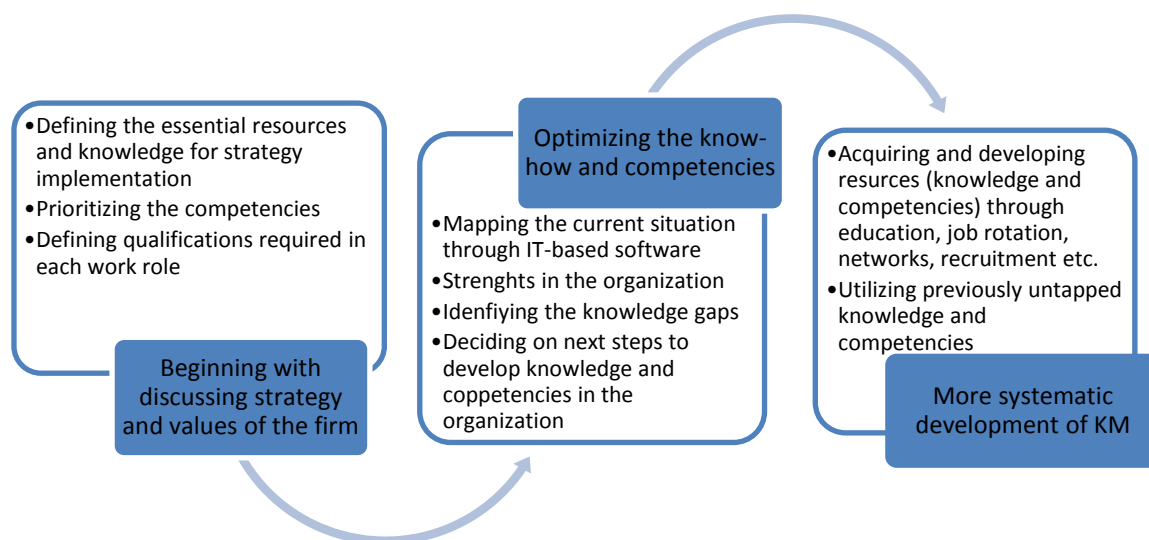


Figure 2 Process of competences and qualifications mapping

Through competence and qualifications mapping the organization receives answers to following questions: are the personnel in the organization occupying the “right” posts, that is doing things that correspond to their competencies and knowledge, or should they perhaps move to new and different posts. During the process the strengths in the organization can be discovered together with the knowledge gaps. The results also aid in deciding about continuing education; its themes and participants and aids in scheduling the education. Based on the results of the mapping, during the second discussion in each organization the development path to acquire the required resources and knowledge was decided.

The data was also collected in workshops organized for solo entrepreneurs or micro firms with one employee. The process was different from the competence and qualifications mapping taking place in small and medium sized companies, in that the entrepreneurs were brought together to discuss entrepreneurial identity, knowledge management and strategy. Four groups of micro entrepreneurs were invited to workshops and the total amount of firms participating these workshops was 22. Prior to the workshops each entrepreneur were interviewed and during the workshops we discussed the competencies needed to manage the firm (marketing, sales, finance, new customer recruitment, networks for new service

development and so on). So the focus was not so much in the substance competencies that each entrepreneur had and had developed, but more on other important issues regarding business and steering the company. After deciding the important competence areas, each participant in the workshops conducted the IT –based competence analysis and evaluated their own expertise. Then these results were put together to show the participants’ combined results and these were discussed. The participants were interested in meeting again and thus three follow-up workshops were organized. One of the groups did not feel the need to meet again. After the first workshops each of the micro firms were visited again and the discussion regarding the results of the individual and development paths took place.

This is a work-in-process study and our data collection is ongoing. Currently there are ten more companies to be recruited and also we will conduct a survey in all the participating companies during autumn this year. We will request each participating companies to answer a survey, through which we will collect the experiences of the process of systematically mapping the competencies and qualifications and also follow-up information after some time has passed from the above described process. What kind of tools have they used for KM? Have they developed processes of KM based on the competence and qualifications mapping? This will enable us to analyze the practices of KM in the participating companies in more detail and provide us with longitudinal data focusing on knowledge management in SMEs.

Data analysis

The data analysis began by analyzing the interview data preceding the competence and qualifications mapping. The semi-structure interview data was analyzed to identify the knowledge management practices currently used in the participating SMEs and also to explore the current understanding of KM and its link to the strategy and HRM in the participating SMEs. The overview of the empirical data for the study and its use in analysis is depicted in the Table 2.

Table 2 Overview of the empirical data for the study

Type of data	Quantity	Utilization in analysis and reporting
Semi-structured interviews in the participating companies before the competences and qualifications mapping	61 (9 more to be conducted)	<ul style="list-style-type: none"> - Identification and analysis of the knowledge management processes currently used by SME’s - How SME’s perceive the (significance) of human resource strategy, business strategy and vision - Benefits of systematic competence and qualifications mapping, systematic knowledge management
Written reports with the results of the competence and qualifications mapping, notes from the discussions in each participating company after the competence and qualifications mapping	60 (10 more to be conducted)	<ul style="list-style-type: none"> - Identification of the most important strategic competence areas - Identification of the most important development needs, what kind of competencies, resources need to be developed - Development plans, how to acquire the competencies needed (e.g. education, recruitment, mentoring, networking)
Field notes from facilitated workshops (observation) organized for micro firms,	7	<ul style="list-style-type: none"> - Identification of the competence areas needed to steer the company (marketing, understanding financial

competence and qualifications mapping and discussions about knowledge management.		<ul style="list-style-type: none"> - issues, identification of potential customers and approaching them, closing the deal) - Understanding the importance of entrepreneurial identity and its´ formation process - Understanding the importance of networks and networks for micro firms/entrepreneurs in resource and competence development
Survey for the participating companies	Upcoming (autumn 2017)	<ul style="list-style-type: none"> - Analysis of the experiences and recognized benefits from systematically analyzing competences and qualifications - Exploring how the knowledge management has changed /developed - Have the firms experienced that developing knowledge management practices has had an effect on productivity

Tentative findings

Working practices for strategy-based knowledge management in SMEs´

With all the interviewees their perceptions regarding business strategy and human resource strategy were discussed. Nearly all of the interviewees were able to describe the benefits of **business strategy**. The views about the strategy and it´s role were quite consistent both in micro, small and medium-sized firms. According to the interviewees the goals, focus and priorities of the business can be defined through strategy and strategy can be seen as an enabler of reaching the set goals, as one entrepreneur stated: *“unless there are objectives defined, nothing comes true”*. The views regarding strategy and human resource strategy together with knowledge management practices in participating companies are depicted in the Table 3. Out of 35 micro firms (data collection and analysis done so far) 11 have written business strategy. In the remaining 24 micro firms, the entrepreneurs were able to define and discuss the strategy of the firm even though it was not in written form. In small firms the strategy could also be thought of but not in “black and white” as the CEO of a firm providing rehabilitation services put forward: *“Plans and the strategy are in my head and they aid me in setting the goals and thus I have courage to make decisions”*.

For the SMEs participating in this study, the strategy can be seen as a road map and thus it gives focus for the business and supports in aligning the processes and activities of the firm. Having a strategy means that the firm operates systematically. The interviewees also pointed out that the strategy guides the activities and operations of the firm only if it is internalized in the organization through implementation plans, year plans processes and control. It makes the vision concrete. Also the necessary resources need to be reserved for strategic planning. This was not always the case in the participating companies, sometimes the managerial focus was seen to be more on operational and tactical, rather than strategic level.

For the interviewees business strategy manifested itself through well-defined processes, which the staff was familiar with and the strategy was considered to support the areas of responsibility in the organization. This also was seen to have an effect on the quality of the processes,

products and services of the firm. Some of the micro firms operated as a chain store and thus the strategy of the chain they belonged to also guided them in their planning. Despite of that, the entrepreneurs felt that they had liberty to develop their business quite freely. As one entrepreneur for a car rental firm stated: *“The chain I belong to manifests itself as logos I can use, and also we have some nationwide customer agreements. Other than that I can develop my business quite freely”*.

The interviewees pointed out, that for the management teams in the larger companies (small and medium sized) the strategy forms a frame inside which the operations and processes are steered towards the defined goals. This is seen to be especially important in the situation where new generation is taking over the management and thus important decision regarding the future of the firm are made. For small and medium sized firms the strategy was also seen as a tool to communicate the direction and objectives of the business to management, personnel and other stakeholders. Also the strategy has an important role in positioning the firm in relation to its competitors in the market. Having and developing strategy increases transparency and enables monitoring the development of business.

Table 3 Strategy, HRM strategy and knowledge management practices in participating firms

Firm size	Strategy is in "black and white"		Human resource management strategy has been made		KM practices used	Other*
	Yes	No	Yes	No		
Micro	11	24	2	33	development discussion (6), personal development plan (4), job rotation (3), randomly conducted competence analysis (3), regularly conducted competence analysis (-), systematic communication practices (2), partnerships and "borrowing" the expertise (17), compensation and benefits (4), peer learning (14), mentoring (8), continuing education/in-service training (20), professional education (9), excursions (11), other* (4)	searching for information in the Internet, participating trade fairs, following the trends via Internet and social media channels, using one's own networks, education provided by the equipment manufacturer, specific educations (for sales personnel for example), attending seminars, engaging into peer-to-peer learning, being an active member in a non-profit organizations (associations) focusing on promotion the substance knowledge on one's area of expertise, engaging into networking and partnership development (albeit challenging, how to find /identify partners and reach win-win situation in collaboration)
Small	4	3	3	4	development discussion (6), personal development plan (1), job rotation (2), randomly conducted competence analysis (3), regularly conducted competence analysis (-), systematic communication	analyzing and developing capabilities to work in teams/groups, guiding/supervising students, practices for rewarding people (such as organizing events for

					practices (2), partnerships and “borrowing” the expertise (2), compensation and benefits (2), peer learning (3), mentoring (1), continuing education/in-service training (5), professional education (2), excursions (1), other* (-)	personnel for example in Christmas time, staff discounts)
Medium	6	2	3	5	development discussion (5), personal development plan (2), job rotation (3), randomly conducted competence analysis (4), regularly conducted competence analysis (1), systematic communication practices (3), partnerships and “borrowing” the expertise (-), compensation and benefits (2), peer learning (4), mentoring (3), continuing education/in-service training (5), professional education (3), excursions (2), other* (2)	utilizing both in-house training and external training and organizing additional training to personnel, engaging personnel into job rotation, development discussions as an arena for development, feedback and prioritizing (organizing also follow-up discussions in-between the discussions taking place once a year), systematic process for introducing/familiarizing new members of staff to their work

Most of the companies did not have distinct **human resource strategy** in “black and white”. Instead the human resource strategy was part of the business strategy or the business plan, as a CEO of a medium sized firm describes: *“It is part of the company strategy. We have not written separate human resource strategy. What is important is developing the competencies of the personnel so that they become even more multi-talented to increase flexibility of the operations and processes. Well-being at work, openness, ability to take responsibility, quality and providing appropriate resources for an individual and organization to help it fulfill its objectives, are highlighted when discussing human resource strategy”*. The way in which the benefits and the role of the human resource strategy were defined and described varied due to the size of the firm. For single entrepreneurs and for a company with only few employees, the need for having written human resource strategy was not obvious. That is because in small organizations the managers knows all the employees and their experience quite well, and development of human resources takes place through development and education needs recognized in daily operations.

For micro firms and especially solo entrepreneurs or firms employing two persons, taking care of human resources means focusing on well-being at work and ensuring that the competencies are up to date in order to anticipate and respond to customer needs. When one is a solo entrepreneur then it is a question of self-management and also about networking and looking for business partnerships to acquire complementary resources and competencies. Regardless of the firm size, the personnel was seen as a crucially importance resource for the firm. The interviewees stressed the importance that the competencies and resources in the firm should be in line with the business objectives. It was also seen important that each member of staff could feel that they are in a position which corresponds with their own objectives and competencies. For small firms the recruitment was brought up as a challenge regarding human resource management. Also the interviewees pointed out that by focusing on knowledge management, the hidden skills residing in the organization might be discovered. Sharing tacit knowledge was also raised up as an important question and challenge regarding knowledge management.

Knowledge management and competence development was seen to be at the heart of the human resource management.

In those medium sized firms, which had a written human resource strategy, the knowledge management and competence development was seen to have a major role in HRM strategy. Human resource management gives guidelines to human resources planning and educational planning in the organization. This also includes and requires successful leadership and operating models that need to be utilized and developed. The interviewees also talked about the future and pointed out that knowledge management has to focus on the qualification required not only today, but also in the future.

Before the competencies and qualifications mapping was done, the SMEs were asked what kind of practices for Km they use at the moment. These are depicted in the Table 3. As is evident when looking at the Table 3, there were quite many KM practices in use in the participating SMEs. Most of the 35 micro firms interviewed employed one or two people and the interviewees were mostly owner-managers. For these micro firms the knowledge management practice most often used was continuing education or in-service training, since 20 firms named it. Partnerships and “borrowing” the expertise, which means that one was able to identify partners with expertise that they themselves did not have was also utilized a lot. Peer learning was also emphasized as an important KM practice.

In small firms as well as in the medium sized firms, the development discussion were named as the most used KM practice. Even so, it became clear to us during the process, that even though the development discussions took place they were not always documented and thus follow-up after them became challenging. Also it was not self-evident that development discussions were part of the KM practices. In some of the SMEs participating our study, the development discussions were adopted after competencies and qualifications mapping and the incentive for adopting them was to begin to build more systematic processes for competence management. In addition, the continuing education or in-service training was found valuable in both small and medium sized firms also. Some of the participating firms were already familiar with competence analysis, since analyses had been conducted for 10 of the SMEs, albeit they were random and not systematically repeated in order to tap into the changing qualifications needs or monitoring the effects of KM practices.

Overview of knowledge management in SMEs – foundations, measuring and collaboration in KM

In addition to asking the interviewees, what kind of KM practices they use, we also discussed about KM related themes more broadly. The interviewees were ask, whether they had a certain model for KM in their organization. Most of them said, that they were no specific model for KM, but quite a lot of tools supporting KM were listed. They were also asked about the foundation of KM (what the KM is based on in their organization) and how they assess the success of KM. Answers to these questions gave us insights about how management and personnel could develop KM in collaboration and what interests the most in knowledge management. These insights are depicted in the next three tables: in Table 4 insights from micro firms, in Table 5 from small firms and in Table 6 from medium sized firms. In this phase of the study the findings and description are tentative and they will be developed further as our data collection continues via survey with follow-up questions.

Table 4 Knowledge management in micro firms: foundation, measuring and collaboration in KM

Is there a model for KM?	The KM is based on	The success of KM is measured by	Management and personnel can develop KM in collaboration by	The most interesting thing regarding KM is	The expertise residing in the organization is acknowledged by
<ul style="list-style-type: none"> • No specific model for KM in participating micro firms • KM is supported by <ul style="list-style-type: none"> • Sound educational background of the entrepreneurs (knowledge regarding management) • Continuous education (trade fairs abroad, both internal and external education for personnel and entrepreneurs) • Model for orientation to work • Expertise is described in the business plan • Collaboration networks • Mentoring, peer learning 	<ul style="list-style-type: none"> • Following the developments (for example technological) • Continuous education • Active search for information (for example digitalization) • Being methodical and staying up to date in KM development • Strategy and business idea (looking for partnerships) • Professional interests • Customer feedback and customer needs • Self-evaluation (what would be useful) • Networking and development of networking skills • Industry requirements and regulations • Branding one's expertise 	<ul style="list-style-type: none"> • Measuring is not systematic • Tools for measuring are <ul style="list-style-type: none"> • Self-evaluation • Continuous development of customer processes • Customer feedback (development ideas), customer satisfaction • Updating the business plan • Measuring turnover versus profit = meter • Ability to utilize social media • Success in product development • Discussions with personnel and stakeholders 	<ul style="list-style-type: none"> • Organizing meeting and join planning • Discussions, which can be easily implemented in small organizations. <p>However, the management may feel that all employees may not be motivated or interested in participating development activities</p> <ul style="list-style-type: none"> • Planning and ideating marketing jointly • Overcoming the challenge of employing seasonal workforce • Enabling employees to plan their own work • Jointly mapping the educational needs in the organization • Using a person external to organization to steer the discussions about KM and to aid in competence and qualifications mapping • By keeping an open mind, since ideas for new services can come during spare time 	<ul style="list-style-type: none"> • To know competence emphasis (to recognize the strategically important expertise) and to define working processes for KM • To understand how to acquire knowledge and competencies nimbly • to get tools and assistance to clarify the vision of the • To learn about networking (solo entrepreneur) • To advance the use of development discussions • Learn how to use mentoring in competence development • Learning to prioritize and to work efficiently • Learn about internationalization, how to find possibilities for it • To know when one has enough expertise • To find and develop tools for focusing in one's own business • To learn to focus on one's strengths and expertise areas • To learn to find and utilized the latent skills 	<ul style="list-style-type: none"> • Utilizing self-evaluation • Knowing one's own expertise and also that of the colleague • By discussing these matters with a colleague or peer or for example business advisor • Conducting competence and qualifications mapping (does not always provide new signals for development, but can reassure) • Following the changes in the business environment, for example recognizing the challenges posed by digitalization • Organizing development discussions (for example addressing the need to develop more wide-ranging know-how • Making and updating Process descriptions • Involving personnel when defining qualifications for work roles prior to competencies and qualifications mapping • Feedback from customers

Table 5 Knowledge management in small firms: foundation, measuring and collaboration in KM

Is there a model for KM?	The KM is based on	The success of KM is measured by	Management and personnel can develop KM in collaboration by	The most interesting this regarding KM is	The expertise residing in the organization in known by
<ul style="list-style-type: none"> • No specific model (6) • Own model for KM (1) including defining the qualifications, systematically mapping the competencies and tools used for discussing the competencies and qualifications with the personnel, use of CVs • A process for development discussions and based on them education plan is made and documented • Development discussions are conducted, but have not been documented • Competence and qualifications analysis conducted, but not systematic 	<ul style="list-style-type: none"> • Actions taken after recognizing a resource gap, searching for ways to acquire knowledge and other resources immediately • Each employee taking responsibility of their own education and training 	<ul style="list-style-type: none"> • Not measured (2) • Inadequately measured (1) • Based on competencies and qualifications mapping and putting the results in practice • Assessing the work ethic and feedback from the customer, recognized need to develop entrepreneurial mindset and abilities 	<ul style="list-style-type: none"> • Jointly looking for solutions • Testing products • Developing new products and services (by adopting future orientation) • Utilizing networks • Personnel does not participate that much, the entrepreneurs has the development responsibility • Constantly developing the ability to co-create with personnel and stakeholders • Utilizing meetings with personnel (1-2 times a year) • Discussing and doing things together 	<ul style="list-style-type: none"> • Defining the core resources, competencies and knowledge and deciding what to outsource and what not • Developing competencies of networking, how to manage knowledge in networks and ensure the quality of products/services when collaborating with various partners • To unearth the competencies by the competence and qualifications analysis and to develop a plan based on the results (framework for KM) • To get an impetus and starting point to KM through competence and qualifications mapping • To develop systematic processes and discussion tolls for KM 	<ul style="list-style-type: none"> • Personally knowing the employees in a small company • Asking about the unused potential (expertise and capabilities not needed in current work) during the process of describing the (work) tasks • Based on long experience in the organization (excluding the hidden skills which are more difficult recognize) • Observation and everyone’s own assessment • Utilizing CVs • Discussing a lot about knowledge, competencies and development areas

Table 6 Knowledge management in medium sized firms: foundation, measuring and collaboration in KM

Is there a model for KM?	The KM is based on	The success of KM is measured by	Management and personnel can develop KM in collaboration by	The most interesting this regarding KM is	The expertise residing in the organization is known by
<ul style="list-style-type: none"> • model for KM in use (2) • no specific model for KM (6) • The tools for KM have been defined. What is needed is more systematic processes • The management group defines the guidelines for KM • The KM is systematic in a short term • The KM is to some extent systematic, but processes not necessarily written in detail. 	<ul style="list-style-type: none"> • On strategy • On the information received through development discussions • On in-service training and guidance • On the identified needs to implement the defined company strategy • The information is received through personal contacts • The strategy process focusing both today and tomorrow 	<ul style="list-style-type: none"> • Giving numeral assessments during development discussions • The people responsible for supervision of the work follow this in daily operations • No extra bureaucracy in needed, the development of the profitability is the best meter • By using competence and qualification mapping (has not been systematic) • Making assessments based on opinions of the personnel and observations • It is currently poorly measured • There is competence matrix used for production personnel 	<ul style="list-style-type: none"> • By utilizing development groups and meetings • Organizing in-house training • By using job rotation • Development ideas are expressed during day to day communication with employees • Collaboration is the key, discussing and deciding together what actions to take • Giving employees freedom to develop their expertise and connecting this to organizational objectives • In principle, the company/ the executive team defines the qualifications. The needs for competence development are discovered during discussion with the personnel and it is the responsibility of the firm to provide education needed. 	<ul style="list-style-type: none"> • To find new tools for KM in addition to the existing ones • The competence and qualifications mapping for the production personnel could become part of developing the payroll system • Making KM as a part of operating system to increase well-being at work through appreciating the expertise of the personnel • Unearthing the hidden expertise and also education needs, to become more analytic and systematic in KM 	<ul style="list-style-type: none"> • By utilizing training register • Through daily communication • By knowing the personnel, since the company is quite small • We should involve the personnel more broadly in development projects • We do not fully know, we know the expertise of the people who have worked here for quite some time, but we know less about the recently recruited members of the staff.

Acknowledged benefits of systematic analysis of competences and qualifications and knowledge management practices

Before the competences and qualifications mapping SMEs were asked what benefits the firm expected to receive from systematic competence and qualification mapping and for what they planned to use the information the mapping provided. In the end of the KM development process conducted in this study, firms will be asked whether they have implemented changes in their KM or has the systematic analysis had any other effect on their KM. At this stage of study, only expectations and future plans towards systematic mapping have been analyzed.

SMEs mainly expected to have accurate information about the competences they have in their firm. In addition, they wanted to recognize the gaps between the qualifications and competencies. The clear motivation for mapping was to develop the skills they or their employees had shortage of. They also wished that the systematic competence and qualification mapping would bring new ideas to which direction to develop their business. In addition, systematic competence and qualification mapping was expected to provide tools for management; they hoped that the systematic data would support managers to bring up the issues related competences and qualifications. There were no significant difference between micro, small and middle size firms' expectations. However, the role of systematic mapping as a managerial tool was highlighted in small and middle sized firms rather than in micro enterprises.

In the future firms planned to use the systematic competences and qualifications mapping for instance for managerial purposes, such as, in recruitment process and employee appraisal. They also planned to use the mapping for long-term evaluation of the knowledge development and, small and middle sized firms particularly, for strategic planning.

Discussion and conclusions

The interest to study KM in SMEs has been growing recently. Nevertheless, more research is still called for tap into the differences between SMEs and large organizations when it comes to knowledge management (Cerchione & Esposito, 2017). The aim of this study was to explore the link between strategy of the firm and knowledge management by analyzing what are the working practices for strategic KM in SMEs and how systematic analysis of competences and qualifications affect knowledge management practices in SMEs? The study was qualitative in nature and entailed interviews, survey, field notes and written reports from 70 SMEs from different fields.

Results of the study indicate that it is not self-evident to have systematic business strategy in SMEs'. It is even more typical that HRM strategies are missing. There are working practices used in SME's and the personnel is recognized as an important asset of the firm. However, the SMEs would benefit form more systematic approach for knowledge management (e.g., Ambrosini & Bowman, 2008; Durst & Wilhelm, 2011) and based on our study, they are also interested in developing processes for KM. Through these processes it would be possible to build a clearer link between business strategy and knowledge management. One tool for this is adopting systematic competence analysis based on qualification definitions estimated essential for strategy implementation. Qualification definitions and systematic competence analysis made the knowledge visible both for managers and for employees. This supported SME mangers to conduct informed HRM decisions and encouraged them to apply more strategic

approach to the firm's KM. Based on the results of the analysis, SMEs' identified the development needs and paths for the future and decided on concrete tools to achieve those goals. In addition to systematic competence analysis' benefits in KM, it supported managers also in other areas of HRM such as in recruitment processes. Qualification definitions supported SMEs' to take a stand for firms' strategy and create long term HRM and KM plans.

In the extant literature the KM of SMEs is argued to be rather informal and lacking strategic orientation (Cerchione & Esposito, 2017; Hutchinson & Quintas, 2008) while more formal practices for KM has been suggested (Ambrosini & Bowman, 2008). The results of this study are in line with those of Cerchione and Esposito (2017) as well as with Hutchinson and Quintas (2008). Regardless of the firm size, the personnel was seen as a crucially importance resource for the firm. The importance of aligning the competencies and resources in the firm with the business objectives was also stressed. Despite this fact, the SMEs had not developed a model for KM and most of the knowledge management practices were used unsystematically. According the results, systematically gathered data concerning competencies and qualifications provided important starting point for managers' strategic thinking. Although systematic competence mapping served mainly as practical KM tool it provided an opportunity to increase the strategic orientation of SME's.

From the managerial perspective the results indicate that systematic competence analysis is a useful tool to increase the strategic orientation of KM in SMEs'. It awakens managers to understand the knowledge as a crucial recourse for the firm. It also concretizes the qualifications the work requires and competences they have. Thereby opportunities to use apply KM practices in more strategic manner increases.

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