

Knowledge management in the SME and its relationship to strategy, family orientation and organization learning

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Abstract: In this study, we examine the prevalence of different KM practices and the organizational determinants of KM among SMEs by conducting a quantitative study of empirical data from nearly 500 Dutch SMEs. Our empirical results show that knowledge is managed in a people-based approach in SMEs. SMEs are most likely to acquire knowledge by staying in touch with professionals and experts outside the company and they incline to share knowledge and experience by talking to each other. Furthermore, KM is dependent on other organizational resources and processes. Organizational learning and competitive strategy with a formality approach are the positive determinants of KM while family orientation is a negative determinant of it. One of the challenges in the current study was to clearly distinguish, on an empirical basis, the previously defined concepts of knowledge management practices and organizational learning. Although in theory, they are distinct, the results of this study lead us to conclude that they may overlap in practice. In the conclusion, we recommend a learning-oriented knowledge management model for SMEs which combines aspects of the two literatures.

First version: January 2007 (EIM SCALES report H200703)

Current version: May 2009

File name: KM_organizational_determinants_v140509

Keywords: knowledge management; strategy; family orientation; organizational learning; SMEs

Acknowledgement: We would like to thank Sita Tan for her input on the first version of this paper. An earlier version has been presented at the Strategic Management Society Conference on 12-15 October, 2008 and nominated as 5 finalists of best conference paper for practical implications.

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INTRODUCTION

Knowledge management (KM) is a relatively new term that encompasses not only the related notions of knowledge transfer and knowledge sharing (externally from other firms to the small firm and/or internally among firm members), but the entire knowledge acquisition and utilization process, beginning with locating and capturing knowledge (including tacit knowledge which is difficult to codify), and followed by the enabling of that knowledge within the firm (Choo and Bontis, 2002; Takeuchi and Nonaka, 2004). Knowledge management has been examined in past research as a possible determinant of firm innovation capability as well as worklife quality of knowledge workers (Corso *et al*, 2001). A report by Business Intelligence (quoted in Numri, 1998) claims that successful KM programs can produce up to tenfold returns, thus indicating that KM might also have a positive effect on firm performance.

To date, some of the most extensive research on knowledge transfer and sharing relates to the nature of networks among (larger) firms and between such firms and public institutions (research institutes, universities, etc.). However, research over the past thirty years repeatedly shows patterns that a disproportionate amount of innovation (including new patents and other inventions and discoveries) comes from small to medium-sized firms (Acs, 1996; Thompson and Leyden, 1983). Although research and policy interest in knowledge management is beginning to grow for small and medium-sized suppliers (e.g., Sparrow, 2001; Wong and Radcliffe, 2000), still relatively limited attention has been paid to understand the specifics of KM issues of SMEs. Previous studies that have been carried out typically rely upon either qualitative methods and/or fairly small samples (e.g., Hellenthal, 2005; Koskinen and Vanharanta, 2000; Sabatier, Nelson and Nelson, 2005; van Rijnsouw, 2005; Uit Beijerse, 1999; Uhlaner and van Santen, 2005).

The aim of this study is to test empirically a preliminary model that addresses the prevalence of different KM techniques as well as certain organization-level determinants of KM, based on empirical data from nearly 500 Dutch SMEs. The scope of the present study is limited to three aspects of the knowledge management practices including external acquisition, internal sharing and storing of knowledge. Determinants of knowledge management practices in our research include aspects of organization strategy (including innovation orientation, sales-focused market orientation, competitor orientation, service orientation, and price discounting), organizational learning, formality of the strategic approach, and family orientation. Those variables are controlled for by

ownership structure and selected organization context variables, including company age, company size and sector.

By conducting the present study, we aim to answer the following research questions:

1. How do SMEs manage their knowledge? In particular, how do they acquire and/or develop, share or distribute, and store knowledge within the firm?
2. What are the organizational determinants of knowledge management in SMEs?

THEORY AND HYPOTHESES

The definition of knowledge management in the present study is based on research by Takeuchi *et al* (2004), Uit Beijerse (1999) and von Krogh *et al* (2000). Common to their definitions is the identification of three phases of knowledge management to unlock tacit knowledge. These phases include: 1) capturing and locating knowledge; 2) transferring and sharing knowledge; and 3) Enabling knowledge. Depending on how studies measure KM concepts, differentiating between such ideas as enabling knowledge and innovation behavior can be rather challenging for respondents since in practice these refer to quite similar activities (Blom *et al*, 2006; van Rijnsouw, 2005). For this reason, we omit the enabling knowledge phase, addressing elements of the first two phases only.

The first phase, ‘knowledge capturing and locating practices’ is mainly concerned with unlocking tacit knowledge into explicit knowledge (Nooteboom, 2001). Nooteboom suggests that tacit knowledge can be externalized through discussion among colleagues as well as connecting with experts and other organizations, joining all kinds of formal or informal activities. Data warehousing is another capturing and locating practice (von Krogh *et al*, 2000). This practice is mainly concerned with repositories of books and manuals, knowledge management systems (KMS), enterprise resource planning (ERP) and file-systems (both computerized and non-computerized) where knowledge is held.

The second phase, ‘knowledge transferring and sharing practices’ also involves a combination of information and communications technology (ICT) and non-ICT solutions (Uhlener *et al*, 2005). Non-ICT solutions are important for a variety of reasons. On the one hand, they are used by firms with a lack of technological sophistication. On the other hand, some knowledge, especially tacit knowledge, can not be transferred easily because it can not be codified in a database (Davenport and Prusak, 1998). Nooteboom (2001) suggests that transfer of tacit knowledge often requires

comparatively lengthy, direct, on-line, real-time interaction, with demonstration, trial, error and correction—in short, direct face-to-face interaction between two or more individuals (Uhlaner *et al*, 2005). Sometimes groups form around common interests or knowledge to expedite transfer of information, and are referred to in the organization learning literature as *communities of practice* (Wenger *et al*, 2002).

Another way to categorize KM practices is to describe types of KM cultures. For instance, Nonaka and Takeuchi (1995) illustrate the difference between two types of knowledge-related cultures by comparing Honda (exploration oriented) and General Electric (exploitation oriented). They find that employees are more willing to share, use and create knowledge in Honda, which encourages them to build new knowledge constantly, than in General Electric, which focuses on using existing knowledge. In an exploration oriented culture, knowledge is managed in a more proactive and strategic way compared to an exploitation oriented culture. In the current study, the items designed to measure KM represent aspects of both the phases (especially knowledge acquisition, sharing and storing) and KM culture.

Strategy and KM practices

According to Porter (1996), competitive strategy is about being different, about competitive position, about differentiating the firm in the eyes of the customer, and about adding value through a mix of activities different from those used by competitors. He develops three generic strategies for creating a competitive position in a given industry. These are: overall cost leadership, which emphasizes the strategy of managing in a way which lowers production costs compared with competitors; differentiation, which requires the firm to create something unique; and focus, which reflects whether the firm concentrates on a particular group of customers, geographic markets or product line segments (Porter, 1980). In the present study, some of the strategies we include have origins in these strategies, including price discounting, competitor orientation and innovation orientation, and to a lesser extent sales-focused market orientation and service orientation. These five strategies are selected furthermore because they are often found to be relevant in the SME population of firms.

‘Price discounting’ as defined in our study means that the firm offers goods or services at a lower price to improve and retain competitive advantage. Note that this is not exactly the same meaning as Porter’s cost leadership though the two are probably correlated, since to be able to offer

products at a lower price on a long term basis it is necessarily to have costs in line with pricing (Porter, 1980, 1985). ‘Innovation orientation strategy’ which can be viewed as a variant of Porter’s concept of differentiation, refers to a strategy where the firm continuously offers new and unique products or services for competitive advantage. The third dimension or type of strategy we examine is that of service orientation, which refers to a strategy of emphasizing excellent service to customers. This does not quite fit the original generic strategies of Porter (1980), although it is commonly referred to in both the SME and marketing literatures as key to success especially amongst SMEs (Hendrickson and Psarouthakis, 1998).

The fourth and the fifth strategies, which we call sales-focused market orientation and competitor orientation in the study, are included in what Kohli and Jaworski (1990) refer to as ‘market orientation strategy’: the organization-wide generation of market intelligence pertaining to current and future customer needs, and dissemination of intelligence across departments and organization wide responsiveness. Firms pursuing such strategies focus on capturing and maintaining new and existing market share, being proactive to competitors and future customer needs for competitive advantage. Market orientation’s external focus on customer needs and competitor capabilities is probably most consistent with Porter’s concept of ‘differentiation’ although as defined by Kohli and Jaworski, it takes on a somewhat broader meaning. Besides types of strategies, another aspect of strategy included in the present study is whether or not the strategic plan is written down.

Strategy concerns an overall analysis based on internal and external information; it is also a crucial choice made by the owner/manager. It is plausible that the choice of strategy determines the type of knowledge needed in the short and medium term and thus, in turn, the types of knowledge management practices required for effective execution of those strategies. From a dynamic capabilities perspective, we thus posit that firms with a more competitive strategy are more likely to perceive the value of knowledge management practices. For instance, firms with an innovation orientation strategy are more likely to acquire, create, develop, and retain their unique knowledge in order to result in new products and services. Competitor-oriented firms are keen to develop their market sensing and customer linking capabilities in order to beat their competitors to keep or gain the market share (Day, 1994). Such firms must continuously update their stored information and knowledge about their competitors. They can react in a more effective way than their competitors and to keep the competitive advantage by continuously studying their competitors. Thus, specific

knowledge of market and competitors is important to such firms and should be acquired, stored and well maintained.

Sales-focused market-oriented firms also require well developed knowledge in existing and related markets. They need to know how to develop deep relationships with key customers. By doing so, they can quickly response to the market which has greatest opportunities for profitable growth of their sales, as well as profitably develop tailored products and services based on the needs of their customers. In this sense, specific knowledge of the market and specific knowledge of customers related to sales are crucial for such firms; it is also important to systematically update and store the knowledge. However, sales-focused market oriented firms might be less likely interested in knowledge activities if they are happy with sales delivered from existing customers or if they just want to achieve their sales goal in a short-term.

Furthermore, service-oriented firms will also be more likely to pursue knowledge activities in order to provide better service on the one hand. On the other hand, they may be less likely to pursue knowledge activities when they only provide average or undifferentiated service to customers. Finally, we assume that simple price discounting is a strategy least likely to pursue knowledge management since many small firms can often compete on price simply due to the fact they are smaller than many of their competitors and thus carry less overhead. Of course true cost leadership may require a more sophisticated set of strategies but we are assuming this not to be the case for most SMEs. Therefore, we formulate hypothesis 1 as follows:

Hypothesis1: Firms following certain approaches to strategy (more innovation orientation, more sales-focused market orientation, more competitor orientation, more service orientation and a more formal strategic process, and less emphasis on price discounting) are more likely to pursue knowledge management practices in their firm.

Family orientation and KM Practices

The earliest and still more broadly adopted structural definition of family orientation was developed by London Business School (Stoy Hayward, 1989). According to this definition, a firm is classified as a family business if more than 50% of shares are owned by one family, or at least 50% management are from one family, or/and a significant number of members of the board are from a single family. However, this definition is problematic for SME research since most small firms fit the definition of the family firm according to this definition (Klein, 2000; Uhlaner, 2005).

Thus, more recent research has attempted to develop definitions which better differentiate extent of family orientation amongst small firms (Astrachan, Klein, and Smyrnios, 2002). The current study uses a multifaceted approach which combines different dimensions into one scale, inspired by the approach to family orientation scale development suggested by Uhlaner (2005) and which captures a number of the common elements for family business measurement (Astrachan *et al*, 2002; Klein, 2000; Stoy Hayward, 1989).

Though specific research on the relationship between family orientation and KM practices is lacking, researchers have examined the differences in other aspects of the organization. Empirical research consistently shows that family-owned firms are likely to be less formally organized in a number of aspects. For instance, studies by Reid and Adams (2001) and De Kok, Uhlaner and Thurik (2006) both report that family oriented firms are less likely to use formal HRM practices. Other research in the context of accounting practices shows that even when controlling for size and other organization context variables, family-oriented firms are less systematic in their use of accounting procedures and policies (Jorissen *et al*, 2002). Two theories have been used to explain such differences including agency theory and the resource-based view. According to agency theory, where the owner and manager are part of the same family, it is suggested that coordination is simpler and can thus be done more informally (De Kok *et al*, 2006). The resource-based view provides an alternative explanation, based on the assumption that differences in physical, organizational and human resources between firms cause a fundamental heterogeneity in their productive potential (Priem and Butler, 2001). Family oriented firms have limitations due to their comparatively smaller size and reduced complexity compared to non-family oriented firms (Cromie, Stephenson and Monthiethl, 1995; Daily and Dollinger, 1993). Thus differences may be due to more limited resources in the family firm. Which theory best explains the results to date is somewhat open to interpretation but the finding of less formality is consistently supported by empirical research to date. Thus, in applying such findings to knowledge management practices one would expect less formal KM practices used in the family-owned firm. Hypothesis 2 is thus formulated as follows:

Hypothesis 2: The more family oriented the firm, the less likely knowledge management practices are used

Organizational Learning and KM practices

The concept of organizational learning can be traced back to Cyert and March (1963), who first articulated that an organization could learn in ways that were independent of the individuals within it. The concept of organizational learning has been studied from various disciplines shifting from the focus on outcome to the process of organizational learning (Dodgson, 1993). Yet there appears to be a lack of consensus regarding the term's meaning or its operationalization (Huber, 1991; Kim, 1993). The term is also often worded in a way that makes it difficult to operationalize. For instance, Vera and Crossan (2003) define organizational learning as 'the process of change in individual and shared thought and action, which is affected by and embedded in the institutions of the organization.' (Vera and Crossan, 2003:123). Note that in their definition, individual plays an essential role in organizational learning. Yet other researchers argue focus on how learning becomes institutionalized, i.e., how knowledge is externalized, stored and managed in non-human-based way such as routines, systems and strategy (Nelson and Winter, 1982; Walsh and Rivera, 1991). But these latter definitions sound quite similar to more recent notions of knowledge management.

In some of the older literature, researchers argue that organizational learning refers to the generation of new insights that have the potential to reshape behavior whereas knowledge management primarily focuses on the formalization, storage, sharing, distribution, co-ordination, implementation of existing information throughout the firm (Huber, 1991). However, this begins to sound like the explorative-exploitative comparisons for knowledge-related cultures described earlier in the paper (Nonaka and Takeuchi, 1995). Still others try to tease the two concepts apart by suggesting organizational learning is embedded in the relationships and interactions between people by which new knowledge can be generated (Orr, 1990; Wenger, 1998) while knowledge management is focused on ICT solutions. But more recent articles address both people-based and ICT-based KM practices (see for instance, Corso *et al*, 2001). And to complete the circle, Garvin (1997) argues that organizational learning is achieved through a process that involves acquisition, transfer and application of knowledge, which sounds quite a bit like knowledge management as defined previously. In spite of these ambiguities, in this study, we attempt to treat organizational learning as a different construct from knowledge management. We define organizational learning as the actual change in thought and action of the groups and individuals in the firm which leads to

new knowledge generation, whereas the practices designed to acquire, transfer, share and store knowledge are viewed as the domain of knowledge management.

In spite of these ambiguities, for the sake of argument, we attempt to examine organizational learning as distinct from KM, and to view it as reflected by the extent to which employees are involved in the knowledge generation process. To summarize, hypothesis 3 can be formulated as follows:

Hypothesis 3: Organizational learning can stimulate a firm be more active in implementing knowledge management practices.

Based on above discussion, the conceptual framework of this study is proposed as follows: we argue that organizational learning and competitive strategy have direct positive effects on knowledge management while family orientation has a direct negative effect, controlling for ownership structure, size, age and industries.

Insert Figure 1 about here

DATA AND METHODS

Sample and Data Collection

This paper uses a sub-sample of firm-level data from a longitudinal ‘SME Business Policy Panel’ of Dutch SMEs¹ funded since 1998 by the Dutch government. The panel data is collected by EIM Business and Policy Research three times per year. The total panel consists of about 2000 SMEs and is stratified according to sectors (manufacturing, construction, retail and wholesale, and service, according to BIK codes²) and size classes (0-9, 10-49 and 50-99 employees in FTEs).

For this particular study, data was collected via telephone (computer-aided) interviews which took place in 2006. A key informant approach was adopted for this study (Kumar *et al*, 1997). All questionnaires were sent to the director of SMEs. However, given the anonymity of respondents, it was not possible to recheck the real organizational roles of respondents. Thus it is difficult to determine whether informant data was distorted due to individual characteristics (Golden, 1992). This so called single-response bias is a recognized limitation of the study.

The target group of this particular study includes only independent companies with at least four employees from all sectors. This resulted in a sample of 496 firms available for empirical

¹ For details of SME Business Policy Panel of Dutch SMEs, refer to http://data.ondernemerschap.nl/MKB_BeleidsP_r_i/Toelichting.htm

² Bedrijfsindeling Kamers van Koophandel

analysis. Within the sample, about 50% of respondent companies are less than 17 years old; and about 45% of our sample is in service sector. Regarding size, about 53% of respondent companies have 4-9 employees, about 36% have 10-49 employees and the remaining 11% have between 50-99 employees. Thus, the sample is somewhat overrepresented by relatively young and small companies in the service sector. However, controlling for company age, size and sector differences is expected to offset this problem, at least in part.

Data Analysis, Models and Variables

In order to answer the proposed research questions, the data analysis used in the present study includes descriptive statistics analysis and multiple regression analysis. The items designed to measure knowledge management practices are based in part on items developed by Uit Beijerse (2000), Wong and Aspinwall (2005), and the authors. By conducting frequency analysis on these items, we are able to examine how knowledge is managed in SMEs.

In order to test the relationship between knowledge management and organizational determinants, we estimate the following regression model:

$$KM = \beta_0 + \beta_1 \cdot OL + \beta_2 \cdot FO + \beta_3 \cdot Strategy + \beta_4 \cdot Context + \varepsilon$$

Where KM represents knowledge management variable; OL represents organizational learning variable; FO represents family orientation variable; Strategy represents competitive strategy variables; Context represents general context variables.

A variety of techniques, including Principal Components Analysis (with an orthogonal rotation), testing for reliability using the Cronbach-alpha reliability coefficient, correlation between the variables, and a check for face validity and common method bias test, were used in combination to construct the variables used in the model. As a result, some items originally thought to be part of either KM or Organizational Learning (OL) could be reassigned or even discarded from further analyses. Detailed of scale development are further described below for individual variables. Variables based on items with scales of the same length were created by taking the mean of different items. Variables that required a combination of items based on items of different lengths made use of the protocol referred to as categorical principal components analysis (CATPCA) and was executed using the Statistical Package for the Social Sciences (SPSS). Appendix A provides a more extensive description of each variable used in the regression analysis.

Independent variables

Although it was initially expected that the different KM practices (acquisition, sharing, storage) would load on different factors, results of a PCA reveals one primary KM factor, consisting of nine items (Cronbach's alpha= 0.79). Furthermore, factor analysis suggests a three item variable for organizational learning (Cronbach's alpha= 0.57). Note that two items which are designed to measure KM sharing practices strongly load instead on a second factor referred to henceforth as organizational learning. The result of factor analysis is consistent with the argument that learning largely occurs in the shared context (Nonaka and Takeuchi, 1995). The family orientation variable is a four item variable (Cronbach's alpha= 0.74), including items on family relations and family influence. Competitive strategy is a set of variables including innovation orientation strategy, sales-focused market orientation strategy, competitor orientation strategy, service orientation strategy, price discounting strategy and the formality approach. Using Principal Components Analysis, we identify a four item scale for innovation orientation strategy, including items on attitude towards innovation of products, services or production processes and expected investments in innovations (Cronbach's alpha= 0.58), and a two item scale for sale-focused market orientation strategy including items on attitude towards market activities regarding sales performance (Cronbach's alpha= 0.59) and a two item variable for competitor orientation including items on attitude towards competitors (Cronbach's alpha= 0.83). Single item variables were used for the other strategy variables, service orientation and price discounting, and the formality approach (See Appendix A).

A commonly accepted test for common methods bias was applied to the data to check whether knowledge management measures a unique construct, given the fact that it is measured using the same respondents and questionnaire as are the other variables (Podsakoff and Organ, 1986; Tippins and Sohi, 2003). In particular, results were checked for an orthogonally rotated Principal Components Analysis (PCA) including individual items for knowledge management, organizational learning, competitive strategies and family orientation. Based on Harman's single-factor test, results provide support for the conclusion that knowledge management, organizational learning, innovation orientation, sales-focused market orientation, competitor orientation and family orientation are separate factors. In the unrotated solution, the largest factor explains only 24% of total variance. Furthermore, component loadings range from .40 to .87. Of the 120 potential cross-loadings, only 1 is above .30. This provides reasonable confidence that common method bias

is not a major problem in the current study. However, given limits of the methodology we cannot rule out such bias altogether (Podsakoff *et al*, 2003).

Insert Table 1 about here

Control variables

Company size, age and sector (manufacturing, construction, retail and wholesale, and services), and ownership structure are used as general context variables. The natural logarithm of company size was used in analyses. Ownership structure comprises: number of owners, number of managers and combined director and ownership (all single item variables).

RESULTS

Descriptive Statistics

Results of frequency analysis for KM practices are presented in Table 2. Frequencies are based on the number of respondents reporting that a particular KM practice is either totally applicable or applicable to a great degree (last 2 points of a five point scale). The most common practice used for acquiring knowledge is staying in touch with professionals and experts outside the company (53%). Regarding sharing of knowledge, the most commonly cited practice is for employees to share knowledge and experience by talking to each other (80% of respondents judging this totally applicable or applicable to a great degree in their firm). The most common storage practice is that the knowledge gained within the firm is stored in formal repositories (57%). Note also that exactly half (50%) of respondents report that knowledge is managed in a proactive and strategic manner in their firms.

Insert Table 2 about here

Multiple Regression Analysis

Results of the multiple regression analysis are presented in Table 3. Variance inflation factor (VIF) scores are computed for the regression analysis and range from 1.07 and 1.43, suggesting results should not be seriously distorted by multi-collinearity. Hypothesis 1 predicts a positive relationship between certain approaches to strategy and knowledge management. Results of a multiple regression analysis (See Table 3) show that there is a

significant positive coefficient for innovation orientation ($B=0.17$, $p<0.001$), competitor orientation ($B=0.13$, $p<0.001$) and a formality approach to strategy ($B=0.27$, $p<0.001$). The regression coefficients for sales-focused market orientation, service orientation, and price discounting are not significant. Furthermore, the contribution of all the strategy variables together, as measured by the change in R^2 -is significant both when entering the strategy variables first, after controls ($\Delta R^2=0.18$, $p<0.001$) and last after entering the other variables ($\Delta R^2=0.11$, $p<0.001$). Hypothesis 2 predicts a negative relationship between family orientation variables and knowledge management. Results show a negative coefficient for family orientation ($B=-0.10$, $p<0.001$). Once again, the contribution to the overall model is significant, though much smaller than for the strategy variables (first after controls: $\Delta R^2=0.02$, $p<0.001$; last after other variables: $\Delta R^2=0.01$, $p<0.001$). Finally, Hypothesis 3 predicts a positive relationship between organizational learning and knowledge management. Regression results indicate that organizational learning ($B=0.25$, $p<0.001$) has a significant positive contribution to knowledge management (first after controls: $\Delta R^2=0.12$, $p<0.001$; last after other variables: $\Delta R^2=0.06$, $p<0.001$). Furthermore, our results show a trend that firms with more managers are more likely to engage KM practice ($B=2.24$, $P<0.05$). SMEs in either construction sector ($B=-0.23$, $P<0.05$) or retail and wholesale sector ($B=-0.20$, $P<0.01$) are less likely to implement KM practices compared with those in service sector.

Insert Table 3 about here

DISCUSSION

The frequency analysis addresses the first research question: How do SME's manage their knowledge?. In the acquisition phase, the most frequently reported KM practice is that of staying in touch with professionals and experts outside the company. In the sharing phase, that employees talking to one another is by far the most common KM practice, followed by contact between management and employees to discuss new developments. ICT based techniques are primarily applicable in the storage phase. Indeed, databases are used quite commonly, though not always based on the computer. Interestingly, about half the directors report managing knowledge proactively. The other half do not, suggesting wide variation in understanding of the KM issue across the sample.

A hierarchical multiple regression analysis is used to address the second research question: What are the organizational determinants of KM in SMEs?. We tested three hypotheses, examining the effects of a variety of strategies, degree of family orientation, and organizational learning. All three hypotheses are at least partially supported. First of all, certain kinds of strategies (innovation orientation and competitor orientation, in particular) as well as a formal strategic process, appear to explain most of the variation of strategy in prediction of knowledge management practices. Predictions for sales-focused market orientation, service orientation and price discounting are not supported. In interpreting these findings, it appears logical to assume that an innovation orientation has a higher requirement for acquiring and sharing knowledge in order to expedite development of new products and services. KM also enhances the firm's ability to track the competition. Thus, a competitor orientation requires firms to continuously update their knowledge about competitors. Furthermore, it is logical to assume that a firm implementing these two competitive strategies is likely to stimulate knowledge management practices in order to acquire and organize the knowledge and information which are important for the firm. Also, Porter (1996) proposes that effective strategy creates a better fit among a company's activities; it is about integrating activities to achieve success.

Effective strategy provides information such as what to do, what not to do, which resources are required, and how to allocate resources effectively. Strategy is dynamic, which requires the owner/manager to continually search for ways to reinforce and extend the company's position. In order to do this, a written strategy is helpful. A written strategy can also serve as a guideline for the owner-manager to allocate the resources and activities effectively. It may also be that having a written plan provides stronger evidence that formal strategic planning actually takes place. Therefore, it is significant that a written strategy or mission statement is positively conducive to knowledge management.

Second, our empirical study indicates that knowledge management practices and organizational learning are closely interrelated with each other in SMEs. As discussed in the introduction, although theoretically organizational learning is a different concept from knowledge management, empirical analyses in our own study indicates that items used in various studies for organizational learning and KM tend to overlap. We relied therefore on a common method bias test to assure that the two scales we use are distinct from one another.

In reviewing the items that end up being included in the two scales we label as knowledge management practices and organizational learning, the one consistency appears to be a distinction in formal relationships and approaches vs. informal involvement of employees within the firm.

Furthermore, results from the regression analysis are consistent with the conclusion that organizational learning is positively associated with reliance on knowledge management practices. This result supports the assumption that the presence of organization learning stimulates a firm to actively implement knowledge management practices. Owners/managers of SMEs not only focus on managing existing knowledge but also are more proactive in detecting and correcting existing knowledge and developing new knowledge based on this activity. It becomes necessary to manage knowledge in a proper way when a cumulative knowledge development process is going on within a firm.

Third, consistent with expectations from past research, our empirical results suggest that more family-oriented firms are less likely to report using knowledge management practices, even controlling for size differences. This is consistent with findings from De Kok *et al* (2006), who find a significant residual negative effect of family orientation on the formality of HRM practices even when controlling for size, reducing support for the resource-based explanation and consistent with agency theory predictions.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study is conducted empirically based on a large, randomly drawn sample representing multiple sectors within the Dutch population of SMEs. The results of this study are consistent with other research regarding KM practices in SMEs based on smaller samples and qualitative studies (e.g. Sabatier, Nelson and Nelson, 2005; van Rijnsouw, 2005; Uit Beijerse, 1999; Uhlaner and van Santen, 2005). The findings of this paper should only be seen as preliminary but are nevertheless encouraging. Some of the limitations in this study should be taken into account in future research.

First, both knowledge management and organization learning are broadly defined concepts. Due to limited time allocated to these questions in the telephone interview, the choice of knowledge management practices is limited, as is the choice for organization learning. Moreover, this study does not include all categories of knowledge management. For

instance, the enabling phase is excluded in this study. Therefore, it is recommended that future research be conducted with a larger sample and including a more varied set of practices for each category of knowledge management and of organization learning. But regardless of these limitations, the definitions of Organizational Learning and Knowledge Management need to be sharpened in future research. It is not clear either from the definitions or the operationalizations whether what we found empirically to be a second factor in this study is consistent with what others define as organizational learning. However, there appears to be extensive overlap between the two concepts in the literature.

Second, compared to practices of knowledge management, knowledge management policies which are embodied into organizational culture are more influential for managing tacit knowledge. For instance, promoting a knowledge sharing culture can make knowledge sharing more effective; motivating employees to remain with firms can help the firm to retain tacit knowledge. Empirical work by Lopez *et al* (2004) supports that knowledge management policies, which they refer to as a collaborative culture, are a means to leverage knowledge through organizational learning. This should be explored in more detail in future research, especially with multiple observers of the culture of each firm.

Third, future research is needed to more fully understand in greater detail the approach that SMEs take to KM practices, as well as the possible consequences of using one set of practices versus another. And last, longitudinal research could be conducted to provide a better understanding of the directions of cause and effect among the proposed relations.

CONCLUSIONS AND PRACTICAL IMPLICATIONS

Based on our results, we can conclude, first of all, that knowledge management practices are carried out widely amongst SMEs, though perhaps, especially for acquisition and sharing, more people-based approaches tend to be used more than those relying on technology-based approaches. If so, this is consistent with past research on knowledge management practices. This would be logical as well, since SMEs would generally have more limited resources to carry out more sophisticated practices. For instance SMEs rely heavily on practices such as personal interactions with external experts and direct contact with each other to acquire and share information. Nevertheless, not all knowledge management practices are people-based. In our sample, we find that more than half (57%) of the respondents do use data warehousing for storing knowledge. This might be due to fairly inexpensive and widespread access to

computer-based technologies in the Netherlands, even amongst SMEs. It is also important to know that the value of knowledge management has been generally realized by SMEs. SMEs overcome their resource constraints and find ways to build their competitive advantage on knowledge.

A second conclusion based on our results is that knowledge management practices are closely linked with several organization strategies, process and other firm characteristics. More specifically, firms which emphasize innovation (innovation orientation strategy), marketing (competitor orientation) and have a written strategic plan are also likely to report higher adoption of knowledge management practices. Furthermore, to a certain extent, organizational learning occurs through knowledge management practices on one hand and stimulates knowledge management implemented in a more active and systematic way on the other hand. Aspects associated in previous studies with the concept of organizational learning, such as the tendency of the firm to rely on non-management employees to come up with new ideas and a culture where employees share experiences and new ideas with each other are positively associated with a number of other practices we refer to in this paper as knowledge management practices, which involve more formal ways to acquire, share, and store knowledge within the firm.

Practical implications

From a practical perspective, this paper indicates a number of ways in which SMEs can acquire, share and store knowledge in their organizations. The results also suggest that SMEs may be quite a bit more willing and active to reach out for information beyond their boundaries, including other organizations and individuals. Thus the barriers toward dissemination of knowledge may not be as great as is sometimes supposed. This may also help to explain why indeed SMEs have historically been responsible for a fairly high rate of innovation, as mentioned in the introduction to this paper. As predicted, furthermore, family orientation is negatively associated with the use of knowledge management practices, suggesting the need to educate owners of such firms especially, to be more open to outside influences and influences from their own employees (perhaps those outside the immediate family) to foster innovation and change. This may be due to limited resources, but may also simply be due to other barriers including family traditions where communications are kept

within the family circle. Organizational learning relies on individuals and is embedded in knowledge management practices in SMEs in practice. In order to keep the competitive advantage, it is important to leverage the overall knowledge of the firm. However, unlike large organizations, SMEs have limited resources to devote in formal training or other activities in ways the knowledge of a group can be leveraged. Alternatively, owners/managers of SMEs can stimulate individual learning, providing opportunities to access external resources, creating an environment for informal discussion and by fostering a learning culture. It is also important to appreciate newly generated knowledge by individual. Owner/Managers of the firm should not only encourage employees to learn but also regularly consult new developments from employees. By doing so, a healthy learning culture can also be stimulated. In conclusion, owner/managers probably would benefit by exploring ways to combine aspects of both informal means of sharing amongst employees as well as more formal KM practices to enhance their ability to manage and leverage knowledge in their firms.

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Figure 1: A Conceptual model of the determinants of Knowledge Management in SMEs

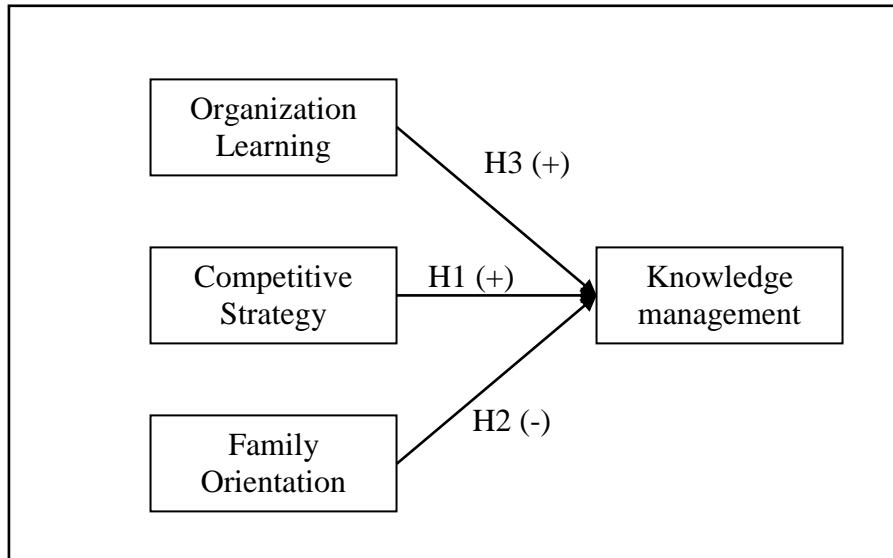


TABLE 1. Results of Common Method Bias Test for Knowledge Management, Organizational Learning, Family Orientation and Strategy

		Component					
		1	2	3	4	5	6
Knowledge Management	Our company collaborates with other organizations (companies, universities, technical college) through alliances.	.63	.07	.25	-.04	.05	.00
	The organization encourages employees to join formal or informal networks outside the organization.	.71	.03	.16	.04	.11	-.16
	Sending employees to exhibitions, congresses or seminars on a regular basis.	.73	.08	.16	.08	.02	-.14
	Staying in touch with professionals and experts outside the company.	.61	.20	.25	-.03	.16	.02
	To stay in touch with new developments, our company hires new employees with particular expertise.	.60	.03	.14	.10	-.04	-.18
	People work a lot in groups here as a way to learn from each other.	.56	.20	.07	.14	.09	-.11
	We pay a lot of attention to the share the ‘best practice’ within the organization.	.41	.34	-.02	-.07	.28	-.13
	Knowledge gained within the firm is frequently stored in formal repositories (written notebook, or computer database).	.40	.17	-.02	.29	.14	-.14
	All the employees in the organization have access to the organization’s databases.	.54	.01	-.08	.21	.11	-.25
Organizational Learning	Management consults employees frequently to discuss new development.	.16	.69	.16	.07	.09	.02
	Employees play an important role in coming up with new ideas or other improvements for the business.	.15	.65	.17	.12	.17	-.02
	Employees share knowledge and experience by talking to each other.	.10	.68	-.10	-.01	-.10	-.04
Innovation Orientation	Does the company emphasize renewal of products, services or industrial processes?	.14	.14	.72	.03	-.02	-.06
	Are you going to invest in new products or services in the next 12 months?	.15	.09	.68	.11	-.05	-.09
	Within our company, people constantly think about new products or services that serve future needs.	.14	.03	.63	.08	.21	-.13
	Within our company, there is emphasis on bringing in new customers with new needs.	.19	-.12	.46	.09	.30	-.00
Market	Does the company emphasize marketing activities aimed at improving sales performance?	.07	.12	.05	.78	.17	-.05

	Are there in the company employees – including CEOs or owners- who work on marketing activities in their daily profession?	.19	-.01	.25	.75	-.01	-.04
Competitor Orientation	Within our company, we regularly exchange information regarding strategies of our competitors.	.14	.06	.10	.06	.87	-.02
	The management regularly discusses strengths of our competitors.	.15	.11	.12	.11	.84	.03
Family Orientation	The owners are related to family?	-.16	-.03	-.12	-.01	-.02	.86
	To what extent do family members determine strategy?	-.11	-.07	-.09	.00	-.02	.81
	The managers are related to family?	-.21	.01	-.04	-.10	.07	.77
	Would you describe your company as a family business?	-.12	.01	-.05	-.04	-.05	.74
Cronbach's alpha		.79	.57	.58	.59	.83	.74

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

TABLE 2. Frequencies (%) for Knowledge Management Practices

	Knowledge Management practices	frequency (%)
acquisition	Our company collaborates with other organizations (companies, universities, technical college) through alliances.	41
	The organization encourages employees to join formal or informal networks outside the organization	19
	Sending employees to exhibitions, congresses or seminars on a regular basis.	29
	Staying in touch with professionals and experts outside the company	53
	To stay in touch with new developments, our company hires new employees with particular expertise.	33
sharing	Management consults employees frequently to discuss new developments.†	68
	We pay a lot of attention to sharing 'best practices' within the organization.	44
	Certain individuals are responsible for collecting and sharing employees' ideas.	26
	Employees share knowledge and experience by talking to each other.†	80
	People work a lot in groups here as a way to learn from each other.	35
	Job rotation is used extensively to help people learn about different parts of the organization.	18
storage	Knowledge gained within the firm is frequently stored in formal repositories (written notebook, or computer database).	57
	All the employees in the organization have access to the organization's databases.	46
	If certain key people left, it would leave large holes in the knowledge needed to run this place.	38
	When employees leave, we often find ourselves contacting them (by email or phone) to ask about how they did things around here.	5
	Knowledge is managed in a proactive and strategic manner to enhance our competitive advantage.	50

* Frequencies are based on the number of respondents reporting that a particular KM practice is applicable to a great degree or totally applicable (last 2 points of a five point scale).

† These two items load on the organizational learning variable, however, in our sample, and thus combined later with that scale.

TABLE 3. Regression results for the hypothesized model

explanatory variables	Hypothesized model		ΔR^{\dagger}	
	b-value	t-value	First	Last
constant	1.24*	2.20		
organizational learning (OL)	0.25***	6.49	0.12***	0.06***
family orientation (FO)	-0.10***	-3.55	0.02***	0.01***
strategy			0.18***	0.11***
innovation orientation	0.17***	4.79		
sales-focused market orientation	0.05	1.35		
competitor orientation	0.13***	4.97		
service strategy	0.00	0.001		
price discounting	-0.17	-1.62		
formality approach	0.27***	3.92		
ownership structure				
number of owners	0.06	1.16		
number of managers	0.11*	2.44		
combined CEO/ownership	-0.18	-1.20		
general context				
size	0.08	1.93		
age	0.00	-0.03		
Manufacturing sector	-0.07	-0.73		
Construction sector	-0.23*	-2.28		
Retail & wholesale sector	-0.20**	-2.58		
R-square	0.41			
Adjusted R-square	0.39			

\dagger : R-square change while first enter variable and last enter variable

Reference group for sector: Service

*p<.05; **p<.01; ***p<.001, two tailed tests of sign

APPENDIX A. Description of Variables used in the regression

Variable	Description of Variables
<i>Knowledge Management</i>	
knowledge management $\alpha=.79$	<p>For knowledge management, the mean of the following nine questions was computed:</p> <ol style="list-style-type: none"> 1. Our company collaborates with other organizations (companies, universities, technical college) through alliances. 2. The organization encourages employees to join formal or informal networks outside the organization 3. Sending employees to exhibitions, congresses or seminars on a regular basis. 4. Staying in touch with professionals and experts outside the company 5. To stay in touch with new developments, our company hires new employees with particular expertise. 6. People work a lot in groups here as a way to learn from each other. 7. Knowledge gained within the firm is frequently stored in formal repositories (written notebook, or computer database). 8. All the employees in the organization have access to the organization's databases. 9. We pay a lot of attention to sharing 'best practices' within the organization. <p>The items were answered with the following scale: (1='not at all applicable'; 2='not all that (barely) applicable'; 3='somewhat applicable'; 4='applicable to a great degree';5='totally applicable')</p>
<i>Organizational Learning</i>	
organizational learning $\alpha=.57$	<p>For organizational learning, the mean of the following three questions was computed:</p> <ol style="list-style-type: none"> 1. Employees play an important role in coming up with new ideas or other improvements for the business. 2. Management consults employees frequently to discuss new development. 3. Employees share knowledge and experience by talking to each other. <p>The items were answered with the following scale: (1='not at all applicable'; 2='not all that (barely) applicable'; 3='somewhat applicable'; 4='applicable to a great degree';5='totally applicable')</p>
<i>Family Orientation</i>	
Family orientation $\alpha=.74$	<p>This scale was created by combining answers to the following four questions using the CATPCA technique:</p> <p>The following questions were answered with the following scale: (1='no', 2='yes')</p> <ol style="list-style-type: none"> 1. The owners are related to family? 2. The managers are related to family? 3. Would you describe your company as a family business? <p>The scales for the following items are indicated below each question or set of questions:</p>

	4. To what extent do family members determine strategy? (1='not'; 2='to a very limited extent'; 3='to some extent'; 4='to a large extent')
<i>Strategy</i>	
Innovation orientation $\alpha=.58$	This scale was created by combining answers to the following four questions using the CATPCA technique: The following question was answered with the following scale: (1='no'; 2='yes') 1. Does the company emphasize renewal of products, services or industrial processes. The following questions were answered with the following scale: (1='not at all applicable'; 2='not all that (barely) applicable'; 3='somewhat applicable'; 4='applicable to a great degree'; 5='totally applicable') 2. Within our company, people constantly think about new products or services that serve future needs. 3. Within our company, there is emphasis on bringing in new customers with new needs. The following questions were answered with the following scale: (1='no'; 2='probably'; 3='certainly') 4. Are you going to invest in new products or services in the next 12 months?
market orientation $\alpha=.59$	This scale was created by combining answers to the following two questions using the CATPCA technique: 1. Does the company emphasize marketing activities aimed at improving sales performance? 2. Are there in the company employees –including CEOs or owners- who work on marketing activities in their daily profession? The items were answered with the following scale: (1='no'; 2='yes')
Competitor Orientation $\alpha=.83$	For competitor orientation, the mean of the following two questions was computed: 1. Within our company, we regularly exchange information regarding strategies of our competitors. 2. The management regularly discusses strengths of our competitors. The items were answered with the following scale: (1='not at all applicable'; 2='not all that (barely) applicable'; 3='somewhat applicable'; 4='applicable to a great degree'; 5='totally applicable')
service strategy	Does the company emphasize excellent service to customers? (1='no'; 2='yes')
price discounting strategy	Does the company emphasize costs optimization? (1='no'; 2='yes')
formality approach	Is the competitive strategy for your business written down? (1='no'; 2='yes')
<i>Ownership Structure</i>	
number of	How many owners does the company have?

owners	(1='1';2='2';3='more than two')
number of managers combined	How many managers does the company have? (1='1';2='2';3='more than two')
CEO/owner	The CEO is owner or co-owner. (1='no'; 2='yes')
<i>General Context</i>	
size	Computed as the natural logarithm of the response to the following question. How many persons does the company employ?
age	Computed as the difference between founding year and 2006.
manufacturing sector	Is the company operating in the industrial sector? (1='yes'; 0='no')
construction sector	Is the company operating in the construction sector? (1='yes'; 0='no')
retail and whole sale sector	Is the company operating in sales or repair of consumer products? (1='yes'; 0='no')