Knowledge Management and Growth in Finnish SMEs

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ABSTRACT

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Purpose

The impact of knowledge management on the financial success of companies has not yet been properly researched. This paper makes a contribution by examining the relationship between sustainable sales growth and knowledge management activities in 108 Finnish small and medium sized enterprises (SMEs).

Design

Data were generated from a questionnaire survey of 108 SMEs from different fields and thematic interviews with 10 companies.

Findings

Higher levels of KM-Maturity were found to correlate positively with long-term sustainable growth. Although Finnish SMEs display a surprisingly high awareness about KM, only a minor proportion of the sample firms has been able to benefit in terms of growth from their KM-related activities. The results have implications for policy formulation in the field of SMEs, since half the Finnish SMEs in the sample do not grow. We found that the fast-growing companies with high KM-Maturity are applying KM-related activities in a comprehensive and balanced way, thereby raising question marks around the effectiveness of eclectic "KM implementations".

Research limitations and implications

This research was carried out only in one country and the results cannot be generalised. Furthermore, this study doesn't provide any information concerning the causal relationship of knowledge management and SME performance. Therefore, further studies in the field are needed.

Practical implications

The results from this study also suggest that SMEs might be able to shift into higher growth by applying a comprehensive KM-approach incorporating all intangible assets equally.

Value

This study provides new information concerning the relationship between knowledge management and small business performance.

KEY WORDS
Knowledge management – SMEs – Growth – Sustainable growth

INTRODUCTION

Management literature has recently seen a boom in the number of publications dealing with the management of organisational knowledge and the intangible dimensions of the organisation (von Krogh et al., 2001). Success is said to depend on the organisation's ability to create, utilise, and develop its knowledge-based assets (Hill et al., 2002; Morrison, 2001; Sveiby, 1997; Teece, 2000).

Given the increased interest in knowledge as a source for company growth as well as company growth itself as a performance variable (March & Sutton, 1997), it is surprising that only few studies have been made on the relationship between knowledge management (KM) and company growth. There are studies on knowledge management in SMEs (Beijerse, 2000; Frey, 2001; Heng, 2001; Kautz and Thaysen, 2001; Lim and Klobas, 2000; Wickert and Herschel, 2001), as well as on growth of SMEs (Choueke and Armstrong, 2000; Morrison and Bergin-Seers, 2002; Smallborne et al., 1995; Smith 1998; Storey, 1994; Watson et al., 1998), but hardly any empirical studies combining these issues in a single study.

To fill this void, this article explores whether knowledge management has an influence on corporate success in small- and medium-sized enterprises (SMEs). We have chosen sustainable growth as the primary measure of success and we explore the relationship of KM and growth in SMEs empirically in a sample of 108 Finnish small and medium sized enterprises. We first test empirically whether KM is related to sustainable growth, and then explore in further detail the relationship between differences in growth and KM.

KNOWLEDGE MANAGEMENT AND SMES

"Knowledge Management" is a contested concept. During the 1990's the concept has often used to describe computer applications for information storage and retrieval, Wilson (2002). The information-perspective on KM has been heavily criticised by authors who claim that KM must be seen as a perspective on strategy, management and innovation (Sveiby, 1990, 1997; Nonaka & Takeuchi, 1995; von Krogh et al., 2001).

In this article we will use the definition *KM is the art of creating value by leveraging intangible assets*, (Sveiby 1997), i.e. KM is a perspective on management of the firm as a whole, encompassing activities in all relevant managerial areas.

We regard the concepts "Intellectual Capital" and "Intangible Assets" as synonyms and we follow Edvinsson & Malone, 1997; MERITUM, 2002; Roos et al., 1997; Sveiby, 1997 in regarding intangible assets as consisting of three groups or "families": human capital (employees' competencies and commitment), external capital (image, customer relations, and other external relationships), and organisational capital (internal processes and management of the company). Intangible assets play a critical role in terms of success and competitive advantage in most businesses today and management of intangible assets has emerged as an important management practice and research area (Petty & Guthrie 2000, 161).

For instance, Jaakko Paatero (2003), the Vice President of Raisio Chemicals Ltd. mentioned in his presentation in a recent seminar that in the late 1970s, 80% of the value of Raisio Chemicals consisted of the tangible assets. Today the intangible assets explain nearly 80% of the value of the company and the only way to increase growth in commodity industries is to focus on the management and development of the intangible assets. According to his estimate, Raisio's financial assets and tangible equipment contributes max 2% of growth, while improved management of intangible assets could add 10% or more per year.

Management activities labelled "Knowledge Management" have become ubiquitous during the last decade, but the interest has been driven primarily by anecdotal evidence and inconclusive data and there is a lack of empirical research. Independent researchers have not yet been able to prove conclusively that KM-activities create value.

KM-activities take place also in small companies, but few SME managers call them "knowledge management". For instance, Beijerse (2000), in his study of 12 innovative small companies in Netherlands, found 79 different knowledge management activities or processes. The most important of those were related to strategic management and supporting open and

positive culture. Lim and Klobas (2000), in turn, found in their study of small businesses in Australia and Singapore that the knowledge management needs and challenges are surprisingly similar to those of bigger companies. They also noted that many knowledge management processes are easier to apply in smaller companies because it is easier to capture tacit knowledge in less formalised environments.

The studies both by Gustavsson and Harung (1994) and by Choueke and Armstrong (1998) have shown that collective consciousness, and shared experience and meaning have an impact on organisational learning and ability to change, and thus, also on the competitive advantage of SMEs. SMEs should thus be able to enhance their performance and competitive advantage by a more conscious and systematic approach to knowledge management. This hypothesis is supported at least by two studies (Matlay, 2000; Penn et al., 1998) on SMEs in England. Their most important conclusion is that strategic learning and knowledge orientation lead to survival and growth in the long run, even though there might be other quicker ways to gain short-term success. Despite of the fact that learning occurred in the majority of small businesses, only a minority of companies was able to manage new knowledge strategically to sustain and advance their competitive advantage (Matlay, 2000: 202). The results of these studies indicate that a strategic perspective on acquiring knowledge can be even more important for the business survival and success in the long run than the environmental factors.

GROWTH OF SMALL AND MEDIUM SIZED ENTERPRISES

Growth is considered as one of the key performance measures in any industry, although there are some opposing opinions (Goold, 1996, Storey 1994). Growth is an important measure for stock market valuation and failure to meet growth expectations may shatter market capitalisation. Growth also tends to be one of the key criteria upon which SMEs have been evaluated. Especially sustainable growth of sales is considered as the most important and reliable success criteria of SMEs (Laurence, 2001; O'Gorman, 2001; Watson et al., 1998), and also as the key to prosperity in the modern society (Charan and Tichy, 2000). Mouritsen (1998) claims that even though "growth and financial value creation may not be the only possible objective for the management of the future, in the contemporary world, this is often the case." (p. 461). Furthermore, maintaining stable growth has proven to be difficult in the long run (Goold, 1999). Therefore, sustainable growth, i.e., the growth on the long run in so-called "mature" businesses is considered as a prominent indicator of success (O'Gorman, 2001).

Still, growth is by no means an uncontested success variable; The business goals of many small business owner-managers are determined by personal lifestyle or family factors, not by growth. (Curran, 1986; Stanworth and Curran, 1986). There are also many other measures of performance; profit, ROA, ROI, increase of customers or increase of employees, etc. There are at least three reasons for focusing on growth as a performance variable in SMEs.

The first reason is that growth of sales is several studies have shown that a majority of small business owner-managers think that growth at least to some extent is very important (i.e. Penn et al. 1998) and growth related measures have been found to be more related to the strategic goals of the business than profit related measures (Hudson et al., 2001). According to the small business study by Smallborne et al. (1995), one important characteristic, which distinguished the best performing firms from other firms, was their commitment to growth. Secondly, growth of SMEs has been identified in most western societies as one of the most significant components of economic strategies for new job and wealth creation (Carson et all, 1995; Hodgetts and Kuratko, 1995; Holmlund and Kock, 1998). Finally, growth is probably one of the most reliable indicators in owner-led SMEs, as profit-related indicators are notoriously unreliable.

There is no single theory that could adequately explain growth of SMEs, and it is unlikely that such theories will be developed in the near future (Gibb and Davies, 1990). In recent studies, the emphasis has been on learning ability, open culture and leadership as antecedents to company growth (Choueke and Armstrong, 2000; Morrison and Bergin-Seers, 2002; Smith, 1998; Watson et al., 1998; Zhang, 2000; Smallborne et al., 1995; Weinzimmer, 2000).

A central challenge of the growing company is maintaining flexibility and innovativeness while at the same time introducing systematic processes. Overcoming this challenge is one of the factors that characterise successful firms (Hambrick and Crozier, 1985). Strategic knowledge management might therefore enhance meeting this challenge in the growing company.

Therefore, we propose that KM may have positive effects on a company's long-term growth prospects:

> *Proposition 1: The employment of knowledge management practices and policies in small and medium-sized enterprises has a positive relationship with sustainable growth of those enterprises.*

Furthermore, given that there is a relationship between KM and company growth, it is reasonable to expect that the subcategories of KM and management of intangible assets are significant dimensions in explaining differences in companies' growth paths and effectiveness in practicing KM. In other words, we expect that the companies exhibiting high growth and high KM awareness also score higher on their intangible asset dimensions than do other types of companies. Hence, we propose the following:

> *Proposition 2: The group of companies exhibiting both high growth and high awareness of KM demonstrate higher command of managing their knowledge assets than do other groups.*

METHODOLOGY

Sample and data

The data for this study were collected through a combination of a standardised questionnaire from 108 SMEs located in Finland and semi-structured interviews with 10 of the 108 companies that responded to the questionnaire.

The purpose of the questionnaire was to find out to what extent and how Finnish SMEs have introduced and are utilising tools and processes related to knowledge management and the management of their intellectual capital or intangible assets. The questionnaire included both closed and open questions concerning interest and familiarity with knowledge management, motivation, needs and concrete attempts to launch knowledge management systems, the experienced obstacles and doubts of IC management, and the definitions, ideas and estimations of the firm's most important core competence, intangible assets and success factors of the company. The questionnaire also included a self-assessment concerning the value, use and development of intangible assets of the company using Likert-scaled statements listing different categories of intangible assets from existing literature (MERITUM-guidelines, Sveiby, 2001, Edvinsson & Malone, 1997, Roos et al. 1997).

The questionnaire was pre-tested by 10 companies and improved and finalized based on the feedback. The survey was carried out in October 2002 and was sent to 540 Finnish SMEs with less than 249 employees randomly selected from three different sources: 255 companies from the *Teollisuus ja Työnantajat*-database (Industry and Employers, the industrial employers' common representative body), 197 from *Suomen Yrittäjät* (Finnish Entrepreneurs), and the remaining 88 companies were selected from the company lists of Finnish Technology and Innovation centres. The number of companies from each of the three databases reflected the total number of companies in them. After one round of questionnaires, 108 valid answers were received. In addition, 5 respondents replied that they no longer were SMEs due to organic growth or mergers. Hence, the effective response rate was 20.0%. The dropout analysis showed that the only demographic factor that distinguished the respondents from the no-responding group was the degree of internationalisation. The respondent companies were slightly more international ($p < 0.05$). There were no differences in size of personnel, industry, location, or annual sales.

In the second part of the study, interviews were carried out with 10 of the companies that responded to the questionnaire in order to get a more comprehensive picture of the

different aspects of knowledge management and SME-specific challenges. The companies were chosen based on the criteria that they had recently been involved in planning or/and implementing knowledge management processes. The semi-structured interviews of 60-80 minutes were conducted with the managers of the companies. The questions were so open, that answers can be considered as narratives.

The 108 companies that responded to the questionnaire were operating in the following industries and geographical locations (also the figures of the original sample of 540 companies is included):

Table I: Industry and locational characteristics of the whole sample vs. respondent companies

Whole sample (N = 540)

Industry	Location
40% manufacturing industry	35% Southern Finland
11% information technology	41% Western Finland
28% services	17% Eastern Finland
7% education and consulting	7% Northern Finland
6% retail stores	
8% other	

Respondents (N = 108)

Industry	Location
37% manufacturing industry	35% Southern Finland
12% information technology	50% Western Finland
25% services	12% Eastern Finland
10% education and consulting	3% Northern Finland
6% retail stores	
10% other	

The average respondent company had 29 employees, was founded 12 years ago, and was located in a city in Western Finland.

Variables

Sustainable growth

Sustainable growth was measured as a function of two variables, annual sales growth and age of the company. We chose a combination of these two variables as it can be argued that in order for growth to be a significant measure of "success", it needs to be sustained over a longer period of time. Growth was measured on a 4-point Likert type scale ranging from 1="no growth in sales" to "4=very rapid sales growth (>25%)". See Appendix 1 for a detailed description of the variable.

Knowledge Management Awareness – (KMA)

This variable was measured with one question: "Are the concepts of intellectual capital management (ICM) or knowledge management (KM) familiar to you?" and the response alternatives ranged from "1=No; 2=To some extent for me personally; 3=The concepts are familiar to me and have been mentioned in our enterprise; 4=Our enterprise works actively with these issues".

Intangible Assets Aptitude – (IAA-index)

Knowing about KM as a concept may have no correlation with actual behaviour. Therefore we asked the respondents to do a self-assessment also of management activities. The categorisation follows the MERITUM guidelines of the intangible assets, human capital (HC), organizational capital (OC) and external capital (EC), as described in Appendix 2. The result is

three composite variables consisting of 7 items in each of the three categories. The sum of these three constructs is called the IAA-index.

KM Maturity level

Both IAA-index and KMA-index can be said to show levels of maturity regarding Knowledge Management. In the course of the analysis we found a very high degree of correlation between them, so for some of the tables, they were combined them into one composite variable, "KM Maturity". See below Chapter "KM Maturity and Growth – Four Clusters of SMEs".

Human capital, Organisational capital, and External capital

The measures of human capital, organisational capital, and external capital follow the MERITUM guidelines of intangible assets (MERITUM, 2002), and each consist of 7 items (see Appendix 2). To test the reliability of the scales concerning these three categories, a reliability analysis was made using the three predetermined IC categories. It gave a KMO measure result 0.74, indicating acceptable simplicity (Kaiser, 1974). The Cronbach's alphas were as follows: HC $\alpha = 0.74$; OC $\alpha = 0.60$; EC $\alpha = 0.64$, thus being on an acceptable level.

Degree of R&D

Degree of R&D was measured by asking "How important are innovation and R&D in your business?" and the response alternatives ranged from "1=No role; 2=In minor role; 3=In significant role; 4=Innovation and R&D is the core of our business".

Internationalisation level

This variable was measured with the statement "Evaluate the degree of your internationalization" and the response alternatives ranged from "1=No or almost no international contacts; 2=We have international business contacts through our networks but we don't export our products; 3=Minor part of our business is international (up to 25% of turnover); 4=Significant part of our business is international (25-75% of turnover); 5=All our business is international (more than 75% of turnover)".

Customer service personnel

This variable was measured by asking "How many employees in your enterprise work with customers?" and the response alternatives ranged from "1=Less than 5%; 2=5-15%; 3=16-50%; 4=More than 50%".

Explorative factor analysis

An explorative factor analysis on the 21 intangible assets items (see appendix 2) was also made. The best fit was found with four factors, which were labelled Collaborative Climate (COL), organizational development (DEV), and service, customer and service orientation (SERV), and risk management (RISK). The KMO measure result was 0.75 ($p = 0.000$). The details of the factor analysis and variables included in each factor can be found in appendix 3. The fourth factor, risk management, consists only of two variables, IPRs and brands, and therefore, the Cronbach's alpha is under the acceptable level. After testing several different factor solutions, we found the best model was gained by using all four variables, and therefore, we decided to include all four, taking into account the limitations of the fourth factor.

Reliability of self-assessment

The intangible asset aptitude (IAA-index) (appendix 2) is based on self-assessment. Self-assessment is used more and more as an organisational and managerial assessment and development method, particularly in conjunction with performance excellence models and quality management, such as TQM and EFQM. The problem with self-assessment is of course its reliability and validity. People tend to overestimate their own competence and achievements (Harris and Schauboreck, 1988, Conway and Huffcut, 1997) so self-assessment is more reliable for gauging processes, behaviours and attitudes than for assessing own results and achievements (Biazzo and Bernardi, 2003; Moore et al., 2002). In this study, the self-assessment is mainly about behaviours and attitudes, and therefore, it is not question of any

absolute values. Secondly, we are more interested in seeing the differences between the respondents than the scale levels as such. Therefore, the results are not in jeopardy even if all respondents slightly overestimate the success of their own company.

Several studies have shown, that when the reliability of self-assessments have been tested with multiple sources of information (given by the others in the organisation or in the documentation), the correlations haven been relatively high, between 0.64 and 0.8 (Baruch, 1996). We may also assume that owing to the anonymity of the respondents there is no reason for them to lie when referring to their processes, practices and attitudes.

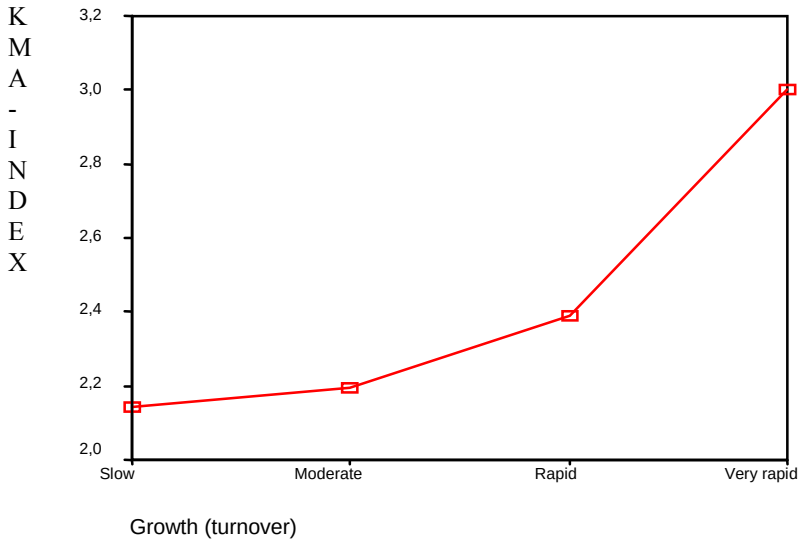
Another challenge is that the respondents may not interpret the same question in the same way. In general, simpler questions show more similarities in interpretations (Baruch, 1996). Some studies have also shown that good education and seniority make managers more reflective and objective in their self-evaluation, and thus, increase also the validity of the self-assessments (Baruch 1996). To limit the opportunity of misinterpretation of question content, the questions was tested by 10 managers before the study, and the questions were reformulated based on their feedback.

Consequently, we assume that the self-assessment is an acceptable method to be used in this study.

RESULTS

We found a high level of awareness about KM in this sample of Finnish SMEs. Only 17% of the respondents did not recognize the concept knowledge management at all (KMA value = 1). 53% knew the concept personally (KMA value = 2), 35% of the respondents reported their enterprise somehow to actively discuss (KMA value = 3) or to deal systematically (KMA value = 4) with the concept. Half of those (16%) reported their enterprise to work currently with knowledge management. 11% (N = 12) of the companies reported that they have constructed an own knowledge management system. 35% of the companies were using some other well-known management systems (like TQM, BSC, CRM etc.)

Figure 1. Growth and Knowledge Management Awareness are related.



We had included questions concerning different knowledge management processes: 70% of the enterprises had sometimes done customer or employee satisfaction surveys. 15% had used competence mapping. Many respondents, 80%, answered that they conducted employee development discussions, 60% do so annually.

Annual Sales Growth

The respondents were asked to evaluate their company's sales growth in the past 3 years on a scale from 1 to 4. Option one referred to growth of less than 3% (= slow) per year, which is the average national growth in the past years in Finland. Option two referred to yearly growth of 3-10% (= moderate), option three to growth of 10-20% (= fast) and option four to growth of more than 20% (= very fast) per year.

More than a quarter (27%) of the companies reported slow (or non-existing, even negative) growth and 43% moderate growth. 17% had grown fast, and 12% very fast in the past three years.

We can see that the very rapidly growing enterprises tend to be significantly more active in knowledge management than the others. Figure 1 illustrates that growth and KMA-index are highly correlated. The curve displays an almost exponential relationship.

The conclusion is that growth is clearly correlated with knowledge management awareness.

KM and Sustainable Growth

As discussed earlier, sustainable growth is desirable and beneficial from the national economic point of view. We thus created one composite variable of sustainable growth. This combined the age and growth of company so that older companies got a higher rating of rapid or very rapid growth than younger. We also combined IAA-index and KMA-index into one composite variable "KM Maturity (KMM-index)". Firstly, the sustainable growth variable correlates positively with knowledge management maturity ($r = .214$, $p > 0.05$). Secondly, a regression analysis was made in order to ascertain which variables could best explain the value of sustainable growth. The best predictors of sustainable growth were the degree of R&D and knowledge management maturity ($F = 5.25$, $p = 0.007$).

Table II: Multiple regression on predictors of sustainable growth

N = 108	Standardized Betas	
	1	2
(Constant)	.520	
Manufacturing industry dummy	-.097	
Service industry dummy	.082	
IT industry dummy	.223*	
Training industry dummy	-.088	
Retail stores industry dummy	-.107	
KM maturity		.217*
Company Size		.097
Internationalisation level		.020
Degree of R&D		.136
Level of competition		-.019
Market share of company		.048

Model F=6.577**

$R^2 = 0.117$; Adj. $R^2 = 0.099$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In order to test Proposition 1, i.e. whether KM is positively related to sustainable growth, we conducted a multiple regression analysis with sustainable growth as the dependent variable. As can be seen in Table III, Knowledge Management Maturity has a statistically significant positive correlation (r=.22, p<.05) with sustainable growth, thus supporting our

proposition. In addition, one of the industry clusters, the IT industry, displayed a positive correlation too (r=.22, p<.05). In other words, out of the SMEs in our sample, those representing the IT sector were better able to sustain growth of annual sales than were companies operating in other industries.

Table III: Correlation matrix of variables in the regression model

	1	2	3	4	5	6	7	8	9	10	11
1. Manufacturing											
2. IT	-,294**										
3. Service	-,439**	-,218*									
4. Training	-,254**	-,126	-,188								
5. Detail stores	-,193	-,096	-,142	-,082							
6. Age	,256**	-,489**	,102	,088	-,091						
7. Internationalization	,444**	-,049	-,235*	-,092	-,180	,190					
8. Degree of R&D	,061	,215*	-,098	-,042	-,051	-,044	,288**				
9. Degree of competition	,117	-,061	-,012	,103	-,046	,237*	-,116	-,061			
10. Market share	,004	-,107	,019	-,100	-,051	,208*	,021	,014	-,235*		
11. KMM	-,065	,211*	-,004	-,020	-,185	-,139	,074	,246*	-,094	-,049	
12. Sustainable growth	-,168	,269**	,028	-,119	-,164	-,169	,025	,225*	-,053	,014	,264**

* p < .05 (2-tailed).
** p < .01 (2-tailed).
N=102 (listwise deletion)

Table IV: Intangible Assets Aptitude, Knowledge Management Awareness and Growth are closely related.

	Growth	IAA-index
IAA-index	.204*	
KMA-index	.215*	.310***

* p < .05
** p < .01
*** p < .01

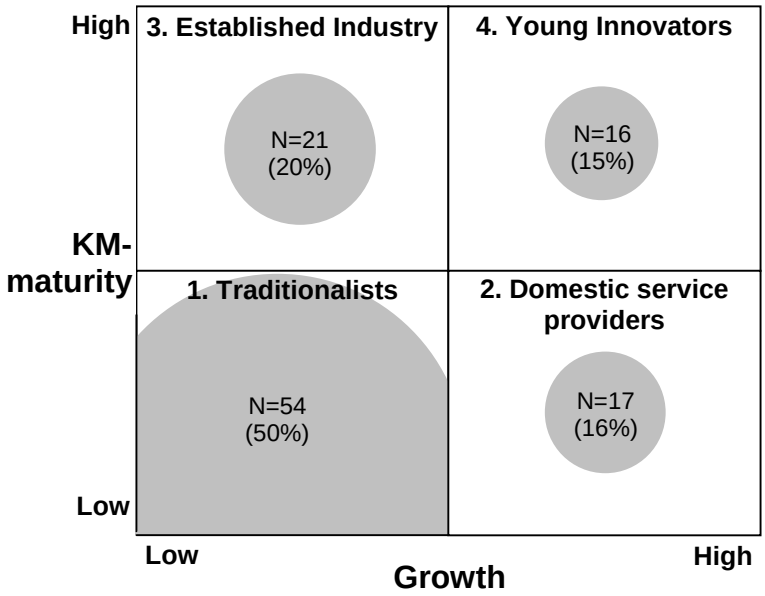
KM MATURITY AND GROWTH – FOUR CLUSTERS OF SMES

Because of the high degree of correlation between IAA-index and KMA-index they were combined them into one composite variable, "KM-Maturity". We then clustered the companies in four different categories with the two dimensions, *Growth* and *KM-Maturity*. The clusters were first made manually, then confirmed by SPSS cluster analysis. The following Figure 2 summarises our findings.

The Y-axis, KM-Maturity in figure 2, is a combination of KMA-index and IAA-index. "Low" KM-Maturity is KMA-index 1 and 2 and IAA index 1-3. "High" KM-Maturity is KMA-Index 3 and 4 and IAA+Index 4-5.

Half of the SMEs, we call them the "Traditionalists", combine relatively low growth and low knowledge management maturity. The other half of the sample is divided equally among the other three clusters. Companies in Cluster 2, the "Domestic service providers", grow rapidly, but they do not employ a high level of KM-related activities. Companies in Cluster 3, "Established Industry", spend resources on KM activities, but they do not grow. And in Cluster 4 we find the "Young Innovators", rapidly growing companies that are actively involved in knowledge management.

Figure 2: Four Clusters of SMEs



Some characteristics of the enterprise clusters are:

Cluster 1: Traditional small businesses

- Old and small
- Low development capacity
- Domestic manufacturing or service enterprises with low level international contacts
- Product-based manufacturing business
- Core competencies: Professional knowledge, outsourcing service knowledge and production of special products
- Most important intangible assets: Personnel, technology, flexibility in business
- Most important success factors: Customer orientation and service attitude, knowledge of the business area, competence and commitment of personnel

Cluster 2: Domestic service providers

- Relatively young and small
- Low development capacity
- Domestic service enterprises
- Core competencies: Professional knowledge, innovative products and process knowledge
- Most important intangible assets: Personnel, technology, and service concept
- Most important success factors: Knowledge of the business area, competence and commitment of personnel, and quality, brand or image of the products

Cluster 3: Established industry

- Old and middle-sized
- Relatively high development capacity
- Domestic or international, most often manufacturing enterprises
- In most cases customer service based, quite often also product based business idea
- Core competencies: Knowledge of the overall business, professional knowledge, and innovative products
- Most important intangible assets: Personnel, customers and networks
- Most important success factors: Knowledge of the business area, competence and commitment of personnel, systematic planning and management, and customer orientation and service attitude

Cluster 4: Young innovators

- Young and small or middle-sized
- High development capacity, innovation as key element
- Half are IT, rest manufacturing and service branches
- Mostly located in cities
- In most cases customer service based business idea
- Core competencies: Knowledge of the overall business, knowledge of outsourcing service, professional knowledge, and innovative products
- Most important intangible assets: Personnel, customers and networks
- Most important success factors: Knowledge of the entire business area, competence and commitment of personnel, and customer orientation and service attitude.

In order to test for the differences statistically, and hence to test for Proposition 2, analyses of variance (ANOVAs) were utilised. The results of these tests are illustrated in Table V.

Table V: ANOVA-analyses of differences between the four groups of companies

Variable	Group 1	Group 2	Group 3	Group 4	F-test
Age of company					
IAA-index	$3.7^{c,d}$	3.8^{d}	4.0^{a}	$4.1^{a,b}$	3.988**
Degree of R&D	2.4	2.5	2.5	3.1	2.649(*)
Customer service personnel	$3.3^{b,c}$	$3.7^{a,c,d}$	$2.8^{a,b}$	3.2^{b}	3.150*
Internationalisation level	2.5	2.2	2.9	2.6	0.877
Intangible assets					
Human capital	3.8	3.9	4.1	4.1	2.015
Organisational capital	3.4^{d}	3.4^{d}	3.7^{d}	$4.1^{a,b,c}$	6.678***
External capital	3.9^{c}	4.1	4.2^{a}	4.1	3.310*
KM factors					
Collaborative climate	3.6^{d}	3.8	4.0	4.1^{a}	2.821*
Organisational development	$3.6^{c,d}$	3.9^{d}	4.0^{a}	$4.3^{a,b}$	5.471**
Customer orientation	4.5	4.5	4.6	4.6	0.542
Risk management	2.3	2.4	2.9	2.6	2.022

*$p < .05$; **$p < .01$; ***$p < .001$ (*)= p = 0.05

The two clusters scoring high on KM Maturity, i.e. clusters 3 and 4, differ from the two low-scoring clusters as follows:

- Firstly, the role of organizational development and innovation is more important and,
- secondly, they keep the understanding the overall business as a key element, and,
- thirdly, they see personnel, customers and networks as the most important assets while the other companies often mention only people and products.
- They also tend to be on average (not statistically significant) more international and,
- Finally, they have a better collaborative climate than the two low-scoring clusters.

The high scorers in KM-maturity thus represent a much more comprehensive and balanced management of intangibles and a more intentionally development orientation style than the two other clusters.

The fast growers, (clusters 2 and 4), are relatively young and are mainly found in non-manufacturing industries. They differ from each other in that "the young innovators" have a more active, holistic, innovative and international strategy, which includes systematic organizational development. The "domestic service providers", on the other hand, are focused on fulfilling customers' needs, but they do not do much organizational development. Both strategies show a positive correlation with growth.

The differences between the clusters cannot be explained by demographic factors; all industries, all sizes, and all age groups are represented in all clusters. The explanation seems to be more the chosen strategy – or lack of it – than anything else.

To improve the analysis we made a series of interviews; one case from each cluster. Because the most interesting data can often be found in the untypical cases, we also made four interviews with border-line enterprises and they are presented below.

THE UNTYPICAL COMPANIES REVEAL THE DYNAMICS

Can the untypical cases give us more clues about what makes SMEs more or less dynamic?

The "high-tech manufacturer" – untypical Cluster 1.

The untypical Cluster 1 is an over 15 years old family business producing special health testing products located in the capital area. The company employs 8 people and is exporting 90% of its products all over the world. Research and product development are important in their business. Two persons work in direct contact with the customers. They have no domestic competitors, and their market share is more than 50% of the global target market. They have a very high profitability, but their growth has been moderate lately. The company started a total quality management project some time ago, and a health and safety at work project, and recently, a knowledge management project. All these projects are seen as one development effort, much related to each other.

Thus, the company has some basic characteristics of a small family business, but on the other hand, very strong international networks and intent to develop organizationally. Therefore, we would expect that this company might shift from cluster 1 to another cluster in the matrix.

The "Service Provider going innovative" – untypical Cluster 2.

The untypical Cluster 2 company is a ten year old software engineering company providing tailor-made solutions and outsourcing services to middle-sized and big companies. It is located in Helsinki with a branch in West Finland and enjoyed a very rapid growth in the early years, which has slowed to 10% in the past three years. The company is owned by its manager and by some of its 16 employees. It has some international customers, but they mainly depend on a couple of big Finnish customers.

Nearly all of the employees work in direct customer contact and until recently, they did almost everything customers asked them to do. Until recently they did not have a product or service concept of their own. Something they are now changing into a more independent and active strategy with their own product, service concept and innovation process. They have started quality management and knowledge management projects to support this development. They also participate in an international technology development project funded by EU. The target is to shift slightly to more organized projects that are bound to their own innovative products, but the goal is still to remain flexible and customer oriented and also to provide tailored solutions at the side.

This company is thus the typical service provider, now starting to shift orientation and strategy. We can see that it represents a borderline case that aims at shifting from cluster 2 towards cluster 4.

The "established company with development potential" – untypical Cluster 3.

A 12 year-old training and consulting company with less than 10 employees is the untypical Cluster 3 representative. It is owned by its manager and located in the capital area. R&D is moderately important for them, and half of the personnel work in direct customer contact. They have some international customers, but their growth has been slow in the recent years and they work actively with knowledge management and other management and

development systems and programs to shift the trend. They see networks, experience, support systems and systematic working as their most important resources.

This is a borderline case in cluster 3. Although they are managing systematically and internationally, they have remained small service provider. This company might shift towards more growth by increasing customer orientation and flexibility.

The "Traditionalist going high-tech" – untypical Cluster 4.

This is the only metal industry enterprise in cluster 4 and it is also quite exceptional because of its background. It started with a one man's enterprise in the 60's, and has slowly grown to its present level, employing about 55 employees and serving big international customers. The company is still a family enterprise and located in a town in Western Finland. R&D is important for them, and about 20% of their staff work in direct customer contact. Despite very hard competition they have grown rapidly in the past three years. They manage knowledge systematically, and they have run several development projects in the past years, often in co-operation with the universities and polytechnics. They have also had many technology co-operation projects with TEKES and other technology providers. They regard their system and process knowledge a core competence, and competitive personnel and production management are seen as their most important intangible assets. They believe that their success is mainly based on their ability to add value by seeking the optimal solutions to their customers' needs. This case is an example of a shift from cluster one or 3 to cluster 4: from established industry towards more service provision.

THE YOUNG INNOVATORS – WHY ARE THEY GROWING SO FAST?

Typical for all the companies in cluster 4 is a more balanced approach; Personnel, organization and systems, networks and customers, are all paid equal attention. This is confirmed by the fact that the means of human, organizational and external capital are almost in balance. In the other three clusters the mean value of organizational capital is clearly lower than the values of human or external capital. The cluster 4 differs in the mean value of organisational capital from cluster 1 and 2 on significant level ($p = 0.000$). Also the standard deviations of cluster 4 are smallest of all clusters in each capital class.

The mean values of collaborative climate (COL), organizational development (DEV) and risk management (RISK) factors are also higher in the clusters (3 and 4) with high knowledge management awareness. The difference is significant ($p = 0.000$) in the organizational development.

This suggests that knowledge management activities are more balanced and more comprehensive and take all intangibles, not just human capital, into consideration. The companies in cluster 4 are young, and many of them had the characteristics of this cluster from their founding. However, the untypical case 4 indicates that "shifting or growing to excellence" is possible.

CONCLUSIONS

The answer to the main question in this article, whether knowledge management is correlated with company growth is: yes. It seems clear that knowledge management maturity is positively correlated with growth. It is not a causal relationship; we can only conclude that knowledge management awareness and activities and faster growth often appear in the same companies.

Our data also indicate that companies with a more comprehensive and strategic approach to knowledge and intangible assets are growing more than those with a less balanced approach, which suggests that also the second proposition is confirmed. The cluster of fast-growing companies is applying KM-related activities in a comprehensive and balanced way covering all aspects of their intangible assets, rather than as eclectic discrete activities. This result is important, because it raises a question mark about the effectiveness of piecemeal "KM implementations", which is the most common approach. Is it possible that KM-related activities are effective in creating value only if they are "strategic", i.e. part of a comprehensive programme covering all aspects of the enterprise?

Our empirical results support proposed theories and frameworks in the field, in particular the MERITUM-model of intellectual capital (2002) and proposals made by Sveiby (2001) and by Hussi & Ahonen (2002).

Finally, our interviews with the untypical companies have revealed several clues about how Knowledge Management might be an instrument for transforming the large group of traditionalist Finnish SMEs into more dynamic enterprises. SMEs might be able to enhance their performance and competitive advantage by a more conscious and systematic approach to knowledge management.

However the results also raise some questions. Conscious learning, good leadership and organisational development increase prospects of success as we have defined it here. These are hardly revolutionary new insights, and they are not unique to knowledge management. Have our survey and analysis only picked up effects of good management in general? Is it at all meaningful to make a distinction between "good" management and knowledge management? Would we have got similar results had we chosen another framework? We do not believe so, but these are some of the questions a new theoretical framework must be tested against.

KM is still not proven as a useful perspective on organisation and as a valuable framework for organisation analysis and strategy formulation. Although promising, much work remains to be done, both theoretically and empirically, before KM can be regarded as a perspective with explanatory power that exceeds other frameworks.

IMPLICATIONS FOR FUTURE RESEARCH

New fields of business research these days often go through a life cycle; first some practitioners present their anecdotes and theories, consultants then quickly mark turf by publishing a swathe of normative how-to books supported by anecdotes and far-fetched unsubstantiated "evidence". Students are there early too; browsing the new field in essays and MBA theses. Finally, business researchers get onto the band-wagon and start producing proper, empirically grounded, research supported by validated scientific methods. It is in the beginning of this last phase that we find KM and IC research disciplines today and our paper represents the lowest level of empirical research; correlations in a small sample.

The results of this study are quite encouraging, but the small sample and the lack of time series data prevent us from drawing more far-reaching conclusions. The study therefore points at several areas in need of future research.

What are the most fruitful KM activities? Time series data are required to establish closer links between activities and effects.

What can SMEs do to make the most of the KM discipline in their businesses? Which are the benefits that KM may bring to SMEs?

What can policy makers aiming at improving the growth of "traditionalist SMEs" do to benefit from a KM perspective?

The analysis of the data indicates that knowledge management activities should be "strategic" to be fully effective, i.e. more balanced and more comprehensive and take all intangibles into consideration. This is a very important conclusion and it also raises the bar for future researchers in the KM field. It suggests that narrow studies, traditionally the advice given to young researchers, are less likely to reveal the full extent of benefits from KM-related activities.

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APPENDIX 1: MEASURING *"SUSTAINABLE GROWTH"*

Sustainable growth was measured as a function of two variables, annual sales growth and age of the company.

Annual sales growth was measured on 4-point Likert type scale:

1 = no growth in sales (less than 3% a year in the past 3 years)
2 = modest growth in sales (3-10% a year in the past 3 years)
3 = rapid growth in sales (11-25% a year in the past 3 years)
4 = very rapid growth in sales (more than 25% a year in the past 3 years).

Age of the company was measured on 4-point Likert type scale:

1 = less than 3 years
2 = 3 to 5 years
3 = 6 to 10 years
4 = 11 to 15 years
5 = older than 15 years

The two variables were combined into one measure of sustainable growth by scoring the different alternatives in the cross-table:

Table 1. Values of sustainable growth

GROWTH	*1*	*2*	*3*	*4*
AGE				
1	1	2	7	12
2	1	3	8	13
3	1	4	9	14
4	1	5	10	15
5	1	6	11	16

Growth is here considered as the main dimension, and age only as a complementary variable, the scores increase primarily based on the growth, and secondly, based on age.

APPENDIX 2: SURVEY QUESTIONS.

Composition of the variables measuring intangible assets (Intangible Asset Aptitude, IAA-index)

The answer scale was the following

1 = I fully disagree
2 = I partly disagree
3 = I am not able to say
4 = I partly agree
5 = I fully agree

Human Capital

1. Human resources play a very significant role in our business and for the growth
2. Our personnel is in average highly competent and professional
3. We use a lot of time and effort in our enterprise to up-date and develop our knowledge and skills
4. Our employees are highly motivated and committed to their work
5. Our human resources management functions well
6. Team work is typical for us
7. Our employees are continuously encouraged to bring new knowledge and ideas to our business to share their knowledge with the colleagues

Organisational Capital

8. Values and norms are very important for us and all our employees are aware of them
9. We continuously develop our work processes
10. We continuously develop our organization (structure and responsibilities)
11. We own several patents, licenses and copyrights
12. We have useful and updated information systems in our use
13. The culture and spirit in our enterprise are positive
14. Our communication is open and reaches everybody

External Capital

15. Customers play the most significant role in our business
16. It is important for us to be in continuous contact except our customers to other stakeholders and to our social environment and to develop our networks all the time
17. Our products represent well-known brands
18. The feed-back from our customers is without exceptions positive
19. We are able to learn and add value through our partners
20. Good reputation and image are very important for us
21. It is important for us to share our knowledge with our partners

Intangible Asset Aptitude = sum of the variables 1-21.

APPENDIX 3: FACTOR ANALYSIS OF INTANGIBLE ASSET ITEMS.

Factor analysis with Varimax rotation on intangible asset items

Factors and explained variance	Variable Number (see appendix 2)	Factor loading	Cronbach's alpha	Factor mean	Item mean *
Collaborative climate (human and social capital) 26%			0.82	3.8	
Competence of our staff	2	0.62			4.22
Competence development	3	0.52			3.38
Commitment and motivation of staff	4	0.78			4.10
Efficient HRM	5	0.70			3.43
Share of team work	6	0.61			3.70
Knowledge sharing within organization	7	0.51			3.86
Importance of values and norms	8	0.62			3.78
Positive culture and climate	13	0.81			4.13
Open and efficient communication	14	0.67			3.76
(Information systems	12	0.38			3.61)
Organisational Development 10%			0.63	3.8	
Continuous organization development	10	0.72			3.91
Continuous process development	9	0.65			3.69
Learning from the partners	19	0.67			3.81
Sharing knowledge with partners	21	0.59			3.87
Service, customer and network orientation 9%			0.62	4.6	
Customer orientation	15	0.72			4.77
Importance of personnel	1	0.70			4.53
Importance of image and reputation	20	0.67			4.56
Importance of stakeholders and other networks	16	0.55			4.34
Risk management of intangible assets 7%			0.32*	2.5	
Intellectual property rights	11	0.78			1.94
(Well known brands	17	0.38			3.04)

- = 5-point scale ranging from completely disagree to completely agree.

* the alpha value is under the acceptable level. This factor was still taken into to factor model in order to cover all the used variables related to Intangible Asset Aptitude. Other factor solutions were also tested, but this factor solution turned out to be the best to differentiate the four clusters of SMEs.