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# Knowledge management in Small- and Medium-sized Enterprises: A Conceptual Framework for Research

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## **Abstract**

Intellectual capital is increasingly viewed as the single most important asset of organisations. While most large organisations have resources, staff and plans in place to support and develop intellectual capital, many smaller organisations do not. This paper focuses on knowledge management and transfer in SMEs within a broader context of a knowledge economy. The paper also develops strategies for knowledge management within smaller organisations as they incorporate technology and strive to build and retain a productive and creative workforce.

**Keywords:** Knowledge management, Small and Medium-sized Enterprises (SMEs), Knowledge-based economy, Intellectual capital.

## **Introduction**

This article deals with a field which gets little or no attention in the research done into the knowledge management: small and medium-sized companies (SMEs). SMEs are viewed as the growth engines of the new knowledge-based economy (Tangri and Scaone, 1998). This new economic growth model differs from the old in significant ways, many of which are related to the knowledge base that will be required by the SMEs. Based upon a review of research a set of factors important to the success of SMEs in a knowledge-based economy is described. Focusing on those factors related to the knowledge base, the paper concludes with a set of questions and a conceptual framework for future research on knowledge management in small- and medium-sized enterprises.

While all organisations must have educated employees who can use technology and adapt to technological change, small organisations have their own idiosyncratic requirements. Unlike larger organisations that often have in-house resources in place, smaller organisations may need to rely more on outsourcing. They may also rely more on ‘emergent experts’, i.e., end-users who, as early adopters, become the in-house repository of knowledge about systems or technology. The decision to rely on in-house versus external expertise, and formal versus informal experts, may reflect how quickly an

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organisation is able to respond to change, and may also impact the organisation's ability to innovate and use new technology in creative ways.

Hansen et al. (1999) proposed two strategies for knowledge management: codification and personalisation. Codification focuses on building knowledge databases. Personalisation denotes facilitating communication with the people who develop and hold knowledge. Based on case studies of large organisations the authors make a compelling case that a company's knowledge management strategy should reflect its underlying competitive strategy. Most studies to date, including Hansen's, focus on large organisations. In large organisations, knowledge management and transfer are particularly problematic because it may be difficult to determine what is known and who holds the knowledge. In smaller organisations however, employees may be more likely to know who has information and to turn to those people when questions arise. i.e. to follow personalisation approach. It is not clear whether a codification strategy ever makes sense for small businesses, and, if so, under what circumstances a small company should consider this approach.

The needs for intellectual capital change in the course of SME growth just as the needs for financial capital change. During the start-up phase, a company relies heavily on the knowledge of a few individuals. At this stage it may make sense to outsource as many processes as possible and to focus efforts on getting the company going. During this stage there are 'key people' whose departure would probably signal the end of the company. In later stages, it becomes increasingly important to share knowledge, codify where appropriate, and make decisions on which areas of knowledge are core competencies for the firm and which can be outsourced.

This study examines knowledge management and knowledge strategies in SMEs. Focusing specifically on the areas of information technology and telecommunications, the paper examines strategies employed by small businesses to learn, adapt to technological change, and innovate. Based on this study a conceptual framework for future research that considers the evolving needs of SMEs will be proposed.

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## Changes in the economy: the knowledge economy

Prior to the 1997 financial crisis the economic growth model in Asia relied primarily on export manufacturing, property development and the banking sector. That model is no longer valid. Increased competition in manufacturing from China, NICs, Latin America and Eastern Europe, coupled with other global changes, have caused governments to search for new growth engines for economic development. Increasingly national, regional and local governments are pinning their hopes on small, high-tech businesses to fuel economic growth.

**TABLE 1**  
**Characteristics of Models for Economic Growth**

<b>Old Model</b>		<b>New Model</b>
Foreign	<i>Ownership</i>	Local
Formal	<i>Networks</i>	Informal
Unequal	<i>Relationships</i>	Equal
Parent	<i>R&amp;D</i>	Local
Slow	<i>Change</i>	Potentially Faster
Potentially Limited	<i>Local expertise</i>	Potentially higher
MNC	<i>Tech Transfer</i>	Internet
Complex	<i>Info and Comm. needs</i>	Simpler
Large organisation	<i>Info access</i>	Everyone

There are significant differences between the new and old models (see Table 1). If we take a more economic focus, we see for example individualisation, immaterialisation, initiation and ageing in consumer markets, whereby the markets in their turn are increasingly steered by an unpredictable consumer. Besides this, we see trends such as flexibilisation, deregulation, professionalisation, specialisation and an increasing interest for individual entrepreneurship, network formation, computerisation and internationalisation within economic contexts. Altogether, it is argued that the western economy has evolved into a knowledge economy in which the technological and scientific developments follow each other in a rapid pace and in which things such as information

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and communication technology (ICT), networks, international competition and knowledge intensive products such as services, play dominant role.<sup>1</sup>

There are also other characteristics which can be mentioned. For example, in the old model many of the large high-tech organisations were foreign-owned. Economies that are dependent on multinational corporations are characterised by network relationships that are formal and marked by inequalities of power. In a study of multinational corporations (MNCs) in Malaysia, for example, Jegathesan et al. (1997) found that foreign-owned organisations were slow to transfer technology and R&D activities to their Malaysian operations. The MNCs in his study used their overseas locations for production, and left the R&D components with the parent company at home. Technology transfer took place through the parent corporation. Small businesses, in contrast, are more likely to be indigenously-owned and to have less formal horizontal network structures. An informal horizontal structure may enable SMEs to respond more quickly to new opportunities. In a model of indigenously-owned companies, any R&D that occurs is likely to be done in-house and in-country. It is unclear how technology transfer will take place under the new model, although it is likely that the Internet will play a significant role in the process. This may mean that the knowledge base needed by SMEs is higher than was needed under the old model of MNCs with foreign-based operations.

Small organisations have simpler communication and information requirements than larger organisations. In the past a lack of information prevented small businesses from competing effectively. This is no longer a barrier. Basic telecommunications facilities today enable small businesses to communicate, access information and participate in new markets in ways that were not possible in the past. A reliable, affordable telecommunications infrastructure enables business to access email, voice, fax, message services, databases, information, training and e-commerce services. This infrastructure is necessary, but not sufficient, for success. What else is needed?

One approach to determining factors contributing to success is to focus on 'best practices' i.e. examine economic success stories to identify factors that may have contributed to success. Another approach is to determine the obstacles that stand in the

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<sup>1</sup> It should be noted that as Keith Smith (2002) maintains the terms like 'knowledge-intensive' industry or a 'knowledge-based' economy often used in a superficial and uncritical way and there is a real need to consider whether they are anything more than slogans. For a critical view on these topics see Smith (2002).

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way of success. Examples of these approaches and the results of several studies are presented below.

### **Best Practices and Perceived Obstacles**

Research on best practices tends to focus on countries such as Ireland, Finland, Singapore or the US to determine what economic/structural circumstances that contributed to success (see, for example, Saperstein & Rouach, 2002). Ireland presents an interesting model. According to Norton (1999) its booming economy appears to have leaped from the agricultural age directly to the information age, with no stops along the way to experience the industrial age. Ireland's success is attributed to financial resources (foreign investment attracted by favourable tax policies), minimal regulation, and a positive business climate specifically designed to attract investments in technology and pharmaceuticals.

Finland is also often cited as a model, as is Silicon Valley in the US, where the IT-based economy grew as a direct result of active government support, including significant federal funds pumped into R&D projects (Lyytinen & Goodman, 1999; Watson, 2000). The Finnish model is based on a strong national strategy that promotes IT and provides significant tangible support for the knowledge base through investments in R&D and education.

Hudson (1999) examined regions in Eastern and Western Europe to uncover common characteristics of successful economies. He concluded that successful economies are characterised by: (1) horizontal networks of SMEs; (2) hard and soft infrastructure including an educated labour force, transportation and communication networks; (3) a governmental mindset that enables and facilitates business; and (4) decentralised regional governance within federal state systems. Although he is cautious about assuming that these characteristics can be transferred directly from west to east, Hudson draws two important conclusions: (1) success is characterised by an ongoing process of anticipating and adjusting to change and (2) the most significant influence remains the character of the national mode of regulation and the strength of the national economy.

Best practice studies are helpful in determining factors that contribute to success. These studies are generally done at a macro level, i.e., studies of economic regions or nations. It is more difficult to capture best practices of individual organisations, and if

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captured at that level, results may not be generalisable to other institutions. Studies of best practices are not the only approach to determining factors important to success. Another approach is to focus on obstacles to progress. Studies of this type are often surveys designed to capture perceptions of individuals involved in doing business in a region. Such surveys can be useful both in identifying problems and setting priorities.

For example, a large-scale survey sponsored by the World Bank as part of the 1997 World Development Report collected responses from 3,951 firms in 74 countries to identify perceived obstacles to business success (Pfeffermann & Ksunko, 1999). Taxes and tax regulations were found to be the most significant obstacle in all countries. Interestingly, this study reveals evolution in perceived obstacles as countries develop. In developed countries labour regulations and safety/environmental regulations are viewed as serious obstacles to progress, yet those are not viewed as important in developing countries. In developing countries the most serious obstacles (in order) are: tax regulations, corruption, unpredictable judiciary, crime and theft, financing, inflation and infrastructure. In transition economies the obstacles are : tax regulations, corruption, unpredictable judiciary, unstable policies, crime and theft, financing, uncertain costs of regulations (Pfeffermann & Ksunko, 1999).

A similar study by the United Nations focused specifically on obstacles to the use of IT in developing nations. The study concludes that unless developing countries remove major obstacles to dissemination of IT, the gap between rich and poor nations will widen. Among the specific problems cited as major factors hindering development are inadequate telecommunications facilities, high tariffs and proliferation of standards. High energy costs and poor power supplies are also serious problems. The study also concludes that all countries must invest more in education and upgrading worker and management skills in order to participate effectively in the expanding global information network (UN, 2002).

Although these studies arrive at their conclusions using different approaches, studies of best practices and obstacles indicate that the following factors are important for economic growth: (1) Financing, (2) Public policies and regulatory climate supporting business, (3) Infrastructure, and (4) Knowledge base.

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*(1) Financing*

Many studies have focused on financial issues and investments needed to stimulate economic growth (see, for example, Pissarides, 1999; McMahon, 2001). Clearly SMEs need venture and working capital, and governments must invest in education and infrastructure while developing policies to stimulate investment. This paper mainly focuses on the knowledge base needed in SMEs, and therefore, the areas of primary interest to this study are investments in education, training and lifelong learning, and support for R&D by both public and private sectors. These issues are touched upon in the sections below on public policy and the knowledge base.

*(2) Public policy*

It is not surprising that public policy can enable or inhibit progress. Among the most discouraging findings are those of Mikosz and Mill (2000), who found 20 countries in Central Asia with laws preventing people from taking advantage of the Internet. Even without such direct obstacles, challenges to gaining access to the Internet are numerous, including language barriers, lack of equipment, limited financial resources and lack of adequate infrastructure. But public policy can make a difference in overcoming many of these obstacles.

Jegathesan et al. (1997) suggests that governments should stimulate economic development in IT by supplying working and venture capital, establishing suitable incentives and tax structures, supporting education and training, selectively funding R&D projects, building and supporting infrastructure, joining economic grouping to encourage trade (ASEAN, NAFTA, etc.) and enforcing piracy laws. Even without major infusions of funds, government has a significant role to play by putting in place policies that help organisations succeed.

A World Bank report concludes that “developing countries must institute policies that will enable them to narrow the knowledge gaps that separate them from rich countries. Examples of such policies include making efficient public investments in lifelong education opportunities, maintaining openness to the world, and dismantling barriers to competition in the telecommunications sector” (World Development Report, 1998/99). The World Bank report distinguishes between knowledge gaps and information problems.

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Knowledge gaps are observed in the differences in technical knowledge in developed and developing countries, Information problems exist when there is incomplete knowledge of attributes, such as quality, credit worthiness, etc. Such information is critical to effective markets. They suggest that three steps are necessary to narrow the knowledge gap: first, acquire knowledge by tapping into and adapting knowledge that exists elsewhere, while at the same time building indigenous knowledge through R&D; second, absorb knowledge by education, training and lifelong learning; and third, communicate knowledge through appropriate legislation, increased competition to ensure that the poor have access.

### *(3) Infrastructure*

In terms of the ICT infrastructure more than 97% of internet hosts are in countries accounting for 16% of the world's population. One obstacle in developing countries is the high cost of service. When measured in terms of per capita income, both set up costs (costs of purchasing computers) and operating costs (costs to connect to ISPs) in developing countries are significantly higher than in the developed world. International leased lines are expensive and ISPs must pass those costs on to consumers. As a consequence, in developing countries growth is often concentrated in the capital cities. Petrazzini and Kibati (1999) found that although more than 60% of the people in developing countries live in rural areas, more than 80% of the main telephone lines were in urban centres.

Because of this imbalance, telecommunications policies often compel companies to provide subsidies to rural and low-income areas in order to gain the right to serve more lucrative markets. Barton and Bear (2000) suggest several models for doing this including phone shops, postal centres, and telecentres. Phone shops in countries such as India, Senegal, South Africa, Indonesia and Bangladesh are locations where people can make local or long distance calls. Typically there are individually-owned shops, franchised from the telephone company. In Bangladesh the Grameen Phone Company provides loans to individuals to purchase cell phones and in exchange those individuals must provide services to the community, including making the phone available to the village, taking messages, and allowing others to receive incoming calls. Telefax, email and other services may be added in the future. Vodaphone has set up similar phone shops in South Africa and

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Indonesia. Such phone shops lay a foundation that can be used in the future for additional services. Postal services are also needed by SMEs, and technology-enabled postal centres, such as PostNet in South Africa are another mechanism for providing telecommunications services to low-income and rural areas. A third model is that provided by community telecenters. These provide not only phone, but computer and Internet access as well. Through community telecentres individuals can access telemedicine, weather information, distance education, and ultimately e-commerce initiatives. At present development in some countries is limited by an inability to provide value-added education and training in the local language. Also, based on prior experience it is not clear that telecentres are economically viable – there is a relatively high failure rate, and experience in Europe suggests that telecentres may take 5 years to become profitable. In developing countries, costs of services need to come down and bandwidth and poor service problems still need to be overcome.

The question therefore is: What telecommunication and technology infrastructure do SMEs need? Barton and Bear (2000) developed a framework of information and telecommunications needs for small manufacturing and service organisations. For some SMEs (traditional artisans, local retailers) telecommunications needs are minimal. These, though, are not the type of businesses that will drive the new economy. These businesses serve local markets and will prosper only if the local economy is good. Businesses that serve larger markets have more complicated information and telecommunications needs, and those are the businesses that can drive economic development and survive local economic bumps. Software development firms are one example of the type of SMEs sought in the new economic model. Successful software development firms need installed computers, reliable telecommunication links, and reliable electricity (Heeks, 1999). In general the type of SMEs that will drive the new economy need access to technology, the Internet and e-commerce.

Access to the IT infrastructure is a necessary, but not sufficient, precondition for success. Beyond the infrastructure and supportive public policy, businesses need a knowledge base upon which they can draw in order to use technology effectively and innovate.

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#### (4) *Knowledge Base*

In addition to hardware and infrastructure, organisations need expertise to be able to use the technology effectively. According to Scott (1999), R&D provides one source of knowledge needed to transfer IT into effective use. Other sources include staff, education, training and support. In today's high-tech, global, knowledge-based economy, intellectual capital is increasingly viewed as the single most important asset of organisations and nations. Serious efforts are underway around the world to manage and measure 'knowledge' through several major bodies of research, including: knowledge management, knowledge transfer, organisational learning and intellectual capital.

*Knowledge management* research focuses on issues of collecting and sharing expertise in organisations. Knowledge management theorists argue that knowledge is the pre-eminent resource of the firm (Grant, 1996; Spender 1996; Davenport and Prusak, 1997). The knowledge-based view of the firm identifies the primary rationale for the firm as the creation and application of knowledge (Nonaka and Takeuchi, 1995; Bierly and Chakrabarti, 1996; Conner and Prahalad 1996; Choi and Lee 1997). Among the questions addressed in this body of literature are: What knowledge exists in organisations? Who holds that knowledge? How can we capture and/or share the knowledge? Some research focuses on building knowledge databases, i.e. electronic repositories of knowledge in an organisation. Among the issues addressed are how to encourage and reward contributions to such a database. This research generally assumes that knowledge is readily transferred as long as it can be captured and stored electronically. This is not always the case. In some circumstances knowledge is not easily codified and effective dissemination requires more personal approaches, such as mentoring. The bulk of the research to date in this area focuses on large organisations.

*Knowledge transfer* is the diffusion of technical information and expertise. At the macro level this research focuses on networked information flows among nations and regions, often focusing on knowledge gaps between developing and developed countries. Ciolek (2000), for example, presents an interesting model for research of this type using the AltaVista search engine to uncover information connections among countries in East Asia. Within organisations (the micro level) the emphasis is on how knowledge moves through an organisation. There is a distinction between knowledge and information.

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Information can be readily transferred, knowledge cannot. According to Denning “it is often very difficult and slow to transfer knowledge from one person to another (1998)”. Much research exists on technology transfer, and increasingly researchers have begun to recognise the importance of human resources in this process, i.e., the role and capacity of the labour force to use, improve, and innovate using technology (see Mefford & Bruun, 1998).

Research on *organisational learning* focuses on discovering attributes of organisations and individuals that enable the institution to innovate, adapt to new situations, and take advantage of new opportunities. Knowledge is central to innovation, both in terms of knowledge stock and knowledge flows. Although much research in this area focuses on innovation, this may not be necessary for success. Since the seminal article by Cangelosi and Dill (1965), organisational learning has been described at three different levels: individual, group and organisation. While many organisational learning theorists have argued for the existence of learning at these levels, some researchers, especially academics in the field of international management, have extended the framework to include learning at the trans-organisational level (see, for example, Miller, 1996).

*Intellectual capital* is a measure of the value of knowledge in an organisation. Much of the literature on intellectual capital stems from an accounting and financial perspective (Stewart, 1997; Roos et al. 1998; Sveiby 1997). Many of these researchers are interested in answering two questions: (1) what causes firms to be worth so much more than their book value, and (2) what specifically is in this intangible asset. Although intellectual capital is a major determinant of a company’s future earnings potential it is not measured or reflected in traditional accounting practices. This explains, in part, what investors are buying when they purchase shares in a company through an IPO or when they purchase shares at high prices in companies that have yet to earn a profit. According to Buckley “intellectual capital is an unrecorded asset, which means that although it is something of value, it is not recorded anywhere on a company’s financial statements. Copyrights, trademarks, brands, staff and research and development are all examples of intellectual capital (2000:1)”. The US Securities and Exchange Commission is considering issues surrounding the disclosure of intellectual property. Some organisations welcome the prospect of doing this because it

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changes the focus on knowledge and IT from being viewed simply as a cost to something of measurable value to the organisation. An interesting related issue not yet addressed in the literature is outsourcing, and the potential long-term impacts of choosing not to build in-house expertise in certain areas.

### **Knowledge management strategy in SMEs**

In this section a conceptual model for knowledge management in SMEs will be developed. This framework can be used to analyse the most important knowledge management processes in companies. It is argued that knowledge management in SMEs gets its form at an operational level. As in strategy literature widely argued, an organisation can be defined in terms of four crucial means with which one can organise: strategy, structure, culture and system (e.g. Hills and Jones, 2001). An optimal mix of these four elements can ensure an optimal management process. Among these elements systems are often central in small and medium-sized companies. There are seldom extensive or crystallised strategies in these companies, or a well thought-out organisation structure. Obviously, there is a certain culture present. However, as the culture is one of the most difficult factors to influence in an organisation, the focus comes back to systems. The systems form the operational part of the organisation.

Hansen et al. (1999) proposed two strategies for knowledge management: codification and personalisation. Codification focuses on building knowledge databases. Personalisation denotes facilitating communication with the people who develop and hold knowledge. Based on case studies of large organisations the authors make a compelling case that a company's knowledge management strategy should reflect its underlying competitive strategy. Most studies to date, including Hansen's, focus on large organisations. In large organisations, knowledge management and transfer are particularly problematic because it may be difficult to determine what is known and who holds the knowledge. In smaller organisations however, employees may be more likely to know who has information and to turn to those people when questions arise. i.e. to follow personalisation approach. It is not clear whether a codification strategy ever makes sense for small businesses, and, if so, under what circumstances a small company should consider this approach.

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Obviously it is important to examine what knowledge can relate to in an organisation such as SMEs. In principle, one should have knowledge of everything, but from a viewpoint of analysis of the organisation, it is useful to define a number of so-called knowledge domains in which an entrepreneur can target himself in particular. Three knowledge domains for SMEs are defined here: (1) organisation, (2) marketing and (3) technology.

Knowledge with regard to the organisation has to do with things such as management, policy, culture, personnel, career planning, internal processes, cut backs, alliances and teamwork. Marketing knowledge basically refer to things such as competition, suppliers, customers, markets, target groups, consumers, clients, users, interested parties, sales, after sales, trade and distribution and relation management. Technological knowledge, however, regards knowledge of products, research and development, information and communication technology, product development and assembly.

Also there are nine possible knowledge streams within the organisation that are important for the management or the entrepreneur to consider in order to structurally managing these processes.<sup>2</sup> The nine knowledge streams are mentioned here. A number of examples of 'systems' that can be used and are especially important within the small and medium-sized companies are named for each stream. Above all, it is stated which of the three other organisation means, i.e. strategy, culture, structure, generally play a dominant role within the knowledge stream concerned:

- (1) Determine the knowledge necessary: before the knowledge stream can be started, it is important that managers look at what knowledge is necessary for the organisation and its goals. This is mainly a strategically driven activity. Necessary knowledge can be, for instance, determined by means of brainstorm sessions, by the development of scenarios or by interviewing clients, suppliers or colleagues.
- (2) Determine the knowledge available: besides determining the necessary knowledge, it is obviously important that managers look at what knowledge is already available in the organisation. Here again, strategic drive in the organisation plays a

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<sup>2</sup> Knowledge streams and processes are also discussed, among others, in Awad and Ghaziri (2003), Tiwana (2000), Davenport & Prusak (2000), and Dixon (2000).

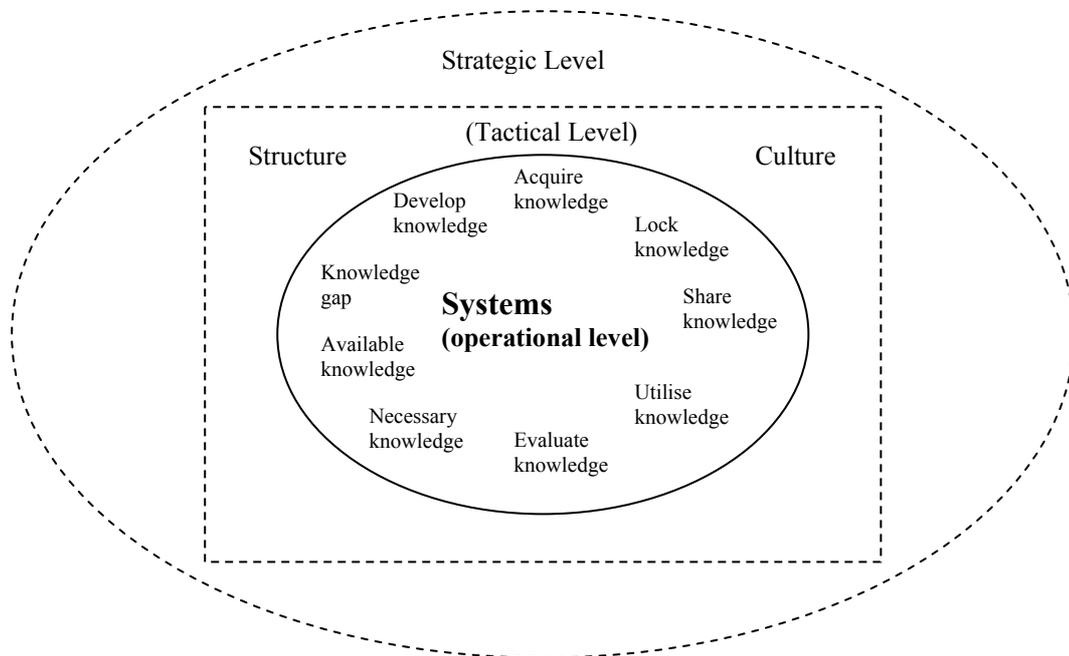
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major role. The knowledge available can be determined, for instance, by baring successful acquisitions or projects (also called best practices), by maintaining a CV file of the personnel or by organising experience swapping sessions.

- (3) Determine the knowledge gap: the difference between the necessary and available knowledge is called the knowledge gap. It is important, in the frame of knowledge management, to have a good insight into this knowledge gap in order to close it in the correct places. Obviously this activity is also strongly strategically driven. The determination of the knowledge gap can be achieved with the systems that were mentioned under points 1 and 2.
- (4) Knowledge development: based on the difference between the necessary and available knowledge, it can be determined to develop the knowledge. This is a knowledge stream that will get its form especially via the structure of the organisation. Developing knowledge can be done via research and development, through education and training or by means of customer satisfaction studies.
- (5) Knowledge acquisition: if developing the knowledge is not possible, one can decide to acquire knowledge. One can primarily use the structure of the organisation for this purpose. This is possible, for instance, by employing specifically qualified personnel, by purchasing licenses or patents or by purchasing market research or strategic reconnaissance.
- (6) Knowledge lock: under knowledge lock we understand that the purchased or developed knowledge is changed into structural and systematic form and that this is ensured, whereby the knowledge is determined and is available to everyone. This can be done by means of the structure of the organisation. Examples of what knowledge one can lock are requesting patents, maintaining project files or installing an intranet.
- (7) Knowledge sharing: a crucial aspect within knowledge management is sharing the available (and locked) knowledge between employees mutually, between employees and managers, between departments, etc. It is important that the correct knowledge gets to the right person at the right time. Knowledge sharing is primarily a knowledge stream that is dependent on the culture of the organisation.

One can share knowledge by making project or fact sheets, job rotation, internal secondment and lunchtime meetings.

- (8) Knowledge utilisation: it should be clear that the actual utilisation of the knowledge forms a central element within the knowledge management process. It is difficult to name examples of knowledge management systems that are specially targeted at the utilisation of knowledge. It is clear that the utilisation of knowledge is also a knowledge stream that rests largely on the company culture. The utilisation of knowledge should chiefly be stimulated and motivated by the management.
- (9) Evaluate (utilised) knowledge: obviously the (utilised) knowledge should be evaluated within the organisation. The evaluation of the (utilised) knowledge should then again be used as input for the determination of available and necessary knowledge. This knowledge stream is largely strategically driven. Evaluation of knowledge can be done, for instance, through project evaluations, internal and external audits, executing customer satisfaction studies or benchmarking.



**Figure 1 A Conceptual Model for Knowledge Management in SMEs**

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Based on the elements discussed in this section that play a role in knowledge management, an integral knowledge management model can be constructed. This model is mainly of a conceptual nature and should be used to give the important factors within knowledge management a place. The conceptual model can be found in Figure 1.

As it can be seen, making the knowledge productive forms the core and the primary goal of the knowledge management process. This requires information, capacity and attitude and has to do with the organisation, marketing and technology. In order to make the knowledge that is available within the organisation, or that should be present within the organisation, one can use the four organisation means. The primary focus here - due to the emphasis on the small and medium-sized company - is the utilisation of all sorts of systems. These systems make operation possible in a 'knowledge management friendly' environment. They should be flexible and should be adjusted with regard to new situations. The use of these systems can be facilitated, stimulated and motivated by the utilisation of the other three organisation means: strategy, structure and culture:

- The strategy is mainly important for the evaluation of knowledge, the determination of necessary and available knowledge and the determination of the knowledge gap. In an organisation where one wishes to make the knowledge as productive as possible, one thinks systematically about it. It should be clear that the other two organisation means play a role too, however the primary organisation mean remains strategy. A strategy that is optimally tailored to make the knowledge process efficient is ideally determined in a flexible manner to suit the changing situations. The strategy is formed above all pro-active and intuitively. The employees, or at least the managers, are aware of the core competencies in the area of knowledge and also know how to exploit them. Finally, the emphasis lies in the formulation of the knowledge intensive company strategies.
- A facilitating structure is mainly important for the development, the acquisition and the locking of knowledge. Here, the two other means - strategy and culture - play a role but the emphasis is on the organisational structure. A structure that is facilitating with regard to an effective knowledge management is generally flexible, flat and decentralised. Project teams are organised in suchlike structures around

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product-market combinations. It is also possible that the entire organisation is organised on a project basis, whereby various employees work together with different colleagues at different times. Staff are mixed in such organisations and co-ordination takes place through consultation.

- Finally a motivating company culture is especially important for the sharing and utilisation of knowledge. Just as with the strategy and structure, the other two organisation means play a role here but the emphasis is on the culture. A company culture in which the knowledge can come to its optimum advantage lays its focus on the stimulation and exploitation of the creativity of its employees. The culture should be informal and orientated on problems, tasks and results. Above all, the culture is characterised by openness, flexibility and an inclination for taking risks. Making mistakes in such an organisation is seen as an investment in a person's learning process. Learning is therefore seen as very important.

It should be emphasised that the reality is obviously not as composed as is suggested here. The conceptual model only gives guidelines for important items with regard to knowledge management in SMEs, where making the knowledge productive is the final goal, whereby information is managed and opened up, whereby the core competencies of employees are tapped into and developed and whereby the intrapreneurship of people is stimulated.

### **A Framework for Research**

This paper discussed knowledge management and knowledge strategy in SMEs and within the broader context of an economic growth model based on SMEs. Based on the literature review above, many issues have yet to be addressed at both the macro and micro levels.

	<b><i>Knowledge base</i></b>	<b><i>Knowledge transfer</i></b>
<b>Macro level</b>	education	Knowledge networks
	Training	Role of the Internet
	Lifelong learning	
	R&D	
	Investments	
	Policies	

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<b>Micro Level</b>	Knowledge gaps Specific needs in SMEs Priorities Knowledge Systems Projections Obstacles to progress	Sources of information and knowledge Diffusion and absorption of knowledge Validating information
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Among the specific questions to be addressed are:

- (1) What specific knowledge do SMEs need? Is this knowledge base different from what was needed under the old economic growth model?
- (2) Is the knowledge base perceived as an obstacle to growth and success? If so, what specifically are the barriers to progress (language, general knowledge of IT, networking, how to build and access databases, familiarity with the Internet)?
- (3) What is the best way to build the needed knowledge base? In-house training? Outsourcing?
- (4) What are the long-term consequences of outsourcing? If the organisations do not build its own IT knowledge base, will this affect its ability to quickly adapt or take advantage of new opportunities?
- (5) How can we build a sensible research agenda balancing the extremely different circumstances in developing and more developed countries? Does the needed knowledge base differ in developed and developing countries?
- (6) Do the needs for intellectual capital change over the life of an SME?
- (7) Several researchers have pointed out that there is an asymmetry in terms of who can participate in the new economy (the haves and have nots). This asymmetry is cited as a problem in India as well as in countries that are widely viewed as models, such as Ireland. How can education, training and lifelong learning address this asymmetry?

Some of these questions can be addressed using survey research and by employing the conceptual model suggested in this paper, while others may require a more focused longitudinal study of specific organisations. Answers to these questions can assist in developing policies and priorities to enable SMEs to become true growth engines of the new economy.

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