Knowledge management in SMEs

Practical guidelines

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Knowledge management is a practical tool in any organization. This paper addresses two issues - why managers of small to medium-sized enterprises (SMEs) need to know about knowledge management (KM) in their organizations and how they can conduct it. Critical steps, key factors and possible alternative paths are also discussed, so that knowledge management does not remain just theory but can be put into practical use in their organizations.

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Introduction

The environment in which businesses operate today can be summarized in terms of five key trends: globalization and the increasing intensity of competition; changing organizational structures; new worker profiles, preferences and predispositions; advances in information and communication technology; and the rise of knowledge management (KM).[1] The basic assumption of KM is that organizations that manage organizational and individual knowledge better will deal more successfully with the challenges of the new business environment. KM is seen as a key factor in realizing and sustaining organizational success for improved efficiency and innovation.

KM may be particularly relevant for SMEs. Typically, SMEs have between 20-50 employees. As such, these firms tend to be relatively more dynamic and agile than larger organizations, and more ready to learn. However, they are often more vulnerable than larger organizations to the loss of key personnel. Therefore, the main issue of concern to this paper is how to effectively establish and sustain good knowledge management practices in SMEs in order to ensure their competitiveness in the new business environment.

Current KM literature recognizes that the field of KM is relatively immature and prone to misconceptions and misappropriation.[2] In *Australian Studies in Knowledge Management*, M. Handzic and H. Hasan identify two major challenges for KM:

- Achieving an objective picture of the field, based on formal and sound research, which integrates diverse perspectives of researchers and practitioners; and

Special Feature : Knowledge Management

- Bridging the gap between theory and practice, thereby providing well-established KM strategies, tools and procedures for managers.

This article takes up the latter practice-oriented challenge, by proposing a set of practical guidelines for conducting KM, directed principally at managers and KM practitioners in SMEs. Owing to the multidisciplinary and complex nature of KM, a prescriptive normative 'standard' is considered inappropriate. The main objectives of this article are to:

- Capture the key concepts regarding KM; and
- Provide a set of practical guidelines to enable organizations to work through the KM implementation process.

Overview of existing KM frameworks

There is widespread agreement among scholars that there is need for KM frameworks that will provide researchers with a holistic view, common ground, consistent terminology and units of analysis across a variety of research settings.[3] There is also a need for frameworks that can help practitioners to understand the sorts of KM initiatives or investments that are possible and to identify those that make sense in their context.[4] It is only possible to realize the full power of knowledge by taking a holistic ecological approach to knowledge management.[5]

There have been a number of recent efforts at developing KM frameworks to understand KM phenomena. In order to make sense of the variety of existing KM frameworks they have been categorized into descriptive and prescriptive frameworks. Descriptive frameworks attempt to characterize the nature of KM phenomena, while prescriptive frameworks attempt to direct methods to be followed in conducting KM. The following sections present examples of descriptive frameworks, based on the review by Handzic and Hasan.[2] They have been grouped into partial and integrated models, depending on their scope and focus.

Descriptive frameworks

Partial

Among resource-oriented partial frameworks, the intellectual capital model group[6] and the Economic School in Earl's taxonomy[4] are well known in the business environment. Human Resources literature relies heavily on this grouping of KM models and frameworks, as does the Accounting discipline's work on intangible assets. From this perspective, KM focuses on hiring, retaining, training of personnel, i.e. 'intellectual assets', and organizational knowledge is defined as 'the sum of the knowledge of its personnel'. De Grooijer's framework[7] using the concept of performance scorecards would fit into this grouping. However, in the broader view of KM, this is just one aspect that would be included in an integrated approach.

Process-oriented frameworks are perhaps the most frequently quoted and used category in knowledge management literature. Nonaka[8,9] distinguished tacit from explicit knowledge based on Polanyi's original concepts.[10] This has led to the knowledge creation spiral, which views organizational knowledge creation as a process involving a continual interplay between explicit and tacit dimensions of knowledge.

Four levels of carriers of knowledge in organizations are assumed, namely individual, group, organizational and inter-organizational. The spiral model describes a dynamic process in which explicit and tacit knowledge are exchanged and transformed through four modes. Socialization enables tacit knowledge to be transferred from one individual to another.

Combination allows the existing explicit knowledge to be combined into new explicit forms. Externalization converts tacit knowledge into explicit knowledge in the form of concepts and models. Internalization allows individuals to absorb explicit knowledge and broaden their tacit knowledge, so that new knowledge could be developed.

To address the question of fundamental conditions for knowledge creation, the concept of 'ba', meaning 'place', was introduced by Nonaka and Konno.[11] They suggested that four types of ba - originating, interacting, cyber and exercising - act as promoters of the processes of socialization, externalization, combination and internalization, and so enable knowledge creation. The dynamics and scope of the Nonaka model, enhanced by the concept of 'ba', brings it from a knowledge category model, with just the two categories of tacit and explicit knowledge, into the realm of the socially constructed group of McAdam and McCreedy or the Behavioural School of Earl's taxonomy. In general, frameworks in this KM grouping emphasize the dependence of knowledge on context.

Earl's Technocratic School supports and structures a large body of Information Systems (IS) work in KM. The data-information-knowledge hierarchical is one classification scheme at the foundation of much KM work within the field of IS, as is the distinction between knowledge as an object, that can be stored in a computerized system, and knowledge embedded in people. Other classifications detailing the dimensions of knowledge are 'structured or unstructured', 'codified or uncodified', 'diffused or undiffused', in addition to the types and perspectives list elaborated in Alavi and Leidner's review.[12]

The message of this overview of KM approaches are that partial KM frameworks can encompass a broad range of issues, methods and theories. There is an obvious need to integrate this diversity of partial approaches to provide improved methods of KM in business practice. The following frameworks represent some of the latest integration attempts.

Integrated models

Snowden's[13] content-narrative-context model illustrates three basic components of KM and their relationships. Content is classified into 'known', 'knowable', 'complex' and 'chaos'. The nature of knowledge content is key to understanding the narrative management. The choice of the most suitable narrative to deliver knowledge content is highly contingent upon the nature of that content. Cataloguing and describing legitimate best practice is the most appropriate way of conveying what is known.

Case studies have been suggested as a highly useful and relevant means of knowledge transfer when a complicated situation or process is be-

ing explained. Perceiving and making sense of patterns is the key to managing complexity. Visualization appears to be a useful vehicle to explore emerging patterns. In the realm of chaos, the only way to learn is to create, to break down old patterns and to form new ones. The creative stimulus of chaos can, through brainstorming, for example, produce new capabilities in the ecology. Finally, the framework recognizes the context-dependent nature of KM. It suggests that a bureaucratic context is good as a training environment. Communities of practice encourage knowledge exchange through socialization, informal contexts use stories and symbols to provide shared understanding, and innovative contexts require action and risk taking to impose order on chaos.

The Hasan approach to KM is based on the 'cultural-historical activity' theory of the Russian psychologist Vygotsky,[14] who, during the first half of the 20th century, with his student Leontiev,[15] developed a holistic conceptual framework for a complete theory of human activity. In this theory the pragmatic concept of 'activity' is simply what people do, defined as the relationship between 'subjects' (people) and 'objects' (purpose). This relationship is mediated by 'tools' (artifacts, language, ideas, models) and the 'community' (context, environment, culture) which defines the rules and roles within which the subjects act.

The Hasan approach provides a framework for both individuals and collections of people in organizations engaged in the activity of sensemaking, mediated by knowledge management systems and organizational culture.

Another recent addition to KM models is the integrated framework of KM.[16] This model suggests two types of organizational factors:

- Organizational environment (eg. leadership, culture, structure, etc.); and
- Technological infrastructure (eg. information and telecommunication technologies) as major enablers that facilitate knowledge processes (eg. creation, transfer, utilization) and foster the development of organizational knowledge (explicit and tacit knowledge, what and how).

The model also suggests that the organizational environment influences the choice of the technological infrastructure that supports knowledge processes. Finally, the model incorporates a feedback loop to suggest the need for continuous knowledge measurement and potential adjustment to strategies over time. This represents a major advantage of this model over other static models of KM.

These frameworks are still going through the processes of development and testing against objective empirical investigations. This research is converging on some common elements that appear to be crucial to successful KM. Handzic and Hasan[2] see this as encouraging.

In short, all integrated KM frameworks are dynamic with an emphasis on knowledge processes and activities in expanding cycles of growth; KM is considered as a socio-technical undertaking, enabled by social, organizational and technical factors which must be considered in any KM initiative; and KM is recognized as being severely dependent on context so that there is no 'one size fits all' prescription.

Prescriptive frameworks

As organizations become more knowledge based, their success will increasingly depend on how successful knowledge workers are at creating and applying new ideas productively and efficiently. The central task of those concerned with KM is to determine ways to better cultivate, nurture and exploit knowledge at individual and group levels. Successful implementation of KM in an organization will require addressing all components of an integrated framework in a deliberate and systematic way. In other words, it will require a methodology that will serve as a roadmap for the knowledge management journey. In general, prescriptive models attempt to dictate methods to follow in conducting KM. The following sections present examples of leading prescriptive frameworks of KM. They have been broadly categorized into sequential and iterative methods.

Sequential

Based on their observations from practice, a sequential evolutionary model

of development of KM in companies was developed. It includes three consecutive stages.[17] In stage 1, most companies try to locate and capture valuable company knowledge. In stage 2, they try to make use of what they have easily accessed and find new uses for existing knowledge. Finally, in stage 3, they realize that the knowledge they have is not sufficient for creating a knowledge-based business and they focus on enabling new knowledge creation for innovation.

More recently, Leibowitz[18] presented a comprehensive overview of leading KM methods, and found most of them to be incomplete, and to lack double-loop learning. This is seen as a major omission, as iterative feedback is an important element of KM which promotes learning organization.

Iterative

The Arthur Anderson Office of Training and Education proposed a more parallel and cyclical KM development approach.[19] Its KM method includes: awareness, strategy, design, prototype/pilot, implementation, and evaluation-maintenance.

- Awareness involves educating clients about KM, assessing current KM, identifying KM problems and getting commitment from key decision makers.
- Strategy is concerned with implementation planning, including identifying communities of practice and their knowledge needs and developing a value proposition.
- Design involves development of a knowledge blueprint and supporting environment and infrastructure.
- The prototype-pilot step tests KM solutions before they are implemented throughout the organization.
- In the final evaluation-maintenance step, KM solutions are assessed and renewed in a repeated cycle.

Furthermore, Siemens AG[20] applied and tested a knowledge strategy process (KSP) consisting of six basic steps which result in a KM action and project plan. These steps lead from the currently most relevant business perspective's key performance indicators and knowledge areas, through to assessing the state of these areas in terms of 'as-is' and 'to-be'. KM actions are

Special Feature : Knowledge Management

defined in order to achieve the to-be states. KSP represents a strategic instrument for the business owner and his management team, and the resulting action plan provides a valuable guideline for the KM team.

Academics[18] argue for a KM methodology that includes tenets of project management, process reviews, change management, process training and quality assurance throughout the phases. Phases include:

- *Conceptualization and strategy*
  The deliverables are documents such as business needs, analysis, knowledge audit, cultural assessment and a KM strategy plan.
- *Action*
  The deliverables are knowledge acquisition and relationship charts, and an initial KM system.
- *Evaluation*
  The deliverables are a documented evaluation method and results, a revised KM system, and a users guide.
- *Implementation*
  The deliverables are a maintenance report, a full production KM system, and the post-audit report.

Most recently, Standards Australia[21] suggested that the following are three key phases in developing and implementing KM:

- Understanding the context for knowledge management;
- Conducting a knowledge gap analysis; and
- Facilitating knowledge in action.

It is recognized that the phases do not form a linear process and that, while the phases do build on each other, they can be used flexibly or iteratively. The order and depth of each phase will depend on the nature and aims of a particular KM initiative.

Practical guidelines for conducting KM

Some important messages from these different methods is that there is no 'one size fits all' approach to KM. According to Handzic and Hasan[22] the success of any KM initiative is determined by its impact on the organization; and a critical starting point for a successful KM initiative is a clear KM vision which is aligned with the overall business strat-

egy. Together with an appropriate understanding of KM this will serve as a basis for designing and applying the most appropriate KM interventions that will achieve the right balance between developing new knowledge and utilizing existing knowledge, to ensure the organization's long-term competitiveness and success.

The following sections provide a set of broad guidelines for successfully conducting KM in SMEs. Ideas are drawn from Handzic and Hasan[22] and supplemented by empirical findings from recent Australian SME case studies.[1]

Build KM awareness

In order to avoid any danger of misconception and misunderstanding, the first important task for organizations starting the KM journey is to build KM awareness.[22] This requires defining and communicating KM concepts, developing common terminology and creating a common understanding throughout the organization.

The most recent KM literature suggests that we are entering the third generation of KM. A new generation of thoughts is beginning to replace our current focus on tacit-explicit knowledge conversion (the SECI model), and our earlier emphasis on efficient provision of knowledge (BPR initiatives). It also brings a new simplicity based on advances in understanding the nature of knowledge. In particular, the third age of KM embraces the paradoxical nature of knowledge as both a 'thing' and a 'flow', and looks for such aspects in new and different ways. Most importantly, it recognizes the need to manage not only the content, but also the process/narrative and the context of knowledge.[13]

Empirical findings confirm that Australian SMEs appreciate the importance of knowledge and its management in the contemporary business environment.[1] For these organizations, KM is not seen as a one-off IT initiative or a silver bullet guaranteeing business success, but as something central and critical to their day-to-day business operations. It is promoted as worthwhile, because of its utility and contribution to the work of individuals and the organization as a whole. It seems that the

earlier scepticism associated with KM has given way to a more mature assessment of the place of knowledge and the importance of managing that knowledge for competitive success.

Aligning KM with business strategy

Aligning KM with business strategy is the next important task.[22] Typically, it involves determining an organization's position, considering its motives for KM, and determining expected outcomes and how to verify them.

While organizations may have many different reasons for starting KM initiatives, they can be grouped into three broad categories:

- Risk minimisers;
- Efficiency seekers; and
- Innovators.[17]

The main difference between these three groups is in their focus on existing or new knowledge and on knowledge processes or content. In general, risk minimisers tend to implement KM initiatives around capturing and locating valuable company knowledge; efficiency-seekers tend to make maximum use of the existing knowledge, through transferring and sharing practices; while innovators focus on new knowledge and processes necessary for enabling creativity for successful innovations.

The recent SME case studies from Australia[1] suggest a relatively strong level of interest and sophistication in the KM strategies and in the practices pursued by some SMEs. In general, the issues reported were no different than those encountered by larger organizations. A remarkable similarity was found in the issues, motivations, rationales and even the specific strategies reported by the SME firms compared to the larger organizations. For example, clear business strategies were critical for informing SMEs approaches to KM._However, compared to large organizations, the successful SMEs were distinctive, in the sense that they tended to be relatively agile, well integrated into international and national, professional and industrial associations and networks, and ready to learn from customers, clients, competitors, suppliers and providers.

The findings further suggest that the improved KM contributes to improved SME business competitiveness in several ways. They:

- Allow organizations to develop a better understanding of customer and client needs, preferences and pressures;
- Facilitate stronger, longer-term partnership-style relationships with customers and clients;
- Contribute to an organization's capacity to establish and sustain their status as thought leaders;
- Do away with costs in business and production processes, and improve speed and quality; and
- Assist organizations to use lessons learnt from previous jobs, projects and tasks, as means of improving their future performance.

Audit knowledge - assets and resources

Taking an inventory of knowledge in the current organizational context, and conducting an analysis on strengths *versus* weaknesses on this inventory in an overt fashion, is seen as the next necessary phase in a successful KM journey.[22] The advice given by Von Krogh *et al*.[17] is to allocate substantial time to think carefully through the types of knowledge that you have in your business and where it resides.

According to Sveiby[23], every organization houses valuable intellectual material. It can be found in people, structures and processes and in customer relationships. It is of utmost importance for the design of the appropriate KM interventions to determine if this critical knowledge is tightly connected to the skills of people and deeply rooted in their years of experience, or if is just kept in instructions, procedures, documents and databases. Otherwise, it is not possible to create the right 'ba'.

Hall[1] found that different SMEs found different kinds and forms of knowledge valuable. For an accounting firm, the most valuable were expertise of senior staff and partners; specialized and technical knowledge contained in office procedures and manuals, used to standardize and manage business processes; partnership style relationships with clients; and analyti-

cal knowledge, gained through experience on particular projects.

For a risk management service firm, the diversity of kinds included developmental and procedural knowledge, tacit knowledge of its employees, market and customer knowledge, and industry intelligence. For a manufacturing firm, developing diagnostic kits, product and process innovation knowledge was most important as it allowed the company to constantly investigate and develop new products and production techniques. In general, these SMEs tended to have a dynamic rather than a static conception of knowledge - knowledge was seen as information that could be used to act. It had to be in the form and kind that is accessible, relevant and ready to use.

Right KM solutions - development and implementation

The final recommendation for a successful KM journey is to implement KM solutions that combine those processes, cultural adjustments and technologies that have the best potential to enhance knowledge and add value to the firm.[22] This requires all sources and forms of knowledge to come into play to maximize business success.

In designing KM solutions, companies need to think carefully why they are needed. According to Von Krogh *et al*.[17] risk-minimisers tend to use data warehouses, yellow pages, expert systems and similar KM technologies for locating and capturing existing knowledge. Efficiency-seekers tend to use Internet, Intranet, groupware and workgroup technologies to support transferring and sharing of best practices and experiences. Innovators tend to create an overall socio-technological context to enable new knowledge creation. In general, technical solutions can help in structuring information and effectively retrieving documents. They may also help in connecting people and removing the geographic and time barriers. However, technologies should facilitate rather than drive the process of human interaction and relationship building.

The findings from SME case studies[1] indicate that one of the key imperatives for many SMEs is the:

- Translation of individual knowledge held by key personnel into organi-

zational knowledge. This is achieved by a variety of strategies including:

- Embedding routine process and procedural knowledge into standard operating procedures,
- Codifying implicit knowledge through "lessons-learnt" programmes; and
- Drawing on deep tacit knowledge through mentoring programmes.
- Another key finding is that SMEs also generate new knowledge and encourage innovation through various strategies including the provision of selective incentives and rewards. Generally these innovations tend to be proposals or ideas for new products or services, new clients, new and improved business services and new ways of using and re-using knowledge.

Furthermore, these organizations often acquire new knowledge through professional associations and industry affiliations and standards. Formal R&D activities are relatively limited in most such organizations. However, a number of organizations have access to the off-shore parent company R&D facilities. The lack of formal R&D facilities does not mean that these firms are not innovative or unconcerned with both product and process improvement and innovation. Rather process and product innovation and improvement is more often seen as part of everyday business, rather than identified as a separate activity or functional division.

One of Hall's important findings[1] is that these organizations are stringy, committed to facilitating key knowledge flows both within and beyond the organization. Ensuring that key people and groups are in communication with other key people and groups, both within and beyond the organization is seen as one of the prime challenges of KM. In successful SMEs, KM tends to be driven by business strategy; predicated on efficient business processes; embraced by employees; and supported by HR, organizational structures and customized IT. While the dividend from KM investments remains difficult to measure, all organizations reviewed by Hall were confident that there were significant payoffs associated with their KM activities.

Special Feature : Knowledge Management

In general, while the SMEs studied tended to use a similar range of techniques and strategies for KM as those employed by larger firms (e.g. mentoring, maintaining databases for lessons learnt, standardizing business processes), these were organized on a less formal basis.

The case studies demonstrated that KM is as relevant for SMEs as for large organizations. KM practices need not be highly sophisticated or embedded in complex IT systems. Indeed most of the SMEs studied achieved considerable success in KM, without investing massively in new technologies and without bringing in consultants to develop new highly sophisticated processes.

From the findings of SME case studies presented in this paper, one may conclude that knowledge management represents one of the most significant management movements in the knowledge economy. If planned and implemented carefully in alignment with organizational objectives and core competencies, it may enable the release of the organizational knowledge resources that would bring ultimate business success in the new economy.

Conclusion

This paper addresses the issues of why and how managers of small to medium sized enterprises (SMEs) need to conduct knowledge management (KM) in their organizations. From what we have learnt so far, knowledge management is too important to be ignored by managers. Knowledge content, process and context all need to be carefully managed in order to preserve or create value for an organization.

KM also needs to be integrated into the strategic management of the organization. This can be achieved by building KM awareness, determining its intended outcomes, auditing and valuing knowledge assets and resources, and finally by developing and implementing those KM solutions that have the best potential to enhance knowledge and add value to the organization. By identifying 'proven' critical steps, key factors and possible alternative paths to follow, this paper attempts to put into the hands of SME managers practical tools that can help them unleash the power of knowledge in their organizations.

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Key-Words: - SME, Knowledge Management, Enterprise Network, Performance Measurement. 1 Introduction. Cooperation among enterprises represents one of the most fruitful and possible ways of development for modern capitalism [9]. Cooperating means to co-invest to be able to offer winning products and services on the global market. · NEED 2 - SMEs can acquire new knowledge by participating in partnerships or networks with other companies, sharing similar or complementary problems in order to become more competitive. This raises the issue of how to facilitate the operation of such networks. – The areas of knowledge management implementation, knowledge management perception, and knowledge transfer are relatively well researched topics; whereas those of knowledge identification, knowledge storage/retention and knowledge utilisation are poorly understood. Given the prevalence of small and medium‐sized enterprises there is a strong need for more research on this important topic.

Knowledge Management for SMEs • Background Large amount of knowledge is needed in the process of developing enterprises. Without effective management, it may lead running off in the staff transfer or change jobs. If things continue in this way, innovation, work efficiency, development will be hysteretic. Hence, the good knowledge management for enterprise is needed and very important. Knowledge Management for SMEs... Keywords—Knowledge Management; Small and Medium Enterprice; SME; I. INTRODUCTION. While knowledge management is recognized as management of the 21st century, there are many problems if people launch programs of knowledge management without due consideration to factors which facilitate or hinder the knowledge management process. Once the factors are understood, they can develop related context that influences the effectiveness of their knowledge management processes [1].The knowledge diagnostic remains one of the least understood aspects of knowledge management, that...