

**STRATEGIC KNOWLEDGE MANAGEMENT IN SMES: MANAGING KNOWLEDGE
THROUGHOUT THE ORGANIZATIONAL LIFE CYCLE**

(Track: Individual Entrepreneurship)

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ABSTRACT

Small and medium sized enterprises (SMEs) have unique characteristics that impact the activities that lead to organizational effectiveness. One important activity is how they manage knowledge. Each stage in the firm's life cycle requires that they emphasize different knowledge managing activities. Based on extant literature, we identify four organizational stages: start-up, growth, maturity and decline/renewal. Drawing from the entrepreneurship, organizational knowledge and organizational life cycle literatures, we develop a model for knowledge management strategies that optimizes organizational effectiveness for SMEs at different phases of their life cycles. This paper builds on the knowledge-based view of the firm and suggests that small and medium sized firms can achieve sustainable competitive advantages through effectively managing their organizational knowledge. We suggest several propositions and directions for future research.

INTRODUCTION

Small and medium sized enterprises (SMEs) are vital to the American economy. In the U.S. and Canadian economies small businesses have created the vast majority of new jobs in the last twenty years, provided half of the total employment, and accounted for 40-50% of gross domestic product (Kirchoff, 1996; Golha and Deshpande, 1997). Because of their importance to the economy, it is important to understand how they operate and what makes them successful.

One important area for SMEs that has received little attention is how these firms manage knowledge to create competitive advantages. A growing body of research on organizational knowledge suggests that knowledge may be a key source of competitive advantage for firms (Boisot, 1998; Grant, 1996; Teece, 1998). Most of this research has addressed larger, established firms and has not examined the unique needs of smaller firms.

Small and medium sized enterprises have unique characteristics that impact how they strategically manage knowledge. One dominant feature for SMEs is the rapid rate of change these smaller firms experience as they move through their organizational life cycles. Each stage in the life cycle requires that firms emphasize different knowledge managing activities in order to be successful. Based on extant literature, we identify four organizational stages: start-up; growth; maturity; and decline/renewal. The entrepreneur faces unique management challenges in each stage. A critical challenge is how to manage knowledge. Each phase of the startup process has different characteristics and requirements. Knowledge must be managed in different ways in each phase in order for the venture to be successful.

In this paper we will present a life cycle model of firm growth and show how the different characteristics and needs of the firm at each phase require a different approach to knowledge management. If managers understand the unique demands of each life cycle stage they can develop a coherent system for managing their valuable organizational knowledge. We build on the knowledge-based view of the firm and show how small and medium sized firms can achieve sustainable competitive advantages through effectively managing their organizational knowledge. We suggest several propositions and conclude with directions for future research.

KNOWLEDGE AND ENTREPRENEURSHIP

Shane (2000) views entrepreneurship as the process of creating value by bringing together a unique packet of resources to exploit an opportunity. This definition emphasizes the entrepreneurial process and allows for legitimate examination of all the factors that impact the creation, recognition, evaluation and exploitation of resources in new ventures, whether inside an existing firm or in a new firm (Shane, 2000).

Since early researchers were focused on personal characteristics of the entrepreneurs, many of the interesting questions regarding entrepreneurial behaviors and processes have just begun to be explored (Shane, 2000; Thornton, 1999). This entrepreneurial perspective suggests that we examine the processes that lead to the discovery, evaluation and exploitation of entrepreneurial opportunities. These discoveries lead to new ventures, which drive the economy.

Hayek (1945) argued that knowledge is unevenly distributed throughout society, since different individuals have access to different knowledge. The main problem is

how to find the best use of the resources that are known only to an individual in society for a purpose only that individual knows. A free market capitalist system is the most efficient and effective system for converting knowledge into new products and services, according to Hayek (1945). Hayek argues further that individuals have bounded rationality and limits to their knowledge. This suggests that we pay attention to knowledge processes that aid the discovery, evaluation and exploitation of opportunities (Shane, 2000). Zahra, Nielsen and Bogner (1999) suggest that corporate entrepreneurship is a source of organizational learning, which drives knowledge creation that in turn becomes new organizational competences. Bird, Hayward and Allen (1993) agree that commercializing knowledge is an important role of entrepreneurship, but argue that there are many challenges to doing it effectively.

ORGANIZATIONAL KNOWLEDGE THEORY

In order to understand why managing knowledge effectively is an important source of competitive advantage, we briefly review the organizational knowledge literature and the knowledge-based view of the firm. We define organizational knowledge as all the tacit and explicit knowledge that individuals possess about products, systems and processes. This includes explicit knowledge codified in manuals, databases and information systems as well as tacit knowledge that is shared collectively in the firm in the form of routines, culture and know-how (Nahapiet & Ghoshal, 1998; Grant, 1996; Nonaka & Takeuchi, 1995).

For many small and medium sized firms the potential of the ideas that the founders have in their heads are the most valuable assets they possess. Consequently, intentionally managing that knowledge is

critical to achieving competitive advantage. Both internal and external sources of knowledge are important to entrepreneurs (Kogut & Zander, 1992). Internal knowledge comes from reorganizing, accidents, experiments, and inventiveness. External knowledge comes from new people, acquisitions, joint ventures and social networks (Kogut & Zander, 1992).

Organizational knowledge is subject to path dependencies. Once a particular technological path or learning path has been taken, it becomes more difficult to diverge from that path (Kogut & Zander, 1992). There are both psychological and financial commitments to that course of action. Knowledge advances on the basis of current information and ways of doing things. It takes investment over the longer term to reap benefits of knowledge (Kogut & Zander, 1992; Cyert & March, 1963; Nelson & Winter, 1982). Path dependencies make it critically important for SMEs to be intentional about managing knowledge processes throughout the life cycle stages.

There are several important sources of external knowledge for SMEs (See Table 1). Social networks provide a forum for informal sharing between firms (trade associations, friends, university programs, college friends network). Aldrich (1999) argues that the diversity of contacts and strength of ties impacts the value of opportunities. The more diverse the ties are, the more information can be shared, since the ties allow greater access to information. Direct (“strong”) ties are a source of more information. However, weak ties are important as well. Floyd & Wooldridge (1999) argue that knowledge creation and social networks impact corporate entrepreneurship. They build on the resource-based view of firm as well as social network theory. Knowledge in the firm can be leveraged into competitive advantage and turned into new firm capabilities. In

particular, individuals with casual or “weak” ties with individuals outside the firm provide a valuable source of new knowledge to the firm, often stimulating entrepreneurial development. This concept applies to smaller firms as well. Social networks are a source of new knowledge. This knowledge can be leveraged into new organizational capabilities.

Alliances, partnerships and joint ventures provide additional sources of external knowledge (new technologies, new production processes, operations processes). Interorganizational networks (e.g., equity investments from investors) impact the success of firms (Stuart, Hoang and Hybels, 1999). Faced with a lack of information about the success potential of small firms, third parties rely on the prominence of the affiliates to make judgments about quality of the company. Those companies with prominent endorsements will perform better than those without them.

A firm’s ability to make use of these sources of external knowledge will be moderated by its absorptive capacity (learning new ideas from internal and external sources, systems and structures that facilitate knowledge cultivation) (Cohen & Levinthal, 1990). Those firms that have systems and structure in place to absorb external knowledge will do a better job of integrating the new knowledge into their firm, which may result in higher levels of innovation and knowledge exploitation.

Insert Table 1 about here

The Knowledge-Based View of the Firm

Researchers have begun constructing a knowledge-based view of the firm that builds on the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984). These researchers suggest that knowledge is

the key resource—and perhaps the only resource—capable of creating sustainable competitive advantage (Boisot, 1998; Grant, 1996; Teece, 1998). In the knowledge-based view of the firm, internal resources and capabilities, such as worker know-how, designs, customer knowledge and efficient processes, are the keys to achieving sustainable competitive advantage (Boisot, 1998; Grant, 1996; Teece, 1998; Davenport & Prusak, 1997).

Knowledge is an especially valuable category of resources and meets Barney’s (1991) criteria for resources capable of providing sustainable competitive advantages. Knowledge resources are highly valuable, unique to the organization, difficult to copy and difficult to substitute (Boisot, 1998; Barney, 1991). A firm’s capabilities for creating and sharing knowledge come from several factors including: 1) The special facility that firms have for the creation and transfer of tacit knowledge (Kogut & Zander, 1992, 1996; Nonaka & Takeuchi, 1995; Spender, 1996); 2) The organizing principles by which individual and functional expertise are structured, coordinated, communicated and through which individuals cooperate (Kogut & Zander, 1992); and 3) The nature of organizations as social communities (Kogut & Zander, 1992). Those organizations that are able to manage knowledge more effectively than their competitors will be able to achieve competitive advantages (Boisot, 1998).

ORGANIZATIONAL KNOWLEDGE PROCESSES

If knowledge is the key firm resource capable of creating a sustainable competitive advantage, then it is important to examine how firms manage knowledge processes. Firms must be intentional in order to manage knowledge strategically. Knowledge should be included in the top-level strategy

as well as in middle and lower level objectives (Floyd & Wooldridge, 1999). Kogut & Zander (1992) suggest that the primary challenge of the firm is to create and transfer knowledge efficiently within the firm. To this we would add that firms also might consider exploiting that knowledge by converting it into new products and services, which Kogut & Zander (1992) refer to as combinative capabilities. There are three key knowledge processes that are consistently referred to in the literature: knowledge creation; knowledge sharing; and knowledge exploitation.

Creation

The creation process involves the factors that go into creating new knowledge. This process has been referred to as exploration (March, 1991), combination (Nonaka & Takeuchi, 1995) and sensemaking (Weick, 1993). Each of these researchers outlines some key factors, processes and tensions that go into the creation of new knowledge. There is general agreement that individuals create new knowledge through intuitive connections between existing ideas or through interaction with others in the organization (Crossan, et. al. 1999).

Sharing

The knowledge sharing process has been viewed from several perspectives, but there is general agreement that this is a key knowledge process. Grant (1996) refers to the transferability of knowledge within firms and between firms. Nonaka & Takeuchi (1995) explain the socialization and externalization processes that transfer knowledge to other organizational members. Several researchers have also examined factors that motivate workers to share knowledge with each other (Argyris, 1991; Davenport, Eccles and Prusak, 1992; Nonaka and Takeuchi, 1995). Knowledge resources become more valuable when they

are shared, but they are difficult to share (Szulanski, 1995).

Exploiting

The final knowledge process that has received significant attention in the literature is the exploitation of knowledge. Boisot (1998), March (1991) and Nonaka & Takeuchi (1995) all refer to the process of converting knowledge into valuable products as the exploitation process. The exploitation process is facilitated through dynamic, flexible systems that allow shared ideas to be converted into products.

ORGANIZATIONAL LIFE CYCLES

There is a strong consensus in the management literature that organizations go through a distinct life cycle not unlike that of organic life forms (Van De Ven and Poole, 1995). This life cycle is often depicted as an S-curve, containing a startup phase characterized by slow growth, followed by an adolescent period of explosive growth. The growth then slows during a maturity phase, followed by a period of decline. At this point, organizations either go through a period of renewal or cease to exist (Geroski, 2000). This process is depicted in figure 1.

Insert Figure 1 about here

There is a great variety of life cycle models in the management literature that differ with respect to the number of phases an organization goes through and the characteristics of each phase. Quinn and Cameron (1983) reviewed nine life cycle models and found that they could be summarized into four distinct phases: the entrepreneurial stage, the collectivity stage, the formalization and control stage and the elaboration of structure stage. More recently, Hanks and Collin (1993) found

some empirical evidence for distinct life cycle stages based on growth rate, structural form, degree of formalization, degree of centralization and main business tasks.

The idea that organizational effectiveness should be measured differently at different phases of the life cycle is not new. Abernathy and Utterback (1978) examined patterns of industrial innovation and concluded that newer firms and mature, established firms should take different approaches to the adoption of new technologies. Newer firms are much more likely to adopt new product innovations because these firms are small and flexible. Established firms become specialized over time due to continuous incremental process improvements. It is more difficult for such mature firms to adopt new technologies. They should focus on process improvements that lead to increased economies of scale.

Quinn and Cameron (1983) reviewed four models of organizational effectiveness and found that different criteria may be appropriate at a different phase of the life cycle. During the startup (“entrepreneurial”) phase, the focus is on resource acquisition and growth. The organization requires flexibility and adaptability. During the growth (“collectivity”) phase, the firm tries to coordinate individual activity. Cohesion and morale are critical. Human resource management becomes central. As the firm moves toward maturity (“formalization”), there is a greater emphasis on productivity and efficiency. Planning, goal setting and controlling are critical.

Kazanjian (1988) proposed a four-stage model and found some empirical support for the idea that organizations faced different dominant problems in each stage. During startup (“conceptualization and development”), firms focused on resource acquisition and technology development. As the firm shifts into the growth phase (“commercialization” and “growth”),

production, market share and organizational issues dominated. As maturity (“stability”) sets in, the firm concerns itself with profitability and internal controls.

Dodge, Fullerton and Robbins (1994) point out that firms do not go through their life cycle in a vacuum. Environmental context plays a large part in determining the challenges faced by growing firms. This study specifically related the degree of competition with problems faced by firms during the early and late stages of their life cycle.

These models all contain some common characteristics. They all depict the organizational life cycle with four basic phases of birth, growth, maturity and decline/renewal. They all show that the organization faces different challenges during each phase. Therefore, measures of organizational effectiveness must vary with the life cycle phase that the firm is in. As we discussed in the previous section, knowledge is a key resource of the firm that can lead to competitive advantage. Knowledge management is a key determinant of organizational effectiveness. Knowledge management strategies must also change as the SME moves through its life cycle.

ORGANIZATIONAL LIFE CYCLE AND KNOWLEDGE

Firms in different stages of the organizational life cycle should emphasize different knowledge processes. Employees in small start-ups have few barriers to effective communication. Knowledge is shared informally, in staff meetings and over lunch. Employees wear many hats and cross-train each other. As the business grows and moves into the growth stage, it becomes increasingly difficult to get everyone together and to understand what others in the firm are doing. Roles become more specialized and processes become more formalized. Firms tend to become

more hierarchical and structured. Consequently, knowledge no longer flows as easily through the firm. Finally, in the maturity and decline/renewal stages, the firm can be more effective if it creates more formalized structures and focuses on exploiting its knowledge by converting ideas into products and services. We now look at each of these processes in more detail (See Table 2).

Start-up

In the start-up phase, firms are small and new. They are focused on resource acquisition and finding new opportunities to exploit. They are more concerned with their external competitive environment than their internal structure. They will benefit from emphasizing knowledge creation processes through internal invention and external discovery of opportunities. When firms are small, there are few barriers to converting ideas into new products and services. Challenges are mainly in coming up with new ideas, funding development and overcoming technical and production challenges.

Proposition 1: SMEs in the start-up phase of their life cycle that intentionally emphasize knowledge creation will be more successful than those who do not.

Growth

When the firm begins to grow and add more employees, its focus shifts from resource acquisition to structural coherence. The firm will emphasize human resource functions and try to generate cohesion and high morale. Knowledge management emphasis shifts to sharing knowledge. When the firm gets larger, the logistics of spreading knowledge throughout the firm become more challenging. Firms must take intentional actions to foster sharing, such as creating formal systems and procedures.

Firms can encourage mentoring relationships between peers and across levels to facilitate sharing (Bryant, 2001; Kram, 1985). Firms can provide training in core technologies, processes, business skills, customer service, etc. Finally by creating a formal technology-based knowledge management solution, such as a knowledge base or an intranet, firms can provide a means to capture knowledge and share it with employees. These employees can then convert this knowledge into new products and services (Boisot, 1998; Nonaka and Takeuchi, 1995).

Proposition 2: SMEs in the growth phase of their life cycle that intentionally emphasize knowledge sharing will be more successful than those who do not.

Maturity

When a firm enters the maturity phase, it shifts focus to efficiency and productivity. Knowledge management during this phase emphasizes creating formal systems and structures that will facilitate the exploitation of knowledge and opportunities. The firm should create formal and informal mentoring programs, training programs, shared knowledge bases and an intranet to connect all parts and stakeholders in the firm. Systems should emphasize the codification and externalization of knowledge—making tacit knowledge explicit (Boisot, 1998; Nonaka & Takeuchi, 1995).

Proposition 3: SMEs in the maturity phase of their life cycle that intentionally emphasize knowledge exploitation will be more successful than those who do not.

Insert Table 2 about here

CONCLUSION

There is increasing realization that new ventures are a significant engine of economic growth in most free market economies and that how new ventures are managed is a critical area of study. Because of this realization, the field of entrepreneurship has grown rapidly over the past decade. Traditional management literature has emphasized large corporations. As the body of entrepreneurship literature develops, it becomes clear that new ventures face different challenges than established firms and must be managed differently as well.

In this paper, we have reviewed extant literature related to the importance of knowledge in new venture development. We have defined organizational knowledge and the knowledge-based view of the firm. We also showed a model of the organizational life cycle. We have shown that firms have different needs and different measures of effectiveness during different phases of their life cycle.

We argue that knowledge management is no different. Small and medium sized enterprises have unique characteristics that impact how they strategically manage knowledge. Each stage in the life cycle

requires that firms emphasize different knowledge managing activities. Firms in the start-up phase may be more successful if they emphasize knowledge creation. As the firm enters the growth phase, they may wish to shift emphasis to knowledge sharing. Finally, during maturity, the firm may be more successful by emphasizing knowledge exploitation.

SMEs will be more effective if they intentionally manage knowledge. As a firm moves through its life cycle stages, it should establish more formal knowledge systems—both technology-based and relationship-based. Effective knowledge processes should improve performance.

Knowledge in general is an abstract concept and is hard to measure. However, The model and propositions presented in this paper can be tested empirically by pairing survey and interview data on knowledge management strategies with archival performance or survival data. This would be a logical future direction for this research. By collecting survey data about life cycle stages and knowledge management practices and comparing them with performance data, we can make some tentative assessments about the relationship between these factors.

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FIGURE 1: THE ORGANIZATIONAL LIFE CYCLE

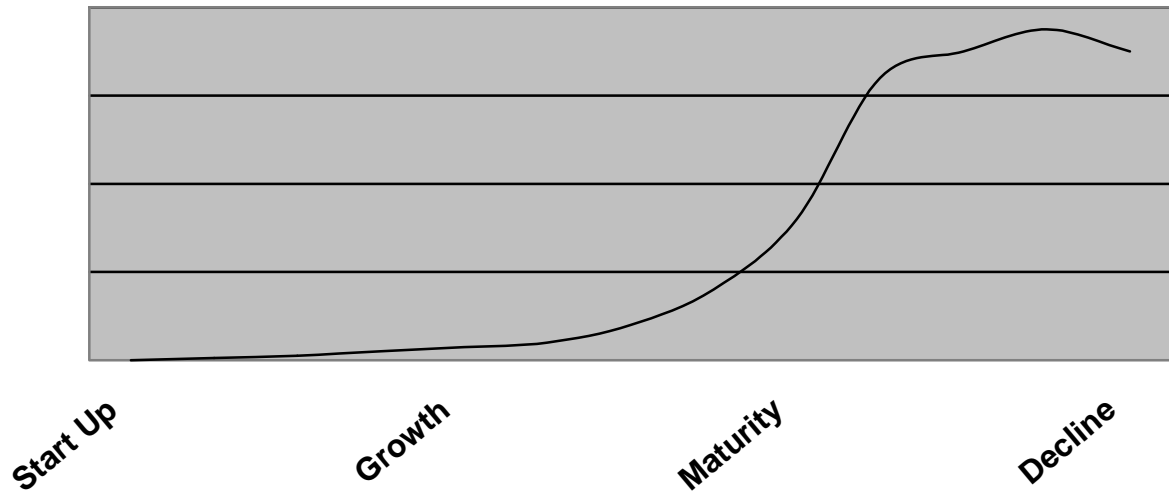


TABLE 1: SOURCES OF KNOWLEDGE IN SMES

Type of Knowledge	Location of Knowledge	
	Internal to Firm	External to Firm
Informal (Tacit)	<ul style="list-style-type: none">▪ Past work experience▪ Mentoring▪ On-the-Job-Training▪ Friendships	<ul style="list-style-type: none">▪ Associations▪ Personal Networks▪ Executive MBA programs
Formal (Explicit)	<ul style="list-style-type: none">▪ Training courses▪ Knowledge-base▪ Intranet	<ul style="list-style-type: none">▪ Alliances, JVs▪ Acquisitions▪ Intellectual Capital markets

TABLE 2: FIRM LIFE CYCLE IMPACTS KNOWLEDGE CULTIVATION AND ENTREPRENEURIAL PROCESS

Life Cycle Stage	Entrepreneurial Process	Management Focus	Knowledge Emphasis
Start-up	Discovery	<ul style="list-style-type: none"> ▪ Resource acquisition ▪ External opportunities 	Creation
Growth	Evaluation	<ul style="list-style-type: none"> ▪ Coordination, cohesion, morale ▪ Human resources 	Sharing
Maturity Decline/Renewal	Exploitation	<ul style="list-style-type: none"> ▪ Formalization, structure ▪ Efficiency, productivity 	Sharing, Exploitation