



# Knowledge evolution strategies and organizational performance: A strategic fit analysis

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## ABSTRACT

The rapid growth of electronic commerce on the Internet provides a platform for organizational knowledge to be changed faster than ever. The process by which knowledge assets of an organization change over time to cope with the pressure of environmental variation is called knowledge evolution. In this paper, we adopt the strategic fit theory to examine whether different knowledge evolution strategies would affect organizational performance in different circumstances. We adopt the concept from natural evolution to define two knowledge evolution strategies: knowledge mutation that relies on internal knowledge sources and knowledge crossover that takes advantage of external sources such as online communities and professional consultants. A survey was conducted to explore the effects of different strategies on organizational performance, as measured by the balanced scorecard (BSC).

The results show that knowledge mutation and crossover have impacts on different aspects of organizational performance. In addition, many industrial factors, such as environment variation, knowledge density, and organizational factors, including IT capability and sharing culture, are found to have moderating effects. The findings of this research will help organizations choose the right strategy for knowledge enhancement and light up new directions for further research.

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## 1. Introduction

With the rapid development of e-commerce and the trend of globalization, the environment surrounding organizations is dramatically changing. Under these circumstances, knowledge assets have become an importance source of competitive advantages to most organizations. Peter Drucker (1999) stated that knowledge would replace tangible assets, such as equipment, capital, material, or labor as the key production factor; knowledge workers are replacing traditional labor to become an important enabler of organizational value. As such, how to manage knowledge assets effectively has become a critical issue to organizations in the Internet age. Knowledge management also plays a key role for e-businesses to cumulate their valuable intangible assets for higher competitive advantages. More and more organizations are taking advantage of external knowledge sources such as online communities (e.g., blogs and social networking websites) to enhance their competitiveness. Knowledge could become an intangible product to be traded in electronic commerce. However, not much research has investigated whether different knowledge acquisition

strategies may affect organizational performance and under which circumstances a particular strategy has a better effect.

Many models have been proposed to manage valuable organizational knowledge. Early research on knowledge management (KM) proposes the perspective that focuses on the process of knowledge creation and sharing in organizations (Nonaka 1994, Davenport and Prusak 1998, Alavi and Leidner 1999). A well-known model is the knowledge creation cycle proposed by Nonaka (1994), which suggests that knowledge creation activities include socialization, externalization, combination, and internalization. An organization should properly manage the process of knowledge creation, storage, retrieval, transfer, and applications. Alavi and Leidner (1999) provided a nice review of the process view of knowledge management. Another research line adopts the resource-based view that treats knowledge as organizational resources to investigate its effect on organizational capabilities and firm performance (Hamel and Prahalad 1990, Grant 1991, Bharadwaj 2000, Billinifer and Smith 2001, Gold et al. 2001, Lee and Choi 2003, Liu and Wang 2009, Schroeder et al. 2009). These studies have found significant impacts of KM activities on organizational creativity and firm performance.

As KM is a continuous and dynamic process, understanding the patterns of knowledge development, their driving forces and organizational context is also an important issue. A better

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understanding of the interaction between knowledge development and organizational context allows us to know more about how different evolutionary strategies affect organizational performance.

Zollo and Winter (2002) proposed a knowledge evolution cycle to explain how knowledge assets adapt to environmental pressure. They added an additional stage to Darwin's evolution process to include *variation, selection, replication, and retention*. Organizational knowledge evolves through these four stages recursively. This model defines the stages of knowledge evolution but fails to identify potential evolutionary strategies, nor provides empirical evidence to show the relationship between knowledge evolution, organizational context and firm performance.

In this research, we extend the knowledge evolution model by conceptually defining and empirically testing two knowledge evolution strategies that organizations use to enhance its knowledge and whether there exists a fit between evolution and organizational factors. The remainder of the paper is organized as follows: Section 2 reviews major literature concerning knowledge evolution and the strategic fit theory. Research model and hypotheses are developed in Section 3. Section 4 shows the results of our survey research. Finally, implications and conclusions are described in Section 5.

## 2. Theoretical background

### 2.1. Ecological view of knowledge management

Research in knowledge management can be traced to early work in the sociology of knowledge around the 1970s and technical work in knowledge-based expert systems in the 1980s. In a review on knowledge management and knowledge management systems, Alavi and Leidner (2001) examine how KM has attracted significant attention in organizations, and consider previous KM research from a process view, including activities such as creation, storage, retrieval, transfer, and application of knowledge.

A quite different view was proposed recently to examine organizational knowledge from the ecological view. Ecology is a science used to analyze the relationship among members (species) of a community and their interaction with its environment. Traditionally, ecology is defined as "the scientific study on the interactions that determine the distribution and abundance of organisms" (Krebs 1978, Carroll 1988, McGlade 1999).

In their recent work, Chen and Liang (2005) and Chen et al. (2010) define the knowledge ecology of an organization as a combination of knowledge communities, organizational resources, and external environment. Different types of knowledge owned by different divisions or employees are viewed as different knowledge communities (or populations) in an eco-system. These knowledge communities build on top of organizational resources (including staff, process, structure, and culture) and maintain a balance with the external environment to maximize its interests through four ecological mechanisms: *distribution, interaction, competition, and evolution*. Fig. 1 illustrates their relationships.

### 2.2. Knowledge evolution

Knowledge evolution represents the fact that organizations change their knowledge contents to cope with the changing pressure from the environment. Evolution is a strategy that a population uses to cope with the pressures of environmental variation (Burgelman 1991, Usher and Evans 1996). It is a dynamic capability which allows every firm to integrate, build, and reconfigure their competences under a rapidly changing environment (Teecle et al. 1997). Those with higher adaptability are more likely to survive in a dynamic business environment. A similar concept

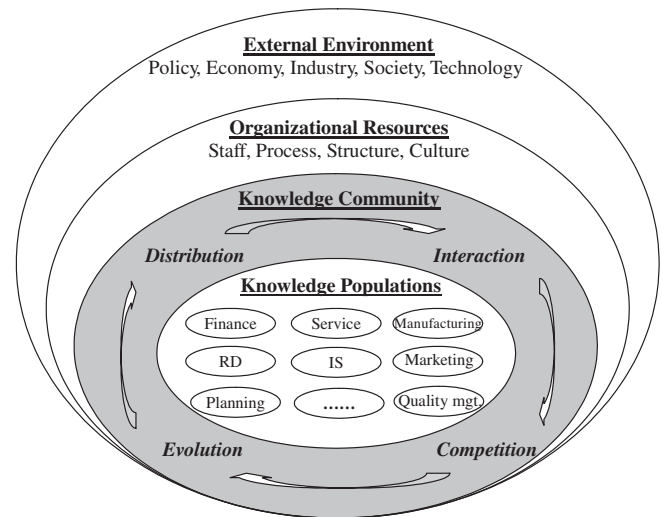


Fig. 1. A conceptual model of knowledge ecology.

developed in strategic management is the strategic fit theory, that suggests the importance of matching strategic selection with environmental features (Thompson 1967). The theory will be explained in Section 3.1.

A typical knowledge evolution cycle may include four stages: variation, selection, replication, and retention (Zollo and Winter 2002). In the variation stage, individuals or groups in an organization generate new ideas to meet the challenges of external stimuli and feedback. Internal selection is a mechanism to ensure that only the most valuable approaches will be selected for further implementation. In the replication stage, the retained and implemented ideas will be shared throughout the organization to further enhance organizational competence. Finally, the new knowledge is routinized in the organization in the retention stage.

Van den Bosch et al. (1999) proposed a framework for the co-evolution of a firm's absorptive capacity with its knowledge environment. The framework offered an explanation of how knowledge environments co-evolve with the emergence of organization forms and combinative capabilities that are suitable for absorbing knowledge. In another relevant work, Bieber et al. (2002) proposed an architecture for developing a community of knowledge evolution that could be used to improve members' tasks in a virtual community.

Menon and Pfeffer (2003) suggest two knowledge sources that may be the driving forces of knowledge evolution: internal and external. The pressure of competition coming from internal colleagues or external rivals drives these two types of knowledge sources respectively. Therefore, these two major forces may cause the variation of the knowledge assets and affect the knowledge evolution strategies in organizations. Chen and his colleagues (2005, 2010) named these two major knowledge evolution strategies driven by internal and external forces *knowledge mutation* and *knowledge crossover*, respectively.

#### 2.2.1. Knowledge mutation strategy: internal-driven evolution

The concept of knowledge mutation is derived from the concept of mutation in genetics, which stands for random changes that occur in a particular gene of a species. Genetic mutation can be recognized as an internal force to change the population through self-adaptation. In knowledge ecology, knowledge mutation allows new knowledge to be created from existing knowledge. The changes or enhancements of knowledge are provoked by internal forces, such as the outcomes from internal Research and Development (R&D) projects or combination of existing knowledge. New

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