Research on the Enterprise Knowledge Management in Dynamic and Complex Environment

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Abstract—This paper first carried on the analysis to the relations between the environment and enterprise knowledge management, and then carried another analysis to the dynamic and complex trend in environment development. According to the dynamic and complex environment, we build a knowledge management model for sustainable competitive advantage. Based on this, we put forward some suggestions from knowledge integration and knowledge application for enterprise knowledge management in dynamic and complex environment.

Keywords-dynamic and complex environment; knowledge management; sustainable competitive advantage

I. INTRODUCTION

Environment is affecting each aspect such as enterprise product, service, market, customer and resource assignment, the survival and development of any enterprise can't be separated from specific environment background. Respect, understanding, mastery and adaptation to the environment are an important source of competitive advantage. Therefore, environmental problems are important strategy areas of enterprise knowledge management system.

II. ENVIRONMENT AND ENTERPRISE KNOWLEDGE MANAGEMENT

A. Knowledge Management is a Special Result of Knowledge-based Economy

With the rapid development of knowledge-based economy, the world's economic and commercial law is undergoing a rapid change, development and intense turbulence. All this constitutes an environment that every modern enterprise manager must face and has become a platform for new management mode. Therefore, in order to research knowledge management, we must analysis the operation and development environment of knowledge management, and explore the inherent and inevitable objective laws. Only in this way will we be able to deepen our understanding to knowledge management and grasp the essence of knowledge management.

B. Environment is the Formation and Development Foundation of Knowledge Management

Analysis and research environment are not only the starting point of knowledge management but also the basis of building a knowledge management system. Knowledge management strategy should be based on understanding of the environment and could cope with the challenges of particular environment. The operation of knowledge management should also be based on an analysis to a specific environment and would be operating in the specific environment. The support system of knowledge Management should be based on the analysis of environmental conditions and develop with the environment changes. Therefore, the study on management environment is the foundation of knowledge management system formation and development.

C. The Adaptability to Environment is the Most Fundamental Enterprise Core Competence

Frequent changes are the most significant characteristics of contemporary society and economic life. For survival and development, enterprises need to continuously improve their environment cognitive ability and insight into the inherent law of environmental change. Further more, enterprises do their best to unforeseen environmental changes and grasp the basic trends so that they can make use of the environment changes to seek new competitive advantages. So knowledge management is helpful to cultivate the core competence and defeat the competitors in knowledge-based economy age.

III. THE DYNAMIC AND COMPLEX TREND IN ENVIRONMENT DEVELOPMENT

According to the difference of environmental uncertainty, Robbins (1997) compartmentalizes the environment in the variability dimension and complexity dimension. In the variability dimension, the environment can be classed into the dynamic environment and stable environment. The former refers to the environment with factors significantly changing and the latter refers to the environment with very small factors changes. The complexity of the environment refers to the number of knowledge elements of an enterprise environment, according to the number of elements the environment can be divided into simple and complex environment. So the
environment can be divided into four types such as simple stable, simple dynamic, complex stable and dynamic complex environment (as shown in TABLE 1)

| Simple Complexity | Stable | Dynamic |
|-------------------|--------|---------|
| Simple            | Stable and predictable environment; Fewer elements, has some similar elements and is basically unchanging; Requiring few complex knowledge and having high complex knowledge requirement. | Dynamic and unpredictable environment; Many environmental elements, the elements are not similar to each other but the basic elements remain unvariable; High complex knowledge requirement. |

### TABLE I. ENVIRONMENT UNCERTAINTY MATRIX

| Adaptability of Knowledge Management | Dynamic Complexity of Environment |
|-------------------------------------|-----------------------------------|
| Free                                | Low                               |
| Ready                               | Low                               |
| Weak                                | High                              |
| Lost                                | High                              |

Before the 1980s, enterprises were facing a basically stable, predictable environment. Since the early 90’s, in the information economy, network economy and knowledge-based economy, the factors, rules and controls for environment stability are weakened gradually [3].

With the increasing globalization, government deregulation and privatization, the rapid technology cross-penetration, rapid development of information technology and competition at an unprecedented depth and breadth, the enterprise environment is changing from the relative stabilization to dynamic and complex environment.

The previous curve changes often happen at once in unpredictably manner, the pace is getting faster and faster, the situation is more complex, the prospect is more difficult to predict, any enterprise can not escape from these changes. The main features of dynamic and complex environment are the rate of change and competition interactions.

### IV. THE CHALLENGES TO ENTERPRISE KNOWLEDGE MANAGEMENT FROM DYNAMIC AND COMPLEX ENVIRONMENT

#### A. Enterprise Knowledge Management Must Adapt to the Dynamic and Complex Environment

The US knowledge management expert Debra M-Amidon called the dynamic complexity of environment as “the kaleidoscope-like change.” In the influences of so many known and unknown variables, enterprises can no longer develop a long-term plan, and then slowly adjust implementation as what they did in the past [4]. Today, what enterprises really need is the ability to face the dramatic changes and the following uncertainties. Keeping the adaptability of knowledge management in the "kaleidoscope-like change" is the main duty of enterprise manager at present.

As shown in Figure 1, in the environment with low dynamic complexity, enterprises with high knowledge management adaptability can enjoy a certain degree of initiative. The free action of enterprise will not be inappropriate or obsolete by the sudden impact (as shown in quadrant I).

Quadrant II expresses the situation that enterprise knowledge management adaptability improves with increasing environmental uncertainty. In this case, for the enterprise knowledge management, the organization has the capacity to cope with growing uncertainty through active or passive actions to the external environment changes. So the enterprise can keep up with the pace of environment development and control its own destiny to some extent.

In quadrant III, the adaptability of enterprise knowledge management and environmental uncertainty are relatively low. In this situation, enterprise may find themselves seems very fragile when facing with future changes. Though they may be in the dominated position with substantial market share, they can’t keep the position in the face of external environment changes for the elements of the past success could not bring them further success in new environment.

Quadrant V represents one of the most unpopular circumstances: poor enterprise knowledge management adaptability and high environmental uncertainty. Under such circumstances, decision-making for past environment shackles corporate internal and external freedom of movement, any success can only rely on good luck rather than good management, and enterprise can only adapt passively to the external environment.

In the current dynamic and complex environment, enterprises have only two choices: getting lost in a complex environment or enhancing their knowledge management level and adaptability to the environment, and be ready to deal with the dynamic and complex changes in the external environment at any time.

#### B. Enterprise Knowledge Management Orientation - Creating Sustainable Competitive Advantage

Enterprises have become the collective body of knowledge in era of knowledge economy. Enterprises are the different knowledge system consists of different explicit knowledge and implicit knowledge [5]. We can draw a conclusion that the enterprise knowledge system is the foundation of enterprise core competence. The essence of enterprise's competition is the competition between different enterprise's knowledge systems.
The enterprise knowledge system especially the tacit knowledge is the fundamental guarantee for a competitive advantage.

In face of rapidly changing external environment, competitive advantages from existing enterprise knowledge systems can only be temporary, that is, the enterprises core competence will become the company’s core competence rigidity if it can not meet the changes in the external environment. In other words, the advantages of an enterprise may also become a disadvantage. The core competence elements of the corporation progressively develop with the company functioning, decision-making, knowledge innovation and knowledge accumulation[6]. In the course of development, a particular type of knowledge is emphasized with the costs that other knowledge be neglected. Therefore, while the core competence brings a competitive advantage to enterprises, it may become a core rigidity impeding the company long-term development at the same time by poor management.

Enterprise can create their competitive advantage by its existing knowledge system in the relatively stable external environment. If the external environment changes slowly, an enterprise can also maintain its relative competitive advantages through organization learning and growth path-dependent that it may be able to passively adapt to environmental changes. However, when faced with such ever-changing as technology, industry background, customer requirements and product updates, enterprises will find themselves lost in the past success and losing its competitive advantages gradually.

Therefore, enterprises must continually improve their knowledge system to obtain sustainable competitive advantage. Clearly, this is a process of obtaining sustainable competitive advantage through knowledge integration and knowledge implementation which could not be separated from knowledge management. Enterprise must implementation knowledge management for dynamic capabilities. In which enterprise can acquire knowledge integration capability through organization learning and knowledge alliance, then creates new competitive advantage by knowledge diffusion and knowledge innovation(as show in figure 2).

A. Enterprise Internal Knowledge Integration Strategy

Effective enterprise knowledge management needs a broad support for the knowledge stock because that knowledge is the foundation of enterprise knowledge management. Since the ability to absorb knowledge determines the enterprise’s competitiveness, enterprise must continue to acquire knowledge to maintain its competitive advantages. The enterprise repository plays a very important role in the process of enterprise’s gaining new competitive advantages. That is, the stock of knowledge determines the enterprise operation performance.

b. Strengthen the organizational learning

In dynamic and complex environment, it is difficult for enterprises to maintain a long-term competitive advantage by quality, skills and market barriers. Organizational learning and learning organization, as an important tool to achieve and renew knowledge, is becoming the object of attention.

Organizational learning in a high level is very important to enterprise in dynamic and complex environment for its contribution to the definition and resolution of highly ambiguous questions. The high level organizational learning often involves the using of information, research and insight into the dynamic and complex environment[7]. Organizational learning ability is very difficult to be imitated by competitors and provides the power for the sustainable competitive advantage.

c. Improve enterprise organizations flexibility

The dynamic and complex requires enterprise knowledge management must have a certain flexibility and adaptability so the enterprise organizational structure must meet the knowledge management flexibility requirements. Organizational structure must be flexible, efficient, and highlights the status of knowledge holders. Organizational structure must facilitate knowledge flow, study and innovation in the organization.

Levels in the organization should be minimized, and strengthen the inter-departmental communication, contact and cooperation to help the exchange of knowledge and innovation. Enterprise must value the main elements of dynamic capabilities and it is necessary to maintain its relative stability and prevent the formation of organizational inertia that impeding innovation.

B. Enterprise External Knowledge Integration Strategy-
Knowledge Alliance

For the dynamic complexity of environment, it is difficult for any enterprise to complete the mission of sustainable development by themselves. Environment requires enterprises keeping a strong openness and adaptability, and enterprises will be able to link the whole knowledge system so that they can make use of the related knowledge of the whole knowledge network.

![Figure 2. Knowledge Management Adapatability and Environment Dynamic Complexity](image-url)
Knowledge alliance is a new trend of enterprise management strategy in the 21st century. It means that enterprises associate with other enterprises or institutions by mergers and joint ventures to create new knowledge and transfer knowledge. Knowledge alliance is an effective way to integrate external knowledge resources[8]. When a particular enterprise in the league finishes an innovation, the technical knowledge and market information will spread abroad through the network, making the entire league sharing the information and knowledge and raising the entire league's competitive advantage.

To create a successful knowledge alliance, alliance member companies must set up long-term mutual trust relationship to reduce transaction costs, reducing each other's knowledge protection awareness create a good learning environment for exchange knowledge. Enterprises should also create a culture of knowledge-sharing and make full use of the external knowledge of league members.

C. Enterprise Knowledge Innovation Strategy - Sustainable Knowledge Innovation

Because of the complexity in a dynamic environment, knowledge and information flows fast, thus technology or product has been unable to provide enterprises sustainable competitive advantage for the competitors can quickly copy the products and services. Enterprises continuously improvement of product quality and development of new varieties come inseparable from the knowledge innovation. Knowledge innovation can increase the return on knowledge and provide competitive advantage. The imitational obstacles and lifemanship of an enterprise can not keep the long-term competitive advantages for these mechanisms are effective largely in a stable environment.

Therefore, in a dynamic and complex environment, enterprises must create new competitive advantages through sustainable innovation so that competitive advantage could continue and update through which the enterprise could acquire sustainable development.

Compared with technological innovation and institutional innovation, knowledge is not only the core of resource and capability but also a method of configuring other resources. Therefore, the enterprise knowledge innovation capability is its competitive advantage accelerator. Through knowledge innovation, enterprises can also continue to create new resources, to acquire new core competence, creating a lasting competitive advantage.

In order to obtain sustainable competitive advantage, the enterprise knowledge innovation should be based on the following four principles: Firstly, enterprise knowledge innovation should be difficult to be imitated by other enterprises. Secondly, enterprise knowledge innovation must reflect the market demand accurately. Thirdly, the enterprise must grasp the effective opportunity for knowledge innovation. In the end, the enterprise should try to carry out knowledge innovation on its special resource and capability.

CONCLUSION

Environment is the starting point and destination for enterprises to implement knowledge management. For the dynamic and complex trend in environment development, enterprise must create sustainable competitive advantage through knowledge management on the basis of adaptability to environment. The enterprise could achieve sustainable competitive advantage by internal knowledge integration strategy, external knowledge integration strategy and sustainable knowledge innovation.

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