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Impact of Cross-Organization Improvisation on New Product Development From Viewpoint of Network Embedding

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ABSTRACTS
Improvisation plays an important role in NPD (new product development) under time pressure, resource constraints, dynamics and high uncertainty environment. Under supply chain embedded circumstances, cross-organization improvisation often occurs. By literature review and theory deduction, the four factors that drive cross-organization improvisation including network driving, behavior diffusion, inter-organizational learning and resource integration are expounded. Meanwhile, the impact mechanism is analyzed among supply chain network embedding, cross-organization improvisation and new product development with a theory model set forth. It can be concluded cross-organization improvisation has a positive effect on NPD under supply chain network embedding conditions.
Keywords: *cross-organizational improvisation; network embedding; new product development; supply chain*

1. INTRODUCTION

As the business environment is increasingly dynamic, complex and obscure, it is difficult for technology enterprises to plan and implement actions on the new product development activities with traditional ways. The time gap between decision-making and action becomes shorter. It is often necessary to take one step and watch one step by relying more on improvisation. Improvisation plays an important role in new product development in many technology enterprises under complex and uncertain circumstances.

The supply chain highly integrates the business activities between enterprises, so the scope of improvisation can span a single organization, which is manifested through the collaborative improvisation involving related enterprises in the supply chain, which is so called cross-organization improvisation. According to the network embedding theory, corporate behavior is embedded in various relationship networks established with external organizations. The inter-organizational improvisation in the supply chain is shown as the response of the partner enterprises to the improvised enterprise behavior. It is the coordination and interaction of improvisation among enterprises in the supply chain, so it is inevitably affected by the embeddedness of the supply chain network.

2. LITERATURE REVIEW

Weick and Moorman believe that improvisation is embodied in "thinking and acting at the same time" and "the degree of concentration of new creation and execution in time"[1-2]. Vera believes that improvisation is a spontaneous and creative process that uses new methods to achieve goals[3]. Magni argues that improvisation is an innovative and spontaneous way to manage unexpected events[4]. Pavlou puts forward that improvisation can spontaneously re-allocate existing resources to establish new operational capabilities to deal with urgent, unpredictable and innovative environmental conditions[5]. Zheng proposes that organizational improvisation is the simultaneous implementation of ideas and execution (real-time planning), and seeks available solutions rather than optimal resources (resource patchwork)[6].

Through combing the research of different scholars, it can be found that scholars' understanding of improvisation follows a cognitive process from the description of the phenomenon to the abstraction of the essence, from emphasizing a certain aspect to the integration and generalization. The understanding of the concept of improvisation and its structural dimensions is not unified. Some scholars regard the cause or result of improvisation as its own attribute, which can easily lead to misunderstandings about improvisation.

The antecedent variables of organizational improvisation are very complex. But overall, the current research mainly analyzes the impact of the internal environmental factors of the organization on the improvisation, while the external environmental factors of the organization are less considered. In addition to general industry environmental factors, the impact of special environments such as the supply chain network environment on improvisation deserves further discussion.

Most scholars believe that improvisation has a positive effect on new product development performance, but they also emphasize that the effect of improvisation is regulated by multiple factors[7]. Due to the network embedding of organizational behaviour, examining the impact of impromptu activities on the performance of new product development from a single organizational level will result in cognitive bias. Promotion of research level is conducive to a deep understanding of the mechanism of organizational improvisation on NPD.

3. DRIVING FACTORS OF CROSS-ORGANIZATION IMPROVISATION

Many research shows that impromptu demand is usually induced under important events, time pressure, lacking of plans, unpredictability and resource constraints. But the actual occurrence of improvisation is also affected by multiple factors inside and outside the organization. A comprehensive mechanism model of inter-organizational improvisation from the four dimensions of network drive, behavior diffusion, inter-organizational learning, and resource integration based on theoretical tools such as social networks, self-organization, dynamic capabilities, planned behavior, and organizational learning. Fig.1 shows:

3.1. Network Driving Mechanism

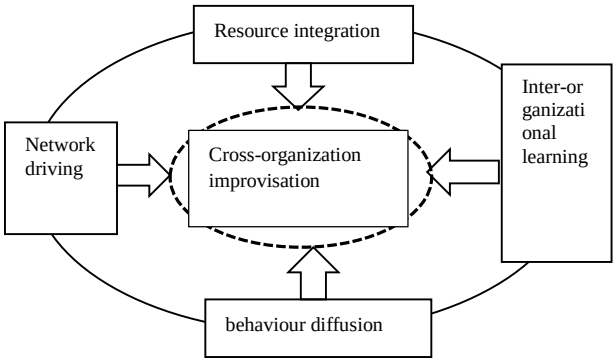

Figure 1. Driving factors of cross-organization improvisation

Supply chain network is an important factor that affects inter-organizational improvisation. Network characteristics, network practices and network capabilities have an important influence on the cooperative behavior of network members. The network studied in the paper refers to the ego network of the focused company. Network characteristics include network structure and relationship characteristics, and network routines mainly include the degree of tacit understanding of behavior and acceptance of norms. Network capabilities include network planning capabilities, network configuration capabilities, network operation capabilities, and network occupancy capabilities. It can promote the evolution of ego networks and have an impact on network characteristics and network practices. It is important to explore the influence mechanism of supply chain network characteristics and network conventions on the inter-organizational improvisation of technology-based enterprises, as well as the moderating role of enterprise network capabilities.

3.2. Behavior Diffusion Mechanism

It is assumed that all actors in the supply chain network are limited rationality, and whether the actors participate in improvisation or not mainly depends on the willingness to cooperate. Some research adopts the iterative algorithm of cooperation willingness to simulate the multi-agents' communication rules, but the algorithm model should be modified according to the characteristics of improvisation. It should be classified that the diffusion of impromptu behaviors under different network characteristic parameters, network conventions and network capabilities by reasonably setting variables and agents' behavior rules, so as to clarify the diffusion mechanism of supply chain network members' impromptu behaviors.

3.3. Inter-Organizational Learning Mechanism

Inter-organizational learning can be divided into two types: exploitation learning and exploration learning. The two kinds of learning process will produce procedural memory and declarative one respectively. Process memory improves the consistency of actions of supply chain enterprises, and another one improves the environmental adaptability of them. Impromptu is also a special type of organizational learning, which has the ability to enhance other learning processes. The causal feedback mechanism between supply chain network, inter-organizational learning and inter-organizational improvisation should be demonstrated to explore the dynamic mechanism of improving the level of inter-organizational learning and inter-organizational improvisation of supply chain network members.

3.4. Resource Integration Mechanism

Impromptu behavior is an organization's spontaneous adjustment to environmental changes whose purpose is to eliminate threats or capture opportunities. Therefore, improvisation has the attribute of dynamic capability. Under time pressure, inter-organizational improvisation mainly relies on the patchwork of available resources. The supply chain network provides an effective mechanism for enterprises to obtain valuable resources. The more valuable resources a company can integrate, the greater probability improvisation occurs. Therefore, it is valuable to deeply explore the influence mechanism of supply chain network on enterprise resource integration, analyzing the specific

path of effective supply chain network resource integration, and clarifying the mechanism of resource integration on various dimensions of cross-organizational improvisation.

4. IMPACT MECHANISM OF CROSS-ORGANIZATION IMPROVISATION ON NPD PERFORMANCE

Based on the previous research results, combined with theoretical tools such as innovation management, knowledge management, and supply chain management, the impact mechanism of cross-organizational improvisation on new product development performance from two aspects of collaborative knowledge creation and supply chain agility.

4.1. Collaborative Knowledge Creation

Impromptu is often accidental. It brings new knowledge in unforeseen ways and challenges the traditional knowledge and routines of the organization [8]. It can be called improvised knowledge. Inter-organizational improvised knowledge is the result of collaborative creation between organizations in a specific context, and has more features of tacit knowledge. Its novelty and level of heterogeneity go beyond organizational improvisation. Therefore, promoting collaborative knowledge creation by cross-organizational impromptu and improving the organization's ability to absorb and utilize new knowledge are important factors that affect the performance of new product development. It should be emphasised to study the mechanism and process of technology-based enterprises to promote collaborative knowledge creation through inter-organizational improvisation, as well as the specific path for enterprises to absorb and use improvised knowledge for new product development.

4.2. Supply Chain Agility

Under time pressure and unprepared circumstances, cross-organizational impromptu as response to environmental changes will help enhance the agility of the supply chain. It should be pointed out that agility and improvisation are not the same concepts. The former is the output that the latter desires to achieve, and the latter is considered to be the most commonly used means to achieve the purpose of the former. Supply chain agility is essentially an ability, which should be studied to analyze the specific ways that supply chain agility promotes new product development performance.

According to the above analysis, the impact mechanism theory model about network embedding, cross-organization improvisation and NPD can be established as Fig. 2 shows.

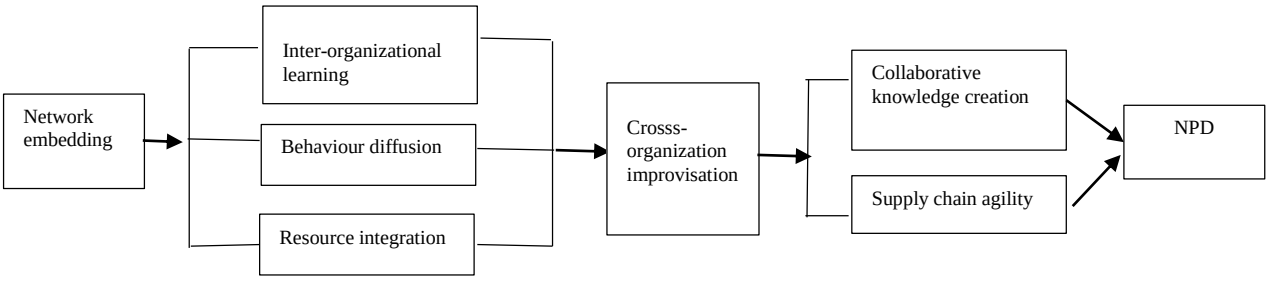

Figure 1. Impact mechanism theory model

5. CONCLUSION

Based on the research framework of "structure – behavior - performance", a relationship mechanism model is proposed concerning network embedding-inter-organizational improvisation-new product development performance. Our research extends organizational improvisation from a single organization to the supply chain network level, which provides a new perspective for the study of the mechanism of organizational improvisation. At the same time, based on logical derivation and literature research, the driving factors of cross-organizational improvisation in the network embedded environment are put forward, as well as its mechanism for enterprises' NPD. It will help enterprises improve the level of improvisation capabilities and adapt to the highly turbulent environment to do a good job in new product development.

In the future, case studies and large-sample questionnaire surveys are needed to further empirically investigate the theoretical model proposed in the paper, and more detailed research will be conducted on the contingency factors in the mechanism model for elaborating the theory model.

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