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Research on the Dynamic Evolution of Manufacturing Industry Cluster Network - The Perspective of the Synergy of Core Enterprise Transformation and Cluster Members

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Abstract. China's traditional industry clusters meet challenges and opportunities as the global economy goes ups and downs. Following the trend of industry up gradation is a highlight in both theoretical and practical domain. This paper focuses on the principles of dynamic evolution of China's industry clusters, in order to pursuit and establishes its enduring growing drive and competitive advantages. This paper gives research into dynamic evolution of cluster network, centering on its inherent relationship with the core enterprise transformation and the restructure flexibility of cluster members and defines "the transformation and up gradation of the core enterprises in cluster network", finds out the dynamic and persistent effect of transformation and upgradation of the core enterprises on network resources and puts forward the dilemma of the dynamic evolution and up gradation of China's cluster network.

Keywords: Core enterprises; Cluster Evolution; Enterprise Transformation;

1 Introduction

Many scholars have all proposed that enterprises in cluster must timely carry out transformation and upgrading when they are studying how to maintain the competitiveness of China's industrial cluster (Xihong Zhu, Aiqing Wu, 2004, Lipparini, 1995; Youjing Liu, 2005). Only focusing on factors on the level of enterprises' their own while ignoring their network resources will usually make the analyses lack certain foresight. So scholars in the analysis of the factors of enterprise transformation proposed that when studying strategic changes, in addition to the analysis of internal resources, the role of inter-enterprise network needs to analyzed more. Therefore, this study will expand the connotation scope of theoretical research of dynamic capability to network evolution, with in-depth analysis and discussion on whether transformation and upgrading of core enterprises in the cluster driven by the

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global value chain can mobilize to achieve benign interaction between cluster members in resource integration and collaborative innovation, enhance the overall innovation capability of the cluster network and realize cluster upgrading.

2 Research Methods

2.1 Variable measure

(1) Cluster innovation performance

According to the conceptual model proposed earlier, measurement of cluster upgrading in this study uses two latent variables of cluster innovation performance and cluster competitiveness respectively representing the internal impetus performance and external market performance of cluster evolution, adapted and designed according to measurement scale of S. Thorgren (2009) and other scholars. The study uses three questions to measure innovation performance of the cluster network. The interviewed enterprises in cluster give subjective scoring according to comparison of the average level of their own cluster and the competitor cluster in the last three years.

(2) Cluster competitiveness

In this study, "cluster competitiveness" is taken as another explained variable (dependent variable) of "cluster upgrading". Measurement of cluster competitiveness puts particular emphasis on competitive advantage of cluster in strategic flexibility and market performance. In this study, research thought of Zaheer &Bell（2005）and other related scholars is used for reference, and measurement scale of S. Thorgren (2009) And other scholars are adapted for new design. This study uses three question items, including: growth rate, strategic competitiveness and flexibility; measure the cluster competitiveness from market share, profitability and other angles.

(3) Transformation capability of core enterprises

This study suggests that transformation capability of core enterprises is an important manifestation of dynamic capability of core enterprises embedded in the cluster network. Measurement based on the constructs in this paper refers to relevant research on dynamic capability and uses research for reference.Scale in existing studies is adapted and modified, and seven-level Likert scale is added to enhance the scale reliability. With the use of program developed from standard scale, the study builds the construct of transformation capability of core enterprises, and takes this construct as a formed second-order factor model. Six question items are used to measure market orientation(Paul A. Pavlou & Omar A. El Sawy 2005）, the ability of effective generation and dissemination of and response to market information. (Jaworski &Kohli 1993). Four question items are used to measure absorptive capability(Zahra & George 2002),the ability of effective acquisition, assimilation, transformation and development of knowledge and resources in cluster. Three question items are used to measure coordinate capability, the ability of effective resource allocation, task

assignment and action synchronization. In this study, at last, 13 question items are formed to measure transformation capability of core enterprises.

(4) Cluster members' restructuring resilience

"Cluster members' restructuring resilience" proposed in this study, as manifestation of cluster dynamic capability on the other hand, refers to that enterprises in cluster can quickly and efficiently search for potential partners and quickly link with existing resources or reallocate resources by re-selection and re-association of network partners to achieve efficient allocation of internal and external resources and technologies owned by various enterprises in the cluster. With comprehensive reference of related literature and views of Paul A. Pavlou, five question items are used to measure the variable of "cluster members' restructuring resilience".

(5) Cluster resource cooperative capability

In this study, cluster resource cooperative capability is taken as an intermediary variable. Cluster resource synergy means combine knowledge and resources of different member enterprises to form new knowledge and resources. This paper proposes cluster resource cooperative capability, and takes it as a formed second-order latent variable. With reference of Kauffeld-Monz (2008), use scale adapted from Lewis (2003) and others to measure resource interface integration performance between the member enterprises and measure the ability that can effectively integrate respective professional experience and resources on strategic cooperation level and achieve good project connection and innovative development.

(6) Network position and link properties of core enterprises in the cluster

Network position centrality is used to indicate the position feature of enterprises in the network structure, which can be used to measure the ability of the enterprises to communicate with other enterprises. With reference of relevant literature (Powell, 1996), four question items are used to measure in this study. Link intensity, relationship strength, is an important variable of link property of enterprises in the cluster network, on behalf of the important indicator of the degree that enterprises are embedded in the strategic network. Based on related research literature and combination of relevant expert advice, considering the practical operability of the questionnaire, only first-level enterprise network is considered in this study, and eventually adopts three question items to measure the link intensity of enterprises within the cluster. Inquire about the degree of cooperation and exchange among member enterprises in the cluster (with key suppliers, customers and other companies) and use three question items to measure.

2.2 Control of research methods

In this study, 385 formal questionnaires are distributed to enterprises in cluster in several regions like Guangdong, Fujian, Jiangsu, Shanghai, and 273 questionnaires are recovered, of which 210 are effective questionnaires. Questionnaire recovery is 70.9% (273/385), and the effective recovery reaches 76.9% (210/273). So unanswered bias of this questionnaire survey recovery can be ignored.

3 Research Limitations and Future Research Directions

The constructed theoretical analytical framework model is in theoretical exploration stage, so the limitations of the study may be the directions of future research for further improvement:

Due to the complexity of the issues discussed in the study, there may also exist other influence factor variables affecting cluster network dynamic changes in the real environment. For example, there are many other situation feature dimensions in cluster network, such as structural symmetry of cluster network, density of cluster network, etc. may affect or regulate network evolution. If in future studies, other variables that affect the cluster dynamic evolution can be found to add in and perfect indicator variables of the model, or analyze and explore the evolution issue of cluster network from more angles and build a more complete theoretical framework, it will contribute to a more comprehensive study of the mechanism and role relationship of cluster network dynamic evolution.

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