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## Corporate entrepreneurship in the enterprise clusters environment—Influence of network resources and entrepreneurial orientation on firm performance

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**Abstract** As the business environment becomes increasingly complex and dynamic, more firms begin to adopt corporate entrepreneurship strategy in pursuit of sustainable competitive advantage. Based on the network theory, this paper compares three types of resources acquisitions and argues that unique network resources are the underlying reason that entrepreneurship activities benefit from enterprise clusters. It also explores the relationship among network resources, entrepreneurial orientation (EO) and firm performance. Finally, drawing on the data of the enterprise clusters in Zhejiang Province, empirical results show that a firm's performance is positively related to entrepreneurial orientation and network resources, which greatly increases the enhancement of EO to firm performance.

**Keywords** corporate entrepreneurship, enterprise clusters, network resources, entrepreneurial orientation, firm performance

**摘要** 环境复杂性和动态性的加强, 导致更多的企业采取创业战略以获取持续竞争优势。

Translated and revised from *Zhongguo Gongye Jingji* 中国工业经济 (China Industrial Economics), 2008, (3): 84–92

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基于网络视角, 首先对公司创业的三种资源获取方式进行比较, 认为网络资源是公司创业活动受益于企业集群的内在原因; 进而对网络资源、创业导向与集群企业绩效的关系进行探索性研究; 最后, 对浙江省集群企业的实证研究表明: 创业导向、网络资源与企业绩效有显著正相关关系, 网络资源显著提高了创业导向对企业绩效的贡献。

**关键词** 公司创业, 企业集群, 网络资源, 创业导向, 企业绩效

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## 1 Introduction

It has become increasingly uncertain for firms to maintain continuous cash flow by relying upon existing lines of business, as business environment becomes more complex and dynamic. Firms have to foster entrepreneurship to seize opportunities and to obtain sustainable competitive advantages (Cavin and Mile, 1999). According to Onuoha (2007), corporate entrepreneurship is the practice of starting new organizations or revitalizing mature organizations, particularly new businesses generally in response to identified opportunities. Corporate entrepreneurship activities include product marketing innovations, corporate risk and strategy innovations, etc. (Teng, 2007). Firms devoted themselves to entrepreneurship activities are called entrepreneurial firms (Miller, 1983). Entrepreneurial orientation (EO) means the intensity and behavioral characteristics of firms' entrepreneurship activities. How to enhance the contribution of entrepreneurial orientation to organization performance has become the focus of research and practice.

For over two decades, researchers have empirically studied various factors that influence the relationship between entrepreneurial orientation and firm performance (Lumpkin and Dess, 1996; Dess et al., 2003). These factors mainly include organizational factors and environmental factors, such as characteristics of high-level management team, salary system, organizational structure, corporate strategy, industrial environment, and social and cultural background (Lumpkin and Dess, 1996). However, the majority of existing studies are limited in atomism, ignoring the increasingly important influence of firm networks on corporate entrepreneurship.

Recently, scholars have started to study corporate entrepreneurship strategy from the perspective of network. Simsek et al. (2003) proposed the theoretical model of network-embeddings' influences on corporate entrepreneurship; Teng (2007) studied the inherent mechanism of strategic alliance promoting corporate entrepreneurship. However, as a new-born enterprise network organization, enterprises cluster has also been regarded as beneficial for the realization of corporate entrepreneurship (Porter, 2000; Zhang, 2003) while the studies on

corporate entrepreneurship in context of enterprise clusters are quite scarce. According to the theory of corporate entrepreneurship (Lumpkin and Dess, 1996), a profound explanation to entrepreneurship and competitive advantages of enterprise clusters could be made as long as we can find out the key factors that impact the interrelationship between the entrepreneurial orientation of enterprise cluster and firm performance, and match these factors with entrepreneurial orientation. This paper takes resource acquisition as a breakthrough point and focuses on the influences of network resources on entrepreneurship, which is a unique feature of enterprise clusters. In doing so, this paper attempts to make an exploratory study on the inherent mechanism of enterprise clusters' impact on corporate entrepreneurship.

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## 2 Theories and hypotheses

### 2.1 Corporate entrepreneurship and resources acquisition

The nature of corporate entrepreneurship is considered an integration process of enterprises' interior and exterior resources. Therefore, the essence of corporate entrepreneurship lies in acquiring exterior resources. However, traditional corporate entrepreneurship studies often overlook the issue of exterior resources acquisition. The reasons are as follows: corporate entrepreneurship studies in the early period mainly focused on solving the problem of pathology of big enterprises, on how to activate the internal entrepreneurship of large-sized enterprises, which usually possess abundant resources internally. Therefore, studies were carried out from the perspective of internal resources allocation, for instance, on how to improve employees' autonomy in making use of resources (Covin, 1991).

With the increasing intensity of labor division specification and increasing technical complexity, mere dependence of internal resources could not bring forth complex corporate entrepreneurship. Large enterprises also need to be embedded into various enterprises networks to make use of mutually complementary resources so that they can create a corporate entrepreneurship function. Hence, resources acquisition has increasingly become a crucial factor for large-sized enterprises in realizing corporate entrepreneurship. Meanwhile, for small and medium-sized enterprises whose internal resources are comparatively limited, their corporate entrepreneurship depends more on external resources acquisition. Although enterprise clusters are typically composed of small and medium-sized enterprises with low resources endowment, they exhibit active entrepreneurship, higher entrepreneurship capability and

competitive advantages. This paper attempts to make a comprehensive analysis of this phenomenon based on theories of corporate entrepreneurship and the resource-based view.

## 2.2 Network resources in enterprises clusters and resources acquisition comparison

Corporate entrepreneurship needs various kinds of resources, and all kinds of resources shortages may happen in entrepreneurship activities. For example, a start-up enterprise may encounter the lack of financial resources; new product development may face shortfall of technical resources while growing businesses may face deficit of managerial resources. Barney (1991) divide resources into general and strategic resources. Being able to plug strategic resources shortage or not is the crucial factor for entrepreneurship enterprises to realize sustainable competitive advantages (Dolinger, 2006). Therefore, opportunity-oriented entrepreneurship enterprises will acquire the needed resources in many ways to seize and exploit business opportunities. Generally speaking, resources acquisitions are realized in three ways: internal acquisition, market acquisition and network acquisition. Table 1 compares these three acquisitions:

① Acquiring resources through internal development and allocation of enterprises. Its advantage lies in controlling resources on the whole, while low efficiency and high time cost are its disadvantages.

② Market acquisition is the main means for enterprises to externally acquire resources. However, its precondition is the accessibility of resources. According to Miller and Shamsie (1996), resources can be divided into property-right-based and knowledge-based resources. The resources based on property right can be purchased from markets of essential factors. As for knowledge-based resources, there are no markets where you can buy them, such as brands, fame, tacit knowledge, trust, etc. These knowledge-based resources are thought to be the source of enterprises' competitive advantages (Barney, 1991), which can enhance the entrepreneurship activities' contribution to firm performance (Wiklund and Shepherd, 2003). Therefore, through market acquisition, it is hard to acquire the strategic resources despite its high efficiency and low trading cost.

③ Enterprise merge and acquisition can help to acquire the needed resources from the target enterprises, and acquire the strategic resources that are inaccessible in market of essential factors. However, enterprise acquisition has many shortcomings, such as protest from the managers of the target enterprises, high trade cost and high moral risk, etc. Furthermore, the acquired resources are not easy to be integrated. For example, the integration difficulties of enterprises' culture and human resources often bring about failure to the whole

acquisition.

④ Strategic alliance is the cooperative arrangement through which complementary resources can be obtained to realize a win-win situation. However, it is usually hard to control and manage strategic alliance and opportunistic behaviors are likely to take place. Furthermore, strategic alliance could be used for resource acquisition temporarily. Enterprises can not rely on cooperation partners to acquire the needed entrepreneurship resources in the long run (Teng, 2007).

**Table 1** Comparison of means for resources acquisition

	Internal acquisition	Market acquisition		Network acquisition	
	Internal development acquisition	Purchased from market	Enterprise acquisition	Cooperation of strategic alliance	Cluster network acquisition
Property right of resources	Monopolized by enterprise	Monopolized	Monopolized	Monopolized or shared	Quasi monopolized
Acquisition availability	Depending on internal capability	Resources accessibility	Availability of target enterprise	Availability of cooperation	Possibility of embedding
Acquisition cost	High time cost	Low trade cost	High trade cost	High trade cost	Low cost
Acquisition efficiency	Low	High	High integrating cost	Medium	High
Resources focus	General/strategic resources	General resources	General/strategic resources	Strategic resources	Strategic resources
Acquisition risk	High	Low	Moral risk	Opportunism risk	Cluster system risk

Data source: Organized by the author based on Teng (2007).

Compared with the previous four kinds, enterprise clusters are a new means of network resources acquisition. Enterprises embedded in an enterprise cluster can acquire the resources that is hard for those outside the cluster, for example, tacit knowledge, intensified cluster network channels, high-level trust between enterprises in the cluster, and brand of the enterprises cluster. Though the formation of the above resources factors may involve long time evolution, for cluster enterprises, these resources are kinds of public goods (Geng, 2005) that can be acquired cheaply and efficiently. In recent years, strategic scholars break through the limitation of internal focusing the resource-based view and propose a series of concepts such as shared resources, network capacity, cluster effect, etc., to summarize the characteristic resources factors in enterprise clusters environment (Molina-Morales, 2001; Geng, 2005). Based on the extant literature,

this paper defines these resources clusters as network resources and divides them into four categories of essential factors: tacit knowledge, network channel, trust among cluster enterprises, cluster brand.

### 2.3 Network resources and performance of enterprise clusters

Tacit knowledge is uncodified and inexpressible knowledge acquired from face to face contact. Enterprise clusters provide a unique platform for acquisition of tacit knowledge. First, there exists a great deal of shared tacit knowledge in enterprise clusters, thus people in enterprise cluster areas can acquire knowledge, technical tricks, market information of the trade imperceptibly. Second, there exist plenty of suppliers, customers and relative supportive institutes in clusters. Frequent face to face contacts between cluster enterprises and these cluster institutes enable cluster enterprises to acquire important tacit knowledge. Third, there exist many informal networks in enterprise clusters. The enterprise owners of the same area get to know each other. They might be town fellows, relatives, friends, and old college mates and might often get together to discuss business. They will acquire a great deal of tacit knowledge in these high density informal exchanges. Tacit knowledge has characteristics of viscosity and regional embedding, and is not likely to flow out of the region, thus becomes the characteristic internal resources not available for those outside enterprises. Therefore, tacit knowledge in enterprise clusters is thought to be the source of competitive advantage of cluster enterprises (Tallman et al., 2004).

The cluster enterprises gathered in the same region come to form complex cluster network channels because of long-term consanguinity, geographical and business relations. This kind of network has obvious advantage compared with other network in many ways. First, inside the enterprises cluster, almost every enterprise is a network node. Through channels of cluster network, cluster enterprises can sense the changes of customers and suppliers faster than those non-cluster enterprises (Porter, 2000). Second, through the enterprises cluster network, cluster enterprises can acquire their needed equipments, technical knowledge, market information and other essential factors efficiently. Cluster network channels come into being as a result of long time evolution of joint participation of each body of the enterprises. It is a unique strategic resource in enterprises cluster which can improve the performance of the cluster enterprises.

In the increasingly volatile exterior environment, trust as one of strategic resources becomes more important. In enterprises cluster, the cluster enterprises and other bodies can form high-level trust relationship (Powell et al., 1996). First, after being embedded into specialized production network, cluster enterprises and enterprises of upstream and downstream have formed long-term

interdependent relationship, such as interdependent relationship in view of technology, sale, procurement, etc. The interdependency brings about trust. With the passage of time, an appropriate match between trust and interdependency brings about the optimum trust level. Second, cluster enterprises are embedded into a high-density competitor network, which means that, in a small region, there are many enterprises producing the same type of products. Therefore, a high competitive environment force the cluster enterprises to choose long-term benefits instead of short-term benefits, enhancing the cooperation between competitors and improving the trust level between cluster enterprises. Third, enterprise cluster network helps to promote the spreading of discredit information. Discredit information will spread quickly in enterprise cluster networks, knocking those discreditable enterprises out of the market. As discredit cost is much higher than discredit benefit, the optimum trust inside the enterprise clusters becomes characteristic strategic resource of enterprise clusters.

The brands of enterprises correlate to product images or enterprise images that come into being gradually in the mind of customers through high-quality products, good after-sale service or a great deal of advertising. Its construct cost is very high. A single enterprise's brand molding is confined by size, capital and age of the enterprise. In enterprise clusters, many enterprises participate in partial work procedures, form large-scale supply, production and sale bases, thus formulate the integral image and collective fame of the enterprises cluster. The cluster brand helps to improve firm performance.

Generally, network resource satisfies the four conditions (value, scarcity, inimitability and insubstitutability) of strategic resources proposed by Barney (1991). It is unique strategic resource in enterprises cluster environment. Therefore, we develop Hypothesis 1:

**H1** Network resource is positively and significantly related to cluster enterprises' performance.

#### 2.4 The relationship between entrepreneurial orientation and cluster enterprise performance

As pointed out by Wiklund and Shepherd (2003), in VRIO analysis frame, if resources are just valuable, rare and imitable, they are not enough to produce a sustainable high performance. Enterprises have to make a sound organization and utilization of these resources. An entrepreneurial orientation is the strategic orientation, reflecting the decision-making mode, method and practice of one enterprise. It is regarded as a method of resource organization (Wiklund and Shepherd, 2003). The following section will discuss whether the

entrepreneurial orientation of cluster enterprises has a positive correlation with firm performance.

Miller divides entrepreneurial orientation into three dimensions, i.e. innovativeness, risk-taking and proactiveness. Innovativeness is the most essential characteristic in the process of corporate entrepreneurship and is used to reflect the degree of one firm's support to entrepreneurship activities. Risk-taking reflects an enterprise's willingness to utilize resources on high-risk projects, showing the enterprise's degree of trial and error and investment level in the unknown future. Proactiveness refers to one enterprise's preferring to lead or follow its competitors in introducing new products or service, operation flow, and management method, etc. Cluster enterprises with high proactiveness have a foresight for the future, being able to effectively identify and utilize opportunities (Lumpkin and Dess, 1996). In enterprise cluster environment, cluster enterprises with strong innovativeness are able to develop or introduce new products and new technology to improve their firm performance. The cluster enterprises with high proactiveness can obtain opportunities from the product market, take actions before the competitors to occupy segment markets, elevate their brand cognitive degree, and thus obtain a first-mover advantage. The risk-taking cluster enterprises can carry out the strategy of trial and error to make use of opportunities, aggressively implement high-return and high-risk projects to improve firm performance (Zahra and Covin, 1995). A summary of the above rationales results in Hypothesis 2:

**H2** There is a positive relationship between entrepreneurial orientation and cluster enterprises.

### 2.5 Impact of network resources on the relationship between entrepreneurial orientation and cluster enterprise performance

Though much attention has been paid to resources (Covin and Slevin, 1991; Lumpkin and Dess, 1996; Cai et al., 2007), extant research mainly focuses on the contribution of enterprises' interior resources to entrepreneurship and firm performance. For example, Wiklund and Shepherd (2003) verified that the knowledge-based resources remarkably improve entrepreneurial orientation's contribution to the firm performance of small and medium-sized enterprises in Sweden. As the network characteristics of economic activities become increasingly remarkable, network resources existing outside the enterprises will have more impact on corporate entrepreneurship (Teng, 2007). In this paper, we analyze the impact of four essential factors of network resources (tacit knowledge, network channel, trust among cluster enterprises, cluster brand) in enterprise clusters on the relationship between entrepreneurial entrepreneurship



orientation and firm performance.

The process of corporate entrepreneurship is thought to be a process of knowledge acquiring, integrating and utilizing, involving input of a large quantity of tacit knowledge. The corporate entrepreneurship body needs to be close to relative knowledge source geographically so as to interact with it frequently and acquire the needed tacit knowledge (Floyd and Wooldridge, 1999). Therefore, embedding into enterprises cluster network improves the availability of tacit knowledge, helps cluster enterprises to discover and exploit opportunities, and remarkably enhances the relationship between entrepreneurial orientation and firm performance.

Cluster network channels' impacts on corporate entrepreneurship are mainly as follows: ① The nature of corporate entrepreneurship is to discover and exploit opportunities. High-density cluster network channels help to identify and utilize opportunities. Inside the enterprises cluster, almost every enterprise is at a network node. Through the channel of cluster network, cluster enterprises can sense the need changes of customers and suppliers faster than those non-cluster enterprises to carry out product innovation and technology innovation or set up a new enterprise (Porter, 2000). ② Majority of innovations are problem solutions in some forms. In enterprise clusters, the solutions to these problems are sought along the value chain. If one enterprise faces a certain problem, it will seek its suppliers, customers or other related party for the solution, thus improving the innovation capability of cluster enterprises. ③ For new business, the needed information and knowledge can be obtained speedily through cluster network, which will speed up the formation and growth of new enterprises and lower down the entry threshold of enterprises and the growth risk.

The increasingly volatile external environment has made trust more significant to the realization of corporate entrepreneurship. Compared to general management activities, corporate entrepreneurship activities are of great uncertainty (Miller, 1983). Technologies in some fields change very fast and the life cycle of products is very short, so the opportunism behaviors from the cooperative parties may cause a complete failure to corporate entrepreneurship activities. Embedded into the interior of enterprises cluster, high-level optimum trust relationship can come into being between the cluster enterprises and other entities (Powell et al., 1996). Therefore, the optimum trust inside enterprises cluster can enhance the relationship between entrepreneurial orientation and firm performance.

Brands and fame of clusters can promote corporate entrepreneurship activities inside a cluster. ① Cluster brand can attract a great number of clients from other places to come to the enterprise cluster. These clients bring about a great deal of market demand information and entrepreneurship opportunities for the cluster enterprises. ② Cluster brand attracts various kinds of professionals to come to

the enterprises cluster for its fame, thus form labor force market in enterprises cluster, providing great convenience of acquiring human capital for cluster enterprises' corporate entrepreneurship activities. ③ Entrepreneurship-type cluster enterprises can make use of the regional brand's popularity to improve the customers' trust to products, hence improving the enterprises' creditability, promoting sales for new products. Especially, when promoting new products and setting up new enterprises, the biggest shortages are their own brands and creditability. However, these enterprises can make use of cluster brands to speedily win the acceptance of clients, fill up the brand resources shortage and set up the first-mover advantage.

To sum up, the network resources of enterprise clusters help cluster enterprises identify and exploit opportunities, fill up resources shortage of corporate entrepreneurship, and help cluster enterprises successfully realize corporate entrepreneurship activities. Therefore, we develop the Hypothesis 3:

**H3** Network resources significantly improve the positive correlation between entrepreneurial orientation and cluster enterprises' performance.

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### 3 Empirical analysis

#### 3.1 Sample

The sample of this study covers all the prefecture-level cities of Zhejiang Province, where small and medium-sized enterprise clusters are most flourishing in China. According to the Yearly Book of Zhengjiang Province (2006), in 2004, the gross output value of the province's enterprise clusters reached 1 582.6 billion Yuan; the gross industrial output value amounted to 64% of the whole province. There were 601 enterprise clusters with each output value exceeded 100 million Yuan. A total of 800 questionnaires were sent out to general managers and top management to ensure the information providers can accurately reflect the actual information of enterprises. Altogether, 245 copies were collected (return rate=30.6%), among which 213 copies were valid. the results showed that there were 117 cluster enterprises in Zhejiang Province (specifically, 32 in Taizhou City, 25 in Hangzhou City, 17 in Jinhua City, 12 in Ningbo City, 10 in Zhoushan City, 7in Quzhou City, 7 in Wenzhou City, 5 in Jiaxing City, 2 in Huzhou City). Data were collected from the following channel: 32 copies obtained after field interviewing cluster enterprises in Taizhou City, 45 copies obtained through social relationship network, 40 copies obtained at EMBA classes of Management Training Center of Zhengjiang University. Table 2 lists some main characteristics of the sample.

**Table 2** Some main characteristics of the sample

Enterprise size	Annual sale volume	Below 10 million yuan	10 million to 50 million yuan	50 million to 100 million yuan	100 million to 500 million yuan	500 million to 1 billion yuan	Above 1 billion yuan	Total
	No. of enterprises	27	43	22	18	4	3	117
	Percentage	23.1%	36.8%	18.8%	15.3%	3.4%	2.6%	100%
Enterprise age	Enterprise characteristic	Below 3 years	3–5 years	6–10 years	11–25 years	Above 25 years		total
	No. of enterprises	4	19	35	57	2		117
	Percentage	3.4%	16.2%	29.9%	48.8%	1.7%		100%
Types of business ownership	Enterprise characteristic	State-owned	private	Joint venture				total
	No. of enterprises	7	104	6				117
	Percentage	6%	88.9%	5.1%				100%

### 3.2 Variables and measurement

7-scale Likert Scales were adopted for item generation. In order to ensure the validity and reliability of the measurement tool, scales that had been used domestically or abroad were adopted. Some modifications were made appropriately on basis of field investigation. Before the finalization of the questionnaires and surveying, some pilot surveys were conducted and modifications were made according to the feedback of these surveys.

(1) Independent variable. The measurement of entrepreneurial orientation consists of three dimensions, namely innovativeness ( $\alpha=0.88$ ), risk-taking ( $\alpha=0.88$ ), and proactiveness ( $\alpha=0.85$ ). Each of these three dimensions has three items and all these items are modified based on the existing literature (e.g., Wiklund and Shepherd, 2003; Zhang, 2005). Factor analysis shows that the load scores of the three dimensions are all larger than 0.5 with no serious cross loading, which provides evidence of construct validity. In addition, the KMO value is 0.83 (minimum requirement 0.7), indicating that it is suitable for factor analysis.

There are 13 items concerning network resources. These of them are made based on relevant work of Geng (2005). Necessary modifications are made in accordance with the field study: ① tacit knowledge is measured with 4 items. These items are used to respectively measure enterprises' core employees difficulty in acquiring technology knowledge during the long time living in the region, the difficulty in acquiring market information, the frequency of exchanging and discussing problems with the enterprises in the region, the

frequency of shared problems solving ( $\alpha=0.90$ ). ② there are also some question items for cluster network channels, which are used to respectively measure enterprises' difficulty in procuring raw materials and equipments in the region, the difficulty in finding out suppliers or clients, the difficulty in acquiring market information and technical support from local government and relative research institutes as well as trade societies ( $\alpha=0.94$ ). There are 3 question items for cluster enterprises to respectively measure the trust level when business contacts are made between an enterprise and other enterprises in the region, level of using oral promise and frequency of being cheated ( $\alpha=0.87$ ). ④ There are 2 question items for cluster brand, respectively measuring the impact level of region marks on the selling of enterprise products ( $\alpha=0.88$ ). Factor analysis shows the common factors' load coefficient of the four dimensions are all larger than 0.5, indicating little intersected loads (KMO=0.83).

(2) Induced variable. The induced variable is firm performance. According to the existing research (Wiklund and Shepherd, 2003; Zhang, 2005), comparison with competitors in the same trade is conducted to measure organizational performance in four aspects such as market growth, sale growth, average profit and satisfaction level of customers ( $\alpha=0.89$ ). As corporate entrepreneurship activities may have different impacts on enterprises' short-term performance and long-term performance, this study measures the average performance of 3 years to erase the time-delay problems of corporate entrepreneurship performance.

(3) Controlled variables. According to the existing research, industrial environment is an important variable influencing entrepreneurial orientation and firm performance (Lumpkin and Dess, 1996). Therefore, this paper controls two dimensions of industrial environment: dynamism ( $\alpha=0.82$ ) and rivalrousness ( $\alpha=0.85$ ). Three question items are used and modified based on existing literature (e.g., Wiklund and Shepherd, 2003; Zhang, 2005) to measure these two dimensions, respectively. The impacts of enterprises' size and age on entrepreneurial orientation and firm performance are also used as controlled variables.

### 3.3 Methods

SPSS 11.5 software is used for data treatment: carrying out descriptive statistics to various indexes, conducting data reliability and validity analysis, averaging the multiple index values under the same variable, conducting partial correlation analysis between variables so as to effectively measure the impacts of controlled variables and other variables, conducting data centralization to two variables: entrepreneurship and network resources and then calculating the interacting items between variables after data centralization, using Hierarchical Regression Analysis (HRA), Basic Model, Independent Model and Contingency Model to

analyze the performance variations. Analyses results show that the variance inflation factors' values of all variables are lower than 4.0, the critical value, showing there are not serious problems of multivariate collinearity.

### 3.4 Result analyses

Table 3 presents the means, standard deviations and related coefficients while Table 4 presents the analysis results. Hierarchical regression analysis, is carried out in 3 steps. ①The basic model only takes controlled variables' explanation to performance variations into consideration ( $R^2=0.18$ ,  $p<0.001$ ). ② Independent model analysis. It is found out after placing in the main effect variables, the explanations to performance variations has been added ( $\Delta R^2=0.51$ ,  $p<0.001$ ). That is, network resources and entrepreneurship respectively have positive remarkable impact on clusters. Thus H1 and H2 are proved. ③ Contingency model analysis. It is found out that after placing in variables of interacting items, the explanations to performance variation also increase considerably ( $\Delta R^2=0.04$ ,  $p<0.001$ ). That is, network resources enhance the positive relationship between entrepreneurial orientation and firm performance. Therefore, H3 is proved.

**Table 3** Correlation between means, standard deviations, and other variables

Variables	Mean	S. D.	1	2	3	4	5	6
Firm performance	4.51	0.89	1					
Entrepreneurial orientation	4.52	1.00	0.76***	1				
Network resources	4.71	0.78	0.75***	0.69***	1			
Enterprise age	3.29	0.88	0.03	0.16	0.03	1		
Enterprise size	2.47	1.24	0.35***	0.60***	0.25***	0.49***	1	
Dynamism	4.20	1.10	0.25***	0.26***	0.25***	0.20	0.27**	1
Rivalrousness	4.72	1.42	0.16	0.09	0.10	0.19*	0.28**	0.14**

Note: \* denotes  $p<0.05$ ; \*\* denotes  $p<0.01$ ; \*\*\* denotes  $p<0.001$  ( $n=117$ ).

**Table 4** Independent and contingency model of network resources, entrepreneurship and firm performance

	Basic model		Independent model		Contingency model	
	Beta	t-statistic	Beta	t-statistic	Beta	t-statistic
Controlled variables						
Enterprise age	-0.20	-2.04*				
Enterprise size	0.39	3.84***				
Enterprise age	0.18	1.95				
Rivalrousness	0.04	0.46				
Main effect variables						
Entrepreneurial orientation			0.53***	5.55		

(To be continued)

(Continued)

	Basic model		Independent model		Contingency model	
	Beta	<i>t</i> -statistic	Beta	<i>t</i> -statistic	Beta	<i>t</i> -statistic
Network resources			0.39***	5.02		
Variables of Interacting items						
EO*network resources					0.25***	4.10
$R^2$	0.18		0.69		0.73	
Adj. $R^2$	0.15		0.68		0.72	
<i>F</i> -statistic		6.60***		41.28***		42.87***
Changes in $R^2$			0.51***		0.04***	
Changes in <i>F</i>				34.68		1.59

Note: \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$  ( $n=117$ ).

#### 4 Discussion and conclusion

This paper analyzes the impact of characteristic network resources of enterprise clusters and entrepreneurial orientation on firm performance. Our empirical study on 117 cluster enterprises in Zhejiang Province shows that network resources and entrepreneurial orientation have remarkable positive correlation with cluster enterprises' firm performance. Network resources remarkably enhance the positive impact of entrepreneurial orientation on firm performance. The result confirms that network resources are the inherent reasons explaining corporate entrepreneurship activities benefit from enterprise clusters. The theory contribution of this paper lies in: ① It is the first study to extend corporate entrepreneurship study into enterprises cluster environments, and make empirical study on the relationship between entrepreneurial orientation of cluster enterprises and firm performance, thus filling up the gap of cluster enterprises' entrepreneurship activity study in the extant literature. ② Corporate entrepreneurship is the characteristic of high-performance enterprises. However, the success of corporation entrepreneurship depends on enterprises' resources and capabilities (Covin and Slevin, 1991; Lumpkin and Dess, 1996).

Though attaching great importance to resources factor, relevant extant literature has mainly focused on the internal resources of enterprises (Wiklund and Shepherd, 2003), and overlooked the increasing important impact of network resources. This paper breaks through the restriction of atomism of corporate entrepreneurship study and studies the impact of network resources existing in enterprises cluster environment on corporate entrepreneurship, thus explains the paradox between low interior resources endowment of cluster enterprises and active entrepreneurship activities. By doing so, this paper explains the significance of enterprises networks to corporate entrepreneurship. ③ This paper pushes forward the integration between the resource-based view and corporate

entrepreneurship theory, and provides evidence for strategic entrepreneurship theory (Ireland et al., 2003).

There are weaknesses in explaining enterprises' sustainable competitive advantages in existing corporate entrepreneurship theories and resource-based view. For example, corporate entrepreneurship theories only focus on the acquisition of Schumpeterian rents which can not last long. With the increase of competitors in number and entrance of more imitators, the abnormal profit will gradually reduce to zero. Resources theory focuses on the acquisition of Richardson rents. In a dynamic environment, strategic resource theory has the so-called "trap problem" and core capability theory has the rigidity problem.

Compared with these extant studies, this paper fuses the essences of corporate entrepreneurship theory and resource-based view, and argues that in a dynamic environment, enterprises need to incorporate entrepreneurship thinking into daily strategic decision-making, and make creative use of resources. Therefore, for cluster enterprises, it is far from enough to have an ambition of entrepreneurship. Only when the entrepreneurial orientation is effectively matched with network resources can sustainable competitiveness be obtained. Similarly, identifying the strategic resources in enterprise clusters is not enough for value creation. Only when network resources are used for corporate entrepreneurship activities, can cluster enterprises realize sustainable development.

At present, the majority of China's enterprise clusters are still at a preliminary development stage. Most of these enterprise clusters depend on low cost competition for survival. Under double pressures of global competition and price growth of raw materials, how to realize the upgrading of enterprise clusters, and turn enterprise clusters from simple enterprises gathering into innovative clusters to realize sustainable development has become an urgent task in both enterprise cluster study and practice. The cluster enterprises are the micro cells of enterprise clusters. The corporate entrepreneurship activities of cluster enterprises are the power sources of enterprise clusters' sustainable development. Therefore, to activate the entrepreneurship of cluster enterprises and effectively promote the contribution of entrepreneurial orientation to firm performance is the essential path to promote upgrading of China's enterprise clusters. The empirical study of this paper finds that the abundant tacit knowledge, dense network channels in enterprises cluster environment, the high-level trust of cluster enterprises and shared cluster brands help cluster enterprises discover and exploit opportunities, and improve the contribution of entrepreneurial orientation to firm performance. Therefore, promoting the corporate entrepreneurship activities of cluster enterprises needs to break through the limitation of atomism thoughts. In this sense, only considering training entrepreneurs or organizational factors such as reorganizing organizational structure is not enough, we need to effectively foster and exploit network resources, acquire tacit knowledge, perfect cluster network

structure and enhance the trust between cluster enterprises and foster cluster brands.

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