

Study on the Social Network Mechanism of Sporting Goods Manufacturing Industry Clusters

Based on the Data from Jinjiang of Fujian

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Abstract—Sporting goods manufacturing industry clusters are the Network which the space agglomerating companies and relevant organizations structured. The network is intrinsic nature of industrial clusters. The formation of network means that industry clusters takes shape. Used field research and interview method, questionnaire survey method, the research selected Jinjiang gym shoes manufacturing industry clusters as the research object, analysed the impact of industry clusters structure from the relation network of entrepreneur perspective, and proved social network mechanism improve the formation of industry clusters structure. It was found that the relation network of entrepreneur promote the formation of gym shoes production network and production supplementary network, and the social network mechanism boost the shape of sporting goods manufacturing industry clusters.

Keywords—sporting goods manufacturing industry; industrial clusters; social network; gym shoes ; entrepreneurs

I. INTRODUCTION

As land, labor, and other production factors of price increase, sporting goods manufacturing enterprises prefer rich in natural resources, low labor costs, transportation, infrastructure facilities, or good policy and system has a comparative advantage in the regional investment and set up factories, sporting goods manufacturing industry gradually rendering space gathered to form a cluster. Sporting goods manufacturing industry cluster is the spatial concentration of sporting goods manufacturing enterprises and production-related raw material supply, product sales or agent and processing enterprises, universities and research institutions, intermediaries and financial institutions, government and other institutions in the Network [1]. The social network mainly focuses between actors in the informal partnership, which is a combination of hidden relationships. As a result of embedded factors exist, sporting goods manufacturing industry clusters of enterprises and the relevant agencies of economic behavior are often influenced by social networks, to build a cluster of network relationships have a certain impact. As a result, social networking mechanisms for sporting goods manufacturing industry cluster formation in the discussion of the role is all the more important. But in the light of the complexity of social network and a large number

of reasons, the study will explore the social networking mechanisms for Jinjiang Footwear manufacturing industry cluster network building mainly from the entrepreneurs networking perspective.

II. RESEARCH CONCEPTS AND METHODS

A. Research Concepts

The concept is to build a basic unit of the research proposition [2]. The three basic elements: actors, activities and resources. The network in the active or passive involvement in activities, actors in resource flows through the formation of formal or informal mutual relations [3]. The social network is a network of various actors based on interpersonal and social relations and informal relations, is an important mechanism for the formation of the network. As a result, sporting goods manufacturing industry cluster in the social network mechanisms is the spatial concentration of sports goods manufacturers and raw material supply companies, product sales or agent enterprise, supporting processing enterprises, universities and research institutions, agencies, financial institutions, government and other relevant bodies of interpersonal and social relations and informal relationships with the role of the cluster network to build relationships.

B. Research Methodology

1) Field research and interviews

By that point the way to the Jinjiang 15 sports shoes and sports shoes manufacturing, sales or agent in the business executives, four government departments and agencies, the leadership of the Jinjiang Footwear manufacturing industry's social network, as well as the history of the development of enterprises and institutions in the social network structure and the relationship of the semi-structured interviews (see "Table I").

TABLE I. INTERVIEW WITH THE JINJIANG ENTERPRISES AND GOVERNMENT AGENCIES

Company Name	Job Name	Company Name	Job Name
361 Degrees International Limited	The Senior Manager of Human Resources Administration	Huake company	Manager
ANTA Sports Products Limited	Operations managers, business executives.	Qiermei company	Manager
Deerway Sporting Goods company	Shoes merchandise director	Honghui company	Manager
Anding Sporting Goods company	General Manager	Zhenyida company	Manager
Xinhuangxing company	Manager	Atlantic company	Business managers and business executives.
Boshi company	Manager	City Economic Development Zone	China Merchants, deputy director of the Office of the chief of economy
Haikei company	Manager	Bureau of Statistical	The Deputy Director
Pilibu company	Manager	Bureau of Trade and Economic Cooperation	The Deputy Director
Fulian company	Manager	Cizao Town Government	The Deputy Mayor
Jinzunbao company	General Manager, production manager		

2) *Questionnaire method*

a) *Questionnaire structure and content of an equivalent degree*

According to Burt's concept framework of structure-relation of network analysis [4], this article by the size of the network [5] [6] [7], the network center of [8] [9] [10] [11], Network heterogeneity [12] [13] [14], network density [15] [16] [17] measuring the network structure characteristics, the relationship between the network strength [18] and network persistence [5] [6] [19] measuring network characteristics. In view of the large number of people involved in social networks and the complexity of their relationships, the study will mainly from the entrepreneurs network perspective on social networks and relationships with the entrepreneurs of the size of the Network [20] measuring social network structure characteristics of entrepreneurs through a network of relationships strength and persistence [21] [22] measuring social networking features, the main topic of the questionnaire in Likert scale measurements. At the same time, through economics, economic and sports industries of 10 experts and scholars in the form of indicators for validation and select and use the *CVR* factor to verify the contents of the questionnaires efficiency ratio, which is calculated using the following formula:

$$CVR = \frac{n_r - \frac{n}{2}}{\frac{n}{2}}$$

The calculated *CVR* factor average of 0.83, the contents of the questionnaire, better energy efficiency, leading to the research survey.

b) *Questionnaire distribution and collection*

This study is based on the Jinjiang Footwear manufacturing industry cluster of listed companies, non-

listed companies, branding or processing enterprises of three types, a stratified sample survey methodology. The questionnaire survey in the field interviews granted to individual staff to fill out and immediately withdrawn, and the recycling of 13 questionnaires and all valid.

III. ENTREPRENEURS NETWORK OF FUJIAN JINJIANG GYM SHOES MANUFACTURING INDUSTRY CLUSTER

Since the entrepreneurs as a fourth factor point of view, the entrepreneurial function and behavior research has gradually become the focus of attention. The history and development of the industrialized countries shows that the importance of entrepreneurship as well as promote the initial impetus to the industrialization development [23]. Entrepreneurs typically refers to the ability of entrepreneurs to obtain resources. Entrepreneurs include not only their own quality and learning ability, as well as entrepreneurs and the interaction between the environment, that is, the entrepreneur network for entrepreneurial behavior. The relationship between the role of the entrepreneur network, the relationship between the members of the network will work with business-related information is passed on to other entrepreneurs. The study is to survey the Jinjiang Footwear manufacturing industry cluster of 13 enterprise managers, as well as indirectly through a questionnaire survey of 10 major sports shoes manufacturing enterprise managers, 12 Raw Material Supply enterprise managers, 5 sports shoes product sales or agent enterprise managers, 2 university or research institution's managers, 2 Intermediary agency manager, 6 financial institution's managers, 5 Administration's manager, involving 55 entrepreneurs network's point of reference, the use of social network analysis software (ucinet6.0) Draw up a cluster of entrepreneurs network architecture (see "Fig. 1").

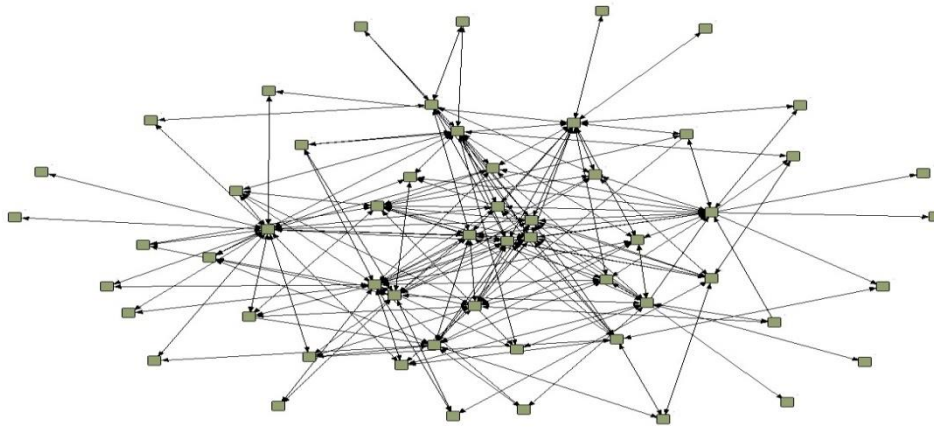


Fig. 1. The entrepreneur relation network framework in Jinjiang gym shoes manufacturing industry clusters.

^a a Note: boxes represent entrepreneurs and related agencies or managers..

It is well known that the tenant business model [24] to the Jinjiang was originally founded the foundation for your business. The Field Research also found that the Jinjiang Footwear manufacturing enterprises in the early days of creation based on kinship and kinship the entrepreneur's personal network, interpersonal trust is high and is conducive to the formation of the enterprise network. As the Panel visited the interviewees of 361 Degrees International Limited and Deerway Sporting Goods company, who said, "Many of the Jinjiang Footwear manufacturing enterprises are the last 'sting', a local family relationship between members of the family to the creation of similar or related business. Entrepreneurs personal networks to promote sports shoes manufacturing enterprise growth and sprawl, but entrepreneurs personal networks primarily to family members and the number of members is limited, the relationship between entrepreneurship network size is small. Therefore, entrepreneurs often need to expand your personal network and the establishment of a wider range of social networks. The Jinjiang, co-located in the same geo-enable entrepreneurs and stakeholders have the same or similar values and cultural traditions, and are easy to set up and develop a wider range of entrepreneurial social network. As the Panel's visit to the foot's leadership, the origin of our business and enterprise development up to now, the boss's family and friends, with foreign entrepreneurs human interaction is very important to the business." Entrepreneurs network involves not only based on ties of blood and kinship entrepreneurs personal networks, but also to the outside of the family of entrepreneurs and other entrepreneurs to build social networks to form a network of entrepreneurs. Entrepreneurs personal networks mainly with the entrepreneurial day-to-day activities directly related to the

family members and friends, as well as the close relations of cooperation. Entrepreneurs social network is the market or industry entrepreneurs and agents, suppliers, financial intermediaries, the executive branch of the Government, based on a certain aim to forge a loose alliance of sexual relations, which is a social network [25]. Therefore, entrepreneurs personal networks often exist prior to the establishment of enterprises, in their day-to-day work and the life of the relationship more closely; entrepreneurs social network is the establishment of the enterprise, the enterprise production and business process as a result of recurrent economic exchanges to establish social relationships, relative to the former, relations are relatively loose.

A. *Gym Shoes Manufacturing Industry Cluster Entrepreneurs Personal Networks*

Manufacturing Enterprise is the cluster network, one of the most important actors, cluster initially is often born by the enterprise and networking, the production network is one of the most important cluster network. Jinjiang gym shoes manufacturing industry cluster in the founding of the enterprise is based on the family, relatives of the Entrepreneurs personal networks with a common family culture, values and trust, most of the enterprise is based on the family factory" or "family business" forms and gradually developed into a network. Compared with other firms, based on kinship, blood relations in the enterprise resources, technology, and information easier to swap or share, but is also conducive to the establishment of sports shoes production enterprise network and sports shoes production network behind the establishment of the mainly in the form of entrepreneurs personal networks (see "Fig. 2").

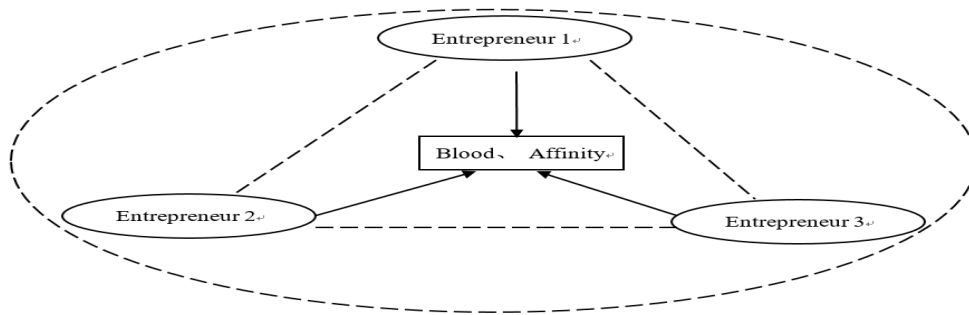


Fig. 2. Entrepreneur personal network in view of blood and genetic relationship in jinjiang gym shoes manufacturing industry clusters.

Note: The dashed line indicates a cluster of social relations among enterprises, the clustering of the opening of the borders.

Based on blood, affinity, and the existence of innate factors, Jinjiang gym shoes manufacturing industry clusters of firms tend to father and son, brother, sister, close friend, and to maintain relations with entrepreneurs personal networks, easy to select manufacturing partners, in the formation of local sports shoes production network. A cluster of enterprises within the rendering "Network", which is "Network" is determined by the individual entrepreneurs, network connection, and then to build a production network, which laid the foundation for the production of the enterprise

network and the entrepreneurs personal networks are intertwined (see "Table II"). Therefore, the adoption of the Entrepreneurs personal networks, such a strong bonding social networks for interpersonal trust, and can reduce the cost of transactions between the Company and the uncertainty and risk, improve trading efficiency, enterprises can establish close cooperative relationship between sports shoes for joint production, which is the Jinjiang gym shoes manufacturing industry cluster formation.

TABLE II. ENTREPRENEUR PERSONAL NETWORK IN VIEW OF BLOOD AND GENETIC RELATIONSHIP

The name of the enterprise or agency	Shoe material supply companies	Shoes product sales agent or Enterprise	The Competition	Complementary Businesses	Universities and research institutions	Financial institutions	Intermediary organizations	The administration or management
Family kinship	15.8%	10.5%	17.4%	19.0%	0	5.9%	7.1%	0

B. Gym Shoes Manufacturing Industry Cluster Entrepreneurs Social Network

Entrepreneurs personal networks is one of the first to point out social relations, the establishment of the enterprise is often exist. Personal network characteristics with a strong link to open the Network enough to get the information, skills and knowledge, and the quality is relatively strong. Especially as the production scale expansion and development, depends entirely on the entrepreneurs personal networks to obtain the resources required for the enterprise's role has become increasingly limited. In particular, in the same area, the limitations of the Entrepreneurs personal

networks are more visible, to a large extent restricted the development of enterprises. Particularly in the current fierce market competition environment, the entrepreneur's family, friends and the quantity is limited and weak forces. Therefore, entrepreneurs need to gradually break the entrepreneurs personal networks, from the outside looking for enterprise development resources and opportunities for cooperation, and entrepreneurs personal networks of related enterprises and institutions and entrepreneurs to establish social networks (see "Fig. 3"), enhancement of the capacity of the enterprise resources, the promotion of enterprise survival and development.

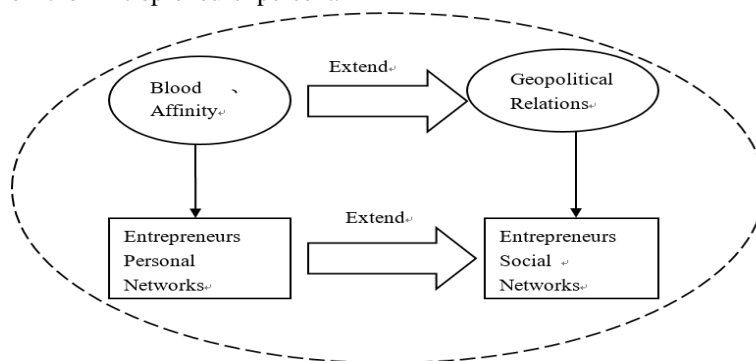


Fig. 3. The formation of entrepreneur relation network i in gym shoes manufacturing industry clusters.

In building a social network of entrepreneurs, the geopolitical relations play an important role. In the blood, kinship-based confidence do not fully meet the cluster's division of labor and exchange further expansion needs, the scope of the trust will be extended into the geo-based and the confidence to achieve market transactions and labor cooperation, the purpose of the expansion [26]. Geopolitical relationship is the distribution of the population is located in the social relations, a traditional community in addition to kinship, another basic social ties is the geographical ties and geographical ties is the geopolitical relationship [27]. Great location close to the often have the same socio-cultural environment to facilitate people-to-people exchanges and the establishment of social relations, people maintain this kind of social relations in a more cost effective to form a stable social network [28]. Jinjiang populated sports shoes manufacturing companies and related businesses, geographic location, close to the geopolitical relationship as business partners with the potential to build entrepreneurs to facilitate social networks (see "Fig. 4"). In the early days, entrepreneurs rely on friends, family members and neighbors of the informal network to collect the relevant information. And then you want to rely on the government, intermediary structures, universities or research, as well as financial

institutions, such as the personnel access to enterprise resources required (see Table III). As the Panel's visit to the shoes product sales or agent of the atlantic company leaders, the good interpersonal relationships and friendships, for we selected optional and delay the payment of funds." The Leader of Cizao town and the Leader of the Economic and Trade Bureau of Jinjiang also said that many of the Jinjiang enterprises the existence of family and friends, these relationships lead us to do business, business problems, help each other out of the plight of many phenomena, social relations and the development of enterprises. The entrepreneurs network, Jinjiang Footwear manufacturing industry cluster enterprises declined to enter into contracts, negotiations, coordination and transaction costs, facilitate access to knowledge, information, technical and financial resources required for such enterprises, and promote the development of the local network. Of course, the cluster of social network type, network structure is more complex, and entrepreneurs network is only clusters of numerous social networks, there are also relevant in-house staff, among internal and external bodies, such as the relationship between this document only from a business perspective, there is no full analysis on a case-by-case basis.

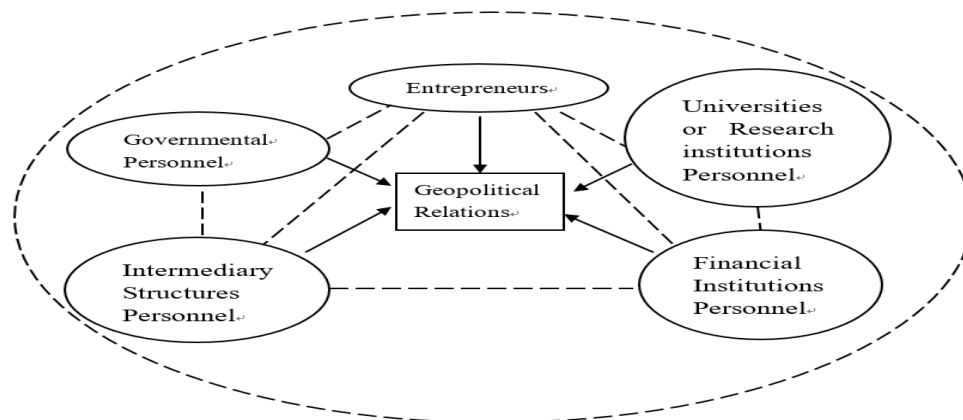


Fig. 4. entrepreneur social network in view of geographic relationship in jinjiang gym shoes manufacturing industry clusters.

^{a.} Note: (1) The dashed line indicates that the cluster enterprises and relevant institutions in social relations said the opening of the borders.
^{b.} (2) Owing to the social network of the complex, this figure is not entirely would show

TABLE III. THE ENTREPRENEUR SOCIAL NETWORK IN VIEW OF GEOGRAPHIC RELATIONSHIP

The name of the enterprise or agency	Shoe material supply companies	Shoes product sales agent or Enterprise	The Competition	Complementary Businesses	Universities and research institutions	Financial institutions	Intermediary organizations	The administration or management
Relationship between friends	31.6%	31.6%	26.1%	28.6%	50%	35.3 %	7.1%	27.7%
Relationship between colleagues	5.2%	21.1%	17.4%	9.5%	18.8%	5.9%	35.7%	5.6%
Student relations	0	0	8.7%	0	6.2%	0	0	5.6%
The relationship of the local acquaintances	47.4%	36.8%	30.4%	42.9%	25%	52.9 %	57.2 %	61.1%

^{a.} Source: The author field research in the Jinjiang interview survey

IV. ENTREPRENEURS NETWORK AND GYM SHOES MANUFACTURING INDUSTRY CLUSTER NETWORK ANALYSIS

A. Entrepreneurship Network and Gym Shoes Manufacturing Industry Cluster in the Production Network

Jinjiang gym shoes manufacturing industry cluster formation begins with a general enterprise is in the shoes of the value chain of production-processing stage, product homogeneity is strong, mostly to small and medium-sized enterprises as the mainstay, family enterprises and dominated from the start of the family factory. Entrepreneurs personal networks is often father and son, brother, sister, close friend, and to maintain relations and also in the same area, the establishment of inter-enterprise network. The entrepreneurs to expand social network process, entrepreneurs tend to prefer a similar social background and values of networking entrepreneurs. The same geopolitical relationship between

the promotion of entrepreneurship and friends, classmates, colleagues, neighbors, and acquaintances, as well as the local social relations between entrepreneurs network. The entrepreneurs network, a cluster of enterprises increased confidence and establish relations of cooperation, inter-enterprise production network is also taking shape (see Fig. 5). Trust is the maintenance and promotion of economic activities, more than any of the things of great value, is an important lubricant system, each of the business transactions often involve an element of trust [29]. The present study the application of the size of the network, network strength and lasting degree of variables, Pearson correlation analysis method to prove that the relationship between the structure of the network of entrepreneurs and the relations between the two parties and sports shoes manufacturing industry cluster in a production network, there are various variables related to verify that social networking mechanisms to the Jinjiang gym shoes manufacturing industry cluster in the network effect (see Table IV).

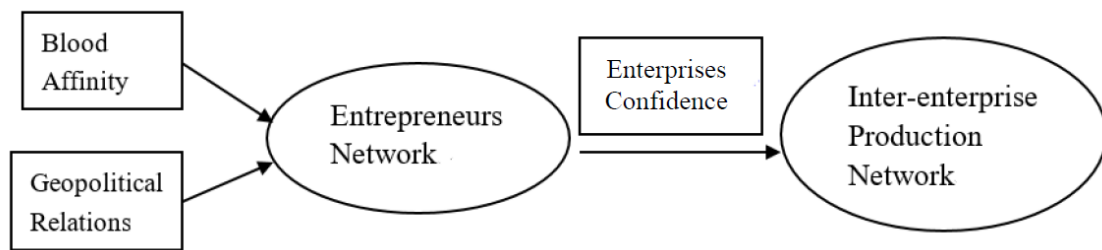


Fig. 5. Entrepreneur social network structured enterprises production network in cluster.

TABLE IV. CORRELATION ANALYSIS ON ENTREPRENEUR RELATION NETWORK AND PRODUCTION NETWORK IN GYM SHOES MANUFACTURING INDUSTRY CLUSTERS

	Entrepreneurs with the size of the network	The relationship between entrepreneurial network (Strong and durable)
The size of the network across the enterprise	0.706**	0.578*
Business-to-business network of the heterogeneity 1	0.750**	0.569*
Business-to-business network of the heterogeneity 2	0.655*	0.689*
Business-to-business network of the heterogeneity 3	0.668*	-0.588*
Business-to-business network of the heterogeneity 4	0.673*	-0.563*
Business-to-business network of the Center.	0.563*	0.583*
The density of the enterprise network.	0.570*	0.579*
The relationship between the enterprise network strength	0.564*	0.571*
Inter-firm networks and lasting.	0.595*	0.567*

^a. Note: (1) ** at the 0.01 level (both sides) significantly related, * in the 0.05 level (both sides), significant, and N=13.

^b. (2) inter-enterprise networks of the heterogeneity of various types of network of the size of the enterprise. 1, 2, 3 and 4 respectively on behalf of the sports shoes manufacturing enterprise and local shoe material supply, sell or broker, competitive and suitable processing of the size of the enterprise.

As shown in Table IV, the relationship between the entrepreneurs network structure, the relationship between the size of the network of entrepreneurs and business-to-business network size and network heterogeneity, network density, network relationships strong, durable, are positive. And gym shoes manufacturing enterprises of the size of the network is being related to cluster entrepreneurs network size increases, so does the number of enterprises in cooperation with each

other and with a relatively large number of inter-enterprise network size is larger. The inter-enterprise network heterogeneity is related to show that the entrepreneur network for extended-related enterprise network impact. The field research found that the Jinjiang gym shoes manufacturers and shoe material supply companies, supporting processing and other complementary businesses in the number and size of the intercourse between the

entrepreneurs more frequently, not only expanding entrepreneurs network, and different sizes of gradually establishing long-term relationships, inter-enterprise networks. The inter-enterprise network density is positive, indicating that entrepreneurs network members, the Partnership is also more closely and frequently. The relationship between the enterprise network strength and lasting, positive, indicating that entrepreneurial network of members, and the establishment of a network of organizations and related agencies more frequently, mutual relations and the more closely.

As shown in "Table IV", the relationship between the entrepreneurs network relationship, the relationship between entrepreneurship network strength and lasting, respectively, and the inter-enterprise network size, density, strength and long-lasting relationship is positive, indicating that the relationship between the members of the entrepreneurs is stronger and durable, the more conducive to building a business-to-business network, the size of the network can also be easily extended, inter-enterprise network density is also close to the stronger relations, relations are also more durable. The inter-Enterprise Network Center, rendering it, that is at the center of the network of businesses, entrepreneurs tend to be more inclined to establish a close and lasting relationship network of entrepreneurs. With the local shoe material supply business, marketing or business size differences exist that are related more to the entrepreneurs and their businesses, there is a shoe-associated different scale enterprises to establish a good relationship

network of entrepreneurs. The local and the type of competitive enterprises, supporting processing and other complementary business size difference is negative, indicating that the same amount of competitive enterprises and processing enterprises to form a complementary relationship between the entrepreneurs network, the close and long-lasting, and conversely, the more do not close and long-lasting.

B. Entrepreneurship Network and Gym Shoes Manufacturing Industry Cluster Production Support Network

Since the relevant professional bodies that have a unique resource advantages, business and professional bodies related to the establishment of a cooperative network to obtain the resources tend to become more visible. In the kinship, descent, geopolitical relations in the social networking mechanism, based on mutual trust, Jinjiang local entrepreneurs and related professional bodies in building social network more easily and conveniently to build sports shoes production secondary network for cluster formation. The study through the use of the size of the network, network strength and durable, the Pearson correlation analysis method to prove that the entrepreneurs network structure and the relationship between the two dimensions and footwear production in the secondary network variables are related to prove that social networking mechanisms to the Jinjiang Footwear manufacturing industry cluster in the network effect (see "Table V").

TABLE V. CORRELATION ANALYSIS ON ENTREPRENEUR RELATION NETWORK AND PRODUCTION SUPPLEMENTARY NETWORK IN GYM SHOES MANUFACTURING INDUSTRY CLUSTERS

	Entrepreneurs with the size of the network	The relationship between entrepreneurial network Strong and durable
Enterprises and institutions related to the strength of the relationship network.	0.558*	0.599*
Enterprises and institutions related to the network of lasting.	0.698**	0.674*
Entrepreneurs with the size of the network	1	0.715**
The relationship between entrepreneurship network strength and lasting.		1

^a Note: (1) ** is 0.01 level (both sides) is significantly related to the level of 0.05 (double-sided) is significant, the N=13.

As shown in "Table V", the relationship between the entrepreneurs network structure, the relationship between the size of the network of entrepreneurs and enterprises and related agencies, the relationship between the network strength and lasting measures are positive. In the entrepreneurship network relationship, the relationship between entrepreneurship network strength and lasting, respectively, and the business and related agencies, the relationship between the network strength and lasting measures are positive, the business relationship between members of the network, the stronger the relationship and lasting, more conducive to the building of inter-enterprise network, the network is scalable, enterprise and inter-agency network of relationships, relationships and the more durable. Thus it can be seen that the Jinjiang entrepreneurs network for the cluster of footwear production secondary network building plays an important role in the social network mechanism for cluster network plays an important role in the build.

V. CONCLUSION

The value chain architecture system of Jinjiang gym shoes manufacturing industry cluster completes, the development and design of sports shoes, material supply, production processing, shoes sales form a local production network. Entrepreneurs network not only to promote various enterprises of sports shoes manufacturing value chain to form sports shoes production network, and help to form sports shoes production auxiliary network with local schools or research institutions, agencies, financial institutions, government agencies. As a result, social networking mechanisms helps to build sports shoes production network and production auxiliary network of sporting goods manufacturing industry cluster, but also the establishment of a network contributed to formation of sporting goods manufacturing industry cluster.

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