ISCTE IUL

Instituto Universitário de Lisboa

The Relationship among Incubating Enterprises' Relational Network, Resource Integration Ability and Innovation Performance: Shanxi Emperor Penguin Innovation Incubation Park

GAO Na

Thesis submitted as partial requirement for the conferral of the degree of

Doctor of Management

Supervisor:

Prof. Nelson António, Professor, ISCTE University Institute of Lisbon

Co-supervisor:

Prof. XIAO Wen, Professor, University of Electronic Science and Technology of China

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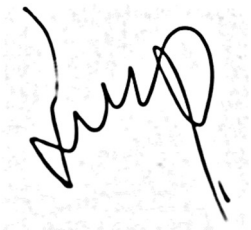

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Abstract

The incubator is an important part of the service system of technological innovation and entrepreneurship. In China, all kinds of incubators have expanded rapidly since 2015, and private incubators are facing great pressure for survival. Problems such as homogenization of entrepreneurial service resources, low service efficiency and high input cost are more prominent. Many incubators in China have unsatisfactory operation performance, so the incubation carriers need to actively look for more profitable models. How to make private incubators grow bigger and perform better is an objective and realistic problem to be solved urgently.

This thesis, taking Shanxi Emperor Penguin Innovation Incubator as a case study, focuses on the performance improvement of incubating enterprises in private incubators. The thesis holds that the relation network of incubating enterprises provides themselves stable business resources necessary for their survival and development, as such relation network influences their business success and prosperity. At the same time, incubating enterprises' effectiveness in the integration of their own resources gives a full play of using commercial resources, which is also of great significance to survival and development. Good relationship network and resource integration ability are the key factors for their success.

Based on related literature on incubator relationship network, resource integration capability and entrepreneurial performance, and further reference to empirical researches on related fields, this thesis explores the problem of incubating enterprises' entrepreneurial performance in private incubators from such theoretical perspectives. It intends to explore the process that the performance results are impacted by the relationship among incubator relationship network and resources integration ability and tries to further reveal the positive role of resource integration ability in this process. The research questions mainly include: 1) Does incubating enterprise relationship network positively influence enterprise resource integration ability or negatively? 2) Does incubating enterprises' resource integration ability positively influence entrepreneurial performance or negatively? 3) Does incubated enterprise

relationship network positively influence entrepreneurial performance or negatively?

It investigates 168 enterprises in Shanxi Emperor Penguin Innovation Incubation Park. Through empirical analysis, the main conclusions are as follows: 1) Positive changes in the relationship network of incubating enterprises can not only greatly reduce the time of resource identification, acquisition, allocation, utilization and their innovative uses, improving the efficiency of resource integration and further improving their resource integration ability, but also expands the channels to resource acquisition, improving the space of channels as well as the efficiency in channel utilization, and thus again improving their resource integration ability; 2) Incubating enterprises' survival, development and prosperity can be achieved and maintained by the improvement in both the ability in integrating enterprise resources and the efficiency of resource utilization; 3) The performance of incubating enterprises can be promoted with the expansion in the scale of the relationship network, the enhancement of its strength and the improvement in the degree of its heterogeneity; 4) The relationship network of incubating enterprises further affects the entrepreneurial performance of incubating enterprises through the intermediary role of resource integration capability.

Keywords: incubating enterprises; relationship network; resource integration ability; entrepreneurial performance; innovation incubator park

JEL: C51; L14

Resumo

A incuba dora é uma parte importante do sistema de serviços de inovação tecnológica e empreendedorismo. Na China, todos os tipos de incubadoras expandiram-se rapidamente desde 2015, as incubadoras privadas estão a enfrentar uma grande pressão pela sobrevivência. Problemas como a homogeneização de recursos de serviços empresariais, eficiência baixa de serviços e custo alto de insumos são os mais proeminentes. Muitas incubadoras na China têm um desempenho operacional insatisfatório, portanto, os portadores de incubação precisam de procurar ativamente os modelos mais lucrativos. Como tornar as incubadoras privadas maiores e com melhor desempenho é um problema objetivo e realista a ser resolvido com urgência.

Esta tese, tendo como exemplo o Shanxi Emperor Penguin Innovation Incubation Park, foca-se na melhoria do desempenho de empresas da incubação em incubadoras privadas. A tese defende que a rede de relações de empresas em incubação fornece recursos empresariais estáveis, necessários para a sua sobrevivência e desenvolvimento, uma vez que essa rede de relacionamentos influencia o sucesso e a prosperidade dos seus negócios. Ao mesmo tempo, a eficácia das empresas de incubação na integração dos seus próprios recursos permite uma utilização completa dos recursos comerciais, o que também é de grande importância para a sobrevivência e o desenvolvimento. Uma boa rede de relacionamento e capacidade de integração de recursos são os fatores principais para seu o sucesso.

Com base em literatura relacionada sobre rede de relacionamento com incubadoras, capacidade de integração de recursos e desempenho empreendedor, além de referência a pesquisas empíricas em áreas relacionadas, esta tese explora o problema de incubar o desempenho empresarial das empresas em incubadoras privadas a partir de tais perspetivas teóricas. Pretende explorar o processo de impacto dos resultados de desempenho pela relação entre a rede de relacionamento com a incubadora e a capacidade de integração de recursos, e tenta revelar ainda mais o papel positivo da capacidade de integração de recursos nesse processo. As questões de pesquisa incluem principalmente: 1) A incubação da rede de

relacionamento empresarial influência positivamente ou negativamente a capacidade de integração de recursos da empresa? 2) Incubar a capacidade de integração de recursos das empresas influencia positivamente ou negativamente o desempenho empreendedor? 3) A rede de relacionamento empresarial incubada influência positivamente ou negativamente o desempenho empreendedor?

Esta tese investiga 168 empresas do Shanxi Emperor Penguin Innovation Incubation Park. Por meio de análise empírica, as principais conclusões são as seguintes: 1) Mudanças positivas na rede de relacionamento das empresas incubadas podem não só reduzir significativamente o tempo de identificação, aquisição, alocação, utilização e uso inovador de recursos, melhorando a eficiência da integração de recursos e melhorando ainda mais a sua capacidade de integração de recursos, mas também expandindo os seus canais de aquisição de recursos, melhorando o espaço do canal, bem como a eficiência na utilização do canal e, assim, melhorando a sua capacidade de integração de recursos; 2) A incubação da sobrevivência, desenvolvimento e prosperidade das empresas pode ser alcançada e mantida pela melhoria da capacidade de integrar os recursos da empresa e a eficiência da utilização de recursos; 3) O desempenho das empresas incubadas pode ser promovido com a expansão na escala da rede de relacionamento, o fortalecimento da sua força e a melhoria no grau de sua heterogeneidade; 4) A rede de relacionamento das empresas em incubação afeta ainda mais o desempenho empresarial da incubação de empresas por meio do papel intermediário da capacidade de integração de recursos.

Palavras-chave: empresas de incubação; rede de relacionamento; capacidade de integração de recursos; desempenho empreendedor; innovation incubator park

JEL: C51; L14

摘要

孵化器是科技创新创业服务体系的一个重要组成部分。在中国，2015 年以来各类孵化器扩张迅速，民营孵化器面临着巨大的生存压力，创业服务资源同质化、服务效率低下、投入成本高等问题更加突出。中国许多孵化器创孵运营绩效不够理想，创业孵化载体需要积极寻找更多的盈利模式。民营孵化器如何做大做强是急需破解的客观现实难题。本文以民营孵化器——山西帝企鹅创新孵化园为例，研究问题聚焦在民营孵化器中在孵企业的绩效提升问题。本文认为，在孵企业的关系网络为在孵企业提供了生存与发展所必须的稳定的商业资源，关系网络影响着在孵企业的生存和发展。同时，在孵企业对其拥有资源的有效整合充分发挥了商业资源的效用，对在孵企业的生存和发展也有着重要的意义。良好的关系网络和资源整合能力都是在孵企业成功的关键要素。

本研究在梳理和分析在孵企业关系网络、资源整合能力和创业绩效等相关领域研究成果的基础上，通过对在孵企业关系网络、资源整合能力与创业绩效之间关系理论研究与实证研究，从在孵企业关系网络角度来探究在孵企业创业绩效的问题，并试图进一步揭示资源整合能力在这一过程中的积极作用。本文研究的问题主要包括：①在孵企业关系网络对企业资源整合能力产生的影响是正向还是反向？②在孵企业资源整合能力对创业绩效的影响是正向还是反向？③在孵企业关系网络对创业绩效的影响是正向还是反向？④资源整合能力在在孵企业关系网络对创业绩效影响过程中是否起到中介作用？

本文对山西帝企鹅创新孵化园 168 家企业进行问卷调查，通过实证分析，得出主要结论有：①在孵企业关系网络的正向变动，一方面，可以大大减少企业识别、获取、组合配置、利用与创新性使用等过程的时间，改善资源整合的效率，进而提高企业资源整合能力。另一方面，也为在孵企业扩展资源获取渠道，提升渠道利用效率与空间，从而提高企业的资源整合能力。②在孵企业可以通过提高企业资源的整合能力，提高资源利用效率，实现企业的生存与发展的目标，保持创业的成功果实得以存续。③扩大关系网络规模、强化关系网络强度和提高关系网络异质性程度，可以促进在孵企业绩效的提升。④在孵企业的关系网络通过资源整合能力这一中介作用进一步影响了在孵企业的创业绩效。

关键词：在孵企业；创业网络；资源整合能力；创业绩效；创新孵化园

JEL：C51; L14

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Chapter 1: Introduction

Since its birth half a century ago, incubator has been leveraged as a new economic organization form that incubates and nurtures technology-based start-ups, and used as a tool for government policies supporting scientific and technological innovations and promoting the setup of regional innovation system.

Until now, incubators have been widely adopted and applied in various countries, having achieved considerable development. In China, not many incubators have satisfactory performance in operations and that is why it is urgent for incubation carriers to actively look for business models that yield better profits.

This chapter mainly introduces the research background, objectives, problems and contributions.

1.1 Research background

The concept of *incubator* is firstly developed by American entrepreneur Joseph Mancuso based on the inspiration that chickens are hatched by hens in 1956 (Brown, 2008; Dahl, 2011).

Business incubators (hereinafter referred to as the incubator) can greatly improve the survival rate of new enterprises as they can aggregate resources, providing new stat-ups a well-nurtured business environment with various convenience in accessing business services for their survival and growth. In the United States, enterprises operating inside the incubator had 84% survival rate five years after graduation from the incubating community, much higher than those outside the community, which was 44% (Smith, 2010).

Besides, development in incubation yield good return on investment and create job opportunities. Research shows that in the United States, return on investment of each dollar public money invested in incubators gave 30 dollar tax revenue, generating more than 17

million dollar and creating more than 100 000 job positions annually (National Business Incubation Association[NBIA], 2009).

In China, the first business incubator, called Wuhan Donghu High-tech Entrepreneurship Service Center, was born on June 7, 1987. Although having started 30 years later than in the United States, business incubators in China has been growing rapidly. The average survival rate for small business start-ups in China is less than 30 percent, but the survival rate for those start-ups incubated in incubators can be as high as 85 percent (Zhang & Nie, 2009).

Until now, the development of Chinese incubators made great progress in sizes, functionality and service level, having made sound economic and social impact. As of the end of 2017 in China, there have been 4 069 incubators, 5 739 shared-work spaces and more than 500 busienss accelerators, creating an environment for more than 3 million people to start businesses and find employment. The total revenue for all incubated enterprises reached 632347 billion yuan, and the total number of enterprises graduated reached 110000, including 11000 high-tech enterprises. As to investment, venture capital invested 194 billion yuan, with total expenditure of 16.4 billion yuan on research and development (R&D), yielding 52247 intellectual property applications nationwide (Torch Center of the Ministry of Science and Technology of China & Capital Institute of Science and Technology Development Strategy[TCMST & CISCTDS], 2018).

Also, investment in public technical service platform by professional incubators reached 3032 billion yuan, with a total revenue of 1.31 billion yuan. The top five regions with the largest number of incubators in 2017 were Guangdong, Jiangsu, Shandong, Zhejiang and Shanghai (TCMSTC & CISTDS, 2018).

This progress can be attributed to two main factors. The first is the fast accumulation of private capital due to the rapid development of private enterprises after the reform and opening-up. In 2014, the number of private companies registered and privately controlled companies with limited liabilities were 7.26 million and 1.77 million respectively (National Bureau of Statistics of China[NBSC], 2015; Lardy, 2016).

The second is the favorable public policies, especially the ones promoting the

introduction of private capital into the development of technological innovations, the transformation of innovative scientific technologies, the cultivation of strategic new industries and the facilitation of economic development.

In 2010, China issued Document No. 13, namely The State Council's Opinions on Encouraging and Guiding the Healthy Development of Private Investment (The Central Government of People's Republic of China[CGPRC], 2010). In 2012, another document was promulgated, called The Ministry of Science and Technology's Opinions On Further Encouraging and Guiding Private Capital to Enter the Field of Scientific and Technological Innovations(No.739) (Minstry of Science and Technology of People's Republic of China[MSTPRC], 2012).

Both has been for the purpose of proactively supporting the improvement of private enterprises' capability in developing innovative technologies, encouraging and guiding private capital to enter scientific and technological field, so as to promote the healthy development of private investment. In 2012, fifty percent of major national science and technology projects, ninety percent of the national science and technology support programs and thirty-five percent of the 863 programs were implemented by enterprises, including private enterprises (MSTPRC, 2012).

Since then, it has always been an important task for the public sector to support and encourage private capital to enter the field of scientific and technological innovation. Also, private capital has become an important source of investment in science and technology, and an essential force of independent innovations.

Under such an environment, the incubator, as an important part of the service system for scientific and technological innovation and entrepreneurship, is among the fields that priviate capital has entered the earlist. Dating back to the year of 1999, the first private incubator in China, named Nanjing Private Entrepreneurship Center, was born and later has been developing gradually for 30 years (IFeng News, 2016).

The development has depended on mainly on private capital. This is because the intrinsic characteristics of priviate capital. Although investment in technological innovations comes with higher risks and demand for more capital, private capital has its better liquidity and

freedom than state-owned capital, making it add momentum to innovations and contributing to incubation industry development and incubators' financial performance (Souhu, 2015).

Therefore, there is a win-win situatioin between private capital and government public policies, which is, private incubators benefit from favorable policies. At the same time, fiscal revenue increases because of the expansion of private capital in incubation business, and great development of such business sector can attract more entrepreneurs, increasing regional economic vitality and promoting regional innovative development.

Incubators' development reached a peak in 2015 after Chinese premier Li Keqiang put forward the initiative of "Mass Entrepreneurship and Innovation" at the Davos world economic forum (Li, 2015). Later the 2015 government work report reemphasized that mass entrepreneurship and innovation should be made one of the "Twin Engines" of China's economic development(CGPRC, 2015), which attracts attention and paricipation privitaely and publicly in realizing such a goal, providing an unique opportunity for the development of private incubators and the setup of incubators' platforms.

The heat pushed the fast expansion of incubtors providing start-ups and entrepreneurs services and consultancy in all levels of businesses in the cost lower than market offers. The nubmer of incubators increased and some cultivated sucessful start-ups stood out of the crowd. For example, in 2015 alone, the figure for newly set-up incubators was 4000, doubled the accumulated figure for all incubators that had developed in the 28 years (Sohu, 2016). Since 2017, China has dominated in the number of business incubators, with 7533 incubators nurturaing more than 200000 start-ups and enterprises (Xinhua, 2017).

However, the rapid expansion brings out problems in management and operations, especially under the fierce competition between incubators. Survival among all other peers becomes a prominent task when there is homogenization in resources provided. Some other problems include high initial cost and low operational efficiency (QQ, 2016).

A question raised out of such a situtaion is that what can be the proper approach to the development, operation and management of China's incubators, either state-owned or private.

There is another problem. Data about the index for China's business incubation level of 337 cities showed that among the top 100 cities with higest index scores which were

calcalated and assessed from 6 dimensions, 14 subordinated indicators and 40 sub-subbordinated indicators, financial performance has the lowest score and unfavoraable result, compared with other five dimentions, namely, financial performance, social impact, operational efficiency, innovation performance, infratructure situation and service level(Sohu, 2018; CISTDS & WIIN, 2019).

Therefore, urgent is that business incubation carriers should actively seek for business models that yield more profits from operations.

1.2 Concept definition

1.2.1 Incubating enterprises

Incubating enterprises refer to enterprises or start-ups that receive incubation services from incubators, who are mainly technology-based entrepreneurial enterprises.

As to specific other requirements, details are listed on the China's governmental document Measures for the Recognition and Management of Incubators for Science and Technology Enterprises(No.300) issued by the (Torch High-tech Industry Development Center of the Ministry of Science and Technology of China[THIDCMSTC], 2018), which are "*when applying to enter incubators, the enterprises should not be established exceeding the time of the registration more than 24 months, with their registration, R&D activities and offices located in the incubators*" and "*Principally, the incubating enterprises should graduate within 48 months under the incubation service, but for those operating in special fields including biomedicine, mechanization and integrated circuit, the time can be extended to 60 months*".

Internationally, there can be difference in the time allowed to enter the incubators. For example, it believed it is within 42 months from the date of establishment, based on consideration of the stability of financial indicators and other factors (Global Entrepreneurship Research Association [GERA], 2018). Other researchers believed it within 8 years starting from the date of registration from a product development point of view (Boeker, 1989; Li & Atuahene-Gima, 2011).

However, considering the actual situation of this thesis which takes Shanxi Emperor Penguin Innovation Incubator as a study case, the incubator enterprises is defined as those within 42 months after the registration date.

The incubating enterprises have the characteristics of being "small" and "new". Compared with mature enterprises, they contain naturally disadvantages and defects. The typical characteristics of incubating enterprises are as follows:

1) Entrepreneurs' personal and individual factors

Whether the incubator succeeds or not can depend more on the individual factors of the entrepreneur in the early stage of development. These personal factors include entrepreneurs' personal qualities, leadership abilities and social resources. If the entrepreneurs want to be successful ones, and they should have a perfect combination of such factors. Therefore, the individual factors of entrepreneurs determine the success or failure of entrepreneurship to a certain extent and are deeply branded in incubating enterprises. Personal factors of entrepreneurs are a double-edged sword, so if in good use, they are positive factors; in bad use, negative ones.

2) Sensitivity to entrepreneurial environment

Generally, incubating enterprises are very sensitive to external environment. Because the incubating enterprises are in their early stages, they are short in human, material and financial resources to a certain extent. Once there is any change in the governmental policies, market demands and social relations, entrepreneurs may be helpless. The adverse external environment may cause the incubating enterprises to die. For the incubator, it can, to a certain extent, imitate the external environment needed for entrepreneurship and alleviate the negative impact of the external environment on the incubating enterprises. Therefore, a relatively stable incubation environment and various support provided by the incubator are sometimes crucial for some incubating enterprises.

3) Inability to fully detect and seize opportunities for entrepreneurship

In the early stage of development, the entrepreneurship network of incubating enterprises has not yet been formed, and information sources are limited. In addition, even if incubating

enterprises are faced with certain entrepreneurship opportunities, they lack strong ability and experience to identify opportunities, and opportunities can be fleeting away from their hands. Therefore, in business starting up stage, incubating enterprises need to constantly obtain information from the external environment, broaden their information channels, improve their ability to identify opportunities, and strive to enter the track of development as soon as possible.

4) Scarcity of entrepreneurial resources

In the early stage of development, resources can be limited, let alone the advantages of resource integration. It is known that resources including capital, technology, talent and organizational system are helpful to the development of enterprises. For example, SMEs can have difficulty in getting loans for financing, because of the lack of relevant transaction records. Due to this, incubating enterprises must realize this situation and learn to fully utilizing social network resources to obtain or receive resources from stakeholders (suppliers, customers, employees, government and others).

5) Incomplete organizational structure

Incubating enterprises', in their early stage of development, organizational structure is incomplete, which has both advantages and disadvantages. The advantage is that incubating enterprises can quickly respond to changes in the external environment, meaning the flexibility of enterprises is strong. However, the disadvantage is that because functional departments are not in position, internal rules and regulations cannot be effectively implemented.

6) Risk of failure in projects

The products and services of incubating enterprises have just been introduced the market, which takes time for the market to recognize them. While waiting for market recognition, they face higher risk factors including the above-mentioned entrepreneurs' personal factors, lack of resource integration ability, inability to detect and seize opportunities, incomplete organizational structure, and others like immature technology and lack of excellent talents. All these weaken their ability to alleviate risks. Once one risk factor is not well controlled, incubating enterprises may face failure.

1.2.2 Relational network

Through sorting out relevant researches, it is believed that the incubating enterprises' relational network is an organizational social network, which is formed through formal relationship links between the incubating enterprises and external stakeholders or related organizations, such as suppliers and distributors (Adler & Kwon, 2002).

Relationship network is one of the cornerstones for incubating enterprises to achieve success and maintain long-term development. It is also the key factor for enterprises to grow from small to large and become from weak to strong. Relational network is conducive to the communication and interaction between stakeholders and related organizations, which promotes the improvement of enterprise performance. In this study, the network contents of incubation enterprises are analyzed from three perspectives, namely, network size, network strength and network heterogeneity.

Network size refers to the total number of network members in the network, which reflects the quantity of network characteristics. In a relational network, network scale refers to the synthesis of the number of business relations formed in the production and operation process of enterprises in a relational network. These sums are important factors for enterprises to complete targeted business activities, achieve business objectives and promote the growth of enterprises. Generally, a larger scale of relationship network is often accompanied by a larger base of resources for selection, making it easier for an enterprise to obtain the resources needed for survival and development as well as reduce the time and path of resource seeking, so as to achieve rapid development of the enterprise.

Network intensity is a description of the compactness of network characteristics, reflecting the quality and quantity of enterprises' access to external resources. Network strength in a relational network refers to the number and frequency of links between a network member and other network members within a certain time in a relational network, which can also be called network link efficiency or network benefits (Burt, 1994; Caner, 2007). Generally, the stronger the relationship network is, the more frequent the interactions between the subjects are, which is more conductive to the stable acquisition of valuable resources by enterprises and their sustainable development.

Network heterogeneity, or network diversity, is another characteristic of network, which reflects the richness and diversity of potential available resources of enterprises. Network heterogeneity in a relationship network describes the differences in the types of business partners or types of resources in the network. Diverse partners can bring more comprehensive or complementary support to enterprises (McEvily & Zaheer, 1999).

At the same time, in the same relational network, it is completely possible to show the network characteristics of large relational network size but small network heterogeneity.

1.2.3 Entrepreneurial performance

The performance of start-ups is a measure to see if they succeed in realizing goals. It is a holistic evaluation on the results of entrepreneurship activities, and an important indicator to measure if the start-ups' processes are workable or not. We need to pay attention to two issues in measuring the performance of start-ups: what are the indicators to measure and how to measure these indicators?

The direct result of the economic activities of enterprises reflects the performance of enterprises. Compared with mature enterprises, new enterprises first pursue survival and then better development. Undoubtedly, entrepreneurial performance has become an important benchmark to measure the survival status and development prospect of enterprises. As a new enterprise, the performance of incubating enterprises can be evaluated by the entrepreneurial performance.

As for the measurement dimensions of entrepreneurial performance, domestic and foreign scholars mostly reflect on entrepreneurial enterprises' profitability and growth performance from the perspective of financial indicators and non-financial indicators.

However, considering the characteristics of incubating enterprises as those ones similar to venture enterprises related to science and technology, and national and local government have been always have higher requirements for incubators' innovations, therefore, the innovative performance is taken as an evaluation index for the performance of incubating enterprises' entrepreneurship.

This thesis examines the entrepreneurial performance of incubators from three

perspectives, namely, performance in profitability, growth and innovation. Considering the availability of data, we will use subjective evaluation method to measure the performance level of new enterprises.

1.2.4 Resource integration ability

Resource integration ability can help enterprises establish core competitiveness and transform potential resources into enterprise activities and behaviors, which plays a very important role for enterprises.

In this thesis, based on the research results of foreign and domestic scholars, it is believed that resource integration capability is the ability of an entrepreneurial enterprise to identify, select, absorb, obtain, allocate and utilize all available resources, including innovative practices, within and outside the organization during the process of establishment and growth.

1.3 Research questions

1.3.1 Basic research problem

In China, all kinds of incubators have expanded rapidly since 2015, and private incubators are facing great pressure for survival. Problems are more prominent, such as homogenization of entrepreneurial services and resources, low service efficiency and high input cost. Many incubators in China have unsatisfactory operational performance, so the incubation carriers need to actively look for more profitable models.

How to make private incubator bigger and stronger is an objective and realistic problem to be solved urgently.

The relationship network of incubating enterprises provides stable business resources necessary for incubating enterprises' survival and development, so it is an important impacting factor on the success and development of incubating enterprises.

At the same time, another significant element for their survival and prosperity is the effective integration of resources, which can give full play to the utility of commercial

resources. It is necessary to reemphasize that for the success and development of incubating enterprises, good relationship network and resource integration ability are crucial elements.

Therefore, this thesis focuses on the improvement in performance of enterprises in private incubators. It is believed that incubating enterprises can only improve their entrepreneurial performance by establishing a good relationship network and improving their resource integration ability, so the core is to research on the relationship among the network of incubating enterprises, resource integration ability and entrepreneurial performance.

1.3.2 Research questions

Based on the above-mentioned dilemma, this thesis conducts research on the following questions. Specific research questions are as follows.

Question 1: Does incubating enterprise relationship network positively influence enterprise resource integration ability or negatively?

Going deep into the effects of incubators, it is proved incubating enterprises and newly established enterprises provide numerous employment opportunities for the society, which is an important driving force for economic and social development. Considering such social benefits, it is urgent to know how these new enterprises can grow up as rapid as possible.

To realize this, an important mission is to break through the status quo, seize the opportunity, obtain the resources needed for enterprise development, and establish a strong relationship network. Entrepreneurs have limited control and mastery over resources, which means that they need to constantly absorb external resources to supplement the resources that enterprises lack. The acquisition and integration of these scarce resources not only requires strong financial support, but also, more importantly, the expansion of the relationship network.

Question 2: Does incubating enterprises' resource integration ability positively influence entrepreneurial performance or negatively?

The network resource integration ability of incubating start-ups has become an important symbol of their success. Incubating enterprises with strong resource integration ability can not only effectively allocate their network resources, but also accelerate their rapid growth.

Incubating new enterprises must strengthen the management and coordination ability of network resources, and further enhance the integration ability of government resources, enterprise resources, intermediary service resources and other resources, increasing performance.

Question 3: Does incubating enterprise relationship network positively influence entrepreneurial performance or negatively?

A good network relationship can help enterprises create value through resource combination, knowledge sharing, improving market response speed and other ways. Because the network has the advantages(division of and specialization in labor forces), it is conducive to reducing transaction costs among members and improving the efficiency of resource allocation within the network. Particularly, incubating start-ups need such a resource network to obtain all kinds of resources needed by enterprises.

Question 4: Does resource integration ability play an intermediary role in the influence of incubating enterprise relationship network on entrepreneurial performance?

In the case of a good relationship network, without a good ability to integrate resources, the efficiency of resources will be greatly reduced, and the improvement of enterprise benefits will be limited. Only with both can the resource maximize its utility through an appropriate path.

1.4 Research purpose

On the basis of sorting out and analyzing the research results in related fields such as incubating enterprise relationship network, resource integration capability and entrepreneurial performance, this thesis explores the performance of incubators from the perspective of incubating enterprise relationship network and further reveals the positive role of resource integration ability theoretically and empirically.

1.5 Research contribution

This thesis explores the relationship between incubating enterprises' relationship network, resource integration ability and entrepreneurial performance, and its main contributions are

1) It is helpful for incubating enterprises to strengthen their understanding of relationship network, resource integration ability and other related factors;

2) It helps to guide incubating enterprises to build a network relationship suitable for their own survival and development;

3) It helps incubating enterprises to optimize the allocation of enterprise resources and guide their efficient utilization, by leveraging on a good relationship network, so as to promote incubating enterprises to effectively adapt to the dynamic external environment, avoid risks, seize business opportunities, improve the entrepreneurial performance of incubating enterprises, and enhance their survival and development ability;

4) It adds research results to academic studies related to China's development in incubators, incubating enterprises, entrepreneurship, and start-up business performance.

1.6 Research framework

1.6.1 Chapter distribution and introduction

This thesis consists of five parts:

Chapter 1: Introduction. This chapter mainly introduces the research background, objectives, problems and its contributions.

Chapter 2: Literature Review and Hypothesis. According to the research content, the literature is divided based on different theories, including innovation cluster theory, social relation network theory, resource-based theory and innovation performance theory. The author systematically combines these theories with analyses, emphasizing the importance of networking, which is stated from the following perspectives, namely incubators, incubating enterprises, resource-based theory, and innovative performance theory. After the presentation

of theoretical analyses, research hypotheses and model are proposed.

Chapter 3: Research Methods and Design. This chapter mainly introduces the research methods, case selection and research design. It mainly adopted two methods, namely questionnaire survey and empirical research, in which the methods of data collection and data processing is introduced. It also presents the selection of a case for empirical analysis, and finally it gives the preliminary model of research design.

Chapter 4: Field Study - Shanxi Emperor Penguin Innovation Incubation Park as Example. This chapter takes Shanxi Emperor Penguin Innovation Incubation Park as an example to carry out field research and verification on the hypothesis. It includes the questionnaire designed for data collection from the incubating enterprises in the Park, the description of variables for statistical analysis and tests. It later introduces the conduction of each analysis and test for the verification of hypothesis, namely descriptive statistics analysis, reliability and validity test, correlation analysis, regression analysis and intermediary variable analysis.

Chapter 5: Analysis of Research Results and Prospects. This chapter summarizes the results of the field research in the fourth chapter and sorts out the practical management significance of these results.

1.6.2 Research structure diagram

For the structure of how the research is conducted, see Figure 1-1 for its roadmap.

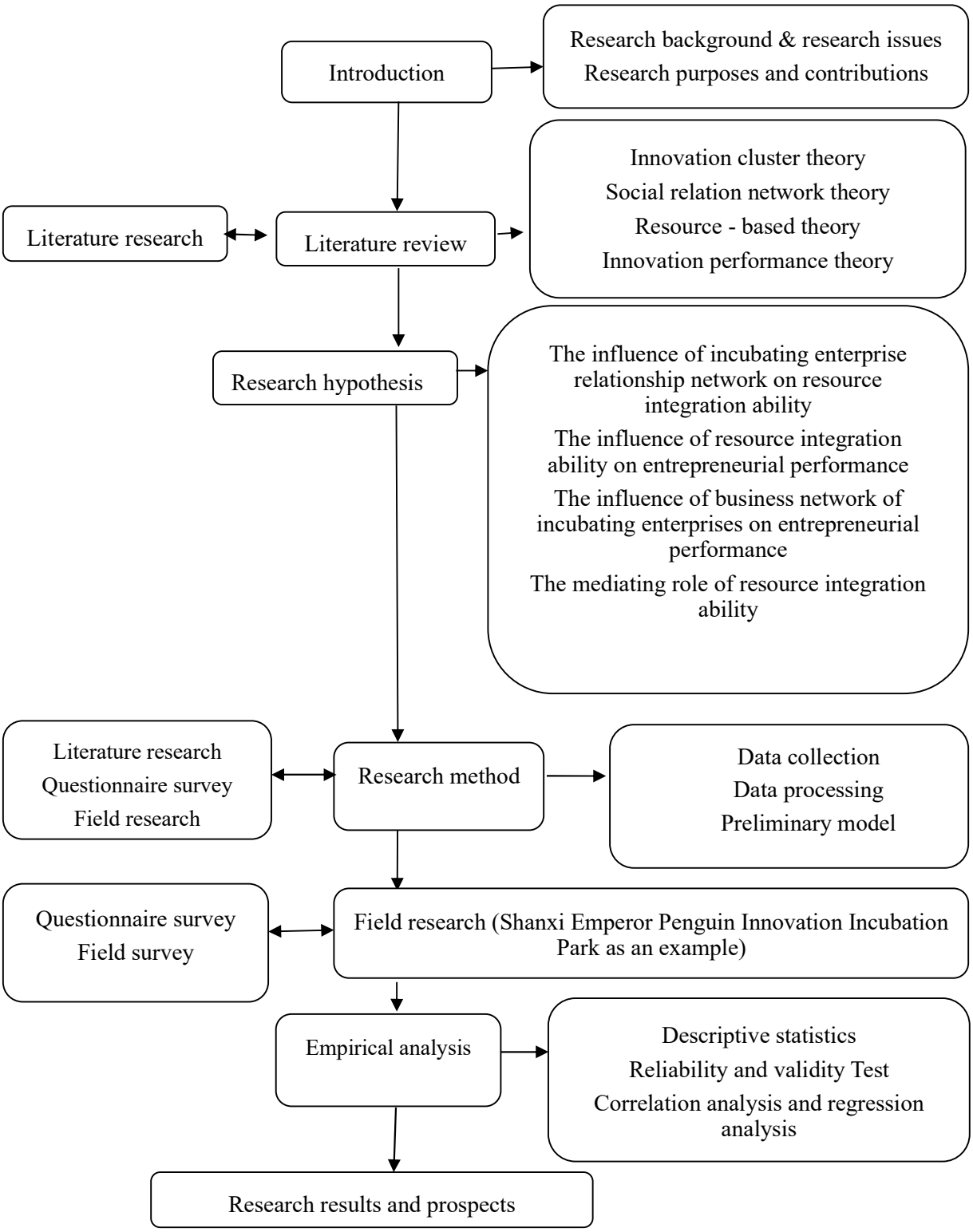

Figure 1-1 Technological Roadmap

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Chapter 2: Literature Review and Hypothesis

According to the research content, the literature is based on different theories, including innovation cluster theory, social relation network theory, resource-based theory and innovation performance theory.

We systematically combine these theories with analyses, emphasizing the importance of networking, which is stated from the following perspectives:

1) incubator, an innovation cluster which provides relations and resources for incubating enterprises;

2) incubating enterprises, which spontaneously form a relationship network and play functioning roles;

3) resource-based theory, which defines reasonably the connotation of entrepreneurial resources and resource integration ability;

4) innovative performance theory, which helps to understand correctly the innovative performance of incubating enterprises.

After the presentation of theoretical analyses, research hypotheses and model are proposed.

2.1 Innovation cluster theory

2.1.1 Innovation cluster

The concept of "innovative cluster(s)" was firstly officially put forward in the OECD research report (Organization for Economic Co-operation and Development[OECD], 2001), after which the academic set off the upsurge of theoretical research on innovation clusters.

However, the idea of innovation cluster has a long history. Marshall (1890) in his book initially put forward the idea of innovation advantages in industrial clusters. In the 20th century, Schumpeter (1934), founder of the theory of technological innovation, pointed out

that innovations appeared in groups in time or space, after which researches on innovation began to focus on its spatiotemporal and geographical characteristics.

Porter (1990) defined the concept of "industrial cluster(s)", representing not only the maturity of concept development, but also that innovation's geographical characteristics has a mature carrier: cluster.

Most of the subsequent studies are based on Porter's theory, mainly discussing innovations together with clusters. Such includes their relationships (Slaughter, Traversat, & Block, 1997; Baptista, 2001; Simmie, Siino, Zuliani, & Jalabert, 2004), and the innovation process of industrial clusters (Ronde, 2001; Carbonara, 2004).

Gradually, the theoretical system of innovation has absorbed the idea of clusters, and at the same time the research on industrial clusters has shifted its focus to the idea of innovation. The two academic systems have been constantly intersected and integrated in contemporary researches, and finally a relatively mature idea of innovation clusters has been formed, which is marked by two OECD reports (OECD, 1999, 2001).

2.1.2 Mechanism of innovation clusters

The formation of innovation clusters is based on industry cluster, which means an innovation cluster is created above an industry cluster or is the high order of an industry cluster. On the causes for the development of industrial clusters, at present the theories widely recognized mainly fall into two categories.

One is Porter's competitive advantage theory. The theory is that industrial geographic concentration is caused by competition, and clusters help to promote the overall competitiveness of industries in the regions and the nation. When promoting the competitiveness of the country, to emphasize are four basic environmental elements, known as the four basic elements of Porter's diamond model, namely "Firm Strategy, Structure and Rivalry, Factor Conditions, Demand Conditions, and Related and Supporting Industries" which have the characteristics of geographic concentration. Therefore, the industry that strengthens the national competitiveness will appear agglomeration (Porter, 1990).

The other one is the theory representing by Krugman's new economic geography. This

school holds that the formation of innovation clusters is due to accidental events and cyclic accumulation. The sprout of clusters is firstly seen when accidental factors occur in a certain region, after which it experiences a path dependent on clustered events and when it reaches a level, clusters finally formed. This represents a process which occurs after a series of cumulative events over a period (Krugman, 1991). By analyzing increasing returns, it is believed that there is nothing special about the emergence of industrial clusters. For example, one industrial cluster, Silicon Valley, is the result of such a cumulative cycle, which is, business activities tend to gather together in a market with larger areas and bigger market potential, and in time the market is further expanded by this gathering of activities, forming an industrial cluster.

However, after the formation of industrial clusters, why do some of them develop into innovation clusters and some do not? Many scholars gave explanations on the formation of innovation clusters.

Among them, Debresson (1989) argues that two major factors, namely internal economic constraints and incentives, and external technological constraints and pressures, explain the formation of innovation clusters. It is believed that the origin of innovation clusters lies in the scope of the economy and the complex, discontinuous but also cumulative learning process in technological development. This explains the complexity of the formation of innovation clusters, laying a foundation for research framework for innovation clusters.

According to Liyanage (1995), the interaction among members of the internal network and all the external networks, is vital for the formation of cluster innovation. Also, the tendency of natural selection among organizations and the complementarity of resources are likely to influence both the decisions on organizational innovations and the selection of networking partners, thereby affecting the mutual relationship among organizations and within the whole network. Therefore, he believed that natural selection, resource complementarity, grouping within the whole innovation system and interaction among participants are the four decisive factors contributing to innovation clusters.

Feldmana and Audretsch (1999) emphasize the importance of resource complementarity and network interaction, holding that both the specialized and diversified externalities of

technology, play a decisive role together. The dynamic relationship among such two types of externalities determines the development of industrial clusters. When the relationship reaches a specific stage, an innovation cluster comes into being.

Ketels (2004) discussed it from the perspective of transaction cost. He believed that the birth and development of innovation clusters lie in the role of innovative technology, i.e. if innovation technology is prioritized to a strategically decisive position, it can affect the enterprise's survival and the standing out of the competition.

Montresor and Marzetti (2008), based on the empirical research on the 15 OECD member countries, think that innovation clusters are formed the time innovation systems within clusters of economies are established.

Park (2003), by analyzing the principles behind the dynamic changes in economic spaces in regions along the Pacific rim, believed that knowledge spillover effect is an important factor for the formation of innovation clusters.

Some scholars share Park's view. It is believed that in development models, transformation characteristics of the knowledge economy and the impact of knowledge spillovers on the high-tech industry are the influencing factors of innovation activities (Bottazzi & Peric, 2003; Moreno, Paci, & Usai, 2006; Tödtling, Lehner, & Trippl, 2006) .

For Lee (2003), the reason for innovation clusters' development is the environment where there are supportive, continuous and stable policies conducive to scientific and technological innovations.

To sum up, the main driving factors for innovation clusters are the economic environment, technological diversity and knowledge spillover. In order to promote the continuous development of innovation clusters and advancement of the established ones, it is necessary to further explore the effects of the driving forces behind the evolution of innovation clusters.

2.2 Social relations network theory

Social network theory was first proposed in the 1930s and 1940s as an important branch

of sociology. The concept of network can be seen firstly and used by German sociologist Georg Simmel in his works including *Conflict/The Web Of Group Affiliations* and *The Sociology of Georg Simmel* (Simmel, 1908, 1922), although it was not defined, while social network was first proposed by British anthropologist in 1940 (Brown, 1940). Later. the British scholar published the book of *Family and Social Networks*, which is regarded as the classic work of the study of social networks in Britain (Bott, 1957).

It was after the 1960s that the concept of social network was really recognized by scholars in various fields and gradually extended to the research on social science. Since then, in sociology, anthropology, psychology, mathematics and other fields, scholars have discussed and proposed a variety of network concepts, such as centrality, density, and structural balance, the word *social network* gradually spread widely. After that, the theories and methods of social network gradually accumulated, and its applicability promoted.

Since the 1990s, social network theory has also been widely applied in the field of management. Many researches have combined it with resources integration or technological innovation ability, which has played a great role in promoting the research and development of social networks (Chidaff, 2007).

The research method of relational network can be borrowed to analyze the problems related to enterprises. Any individual has social relationship and a tie with the outside world, as well as any economic organization. They are embedded in or suspended above a relationship network which is complex, multiple-layered and overlapping as it is interwoven by multiple relations among various parties. Among them, the relation is the cause for the result of a type of networking connections, so where there are relations, there are networking connections. With this logic, relations are connected, and various relationships and networking connections form the basic framework for the relationship network, which is applicable for analyses on corporate issues (Yao & Xi, 2003).

In recent years, much attention has been paid to researches on the social network theory relating to the fields including new economics and social economics, and there has been some progress, which are carried out from the perspectives of embedding theory, connection theory, classification theory, market network theory, function theory, network organization theory,

and the relationship between social relation network and capital.

For a long time, there has not been a clear definition of social network. It was not until 1969 that Mitchell came up with his definition of a social network. In his opinion, the essence of social network is "*the specific relationship between individuals in a group, whose overall structure can be called the social action of individuals in the group* (Mitchell, 1969:12)".

Subsequently, the concept of *individual* in this definition is extended to refer to, a single organization, enterprise, group or even state. With the rapid development of economy, many new economic sociologists have introduced the social relation network as an analytical tool into researches and analyses on social and economic activities, and gradually formed the social relation network theory from the perspective of new economic sociology (Mitchell, 1969).

On embedding theory of social network, Polanyi (2001) first creatively put forward the core concept in new economic sociology, or the embedding quality of social network. He believed that with the 19th century as the dividing point, this quality has different meanings.

Before the 19th century, human's economic behaviors were embedded in social relations as an institutional process, and social relations, economic system and non-economic system jointly work together. After the 19th century, the economy was no longer embedded in social relations, but developed independently and responded accordingly to society in its own specific patterns (Polanyi, 2001).

Granovetter (1985) critically extended the concept and developed it into one called embeddability. With embeddability as the core value, he created the theory of relational network, after which network analysis has become the main means and the essential tool to study economic sociology.

Besides, according to Halinen and Tornroos (1998), network embedding can be divided into three research models, namely actor-centered model, dual-network model and macro and micro network model in multivariate sense.

On the connection theory of social relation network, the idea of networking connection and the concept of network strength are first proposed and introduced in 1973 (Granovetter,

1973). In Granovetter's opinion, the interaction between single actors in a relational network exists with networking connection as a carrier. The degree of interaction among actors defines networking connection.

There are two types of networking connection: strong or weak. Strong networking connection means frequent and closer interaction among actors, while weak ones refer to indirect and sparse communication among actors, both of which have different effects on the actors and play distinctive roles in the relational network. Further, he proposed four criteria for measuring such strength and weakness, namely interaction frequency, emotional intensity, degree of intimacy and trust, and the number of mutual assistance (Granovetter, 1983).

Many scholars believe that in addition to the four dimensions proposed by Granovetter, the measurement for such strong and weak links should also include indicators such as the contact time between actors, the degree of information sharing, the degree of joint problem solving through consultation, the degree of shared process and the degree of value sharing.

On the market network theory, in 1981, Harrison c. White, the key founder of the relationship network school, defined the market as a relationship network and developed a sustainable social structure.

On network organization theory, Richardson (1972), based on each enterprise's ability in engaging in productions and operations, divided enterprises' business activities into two groups, namely similar and complementary activities, which is referred as the foundation for this theory. In order to ensure the smooth completion of complementary activities, a coordination mechanism among all enterprises or among the whole market, independent from the internal hieratical one in a stand-alone enterprise, is needed.

Hence, there is an inter-enterprise coordination mechanism. It is believed that, such a network mechanism, as an arrangement among institutional players, is necessary when to deal with innovation issues in the system. The theory of network organization emphasizes the importance of the relationship network among enterprises. By encouraging enterprises to actively use the established social relations to interact with the external environment, enterprises' development scope or the development without boundaries is expanded.

As to the function theory of social network, there are mainly four sub-theories.

The first is the functional theory of information transmission. Social network functions as an agent of information transmission. Within a social network, any individual or any subject performing economic activities generally constantly look for market opportunities, and these behaviors are detected by the market without suffering any risk and defect. In return, the market responds to such information accordingly, after which market responses are spread to more individuals or economic activity subjects through the whole social network, hence prompting market players on a larger scale, even across the border, to seize those market opportunities (Granovetter, 1973; Burt , 1992).

The second is the theory of media connection function. Oviatt and McDougall (1997) put forward that the interaction among individuals or economic actors from different countries is an important condition for enterprises' successful internationalization. Enterprises in their initial stage performing cross-border expansion can mainly depend on seeking overseas partners who can provide useful necessary comprehensive resources for international operations. By leveraging on such a relationship and their own comparative advantages, they can obtain mature conditions for international expansion.

The third one is the functional theory of resource allocation. Social relation network belongs to the category of social resources or can be seen as intangible resources (Lin, 1999). Enterprises can find a balance between internally and externally controlled resources and allocate them through an alternative governance structure (Oviatt & McDougall, 1994).

The fourth is the functional theory of moral constraint. A cooperative relationship connected and established within the social network means that it is formed during many interactions among individuals or economic actors, which has withstood close observations and investigations. Under such cooperation, there is high level of mutual trust among them and their behaviors are subject to moral constraints or the supervision of the whole social networks as it functions under a specific punishment mechanism. Although such a function of moral restraint by social network has no legal biding effect, yet it plays informally as restraint mechanism like an invisible hand, effectively preventing enterprises' loss of core resources and greatly eliminating cooperative members' short-term speculations (Sasi & Arenius, 2008).

2.3 Resource-based Theory

The resource-based theory of enterprise is marked by the publication on enterprise resource-based theory (Wernerfelt, 1984). Through the researches on its development by scholars including Barney (1986a, 1986b, 1991), and Grant (1996), it has become a relatively systematic theoretical system.

Enterprise resource-based theory regards the internal resources of enterprises as the basic analysis unit. It holds that the essence of enterprises is the aggregation of heterogeneous resources, focusing on the analysis of these heterogeneous resources owned by enterprises. Through the analysis on the uniqueness of resources and enterprises' capabilities in applying them, enterprises' sustainable competitive advantages can be established and improved, so as to achieve outstanding performance.

This theory is established on the basis of two assumptions. There is heterogeneity in the resources that an enterprise possesses, and such resources cannot be incompletely liquidly used and circulated (Penrose, 1959; Perteraf, 1993).

For its development, two group of perspectives are seen.

One is Barney's which looks from the enterprise itself, which is to analyze the characteristics of each category of heterogeneous resources, explore their effects on the sustainability of sustainable competitive advantages and the level of performance, and to find out the sources contributing to performance differences in various enterprises.

The other is Peteraf's, which is to analyze enterprises' decision making on enterprises' competitive strategies in in competitive markets, i.e. how enterprises select appropriate competitive strategies by making full use of their own resources.

With its continuous evolution, it saw expansions in related theoretical researches and many concepts emerged, including enterprise core competence, and enterprise knowledge and dynamic competence. It is believed that success in entrepreneurship and business operations requires the integrating use of various resources, which involves studies on resource classifications and resource integrations.

2.3.1 Resource classification

For resource classifications, Montgomery and Wernerfelt (1998) believes that enterprise resources can be divided into material resources, human resources and organizational resources.

According to Grant (1991), besides these divisions, resources also include technical resources and financial resources.

Barney (1991) has a similar division of enterprise resources. Resources are also simply divided into physical capital resources, human capital resources and organizational capital resource, in which these three types of resources refer respectively to 1) plant, equipment and technology and other related ones, 2) personnel, managers and staff, and 3) the control and coordination of internal and external relations.

Besides, according to Ford and Schellenberg's idea (1982) resources are divided in a discrete system, in which those intangible and systematic resources based on knowledge are seen as complex resources while those tangible but discrete resources based on property ownerships is referred as simple resources.

Miller (1996) adds to it knowledge resources as well as equity ones, in which the former refers to resources that make it difficult for competitors to imitate or entry the market due to resource barriers, including their management processes or production skills, while the later specifically refers to those that can only be protected through the form of property rights.

Black and Boal (1994) divides it into cohesive and systematic resources in his research on the network relationship between resources.

As to the importance of network resources, Gulati (1999) stressed they help explain enterprises' strategic behaviors. In his research on the influence of network resources and enterprises' capability on the formation of alliances, it confirmed that the accumulation of network resources which are gained in previous alliance networking has an important impact on the decision-making of establishing new alliances.

As to innovation resources, Caldeira and Ward (2003) believed that human resource is indispensable as any technological innovation activities of an enterprise cannot be separated

from the participation of people, although it is generally hidden in the enterprise as invisible resources.

2.3.2 Resource integration

From the perspective of enterprise resources, resource integration refers to the dynamic process in which entrepreneurs effectively identify, acquire, allocate and apply the internal and external resources of a start-up enterprise, so as to create new resources and solve occurring problems or develop new business opportunities.

Edmondson and McManus (2007) divided the integration of enterprise resources into the process of selection, absorption, allocation, activation and integration, not only of internal resources on the micro tactical level, but also external resources on the macro strategic level.

Within the integration process, the identification of resources refers to that the entrepreneurs start businesses by taking full use of their own resources but also delving into the search for various resources required, which is the first step for the success or failure of resource integration and the formation of resource integration ability.

Brush, Greene, Hart, and Haller (2001) held that resource identification is an important premise for the growth and development of an enterprise. Entrepreneurs can help enterprises create value by identifying useful resources and building a system for the identification of entrepreneurial resources. Only by constantly identifying valuable, scarce, irreplaceable and inimitable resources can entrepreneurial performance be further improved.

Secondly, the acquisition of resources refers to the process that entrepreneurs try every way to obtain entrepreneurial resources and make them serve for entrepreneurship.

Thirdly, resource allocation refers to the process that entrepreneurs adjust the entrepreneurial resources to make them match to and complement with each other, so as to gain the core competitive advantage.

Fourthly, resource utilization is a process in which an entrepreneur internalizes the acquired and allocated resources, building the capacity to provide products or services or added-value to customers, which shows the full play of the ability of using resources. Resource utilization is the final step of resource integration for most small and micro science

and technology enterprises. Only by making full use of resources acquired and allocated well by enterprises, can the efficiency of transforming resource integration ability into enterprise performance be improved. Therefore, the proper use of resources will improve the ability and efficiency of entrepreneurial resource integration, thus enhancing the entrepreneurial performance (Brush et al. 2001).

Overall, Sirmon, Hitt, and Ireland (2007) argued that resource integration has three modes: stable adjustment, rich and detailed integration, and pioneering and creative integration.

The essence, according to Herstad, Sandven, and Ebersberger(2015), is the optimization of resources owned and acquired, i.e. the whole integration from the identification, acquisition, integration, internalization, and allocation to utilization of internal and external knowledge, technology, information and other resources.

To achieve the goal of maximizing the overall benefits, Leonard (1995) discussed the approaches from a relatively dynamic perspective, which is, enterprises should set up standards to plan, manage and evaluate relative elements including internal and external information, resources, functionalities and networks. He argued that by such a way, enterprises' core competitive capacity can be built and improved as well as their healthy business development.

As to this, some Chinese scholars share similar opinions, especially on new enterprises' resource integration ability.

Cui (2005) proposed a two-level approach to integration: strategy formulation and strategy implementation. Based on this research, Rao (2006) shared similar analysis and developed it into micro and macro levels, and Ma, Dong, and Ge (2011) proposed a new definition of resource integration ability shown by new enterprises, which includes their ability to identify and obtain required resources from the external environment and identify, acquire, configure and utilize internal resources.

For new enterprises, based on the acquisition of resources from the macro or external environment, they integrate such resources with their own resources in a dynamical way. Such integration ability is shown as resource construction and utilization capability, which

coincides with Wang's (2011) idea.

The evaluation of resource integration ability of newly established SME clusters is studied by Xiao, Li, and Tang (2009), with the construction of an index system from four aspects: breadth, depth, speed and openness.

Gu (2011) further analyzed resource integration ability takes a mechanism to influence different stages of the entrepreneurial process.

2.4 Innovation performance theory

As to performance, Ford and Schellenberg (1982) summarized three methods to define performance:

1) Goal method, which assumes that enterprises pursue ultimate and clear goals and define performance by the achievement of goals;

2) Resource method, which emphasizes the relationship between enterprises and the operation environment, and judges enterprises' performance by their ability to retain scarce and valuable resources;

3) Constituency method, which values performance by the interaction between enterprises' members or between enterprises' members and enterprises themselves.

Later, Ruekert, Walker, and Roering (1985) raised the definition of performance from three aspects:

4) Efficiency: the ratio between the input of resources and the relative output, expressed as the rate of return on investment;

5) Effectiveness: the percentage of sales growth or market coverage when compared with its competitors, expressed as the percentage of sales growth or market share;

6) Adaptability: the ability of an enterprise to respond to environmental threats or opportunities, expressed as sales or sales rate within a certain period.

For innovative performance, after Farrell (1957) first proposed the concept of technical efficiency, it is regarded as the default for the measurement of innovative performance.

However, further, scholars have different perspectives on the measurement of start-ups' performance, mainly as the following.

The first is by using financial and non-financial indicators.

It is the most basic and the most important method as the performance of new enterprises or any enterprise can be measured from a financial perspective. The measurement can adopt indicators either from accounting-based or the market-based system. Until now, the latter is more popular and more commonly used.

Specifically, financial indicators include liquidity ratio, net income, return on investment, return on sales, average annual sales volume, average annual return on assets and some others. Besides, sales growth, used generally as new enterprises' financial goals, should also emphasize on the increase in sales in new markets, the number of new customers, and the provision of new products and new services (Kaplan & Norton, 1992, 1996).

Also, the indicators of the earning rate plays a very important role in related researches, which includes profit margin on sales, return on stocks, return on assets, and return on investment. Perters and Waterman (1982) used the three indicators, return on total investment, return on sales, and the average return on assets.

The second is the use of subjective and objective indicators.

Subjective indicators refer to using scales by perception to evaluate enterprises' different performance levels, and adjectives are used as indications, namely *very good, average, uncertain, pretty bad, and very bad*. Objective indicators refer to objective financial data such as sales growth rate and market share related to enterprises' business performance.

However, this method has many limitations, mainly because the data to be collected are generally confidential and it can be difficult to obtain from interviewees. Besides, small enterprises are neither able nor willing to provide the information needed for assessment, especially in some cases that, the objective financial data of small enterprises cannot be made public, so even they do provide the data, it is difficult to confirm the accuracy of financial performance figures (Covin & Slevin, 1991).

Moreover, with the deepening of market-oriented research, more scholars believe that

financial indicators alone cannot fully effectively reflect enterprises' operation results. This means non-financial indicators should gain increasing attention, so the balanced scorecard method was designed, promoted and used by Kaplan and Norton (1996), which, on the basis of financial indicators, takes into account non-financial indicators including relative market share, customer satisfaction, product quality, customer loyalty and other indicators.

Also, the adding of non-objective indicators is also due to their flexibility. Objective indicators or the absolute financial performance index scores are inflexible, as they can be affected by specific industry factors. For example, if objective financial indicators of SMEs in different industries are compared, it may lead to misleading results. In contrast, measurements on subjective performance indicators are more flexible and useful, especially when comparing performance across industries. Therefore, in relevant literature, when to measure enterprises' performance, both subjective and objective indicators or a combination of both indicators are used.

Although when using both subjective and objective indicators to measure performance, there is doubt that there is difficulty in obtaining objective data. Even some scholars have pointed out or questioned the validity and reliability of subjective indicators, yet Venkatraman and Ramanujam (1986) considered that, in measuring sales growth, profit growth rate and other financial indicators, subjective indicators are highly correlated with objective ones, proving the feasibility of subjective measurement, hence it is more valuable to use both subjective and objective indicators in the study.

However, one thing to be reminded is that, sometimes, researchers should consider their research purposes and backgrounds, so when it is not advisable to use both methods at the same time, researchers will usually only use one of the evaluation methods, because subjective measurement includes indicators for perceived market share growth, perceived customer satisfaction, perceived changes in cash flow and sales growth, and perceived profitability compared with competitors, and objective measurement includes indicators such as sales volume, net capital value, net income, sales growth and the number of successfully newly developed products.

Chinese scholars are also concerned about the measurement of innovation performance

in incubators. For example, Wang and Rao (2004) divided the measurement on enterprises' performance in technological innovations into two dimensions: economic and social benefits.

Ye and Jiang (2008) divided it into three dimensions: input of resources, input of management skills and effects of technological innovations.

Chen and Chen (2006) divided such evaluation system into two dimensions: the improvement in the factors affecting production, and the market performance of innovative products.

For Yan and Cai (2014), such measurement is made on both financial and strategic performance. Measurement on innovative financial performance mainly focus directly on the output of enterprises' innovation activities, including the speed of new product development, the number of patent applications, intangible assets, and intellectual property rights. The measurement on the performance of innovation strategies mainly looks at the long-term results of innovation activities, including the potential range of the benefits, the management skills demonstrated in the process, and the internal policies promulgated and the environment created for innovation.

Song, Jin, and Zhao(2014) believed that the performance of incubators can be shown from three aspects, namely their economic results, innovation achievements and incubating enterprises' performance. After a regression analysis was conducted on the relationship between the input of resources (human, financial and material), positive results were found in these three types of performance indicators. Zhu, Zhou, and Wu (2018) used the method of self-evaluation to measure the performance of start-ups, in which the members of the entrepreneurial team were asked to self-evaluate themselves to obtain relevant data.

With the scale developed by Zahra, Neubaum, and El-Hagrassey (2002), the participants were asked to evaluate the importance and the performance level of five performance indicators, namely profit margin, sales growth rate, growth in market share, new product success rate and customer satisfaction level.

Cheng and Dong (2019) learned from the research of Mcdougall, Covin, Robinson, and Herron (1994), and Li and Atuahene-Gima (2001). They measured the performance of new enterprises with nine indicators, including return on investment, sales profits, growth in

profits, return on assets, operational efficiency, growth in sales revenue, growth in market share, performance in cash flow, and corporate reputation. It includes both financial and non-financial indicators, which can explain the overall performance of new enterprises.

At present, the academia has not reached a unified conclusion on the approach to the measurement of incubating enterprises' innovation performance, but it is generally believed that, when making measurement on such performance, a comprehensive method should be adopted, meaning aspects including innovation, finance and growth should be simultaneously considered. Therefore, a multi-dimensional, multi-angle and multi-index system should be used.

2.5 The importance of networking, resources and performance

2.5.1 As an innovation cluster, incubator provides relations and resources for incubating enterprises

2.5.1.1 The incubator acts as the organizational intermediary in the relationship network

An important but little-mentioned contribution of incubators is their ability to provide networking opportunities. Incubators can help incubating enterprises gain access to financial resources, customers, service providers, and other resources, thereby increasing their chances of success. Under incubation, enterprises can make use of two types of networks: internal and external network.

Lyons (2000) believed that the above-mentioned two types of networks are equally important, because they both help incubating enterprises to build their own network. The internal network within the incubator is beneficial for them to establish social capital, meaning many enterprises are able to share with each other various resources in the incubator internal network. He pointed out that the most important resource provided is the networking opportunities with other incubating enterprises, and such is called internal networking.

However, the study conducted by Sherman and Chappell (1998) showed that incubators

provide convenience for incubating enterprises to establish connections with enterprises in other incubators, which is external networking. External networks are important for incubating enterprises, as it enables them to connect with potential partners, customers and local businesses (Sherman & Chappell, 1998).

Incubating enterprises use the incubator as a platform for cooperation. Research results showed that one in four enterprises signed sub-contracts with other enterprises and one in six had cooperative projects with other enterprises (Markley & Mcnamara, 1995).

The existence of business incubators overcomes incubating enterprises' deficiency in establishing network relationships, greatly accelerating the process of developing their relationship network and enhancing their ability in independently managing network resources. This is very important for SMEs because the relationship network to obtain the resources they need is the guarantee of their survival and development. The incubator can be used as a very effective entry point. While maintaining close ties with incubators, incubating enterprises can also establish cooperative relations with commercial banks, investment institutions, government, research institutions and other organizations.

Besides, this resource network is of great significance to accelerate the growth of incubating enterprises. Through the incubator-centered network in which the above-mentioned organizations are included, incubating enterprises can gain support in areas such as management, marketing, law, accounting and others more conveniently and even enjoy professional services in lower costs. Moreover, they can use idle equipment and obtain professional technical advice and guidance at a relatively low cost, as the incubator establish relationships with scientific research institutes and university laboratories. Conversely, these professional companies and institutions also increase their operational profits with economy of scale while serving incubating enterprises.

This not only saves incubating enterprises' time and money. At the same time, incubating enterprises obtain investment and financing support necessary for further development or growth as they can obtain bank loans through the recommendation and guarantee of incubators.

The incubator support incubating enterprises not only depending on the resources and

abilities owned by itself, but also on its ability to organize and link other entrepreneurial networks. The most critical factors to determine the effectiveness of business incubation are incubators' management support and networking resources.

The networking resources coordinated by the incubator for incubating enterprises is far more important than the resources possessed by the incubator itself. By acting as an intermediary between incubating enterprises and other organizations or individuals with corresponding resource capabilities, the incubator helps incubating enterprises establish connections with various entrepreneurial groups and supporting services. The size of such a network organized and intermediated by the incubator determines the scope of potential trading objects for incubating enterprises.

There are many ways and means for the incubator to strengthen its intermediary role in the establishment of an entrepreneurship support network.

The first is from the organization of the incubator's own network.

The institutions involved in the initiation, sponsorship and operation of the incubator, such as universities, governments, enterprises, institutions and individuals, should be carefully selected, as well as the incubator's managers and expert committees. For the latter ones, their background, business management experiences and social relations need better examination. Because both constitute the incubator's basic support network.

The second is to establish contact with existing intermediary institutions.

Incubators and their members can become members of various professional and technical associations, thus linking incubators with existing intermediaries.

The third is by introducing other organizations and their branches into the incubator.

Incubators can launch special incubation projects or organize various activities through making alliances and collaborations with various organizations and individuals, so that some organizations can steadily get involved in the operation of incubators.

The last one is to encourage graduated enterprises to provide support to current incubating enterprises.

It is very important to keep in touch with the graduated enterprises, and encourage them

to share their professional technical knowledge, management experiences and market information with existing incubating enterprises, during which they can play a role as communicators, assistants and guides, providing support to the incubating enterprises.

The degree of support that can be provided by supporting networks for entrepreneurship on the organizational level determines the incubator's visibility, image, attractiveness and social influence.

2.5.1.2 Incubators provide public relations support for incubating enterprises

For an incubating enterprise in urgent need of external resources to develop its enterprise capability, an incubator's social popularity and credibility is very important because such affacts the transaction cost for them to obtain these resources through various channels. For this, incubators' support in public relations for incubating enterprises does not only mean to make the link to networking with entrepreneurship support in cheaper costs, but also create them a more friendly social environment, i.e. incubators can create many opportunities for incubating enterprises by providing public relation support to improve their visibility.

An incubator with a good image and reputation can improve the creditworthiness of the incubating enterprises. Some excellent incubators clearly set up strict selection standards and procedures for incubating enterprises to enter. Under this selection, incubators can not only ensure their operation efficiency, but also help improve the reputation of incubating enterprises who have passed the selection.

Besides, these incubators later can hold various activities to create opportunities for incubating enterprises to contact with various entrepreneurship support networks, so as to improve their popularity.

Moreover, some incubators also publish magazines and issue newsletters, regularly updating analysis on the performance of incubating enterprises, and introducing entrepreneurs to the entrepreneurship support network, so that the incubating enterprises and entrepreneurs are fully understood by the public about their activities.

In short, incubators with various incubation functions play different roles, having different values to incubating enterprises. Incubators generally adjust their functions with

specific emphasis when to serve incubating enterprises whose development falls into different stages in various industries.

Generally, these functions interrelate with each other, having a combining effect on incubating enterprises' growth and prosperity. Especially, incubators provide different services for achieving a variety of purposes. For example, to help entrepreneurs establish organizations, incubators provide venues, facilities, office secretary services and other general management support. To help incubating enterprises develop organizational capabilities, incubators offer assistance in management and financing. To reduce incubating enterprises' learning cost, and prevent them from catastrophic consequences, incubators provide education and training on entrepreneurship. To create opportunities for incubating enterprises to acquire more resources and capabilities, incubators offer links to entrepreneurship support networks. To improve incubating enterprises' visibility and reputation, incubators provide support in public relations.

2.5.2 Incubating enterprises spontaneously form a relationship network and give play to its network functions

2.5.2.1 Relational network spontaneously formed by incubating enterprises

Enterprises need resources for incubation. Incubating enterprises connect with other actors in the network through the incubator, and different forms of resources flow between organizations and individuals through these connections. It is this connection that provides nutrients or resources for the development of incubating enterprises.

The entrepreneurial process of incubating enterprises is a process in which entrepreneurs attract and combine external capabilities and resources with internal creative ideas. Such external capabilities are generally used as the leverage. That is why the channels to obtain these enterprise capabilities and resources are extremely important. Incubation, in essence, is the allocation of resources to incubating targets.

The reason for new enterprises to enter an incubator is that they can obtain more resources at lower costs in more effective ways through the relationship network established by the incubator than doing so otherwise. An important aspect is that incubators help

incubating enterprises to organize and coordinate their required resources and enterprise capabilities through various channels. This incubation process is the process of linking the incubating enterprises with various relationship networks. Therefore, this superior role of relational network in knowledge dissemination determines its prominent importance in the process of enterprise incubation.

Incubating enterprises must rely on external networks to obtain resources. They are generally in highly uncertain and risky situation in competitive markets and lack the ability and reputation to search and obtain resources, which means that they cannot effectively access to necessary external resources, nor the opportunities to trade in the market.

For this, there will be a relationship network spontaneously formed by entrepreneurs' personal interpersonal relationships or social networks.

This network, whose formation shows the mark of personal identities, has the characteristics of cohesion, embeddability and path dependence, as shown in Table 2-1 below.

Most of the nodes of this network are based on personal interpersonal relationships, which presents the embedding characteristic of the social relationship between nodes that determines enterprises' economic behaviors. In this kind of relatively closed and dense cohesive network with a few participants, the cooperation between nodes is mostly based on mutual identity, social obligation and family trust. Therefore, the network is highly dependent on the pre-existing entrepreneurs' personal-identity-based relationship network, with a high degree of path dependence.

With incubating enterprises' growth, the network relationship obviously cannot meet the their needs, and for the purpose of increasing economic benefits, there must be a market-oriented transaction relationship with other nodes, which will increase the number of non-embedded nodes, reduce the level of cohesion, and overcome the problems of high repeatability, insufficient diversity and information waste. Originally, these incubating enterprises were confined to a close and dense network with much cohesion, but with these non-embedded nodes, the greatest advantage for incubating enterprises is that they help them to establish relations with other organizations, so they can more easily obtain rich and various resources required for development.

Table 2-1 Relationship Network Analysis of Incubating Enterprises Formed Spontaneously

	Embeddability	Cohesion	Path dependence
Main characteristics	The relationship between nodes is more out of personal interpersonal relationships, and business transactions are carried out in the relationship network.	Dense network, close connections between nodes, non-economic transactions.	Businesses rely heavily on entrepreneurs' pre-existing networks of personal relationships.
Causing reasons	Not identify for other enterprises, which is difficult to establish relations with other enterprises.	Nodes are based on mutual identity factors, social obligations and kinship dependence.	Unable to make groundbreaking explorations, as they have to rely on existing personal identity-based networks.
Evaluation analysis	The continuous support provided by embedded nodes may be the only source of resources for some enterprises.	Non-economic transaction is very important for enterprises in the establishment stage. The greater the uncertainty of the future of enterprises, the more they rely on the cohesive network.	The pre-existing personal network of entrepreneurs limits the flexibility and adaptability of the network.
The direction for development	Transition to a network which mainly is based embedded networks and normal market linkages.	Non-embedded nodes increase and cohesion decreases. Node connections are sparser and more fragile.	Transition from path-dependent networks to consciously managed networks.

Also, it is possible for them to control resources necessary for other enterprises' growth,

thus increasing their values. Both ways make incubating enterprises consciously learn network management. The research shows that when an enterprise has a network relationship dominated by both embedded nodes and normal market ones, they are most likely to obtain resources such as financing at lower costs.

2.5.2.2 Functions of incubating enterprise relationship network

According to Baker (2000), as entrepreneurial enterprises increasingly manifest the network characteristics in organization forms (virtual organization), cooperation methods (strategic alliances and joint investment), marketing strategies (marketing and client networking), and competition tactics (interdependent and cooperative competition), relationship network becomes an important characteristic of any start-ups. As a special form of entrepreneurship, incubating enterprises have the following functions in their relationship network:

1) Saving transaction costs

The establishment of relationship network can effectively reduce incubating enterprises' transaction costs. For example, by establishing a close network relationship with raw material suppliers and downstream dealers, incubating enterprises can reduce their bargaining power. The relationship network is helpful for incubating enterprises to realize the internalization of their transactions with external parties, saving transaction costs in the review, negotiation and supervision on the activities.

Also, by establishing a good marketing network, incubating enterprises can reduce the investment in marketing costs such as market development and product promotion, while with a stable customer relationship network, they can reduce commissions for sales people, even customer brand loyalty will invisibly increase other potential competitors' entry barriers and conversion costs.

2) Spreading and sharing risks

The establishment of incubating enterprises' relation network transforms their competition behaviors. Under the construction of the relationship network, incubating enterprises, either partners or even competitors, can be jointly committed to technological

research and development, product promotion, market development, and project investment, not only shouldering risks but also enjoying benefits together. This is because the business activities of any incubating enterprise or start-up is generally considered with high-risk and high-return, and any single one's capability, strength and judgment is limited, but the establishment of relationship network can make up such deficiency.

In addition, through the alliance with other enterprises, including well-known ones, they can improve their public image; through effective learning and imitation from those successful enterprises in the network, they can reduce errors and trial times; even through the alliance with competitors, they can reduce external resistance and competition risks. Therefore, the network synergy can effectively ensure the success rate of entrepreneurship.

3) Changing competition modes

In time when there is shortage of goods, the market is controlled by the seller, and the difference in market demand is not obvious, so the enterprise does not need to consider product difference to meet the requirements of customers, and it can survive and develop only by mass production, and neither does it have the pressure of competition, so its business strategy only needs to consider how to improve the efficiency of mass production.

However, with the development of market economy and the continuous improvement of high-tech technology, gradually farewell is to such an era of product shortage and comes the market controlled by the buyer. Market demand presents diversified characteristics and competition is increasingly fierce. Customers demand personalized goods and services, getting increasingly fastidious with mountingly higher expectations. In high-tech industry, globalized market and the popularization of information and technology make the products less different and more homogeneous.

Under such a situation where the industrialization of the high-tech sector increases as well as its comprehensive penetration into traditional industries, incubating enterprises need to improve their management. Seeing cooperation is inefficiently established among enterprises, customers and suppliers within traditional transaction relationship network, many forward-looking incubators have proposed that these three parties compete in cooperation. In this way, together they make the cake of profits bigger, so all can benefit from a better

relationship network. Such proposal is applauded by many others and it is actively put into practice. Hence, incubating enterprise relationship network has changed the competitive concept in incubating enterprises' minds, so they are rational in making decisions, effectively avoiding the problem of prisoner's dilemma they used to face.

4) Bringing network characteristics into full play

Compared with common enterprises whose needs for capital tend to be general and universal, incubating enterprises' seeking are more specific and selective.

When their relationship network is formed, it has the intention to target at specific objects, with identifiable characteristics of being self-replicating, self-selective and self-reinforcing.

Firstly, self-replicability refers to the potential evolution of network, which is, the incubator's relationship network owned directly or indirectly by all members can eventually evolve into each other members' direct network. Not only this, under a learning mechanism, each member's characteristics may be assimilated, and a small and simple relationship network can be aggregated into a large and complex one.

Secondly, self-selectivity refers to the development path of a set of evaluation and selection criteria for the formation of networking relationships. The criteria are set after incubating enterprises have learnt from previous errors and experiences.

Thirdly, self-reinforcement means a formed relationship network has path dependence and can reach economy of scale. Once an incubating enterprise sets its selection criteria, this set of criteria can automatically guide the process of the accumulation of its social capital in a systematic path. With gradual expansion, the relationship network becomes larger and larger in scale. Meanwhile, the average cost of building and maintaining the relationship network will be lower and lower.

Beneficial from such economy of scale, starting a business is more conductive as incubating enterprises can just replace or reduce economic cost with lower relationship network cost.

Data prove that successful incubating enterprises can usually make full use of resources

and seize business opportunities from relationship networks. Moreover, they leverage the networks as an opportunity to create values, the values that cannot be realized by one enterprise alone with its own explicit capital (human resources, equipment, capital, technology).

Therefore, incubating enterprises' abilities to construct a relationship network should be seen as their core competitiveness. Such network resources, although not actually able to be used for the production of goods, is indeed quasi-capital providing auxiliary values. They can pave the way for those operation activities generating direct profits, or those activities yielding competitive advantages.

2.5.3 Resource-based theory helps define the connotation of entrepreneurial resources and resource integration ability

2.5.3.1 Definition of entrepreneurial resources

Resources are the foundation for any enterprise's development, and for an entrepreneurial enterprise, they are especially indispensable. Resources are seen as the sum of all elements that an enterprise possesses; also, they can be leveraged to achieve the enterprise's goals in the process of providing products and services to the whole society as a business entity. Entrepreneurial resources are the sum of all kinds of tangible and intangible resources continuously invested and utilized in a new enterprise during its process of establishment and growth. They are the source of entrepreneurship.

However, it is undeniable that entrepreneurial enterprises have relatively little experience in the application of entrepreneurial resources. It is known that the introduction, consumption, exchange and deployment of entrepreneurial resources have a direct impact on new enterprises' operations. Therefore, in order to improve the core competitiveness of entrepreneurial enterprises, it is particularly important to integrate entrepreneurial resources.

The acquisition and integration of entrepreneurial resources are non-stop processes in the total development of any entrepreneurial enterprise. Entrepreneurs need to effectively identify all kinds of resources in the external environment and select and acquire valuable entrepreneurial resources. After, they should organize, integrate and utilize those acquired

resources effectively, so as to transform them into the enterprise's core competitiveness and promote entrepreneurial growth. Therefore, the investigation and analysis on entrepreneurial resources are crucial to learn how entrepreneurial process works.

Entrepreneurial activities need resources. In economic analysis, it is believed that resources are the factors or conditions supporting production operations for enterprises to create added-values to customers and pursue wealth. As the core principle of traditional strategic management, resource-based theory points out that enterprises must master those scarce and irreplaceable resources if they want to gain lasting competitive advantages (Barney, 1991).

Entrepreneurial resources are all assets that are continuously put into operation during the development and growth of a new enterprise and they are the indispensable foundation of new enterprises, running through the whole production and management. At the beginning of starting a business, entrepreneurs need to judge whether they have enough resources to develop entrepreneurial opportunities. At the same time, as the high growth of new enterprises requires more resources as guarantee, entrepreneurs also need to fully integrate entrepreneurial resources to ensure the implementation of organizational strategies.

From the establishment to the growth and development of an enterprise, it is always accompanied the process of identifying and obtaining required entrepreneurial resources, leveraging and integrating new entrepreneurial resources, and utilizing integrated resources. Enterprises need entrepreneurial resources not only as guarantee for their production operations, but also the formation of competitive advantages, especially through the integration of such resources.

This thesis argues that incubating enterprises acquire two types of resources, namely tangible and intangible resources. In this thesis, intangible resources include technology (such as production process, equipment maintenance, financial analysis and management skills), information (such as data and intelligence), and reputation (such as brand, culture, image and knowledge) and others. Tangible resources include capital, land, building, equipment, raw materials and others.

2.5.3.2 Connotation of resource integration capability

The resource integration capability discussed in this thesis refers to the ability of a new enterprise to select, absorb, allocate and utilize all available resources inside and outside the organization in the process of its establishment, growth and development. It includes not only at the macro level the strategic foresight and organizational support and coordination, but also at the micro level the capabilities to swap, allocate, activate and integrate entrepreneurial resources.

The level of resource integration ability affects an enterprise' strategy on using resources, determining whether the entrepreneurial resources can give full play to its effectiveness or not. The results can affect the new enterprise' competitive advantages.

At the macro level, strategic foresight refers to the insight developed by entrepreneurs who have predicted the trend of the market and uncertainties in external environment, as well as the organizational strengths and weaknesses and the potential management problems that may occur. It also refers to their ability to allocate entrepreneurial resources in a targeted way to cope with various challenges. Strong strategic foresight can accurately detect the challenges inside and outside the organization, knowing what and how many resources can be allocated to give their full play. Entrepreneurs good strategic foresights can help the enterprise improve operation effectiveness and resolve various problems.

Besides, at the macro level, support and coordination capability refer to an enterprise's ability to provide support to the execution of its strategies and organizational operations, coordinating resources for strategic goals.

At the micro level, swapping and allocation capability refers to the abilities to identify, acquire and allocate entrepreneurial resources, which the new enterprise has developed during the process of its development and growth. It is mainly manifested in the accumulation of entrepreneurial resources, including in resources quantity, quality and structure. For new enterprises, the ability to identify and absorb entrepreneurial resources is particularly important.

At the same time, activation and integration ability refer to the abilities if entrepreneurs

can give full play to entrepreneurial resources, especially in the utilization efficiency and benefits yielded. It is mainly reflected in the way enterprises use entrepreneurial resources.

Whether a new enterprise can succeed or not depends not on having more resources, but on whether it integrates resources efficiently and exerts the resources to their full efficiency and productiveness. Strong activation and integration ability can enable new enterprises to develop competitive advantages that should not completely commensurate with their entrepreneurial resources.

Resource integration entails four characteristics, namely:

1) The activation characteristic. Only when resources are activated can they exert their efficiency and realize value creation.

2) The dynamic characteristic. As external environment changes, not only the integration of resources changes but also resource itself. New enterprises will adopt different ways for resource integration in the process from early establishment to later development and growth.

3) The system characteristic. In the early stage of resource integration, namely identification and absorption of resources, it is necessary to build a systematic resource architecture to make various resources match with each other and function complementally. The integration of resources should bring all resources of the enterprise together and form a system.

4) The value-added feature. Resource integration achieves the effect of $1+1>2$ as it is not just a simple sum but the combination of various resources through mutual matching with one another. Entrepreneurial resource integration has its own internal logic, which is, through scientific integration, it helps improve an enterprise' abilities and capabilities, and obtain competitive advantages.

The ability of resource integration is affected by three main factors as the following.

1) Innovation culture. From establishment to growth and development, innovation is a continuous process for any new enterprise. Such innovation culture is reflected in the level of efficiency of the integration of entrepreneurial resources.

2) The entrepreneurial network. Most new enterprises are constrained by a lack of resources, so they must strengthen their contacts with external players and establish with them relationship networks. They should improve the efficiency of resource acquisition and maintain its sustainability by establishing strategic alliances with other institutions, for their survival and development in an uncertain environment. Entrepreneurial networks are not only about helping new businesses get the resources they need at a lower cost, but also about improving their credibility and legitimacy.

3) The initial resource endowment. This includes entrepreneurs' educational level, industry knowledge, experiences, network relationships and other factors. Entrepreneurs' initial resource endowment affects the types of entrepreneurial opportunities and the identification and extraction of external entrepreneurial resources. In the process of entrepreneurship, entrepreneurs have to use their own initial resources to establish relationships with external partners, suppliers, banks and other players, so that they can make full use of the leverage of initial resources to improve the utilization efficiency of resources.

2.5.4 The innovation performance theory is helpful to correctly understand the innovation performance of incubating enterprises

In the incubation network, the innovation performance of incubating enterprises refers to the performance achieved by incubating enterprises with the help of the incubator. The incubator, relying on its own advantages and resource network, provides incubating enterprises with support in finance, knowledge, opportunities and other resources, improving incubating enterprises' capabilities in innovation and in transformation of innovative achievements and realization of their total growth.

This thesis considers that the performance of a new enterprise is a special type of organizational performance. It is the expectation of new enterprises for future development, and the effective output at all levels in the process of pursuing organizational goals; it is also a measurement for the degree of achievement of goals.

Compared with mature enterprises, new enterprises first pursue survival and second better development and growth. Undoubtedly, entrepreneurial performance has become an

important benchmark to measure an enterprise's survival status and development prospect. Incubating enterprises, as new enterprises, can evaluate its performance using the level of entrepreneurial performance. As for the dimensions for the measurement of entrepreneurial performance, scholars mostly use entrepreneurial enterprises' profitability and growth rates as indicators from both financial and non-financial perspectives.

At the same time, for technology-based start-ups in incubating enterprises, considering their characteristics, all stakeholders including the state, local governments and incubators should make higher requirements for their innovation activities. Therefore, innovative performance is also taken as an evaluation index for incubating enterprises' entrepreneurial performance.

In this study, three perspectives of incubating enterprises' performance, namely the performance on profitability, growth and innovation, are used to examine their entrepreneurial performance.

2.6 Proposal of research hypotheses

2.6.1 Hypothesis of the relationship between incubating enterprises' relational network and resource integration ability

2.6.1.1 Relevant research

As a key branch of social network, relationship network plays an indispensable role in the acquisition of superior resources for start-ups. Relational network is also a key relationship network for the sustainable growth of start-ups, while resource integration ability can help start-ups form core competitiveness, both of which have a positive impact on entrepreneurship performance.

Freel's (2000) research shows that small-scale enterprises can cooperate with other enterprises by establishing alliances and other kinds of enterprise networks to obtain technical resources and overcome the shortage of funds, so that enterprises' technological innovation activities can be carried out normally without getting elimination in competition.

According to the embeddedness theory of social network, Chen and Wan (2006) discussed how SMEs integrate resources by embedding relationships into social network. They put forward modes for resource integration, namely embedding inheritance relationship network, generative relationship network and symbiotic relationship network. They believe that SMEs in China should pay great attention to the essential role of embedding social network in resource acquisition, understanding deeply the resources needed for different stages of enterprises' life cycle and choosing an effective mode of resource integration so as to achieve healthier development.

Shen and Liu (2007) believed that social capital is an important source for resource allocation. Through social network relationship, many resources could break away from their state hidden deeply in their characteristics, hence playing a role of promoting the enterprises. All enterprises should seek active guidance to establish social networks and maintain the networks well.

Wang, Cai, and Chen (2011) believed that social network is a key external source for enterprises to obtain innovative resources, and due to the differences in social network's characteristics, there can be various impacts of such difference on the acquisition of innovative resources. Overall, social network characteristics positively affect such acquisition process, whose impact on innovation performance occurs in the whole process of obtaining innovation resources. Only by acquiring external innovation resources through social networks and forming their own unique competitive advantages which are difficult to be imitated by competitors, can enterprises continuously improve their innovation ability and maintain their competitive status in the industry.

Jian (2012) believed that the significance of social network for resource integration shows in two aspects, namely, resource supplementation and self-learning motivation.

First, there are abundant resources embedded in the social relationship network, such as technology, market insights and human resources. However, he thought, these resources are generally scattered in the network, yet can be spread via the continuous communication and interaction between relationships. The integration of these resources can bring enterprises opportunities, help promote their innovation activities and assist in enhancing their

competitive advantages. Therefore, social network relationships affect all stakeholders including customers, suppliers and competitors, and by obtaining and utilizing different resources within the whole network, different benefits to enterprises can be brought about.

Second, social networks promote an active learning situation within enterprises. To a large extent, an enterprise's acquisition and maintenance of sustainable competitive advantage depends on whether the process of resource integration is constantly adjusted to changes in external environment. This is because the external operation environment is constantly changing, and enterprises must constantly adjust and change themselves to adapt to the environment. Self-learning among all employees of an enterprise reflects their adaptive ability.

Chesbrough (2012) pointed out that through collaborative innovation network, enterprises seek and obtain external resources, after which through these resources, they expand their internal knowledge base, and promote innovation activities.

Also, Chen and Wu (2012), focused on the acquisition of external key resources, believing that in the open mode of collaborative innovation network, such external key resources can be acquired and integrated effectively, thus further affecting the innovation performance of enterprises.

Yang and Chen (2015) believed that, while establishing collaborative innovation networks, enterprises should acquire and share different types of innovation resources by constantly dissolving and breaking organizational boundaries, and actively establishing formal or informal collaborative relationships with external stakeholders, to continuously create values in innovation.

Wang and Jian (2013) believe that the root of enterprises' technological innovations is the level of resource integration, and a very important actor in this innovation is social network. Based on social network theory and resource-based theory, Chen (2014) discussed the impact of entrepreneurial network on the performance of new enterprises. He also analyzed the mechanism of resource integration ability in this process.

The role of social networks in resource allocation and intergradation for enterprises' innovation can be summarized in three aspects:

1) Providing shortcut for enterprises to obtain resources

At present, social networks are capitalized. From a social perspective, the motivation for capitalization on social network is beneficial and the reason for the deficient realization of such benefits lies in the lack of a system. The establishment of social networks is regarded as a shortcut for enterprises to occupy social resources. One feature is that social resources are scare. However, to achieve better development, any enterprise must obtain these scarce resources. Because social resources are embedded in social networks, enterprises will regard social networks as an important means to support social resource acquisition. This means that the social network itself is regarded as a special source that can bring more social resources.

2) Reducing transaction costs

Highly available social networks can reduce enterprises' operating expenses. Transaction cost theory holds that the formation of enterprise networks reduces transaction costs. As the cooperation between enterprises become frequent and long-term, mutual trust is built, which in return, based on trust, many unnecessary transaction costs can be reduced.

Within social networks, enterprises benefit from their ability to acquire resources and information. The low level of costs that they can acquire for resources is an important reflection and a fruitful output from the orientation of social networks. This can be explained by the theory of labor division and specialization. Through the division and specialization of labor, enterprises' efficiency gets improved, enabling them to engage in specialized business that they have competitive advantages; also, by cooperating with each other in the whole network, they maximize the total income together, ultimately benefiting all members in the enterprise network.

3) Reducing moral hazard

Like the logic mentioned above, enterprises build mutual trust via long-term collaboration, hence reducing the possibility of moral hazard among all parties. From the perspective of reducing moral hazard, the mode of interpersonal transaction is mainly based on social network. Mutual trust within all stakeholders involved in the whole network is established with interpersonal relationships, and the more trust the other party has for another, the more likely it is to conclude a transaction. To reduce risks and uncertainties, such a special

relationship of trust is preferred in the process of trading. The advantages of this relationship lie in the fact that information is relatively completely shared and there is punishment for violations. Although it cannot assume that under such a mechanism, engagement in transactions is optimal, it can greatly reduce risks during any enterprises' economic activities as it reduces uncertainties.

2.6.1.2 Hypothesis proposal

Providing stable resources for the survival and development of incubating enterprises is one of the main roles of incubating enterprise relationship network. These resources include tangible resources and intangible resources.

In a relational network, the resources of each network node depend on each other or supplement each other, and the flow of resources between different nodes can be realized through network connections. Many enterprises in different incubators can have resource base without much difference and operate in the same external market environment, but their development in the process of resource acquisition and utilization is far from each other. Such difference is closely related to the relationship network their incubators own.

Generally, the larger the scale of the relation network incubating enterprises enjoy, the lower the cost and the time for incubating enterprises to search and acquire resources to match with the needs for growth. As a larger relationship network improves, their possibility to identify and acquire resources also increases efficiently.

At the same time, through the connection with the majority of network members, incubating enterprises have a more extensive range of choices on learning from experiences and technologies. They can choose those that are more developed and mature, so that it is more convenient for them to convert such successful experience and advanced technologies into their internal resources. When such resources realize rich accumulation, resource integration ability can be promoted for further improvement.

Also, the stronger the strength of the relationship network is, the closer the nodes in the network, and the relationship between incubating enterprises and other stakeholders will be. This provides convenience for incubating enterprises to overcome the problem of information

asymmetry, which helps them to grasp the dynamics of information resources, stays in the latest state of resource utilization, and improves their efficiency to identify, acquire and use resources. In this way, incubating enterprises' resource integration ability is improved.

Moreover, if the heterogeneity of incubating enterprises' relationship network is strengthened, the types of resources available to these enterprises can be more diversified, and the possibility of resource integration and utilization can be greatly raised. Under such a condition, development of resources as well as their utilization can be enhanced, and resource integration capability can be efficiently built.

Based on the above analyses, this thesis proposes the following hypotheses:

H1: The incubating enterprise relationship network has a positive impact on the ability of resource integration.

H1a: The network size of incubating enterprise relationship network has a significant positive effect on resource integration capability.

H1b: The network strength of incubating enterprise relationship network has a significant positive effect on resource integration ability.

H1c: The network heterogeneity of incubator enterprise relationship network has a significant positive effect on resource integration ability.

2.6.2 Hypothesis of the relationship between resource integration ability and entrepreneurial performance of incubating enterprises

2.6.2.1 Relevant research

Resource integration capability is a valuable asset of an enterprise, and seen as one of the important factors to help an enterprise establish and maintain its competitive advantages.

Reynolds, Miller, and Maki (1993, 1995) believed that enterprises' improvement in innovation efficiency and innovation performance is related mainly if they build their own capabilities and advantages via the effective integration of key resources provided in the collaborative innovation network (Davidsson, 2005).

Brush et al. (2001) adopted a case study to deeply explore the mechanism of how

resource integration ability influences the improvement of enterprise performance Zhang, Cai, and Zhu (2008) believe that resource integration ability plays a positive role in the process of resource acquisition and affect the performance of start-ups.

Yi and Song (2008) believed that the core of technological innovation is the integration of internal and external resources. According to traditional methods for division of resources, enterprise resources mainly refer to internal resources. Under the concept of *competition and cooperation*, an enterprise's external resources become important components of its resources. The result of resource integration is to form a larger collection of resources. The overall benefits of this collection are greater than that of a single one without integration. Resource integration is not industry-oriented, but based on the ecosystem for the enterprises' operations, whose stakeholders can include communities, institutions, enterprise customers, and suppliers.

According to Yi (2010) and Chen (2014), there is positive correlation between resource integration ability and entrepreneurial performance verified by empirical research. Cai,Yang, Shan, and Ren (2011) reiterates the importance of resource integration capability for new enterprises. Gu and Wang (2011) took the newly established enterprises in the specific context of China's transition period as research objects and believed that the ability of resource integration determines the efficiency of organizational capacity transformation, which thus has an impact on entrepreneurial performance.

Zhong and Li (2011) believed that resources exist in various forms within or outside the enterprise, and the use of each resource is different. The resources existing within or between enterprises can be divided into management resources, human resources, technological resources, market resources, corporate culture resources, and information resources. However, in order to transform the advantages of these existing resources into technological innovation ones, it is necessary to effectively integrate enterprises' internal and external resources in a reasonable way to maximize the benefits, so as to provide guarantee for enterprises' technological innovations, as such innovations are the basis for them to remain invincible in competition.

Ma, Fang, and Wu (2012) pointed out through empirical research that the enterprise's

ability to integrate core resources such as internal knowledge and external technologies is helpful for enterprises to grasp the opportunities in constantly changing environment and achieve outstanding innovation performance.

2.6.2.2 Hypothesis proposal

Resources are one of the foundations for enterprises' survival and development and as the core elements for their growth, resources are the important sources to obtain and maintain competitive advantages. Due to the defects of being new and small as start-ups, incubating enterprises' survival and development relies on their abilities to acquire and integrate these resources. It is important to note that in the past reign lacking mobile and internet, resources are scarce.

However, for incubators, nowadays with technological advancements, the information and resources available are not scarce but over-inflated. How to identify and the resources needed and absorb necessary information in a sea of over-inflated sources is the key for business survival, development and growth.

Hou (2008) also pointed out that enterprise performance is closely related to the level of integration of resources. Through the integration process where resources are selected, acquired, absorbed, combined, applied and reengineered, incubating enterprises can develop efficient resource integration ability. Resources hence can be organized and systematized to maximize their values, improving enterprises' competitiveness and performance.

Firstly, with the improvement of resource integration ability, the allocation of resources can be optimized. The identified and acquired resources can be effectively allocated, so as to give full play to the maximum value of resources and realize cost saving or cost reduction, creating higher added-values and improving business performance in a more profitable way.

Moreover, with the improvement of resource integration ability, enterprises can effectively enhance the efficiency of resource utilization. By absorbing resources needed for development and growth from external sources, incubating enterprises can not only have guarantees that resources for the current operations has been acquired, but also for future growth, which provide a solid foundation for further business activities.

At the same time, during the path of incubating enterprises' development, many practices can broaden resource availability and bring them new resources, including the re-integration of some resources that was ineffectively integrated in an innovative way, acquisition of newly available resources or utilization of current resources in a different and creative way. By this, it provides more resources for incubating enterprises to innovate and evolve.

Based on these analyses, this thesis proposes the following hypotheses:

H2: Resource integration ability has a positive impact on the entrepreneurial performance of incubating enterprises.

H2a: Resource integration ability has a significant positive impact on profitability performance.

H2b: Resource integration ability has a significant positive impact on growth performance.

H2c: Resource integration ability has a significant positive impact on innovation performance.

2.6.3 Hypothesis of relationship between network and entrepreneurial performance

2.6.3.1 Relevant research

For enterprises, relationship network provides them a good channel to obtain external resources stably, enhancing their survival rates and development paces. For entrepreneurs, a good relationship network helps them to achieve success. Therefore, the relationship between relationship network and entrepreneurial performance has also received some attention both academically and practically.

Gautam (2000) analyzed the relationship between the structure of relationship network and the innovation output of an enterprise, concluding that both direct and indirect relationship networks have positive impacts on an enterprise's innovation output.

Lee and Lee (2001) investigated and studied 137 start-up companies in aviation technology sector and believed that relationship network had a significant impact on their existing performance.

Berg (2006) studied the maturity of enterprises' actions for technological innovations from the perspective of social network. It is believed that close cooperation among enterprises will greatly affect enterprises' actions for technological innovations and accelerate their pace in innovations.

Yu (2006) thinks that the actions and behaviors of those enterprises in clusters for innovations is the same as the ones during the evolution of biological communities, both of which has complex evolutionary laws. Based on the evolutionary game theory of biology, he made a deep theoretical study on enterprises' behaviors and actions for technological innovations from the perspective of enterprise agglomeration. It mainly discusses the frequency and pattern of the behaviors and actions for technological innovations of those clustering enterprises and their willingness to cooperate in innovation activities. Through a series of analysis, it concluded that the innovation behaviors of those enterprises in clusters shows the externality effect of social network. At the same time, because clustering enterprises' resources for innovation are limited, a mechanism of mutual trust should be established, so as to strengthen their cooperation and gain competitive advantages for innovation activities.

Qian (2008) divides the process of technological innovations into five models. Either the process is technological, or demand-driven, or technological and market interacting, or integrated, or systematically integrated. By analyzing the influence of network types on technological innovation, the following conclusions are drawn.

Firstly, for the first-generation enterprises, the technological innovation process is generally closed, and external network relationship hardly affects their technological innovation.

Secondly, for the second and third generation enterprises, users play an important role in the such a process, as technological innovations should be made meeting their needs.

Thirdly, for the fourth-generation enterprises, their technological innovation process is closely related to both users and suppliers, and their business network promotes technological innovations.

Finally, for the fifth-generation enterprises, technological innovations are completely

open, and they are embedded in the whole society. In other words, all types of networks, including the business, information, research and relationship ones, play an active role in the enterprises' technological innovation activities. In a word, it shows that the impact of different network types on technological innovation process models is from weak to strong, and from simple to complex.

Wang and Hu (2009) made an empirical study of 46 enterprises in Hutang Textile Industry Cluster in Changzhou City, Jiangsu Province. They found that the information enterprises are exposed to are more extensive and heterogeneous due to three factors, namely the degree of network reciprocity, the diversity and the centrality of network objects, hence tending to promote enterprises to invent new products and form new organizational structures.

Therefore, those three factors are significantly positively correlated with enterprises' innovation ability, while network density and intensity are negatively correlated with such an ability. It is believed that because of high density and intensity, there is high repetition in enterprises' information, most of which are the redundant resources obtained by enterprises through the network. It shows that network density and intensity have little influence on the promotion of enterprise innovation.

Zheng and Xu (2009) investigated and studied three industrial clusters in Guangdong province in South China. He believed that enterprises' external relationship network has a positive effect on their technological entrepreneurship, further influencing their performance.

Zhao, Sun, and Wang (2013), taking the frequency of 154 enterprises' interaction with each other as a measurement index, studied the impact of two types of social network, i.e. personal and relationship network, on the performance of start-ups and found positive results.

2.6.3.2 Hypothesis proposal

Researches on relationship network have shown that relationship network is a formal network, which includes formal cooperative relationships established between enterprises and other similar enterprises, suppliers, agents, research and development institutions, industry associations, government departments and other intermediary institutions. These formal partnerships can provide important information for start-ups as well as various resources.

Such a network can determine whether start-ups can obtain the key resources and market information they need for their growth. It can be seen that relationship network is the basis for the survival and long-term development of entrepreneurial enterprises.

Incubating enterprises, as a kind of new enterprise, have many advantages such as high flexibility, rapid growth and innovation, but also many disadvantages as they are new and small. Under this situation, relationship network has become one of the key elements to overcome such disadvantages and facilitate the growth of enterprises.

Relationship network can provide these incubating enterprises important information and various resources, conducive to not only the establishment of mutual trust between entities, but also the promotion of their interactions and communications, which is vital for good entrepreneurial performance.

Compared with the relationship network owned by any single start-up, the incubator is in the center of the whole network for all incubating enterprises, having great influence on these enterprises' development of own networks.

Firstly, the incubator provides a basic platform for incubating enterprises to build their own relationship network. By providing service platforms such as information network platform and organize activities like enterprise promotion meeting, the incubator offers convenience to incubating enterprises for their business promotion, the seeking for business opportunities and the establishment of cooperation relationships, which can eventually greatly promote the setup of their own relationship network.

Moreover, incubators have good relationships with many strategically important parties such as scientific research institutions, financing institutions, third-party institutions and other organizations, which help facilitate incubating enterprises' localization process, and greatly reduce their opportunistic behaviors. All contributes to avoidance of relationship risks caused by information asymmetry, and reduction in the time and cost due to the search for cooperation partners. At the same time, as the referrer and guarantor of relevant organizations, the incubator can assist in maintaining a stable relationship between businesses, promoting the development of the relationship network at a high-quality level.

In this thesis, the relation network of incubating enterprises is taken as the research

object, and how the network size, network strength and network heterogeneity influence the performance of incubating enterprises is mainly discussed.

2.6.3.2.1 Influence of network size of incubating enterprise relationship network on entrepreneurial performance

The size of the network reflects, to some extent, the number of external resources that an enterprise can generally obtain (Hansen, 1995). Generally, the more organizations who establish relationships with the incubating enterprises, the richer the types and quantities of resources that these incubating enterprises can identify and acquire. With the constant development of incubating enterprises, their demand for resources will also show an incremental pace. If there is a problem in the supply of resources during incubating enterprises' development process, their development and growth will be hindered. Even such a problem can lead to the failure of new enterprises. Therefore, incubating enterprises with relatively large network scale have better chance to avoid this.

According to Freeman (1994) and Baum, Calabrese, and Silverman (2000), it is believed that in general, the larger the network size is, the richer the relationships between the network subjects will be.

From the perspectives of Rowley, Behrens, and Krackhardt (2000), economies of scale exist in networks. Batjargal (2003), through the analysis of historical data of Russian enterprises, proved that network size has a positive impact on enterprise performance.

In addition, scholars also proved the positive correlation between network size and enterprise performance (Ahuja, 2000; Vanhaverbeke, Gilsing, Beerkens, & Duysters, 2009). Domestic scholars have also proved the positive influence of network size on performance from different research perspectives and samples.

In conclusion, this thesis proposes the following hypotheses:

H3: The network scale in the incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H3a: The network scale in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H3b: The network scale in the incubating enterprise relationship network has a significant positive impact on growth performance.

H3c: The network scale in the incubating enterprise relationship network has a significant positive impact on innovative performance.

2.6.3.2.2 Influence of network strength of incubating enterprise relationship network on entrepreneurial performance

Granovetter (1985) believed that the intensity of the network reflected, to some extent, the frequency and closeness of connections between network members. The network strength of incubating enterprises' relation network reflects the richness of the external resources that incubating enterprises can obtain. As for the relationship between network strength and entrepreneurial performance, there are some differences in the perspectives of some researchers.

Firstly, the research of (Burt, 2004) shows that even a weak connection between networks contributes to the members' acquisition of new knowledge, diversified information and other resources. It enriches the variety of resources within networks. Gilsing and Nooteboom (2005) conducted an empirical research on the biotechnology industry in the Netherlands and believed that weak links between networks are more conducive to the growth of enterprises. Sampson (2005) also pointed out that the excessive relationship between networks would result in the rigidity of cooperation, which is not conducive to the development of enterprises.

Moreover, Krackhardt (1992), who put forward the strong linkage advantage theory, believed that the more frequent the communication among network members, the closer their connections are, and the higher their tacit understanding about strategic actions can be. This thus promote the survival and development of enterprises.

Julien, Andriambeloson, and Ramangalahy (2007) pointed out that a strong network connection can provide support to enterprise decision-making or it is even a key element for such decisive moments. The stronger the network, the shorter the path for enterprises to obtain resources, thus promoting timely and efficient acquisition of the resources required by

entrepreneurial enterprises.

It is believed that the strong connection contributes to the improvement of enterprise performance (Lavie, 2007). Zhao (2009) also believes that the stronger the network intensity, the more stable the network relationship, and the stronger the enterprise credit and information acquisition ability, which is conducive to the development of enterprises.

This thesis is more aligned with the latter view. The strength of network embodies the stability of network. The stronger the strength of network, the more stable the relationship between network members, and the closer the communication. It can effectively promote the sharing and circulation of knowledge, skills, resources and other comprehensive elements, and ultimately transform them into incubating enterprises' abilities. It also helps promote the growth of entrepreneurial performance.

In addition, the higher the intensity of the network, it means that there is a more consistent recognition of common identity among network members. This high recognition of consistent identities promotes all network stakeholders to establish clear and tacit coordination rules, reduces costs in communications, and thus improves entrepreneurship performance.

In conclusion, this thesis proposes the following hypotheses:

H4: The network strength in the incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H4a: The network strength in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H4b: The network strength in the incubating enterprise relationship network has a significant positive impact on growth performance.

H4c: The network strength in the incubating enterprise relationship network has a significant positive impact on innovative performance.

2.6.3.2.3 Influence of network heterogeneity of incubating enterprise relationship network on entrepreneurial performance

Different from network size and network strength, network heterogeneity focuses on

describing the type of network partners or the degree of diversity of resource types in a relational network. A positive correlation between network heterogeneity and innovation advantage is found by conducting an empirical study on manufacturing enterprises in the industrial district of Silicon Valley in the United States.

Häusler, Hohn, and Lütz (1994), Johannisson and Ramirez-Pasillas (2001) and Franke (2005) argued that the greater the heterogeneity of network, the greater the degree of diversity of resource types. Network heterogeneity generally brings a richer variety of resources to enterprises, including innovation resources. These heterogeneous resources can provide enterprises with more opportunities to combine elements for technological innovation, thus promoting the improvement of enterprise performance (Policy Research Initiative[PRI], 2003; Franke, 2005).

In addition, network bit difference is one of the measurement indexes of network heterogeneity. Some scholars examine the influence of network heterogeneity on enterprise performance by studying this index. For example, Liao and Welsch (2000) used the database of the National SMEs Research Group of the United States to conduct a research. They believed that there is a significant positive correlation between network location differences and enterprises' growth directions, which further indicated the positive correlation between network heterogeneity and the growth of enterprises.

Based on different samples, scholars verified the positive effect of network difference on the growth and development of enterprises through network bit difference (Ma, 2004; Wu, 2006).

In conclusion, this thesis proposes the following hypotheses:

H5: The network heterogeneity in incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H5a: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H5b: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on the growth performance.

H5c: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on innovative performance.

2.6.4 Hypothesis of mediating role of resource integration capability

Many studies have shown that while resource integration promotes innovation performance, it may also play a mediating role between collaborative innovation network and innovation performance.

Lin and Wang (2013) believes that enterprises should integrate innovation resources, focusing on the identification, acquisition, internalization and integration of external resources. Through resource integration, enterprises can further expand the resource base and improve innovation performance.

Xie and Liu (2015) believes that the strength, scale and openness of enterprise collaborative innovation network can improve enterprises' innovation performance through the effective allocation of resources.

Based on case studies, Li (2012) explained the mediating effect of knowledge resource acquisition on relationship embeddedness and innovation performance.

As innovative new enterprises, incubating enterprises have the goal of realizing enterprise survival and development, so a steady flow of resources input is essential. The relationship network provides incubating enterprises a good channel for resource circulation, as it offers a stable resource base where resources are put into production process (Barney, 2000).

Barney (1991, 1995) pointed out that a company should not only have valuable, rare and unique resources to promote higher performance, but also should establish appropriate organizational processes to make full use of these resources. In the case of a relationship network, without a good ability to integrate resources, the efficiency of resources will be greatly reduced, and the improvement of enterprise benefits will be limited. Only with both can the resource maximize its utility through an appropriate path.

Based on this, this thesis proposes the following hypotheses:

H6: Resource integration capability plays an intermediary role in the process of relationship network influencing the performance of enterprise creation.

H6a: Resource integration capability plays an intermediary role between network size and profitability performance in the incubated enterprise relationship network.

H6b: Resource integration capability plays an intermediary role between network size and growth performance in the incubated enterprise relationship network.

H6c: Resource integration capability plays an intermediary role between network size and innovative performance in the incubated enterprise relationship network.

H6d: Resource integration ability plays an intermediary role between network strength and profitability performance in the incubated enterprise relationship network.

H6e: Resource integration capability plays an intermediary role between network strength and growth performance in the incubated enterprise relationship network.

H6f: Resource integration capability plays an intermediary role between network strength and innovative performance in the incubated enterprise relationship network.

H6g: Resource integration capability plays an intermediary role between network heterogeneity and profitability performance in the incubated enterprise relationship network.

H6h: Resource integration capability plays an intermediary role between network heterogeneity and growth performance in the incubated enterprise relationship network.

H6i: Resource integration capability plays an intermediary role between network heterogeneity and innovative performance in the incubated enterprise relationship network.

2.7 Research model construction

By reviewing and analyzing relevant researches and combining with specific development status of incubating enterprises, this thesis aims to explore their relationship among the network, resource integration ability and entrepreneurial performance.

In this thesis, investigated are the relationship between the relationship network and resource integration ability from three dimensions, namely network size, network strength and

network heterogeneity, and also the positive impact the relationship network has on resource integration ability.

A larger network of relationships is often accompanied by a broader base of resources. Enterprises can realize the efficient use of resources with lower cost and less time, so as to improve the ability of resource integration. Network strength is closely linked to the stability of business relationships. Higher network strength helps enterprises to obtain resources stably, reduce the probability of counterparties' opportunistic behaviors in the transaction process, and improve the ability of resource integration.

Higher network heterogeneity means that enterprises have more kinds of resources, which lays a good foundation for the innovative application of resources and promotes enterprises' formation of efficient resource integration ability.

See Figure 2-1 for this hypothesis model.

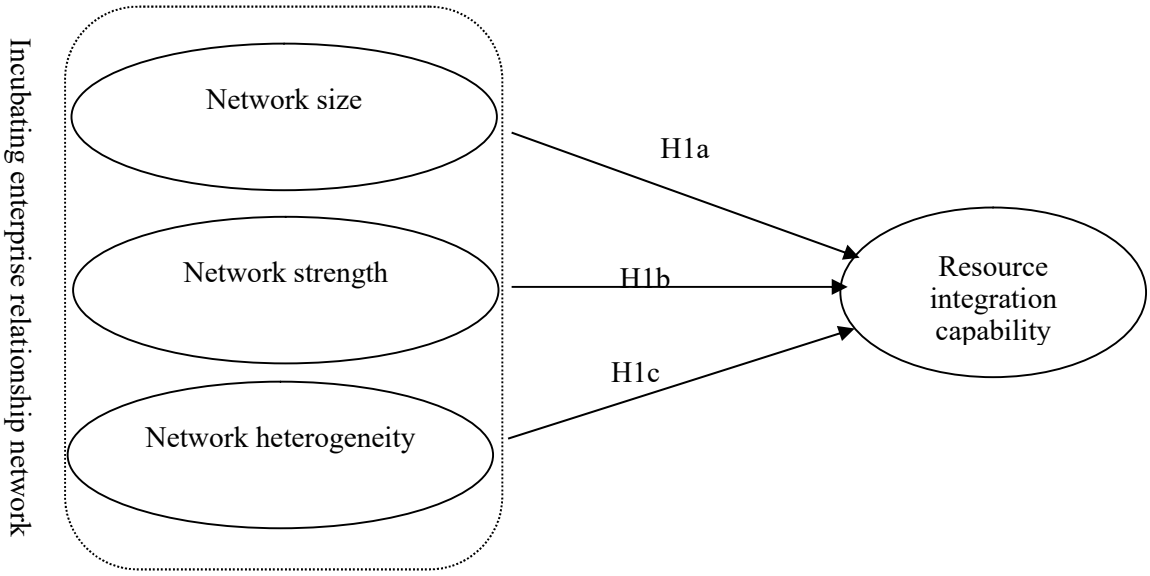

Figure 2-1 Model of Relational Network and Resource Integration Capability

Moreover, through the analysis of relevant researches, this thesis believes that resource integration ability has a positive effect on entrepreneurial performance. The improvement of resource integration ability improves enterprises' efficiency in resource utilization, yields the comprehensive benefits out of resources and products, and then improves the performance in profitability and growth rates, which is consistent with previous research results. The improvement of resource integration ability often leads to the improvement of enterprise

innovation ability. The utilization of new competitive resources or the innovative application of resources provides a broader development prospect for enterprise innovation activities and promotes the development of enterprise innovation performance.

See Figure 2-2 for this hypothesis model.

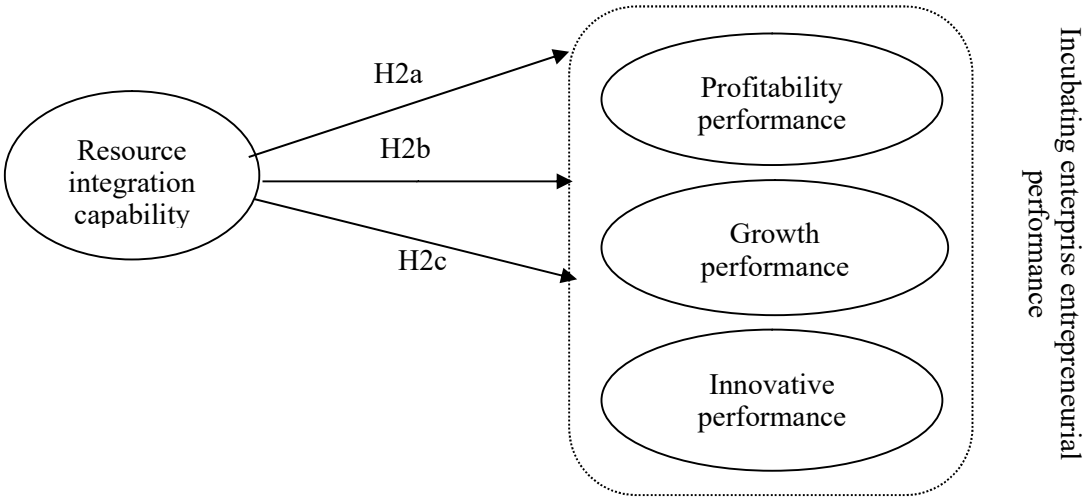

Figure 2-2 Model between Resource Integration Capability and Entrepreneurial Performance

As mentioned above, incubating enterprises' performance is investigated from three dimensions of network size, network strength and network heterogeneity, and the influence was considered as positive.

The larger the scale of the relationship network, the more resources the incubator will get, which can better promote incubating enterprises to perform innovation and entrepreneurship activities and improve their entrepreneurship performance. The stronger the relationship network, the closer the relationship between the incubator and other business organizations, the more stable the business relationship, and the more reliable and lasting the acquisition of business resources.

Furthermore, resources will be better recycled and utilized within the network, promoting the improvement of production efficiency, and thus achieving the growth in enterprise performance. The richer the network heterogeneity is, the richer the types of resources that enterprises can carry out innovative activities are.

At the same time, the more likely enterprises can obtain differentiated information and experience. The more likely enterprises can apply resources through different perspectives,

ways and methods, the more likely they can promote the survival and development of enterprises. See Figure 2-3 for this hypothesis model.

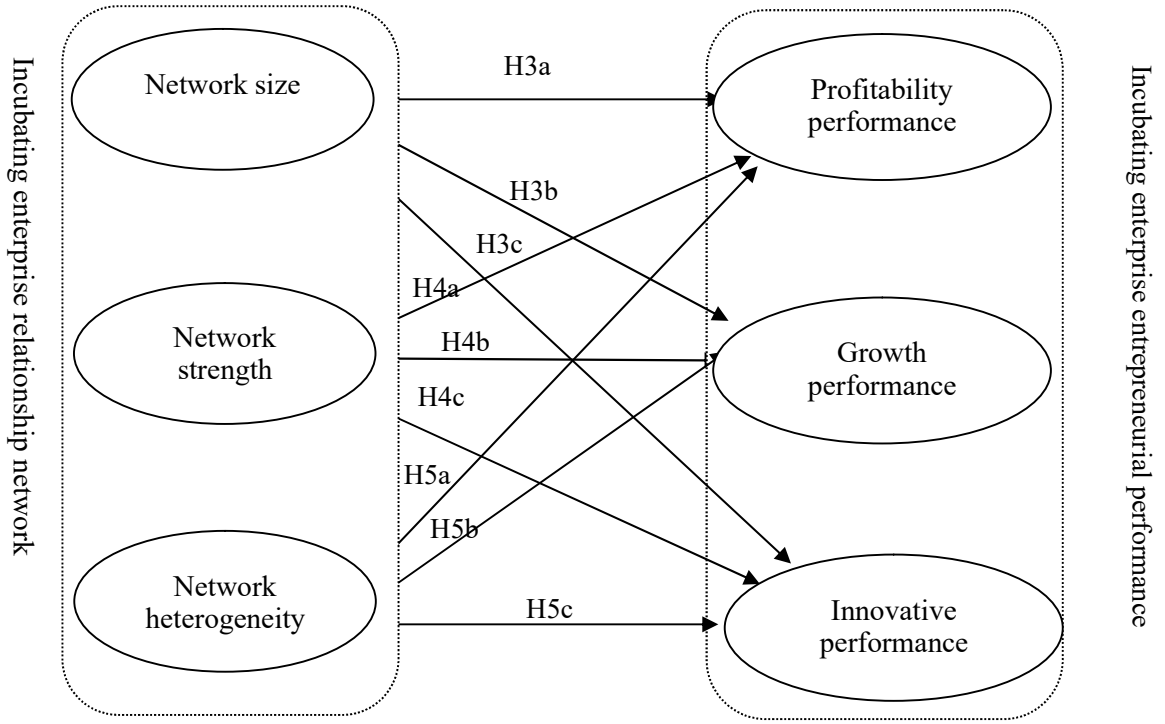

Figure 2-3 Model between Network and Entrepreneurial Performance

At the same time, it is considered in this thesis that resource integration ability plays an intermediary role in the influence of incubated enterprise relationship network on entrepreneurial performance. A good relationship network is helpful for incubating enterprises to timely and efficiently acquire the resources needed for their survival and development. Also, it is beneficial to effectively combine, apply and re-innovate these resources by virtue of the experiences and technologies circulating in the network, so as to form a good resource integration ability.

Besides, only by effectively integrating resources can incubating enterprises achieve the effect brought about by making the best use of materials and people, and further expand the influence of resources on entrepreneurial performance.

To sum up, the specific theoretical model established in this study is shown in Figure 2-4.

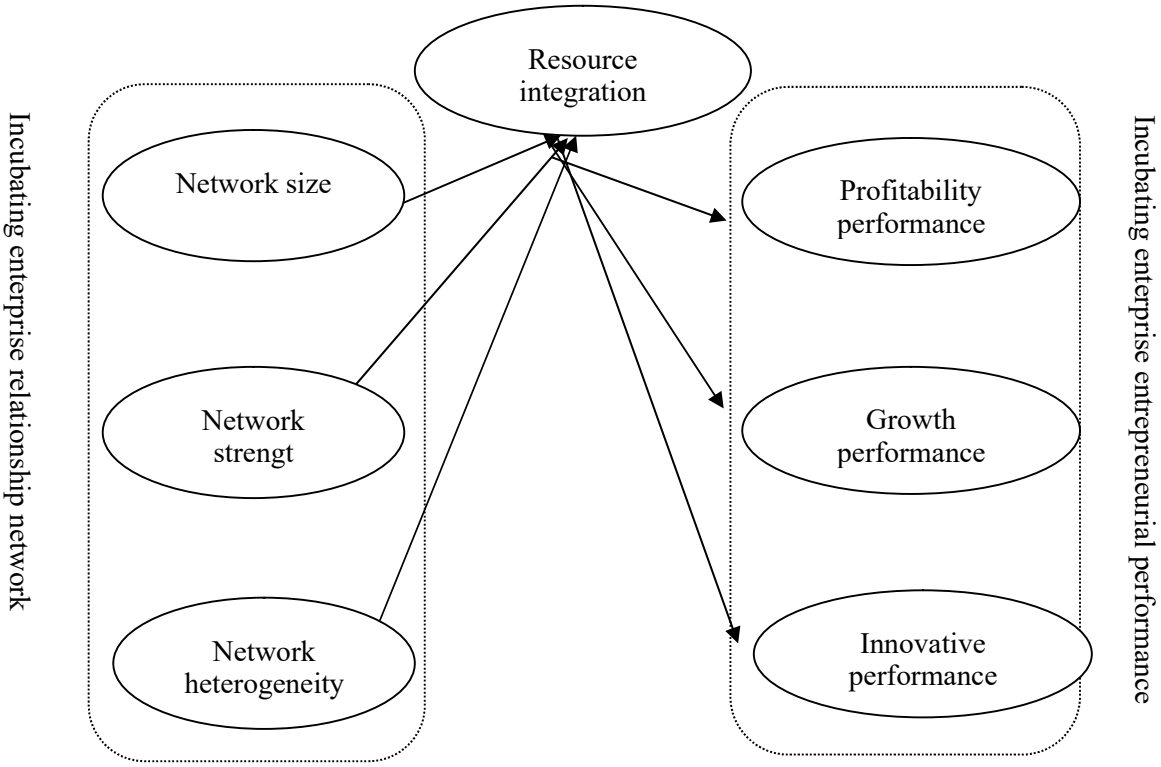

Figure 2-4 Mediation Model of Resource Integration Capability

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Chapter 3: Research Methods and Research Design

This chapter mainly introduces the research methods, case selection and research design used in this thesis.

It mainly adopted two methods, questionnaire survey and empirical research, in which the methods of data collection and data processing is also introduced. It also presents the selection of a case for empirical analysis, and finally it gives the preliminary model of research design.

3.1 Research method

Secondhand information on the literature on related research topics is gathered from various sources, including books, periodicals, newspapers, academic papers, scientific reports, archives and statistical databases, after which the information is identified and sorted out.

In this way, the existing research results and cutting-edge directions on the relational network, resource integration ability and innovation performance of incubating enterprises is intended to be comprehensively grasped.

3.1.1 Questionnaire survey method

First-hand information on the research topics is gathered via questionnaires, as this method intends to include a whole process of investigating a certain individual, a certain group or an organization for a long time, so as to study the development and change of their behaviors, including the steps of collecting, processing and analyzing the materials of the investigated objects.

In our case, a questionnaire survey is used to collect information and data on the incubating enterprises in the innovation incubator Shanxi Emperor Penguin Innovation Incubator Park.

To realize this, test questions are designed based on the topics of incubating enterprise relationship network, resource integration ability and innovation performance. During the process, the preliminary draft of the questionnaire is created, and then revised accoring to the requirement of predictive tests, after which the questionnaire is finnalized.

The questionnaire is divided into four parts: basic information of enterprises, incubating enterprise network, resource integration ability and entrepreneurial performance.

Questions were scored with the five-point scale, which is, according to the research content, the questions were divided into 5 levels, indicating the degree of approval of the content, among which 1 represents completely disagree, 2 relatively disagree, 3 not sure, 4 relatively agree and 5 completely agree. Respondents fill in according to the actual situation of the enterprise.

The specific content of the questionnaire is shown in the appendix.

3.1.2 Empirical research method

Researchers often use this method to find variables that play a key role in complex phenomena and the relationships between variables.

In this thesis, the three dimensions of network, namely the network size, network strength and network heterogeneity of incubating enterprise relationship network were taken as antecedent variables. Yet, the three contents of entrepreneurial performance, namely, profitability performance, growth performance and innovation performance, were taken as outcome variables.

At the same time, the resource integration ability of incubating enterprises is taken as an intermediary variable to propose the research hypothesis and construct the research model. Further it demonstrates the rationality of the hypothesis through empirical analysis, to outline the influencing factors on incubating enterprises' innovation performance.

On the basis of sample data collected, SPSS analysis tool is used to test the theoretical econometric model proposed in this thesis, in order to verify the authenticity of relevant hypotheses proposed in this thesis and the reliability and interpretation ability of each model is analyzed.

3.2 Research design

3.2.1 Data collection

In this thesis, the data were collected mainly by conducting questionnaire surveys, and the incubating enterprises in Shanxi Emperor Penguin Innovation Incubation Park are taken as respondents. The sample respondents selected are mainly based on the following principles:

1) The establishment time of incubating enterprises is less than 42 months;

2) The incubated enterprise must be an independent operating entity, with the legal personality, and it cannot be a branch or subsidiary of the head office.

3) The personnel required to fill in the questionnaire are the core personnel of the enterprise, mainly including the company's leaders, managers or technical leaders.

3.2.2 Methods of data processing and analysis

After the gathering of the data needed, analysis and tests are made on the data for the verification of hypothesis. The methods for such data processing and analysis include descriptive statistical analysis, reliability and validity test, correlation analysis and analysis for mediating effect.

1) Descriptive statistical analysis

It is carried out on the sample data first, which mainly refers to the analysis on the basic statistics of each measurement item in the valid questionnaires recovered, including the mean, standard deviation, slope, kurtosis and other indicators.

2) Reliability and validity test

It is a test to determine whether the items designed in the study and the data collected are reliable and effective. Reliability test is to test the reliability of the questionnaires, and validity test is to verify the validity of the measurement results. The credibility of empirical research results depends on the good reliability and validity of the collected data. Therefore, this thesis needs to verify the reliability and validity of the questionnaire design and the collected data before conducting empirical verification analysis.

To illustrate, firstly, reliability analysis is an analysis to check whether the measurement results are consistent or stable, which reflects the authenticity of the measured objects.

Normally, using Cronbach's α coefficient for reliability test, when the value of Cronbach's coefficient is greater than 0.7, the reliability of the scale is relatively high. When the value of Cronbach's coefficient is between 0.5 and 0.7, the reliability of the scale is acceptable. If the value is less than 0.35, the index should be rejected.

Secondly, validity test is used to test the degree to which questionnaires reflect the authenticity of concepts. The content validity and structure validity are two aspects to measure the scale validity. In terms of scale design, this thesis synthesizes the content and key points of this study and refers to the relevant research results in stages. Most of them adopt mature scale or make minor adjustments to some characteristics of incubating enterprises, and the scale items are also set with situational factors in mind.

3) Correlation analysis

It is a common econometric statistical method used to study the degree of closeness between variables. It mainly describes the correlation between variables through the value of correlation coefficient and significance level. The correlation analysis method of Pearson bilateral test was used in this thesis.

4) Regression analysis

It will adopt the method of multiple linear regression analysis to further analyze the relationship between incubating enterprises' relationship network, resource integration ability and entrepreneurial performance.

5) Analysis of the mediating role of resource integration capability

The so-called mediating effect generally means that the independent variable X has an influence on the dependent variable Y. If X affects the variable Y through M, it is believed that M plays a mediating role in this influence process.

Baron and Kenny (1986) believe that mediating effect should meet the following four conditions.

Firstly, there is a significant correlation between independent variable X and mediating

variable M.

Secondly, there is a significant correlation between the mediating variable M and the dependent variable Y.

Thirdly, there is a significant correlation between independent variable X and dependent variable Y.

Finally, when the mediating variable is introduced into the regression equation, the correlation between the independent variable and the dependent variable or the regression coefficient decreases, then the mediating variable plays a mediating role.

When the correlation between independent variable and dependent variable or regression coefficient reduces to no significant correlation, the mediating variable is considered to play a complete mediating role. If the coefficient only decreases but is still significantly correlated, the mediating variable is considered to play a partial mediating role.

3.3 Case selection - Shanxi Emperor Penguin Innovation Incubation Park

3.3.1 Basic information of the park

This thesis takes Shanxi Emperor Penguin Innovation Incubation Park as a case to study the relationship between the relationship network, resource integration ability and innovation performance of incubating enterprises.

Shanxi Emperor Penguin Innovation Incubation Park (hereinafter referred as the Park) was established in June 2016. It is also the first incubator park in Xiaodian district which was approved Taiyuan Xiaodian district government, a district government in Shanxi Province in North China.

The basic situation of Shanxi Emperor Penguin Innovation Incubation Park is as follows:

1) Location

The Park is located in the middle section of Xutan East Street, Xiaodian District, Taiyuan City. It is adjacent to a transportation hub, the Taiyu Road, East Central Road and Southcentral Transportation Hub.

The Park, in the east, is adjacent to the transit Expressway, in the west Wusu International Airport, in the South Ring Expressway and in the north Changfeng Street.

The park is radiated by national high-tech development zones, economic and technological development zones and Wusu Logistics Zone.

It is only 10 minutes' driving distance from Taiyuan Airport and 5 minutes' driving distance from Changfeng Dongkou Express Toll Station, and 15 minutes' driving distance from Zhonghuan Expressway to downtown.

Its geographical location demonstrates the convenience in quick access to different part of the province and the nation.

2) Position of the Park

The Park positions itself as a five-star enterprise incubation park for incubating enterprises active in the core industries including education, tourism, and logistics services, providing excellent new services in related areas for business activities, relying on e-commerce platform, technological innovation and service innovation.

3) Resources

In the Park, provided are resources in e-commerce system and logistics, and services in hospitality and investment. For example, E-commerce system includes enterprises like Xindongfang, Zhongguowangku Group, and other related resources brought by One Belt One Road Initiative and New Bohai Initiative. Logistic system includes enterprises like Sitongyida, Tongchengpeisong and others. For hotel services, Lifeng Hotel and Putao Club are in place for excellent and convenient services. As to investors, American professional venture capital companies are contacted and can be introduced for financing support. All of these forms a complete set of closed-loop business chain.

Currently, there are nearly 300 incubating enterprises in the Park.

4) Services Provided

- Project investment and financing: it cooperates with many well-known venture capital institutions to provide enterprises with various flexible and convenient financing services, such as guarantee recommendation, and credit guarantee for high-tech projects.

- Policy consulting: it provides consulting services on patent, achievement transformation, technology transfer and tax policy for enterprises.

- Project application: it helps enterprises to apply for projects at all levels, including national, provincial, municipal and other ones, get policy support, and implement various preferential policies.

- Intermediary services: it provides enterprises services in legal counsel, technology patent, real estate agency, accounting and other intermediary services.

- Public technology platform: it integrates the research and development (R&D) resources for all enterprises and has Business Process Outsourcing (BPO) call platform, e-commerce trading platform, software electronic information monitoring platform and others.

- Public service platform: it provides enterprises by providing help in the application for business license, registration and other services, and assist enterprises to handle annual inspection from legal representatives, annual inspection from industrial and commercial experts and other services.

- Business incubation: it holds various trainings in project declaration, law, finance and tax, human resources, and marketing. Activities that are regularly organized include entrepreneur club forum, entrepreneurship discussion and project promotion meeting.

- Human resources: it provides enterprises with personnel candidates, experts in training, and others.

- Public supporting facilities: With the improvement of environment in the park and its surrounding areas, it can meet the needs in residential, commercial, financial, cultural, entertainment, sports, health care, education and public transport services and all other aspects.

5) Entry requirements

- Engaged in cultural creative industry and/or e-commerce business, and/or research, development, result transformation of related high-tech.

- Business plan, with clear business objectives.

- Clear property rights (including intellectual property rights) with good market prospects.
- Necessary working capital and equipment conditions for the establishment of enterprises.
- Having the registered capital corresponding to its business scale.
- Enterprises carry out independent accounting, self-management and bear their own profits and losses.
- Legal representatives and managers have good professional ethics and quality.

6) Preferential Policies

- To align with China's supporting policies for enterprises entering e-commerce parks and incubators, the Park exempts the rent of enterprises who are the leaders in its industry and the exemption takes effect immediately after the signing of the contract for the entry into the Park.
- All enterprises admitted to the Park approved by the Taiyuan Municipal Government will be granted full rent-free policy in the first year, and free access to broadband internet. Also, supporting facilities for offices will be provided as well as multimedia conference rooms.
- Free training, guidance and lectures in in entrepreneurship and project roadshow will be provided;
- Companies located in incubator park can enjoy the government's tax benefit support policy. Qualified entrepreneurs who enter the park enjoy free loan guarantee and can apply for interest-free subsidies and loans provided by the government.
- Eligible entry companies can enjoy subsidies in receiving management service, business training and social insurance and other related support policies.
- Ph.D./Master/Undergraduate students who developed independently or cooperatively projects having yielded innovative intellectual rights can apply to the Park for University Students' innovation and entrepreneurship projects, which provide grants as much as 30,000 Yuan for doctoral students, 20 000 yuan for master students, 10,000 yuan for undergraduate

students, and also special amount of grants for projects with patents.

- Besides the application for grants above-mentioned, large-scale projects of scientific and technological enterprises led by university students, and funded by private scientific research institutions, can also apply for grants from Taiyuan City's Special Venture Capital Fund.

- Doctoral, master and undergraduate students graduated within 3 years who are in charge of scientific and technological enterprises located in Taiyuan City, in which they invest with their own capital, can apply for grants of the amount from 50,000 to 150,000 yuan. If the enterprises perform well later, such grants can be continuously given.

3.3.2 Assessment of incubation environment in the Park

3.3.2.1 Research methods

This part mainly uses two research methods: semi-structured interview and structured questionnaire.

Semi-structured interview is a method in which interviewees are invited to freely answer scheduled interview questions or discussions. The interviewees mainly include managers of technology incubating enterprises and entrepreneurs or team members of high-tech incubating business.

The structured questionnaire is mainly a research questionnaire designed with guiding items based on existing data and interview content, and the subjects are required to make reactive judgment according to the actual situation.

3.3.2.2 Data collection

The survey focused on the Emperor Penguin Park in Shanxi Province. The respondents are mainly the core personnel of the enterprises, including general managers, department managers and technical directors. A total of 300 questionnaires were issued and 256 were returned. Invalid questionnaires and questionnaires from non-technology enterprises were removed. 212 valid questionnaires were obtained, with a total effective rate of 82.81%. The description of sample characteristics is shown in the Table 3-1.

Table 3-1 The Basic Information of Samples

Characteristics	Classification	Sample	%	Characteristics	Classification	Sample	%
Gender (Entrepreneurs)	Male	180	84.90	Turnover	< 100,000	21	9.91
	Female	32	15.09		100000−1 million	32	15.09
Age (Entrepreneurs)	20−39	126	59.43		1−2 million	33	15.57
	40−49	64	30.19		2−4 million	84	39.62
	> 50	22	10.38		> 4 million	42	19.81
Age (Enterprise)	0−12 months	40	18.87	Industry	Environmental protection and new energy	39	18.40
	12−24 months	84	39.62		Electronic/ communication	50	23.58
	24−36 months	76	35.85		Shipbuilding	2	0.94
	36−42 months	12	5.66		Agricultural high technology	3	1.42
Number of employees	< 10 people	32	15.09		IT industry	78	36.79
	10−30 people	73	34.43		Mechatronics	22	10.38
	31−50 people	79	37.26		Chemical	8	3.77
	51−100 people	20	9.44		Biological medicine	8	3.77
	> 100 people	8	3.78		Other	2	0.94

3.3.2.3 Questionnaire measurement

The questionnaire on entrepreneurship incubation environment is compiled, tested and revised based on the semi-structured interviews and previous related literature.

Questionnaire contains 20 items, and sample items include "*park help you to get the*

right human resources, accounting, legal and other professional services" and "*park provides management and operation enterprises help*".

All items are evaluated with a Likert 5-point scale, with a score from 1 to 5, indicating the changes in the perspective on the level of agreement from "very low degree" to "very high degree".

The respondents are asked to evaluate with a Likert 5-point scale according to the actual situation.

The specific measurement results are shown in the Table 3-2.

3.3.2.4 Factor analysis

1) Data test

Before factor analysis, KMO statistics need to be calculated and Bartlett's spherical test needs to be performed to see whether the sample variables are suitable for factor exploration.

KMO is the appropriate sample quantity of Kaiser-Meyer-Olkin, and it is an indicator used to observe the value of the phase relationship and the value of the partial phase relationship, and its value is between 0 and 1.

Under KMO test, the closer the statistic is to 1, the stronger the partial correlation between variables is, and the better the effect of factor analysis is.

In the actual statistical analysis, when the KMO statistic is above 0.7, the effect is better. When the statistical value is less than 0.5, the factor analysis method is not appropriate.

Bartlett's sphericity test is used to determine whether there is correlation between the study sample variables.

In SPSS statistical analysis, if variables are independent or not strongly correlated, then factor exploration analysis is not applicable.

The KMO statistic of the sample is 0,805, and the significance level is $P < 0.0001$. It can be seen that Bartlett's sphericity test indicates that there is a strong correlation between variables, so it is applicable to factor analysis.

The test results are shown in the table 3-3.

Table 3-2 Statistics of Hatching Environment Evaluation Results

Factors	Items	The rating and the proportion selected				
		Excellent	Good	General	Pass	Fail
Policy support	Provide preferential policies, or government preferential policies	0.42	0.35	0.15	0.07	0.009
	Provide relevant financial and tax support	0.46	0.38	0.12	0.005	0.04
	Effective coordination with the government and other parties	0.30	0.27	0.35	0.06	0.02
	Help with financing	0.19	0.27	0.38	0.12	0.04
Incubation network	Help to obtain professional services in human resources, accounting, and law	0.41	0.31	0.18	0.11	0
	Provide technology, production, sales and marketing information intermediary	0.15	0.35	0.23	0.16	0.12
	Provide information platform that can meet the needs of entrepreneurship	0.68	0.24	0.08	0	0
	Introduce purchasing items to customers, suppliers or government	0.50	0.14	0.12	0.18	0.06
	To help establish exchanges and cooperation with universities and scientific research institutions	0.38	0.35	0.18	0.07	0.03
	Organize activities to share and exchange information to meet entrepreneurial needs	0.65	0.19	0.12	0.02	0.02

	Organize quality seminars and training courses as required	0.42	0.31	0.15	0.005	0.07
	Provide business planning guidance	0.38	0.35	0.15	0.08	0.04
Counseling training	To provide assistance in the management and operation of the business	0.31	0.42	0.19	0.05	0.04
	Help to analyze and research the market prospect of the product	0.42	0.35	0.15	0.04	0.04
	To help smooth the transition to an entrepreneur's career	0.27	0.42	0.19	0.10	0.02
	Provide necessary business and ancillary facilities	0.38	0.35	0.18	0.06	0.04
	Provide convenient living and working conditions	0.23	0.31	0.38	0.07	0.02
Public service	Provide necessary lab condition, site and storage service	0.31	0.42	0.23	0.03	0.02
	Provide leisure, fitness places	0.27	0.35	0.34	0.04	0
	Provide medical care, labor security and other comprehensive services	0.04	0.46	0.30	0.15	0.05

Table 3-3 KMO and Bartlett Tests (N=256)

Kaiser-Meyer-OlK in Measure of Sampling Adequacy		0.805
Bartlett's Test of Sphericity	Approx. Chi-Square	861.623
	df	192
	Sig	0.000***

Note: *** means $p < 0.001$

2) Factor analysis results

The factors of entrepreneurship incubation environment questionnaire were analyzed. Principal Component Analysis (PCA) and Maximum Variance Rotation (MVRO) were used to extract factors to identify different knowledge creation processes. Using Kaiser criterion and Cartel steep step test method to determine the number of factors extracted, using the criterion that the eigenvalue is greater than 1, and the project factor load is greater than 0.5, a total of four key factors were extracted. Finally, we get a scale of entrepreneurship incubation environment with four dimensions, including four projects, six projects, five projects and five projects, totaling 20 projects.

From the content of the questionnaire on business incubation environment, the results are in good agreement with the idea of creating business incubator environment in this study, and basically consistent with the results of research interviews. Based on the analysis of the content of factor extraction and the naming of four factors, this study concludes that the business incubation environment includes four aspects, namely policy support, incubation network, counseling and training, and public service facilities.

Four factors of the questionnaire explained 67.17% of the variance, among which "*policy support*" explained 18.036%, "*incubation network*" explained 17.597%, "*counseling and training*" explained 16.778%, and "*public service facilities*" explained 14.758%.

The results of factor analysis are shown in the Table 3-4.

3) Internal Consistency Test

For the reliability test of the questionnaire, Cronbach's Alpha was used here. Nunnally (1978) and De Vellis (1991) considered the questionnaire's Cronbach's Alpha above 0.7 as the acceptable minimum reliability value.

The results of reliability statistical processing are shown in the table. Cronbach's Alpha values of the four factors are 0.830, 0.858, 0.852 and 0.826, the total table coefficient is 0.925, and the internal consistency reliability is very good, which proves that the questionnaire of this study has high homogeneity reliability.

See Table 3-5 for this.

Table 3-4 Analysis Results of Incubation Environment Factors

Factors	Items	Factor load	Interpretation variation(%)	Common Degree
Policy support	Provide preferential policies, or government preferential policies	0.690	18.036	0.651
	Provide relevant financial and tax support	0.705		0.553
	Effective coordination with the government and other parties	0.809		0.676
	Help with financing	0.775		0.659
Incubation network	Help to obtain professional services in human resources, accounting, and law	0.561	17.597	0.576
	Provide technology, production, sales and marketing information intermediary	0.849		0.753
	Provide information platform that can meet the needs of entrepreneurship	0.587		0.718
	Introduce purchasing items to customers, suppliers or government	0.664		0.694
	To help establish exchanges and cooperation with universities and scientific research institutions	0.589		0.525
	Organize activities to share and exchange information to meet entrepreneurial needs	0.746		0.742
Counseling training	Organize quality seminars and training courses as required	0.707	16.778	0.684

	Provide business planning guidance	0.748		0.724
	To provide assistance in the management and operation of the business	0.739		0.747
	Help to analyze and research the market prospect of the product	0.674		0.727
	To help smooth the transition to an entrepreneur's career	0.649		0.689
Public service	Provide necessary business and ancillary facilities	0.516	14.758	0.646
	Provide convenient living and working conditions	0.761		0.744
	Provide necessary lab condition, site and storage service	0.518		0.737
	Provide leisure, fitness places	0.706		0.728
	Provide medical care, labor security and other comprehensive services	0.742		0.67

Table 3-5 Reliability Statistics of Questionnaires (N = 256)

Factor	F1	F2	F3	F4	Scale table
Alpha coefficients	0.830	0.858	0.852	0.826	0.925

3.3.2.5 Research inspiration

Firstly, from the analysis results of the research questionnaire, four factors, namely policy support, incubation network, coaching and training, and public service, constitute the main structural dimensions of the entrepreneurship incubation environment.

Secondly, business incubators should jump out of the self-positioning of quasi-government institutions, serve as a good link between the government and start-up

enterprises, and use their own policy-oriented advantages to help start-ups coordinate their relations with the government and its various aspects and promote their growth.

Thirdly, as an effective platform to connect entrepreneurial enterprises with various social network resources, business incubators should give full play to its platform effectiveness, so as to enable incubated enterprises to obtain various professional services and reduce management costs and transaction costs.

Fourthly, business incubators should comprehensively promote entrepreneurship guidance and training services. Business incubators need to introduce talents with rich business management experiences, especially those with entrepreneurial experience, to help enterprises get out of difficulties. Even those with failed entrepreneurial experience have much deeper evaluation and insight into entrepreneurial potential than those without any entrepreneurial experience.

Fifthly, business incubators should start from details and improve supporting public service facilities. Public service facilities can often reflect the degree of perfection of a business incubator service from the details. The business incubator should start from meeting the needs of work, life, leisure, communication and other aspects to ensure the personal safety and property safety of entrepreneurs and exempt them from worries at home.

3.4 Preliminary research model

According to literature review, the relation network and resource integration ability of incubating enterprises have profound significance for their survival and development.

However, in the existing studies, there is still a large space to explore the influence of the relationship network of incubating enterprises on entrepreneurial performance.

At the same time, resource integration ability, as a key ability for enterprises to acquire and maintain competitive advantages, plays an important role in the process of incubating enterprise relationship network which affects entrepreneurial performance.

Therefore, on the basis of literature review and in combination with the relationship between incubating enterprises' relationship network, resource integration ability and

entrepreneurial performance, the relationship model among the three is constructed and a confirmatory analysis is carried out to deepen and enrich relevant research contents.

The research content is mainly composed of four parts, namely

1) The influence of incubated enterprise relationship network on resource integration ability.

2) The influence of resource integration ability on entrepreneurial performance of incubating enterprises.

3) The influence of incubated enterprise relationship network on entrepreneurial performance.

4) The mediating effect of resource integration capability.

See Figure 3-1 for such a model.

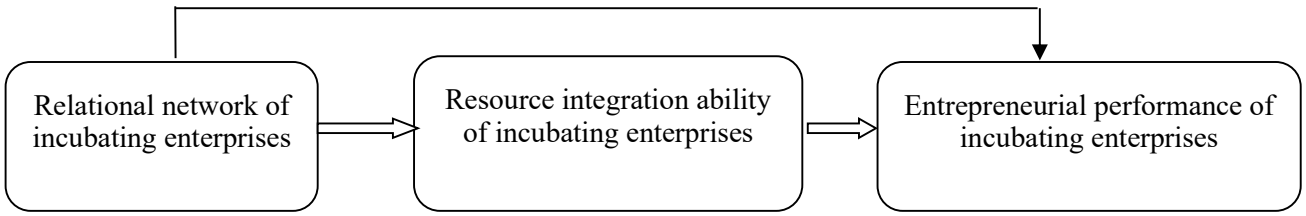

Figure 3-1 Preliminary Model of the Relationship among Incubating Enterprise Relational Network, Resource Integration Ability and Entrepreneurial Performance

Chapter 4: Field Work - Shanxi Emperor Penguin Innovation Incubator Park as Example

This chapter takes Shanxi Emperor Penguin Innovation Incubation Park as a case to carry out field research and variation on the hypothesis.

It includes the questionnaire designed for data collection from the incubating enterprises in the Park, the description of variables for statistical analysis and tests.

It later introduces the conduction of each analysis and test for the verification of hypothesis, namely descriptive statistics analysis, reliability and validity test, correlation analysis, regression analysis and intermediary variable analysis.

4.1 Questionnaire design and variables

4.1.1 Questionnaire design

The questionnaire is divided into four parts, namely basic information of enterprises, incubating enterprise network, resource integration ability and entrepreneurial performance. Some questions were scored with the 5-point scale.

According to the research content, the questions were divided into 5 levels, indicating the degree of approval of the content, among which 1 represents completely disagree, 2 relatively disagree, 3 not sure, 4 relatively agree and 5 completely agree.

Respondents fill in according to the actual situation of the enterprise. The specific content of the questionnaire is shown in the appendix.

4.1.2 Variables

Combined with the situation of incubating enterprises in China and the purpose of this thesis research, and based on the literature, the following variable measurement design was carried out.

4.1.2.1 Dependent variable - entrepreneurial performance of incubating enterprises

Looking at the current measures of the performance of new enterprises, we mainly consider them from two aspects, namely profitability and growth.

Considering the high requirements for the innovation of incubating enterprises, the entrepreneurial performance of incubating enterprises from three dimensions, namely profitability, growth and innovation, is explored.

Profitability performance and growth performance of measurement items refer to the results of financial performance, according to Hoang and Antoncic (2003), and other scholars.

Three items, namely market share, net return and investment return, are selected to measure profitability performance.

Four items are selected to measure growth indicators, namely sales growth rate, net income growth rate, market share growth rate and capital turnover rate (Hoang & Antoncic, 2003).

Four measurement items are selected to measure innovation regarding to the number of patent applications, namely the number of new product release, the speed of new product development, and the proportion of new product output and the value in the total sales revenue.

See Table 4-1 for such variables.

4.1.2.2 Independent variable - incubating enterprise relationship network

Although scholars have done some research on the measurement of relational network, they mainly refer to the research perspectives and methods for enterprise network and social network.

In this thesis, by referring to relevant research literature, network size, network strength and network heterogeneity are used to describe the relational network of incubating enterprises.

See Table 4-2 for such incubating enterprises business network scale, or the independent variables.

Table 4-1 Entrepreneurial Performance Scale of Incubating Enterprises

Network	Symbol	Content
Profitability performance	Y11	Compared with the average level of the market, your company has a relatively high market share (the proportion of product sales in the total market sales of this kind of products).
	Y12	Your company's net income (net income/total sales) is higher than the market average.
	Y13	Compared with the market average, your company has a higher rate of return on investment (return on investment/cost of investment).
Growth performance	Y21	Compared with the average level of the market, the sales volume of your company has increased rapidly.
	Y22	Compared with the market average, your company's net income grows faster.
	Y23	Compared with the average level of the market, your company's market share is growing faster.
	Y24	Compared with the market average, your company's capital turnover rate is faster.
Innovative performance	Y31	Compared with your major competitors, your company has applied for more patents.
	Y32	Compared with your major competitors, your company has released more new products.
	Y33	Your company develops new products faster than its main competitors.
	Y34	Compared with the major competitors, the output value of your new products accounts for a higher proportion of the total sales revenue.

Table 4-2 Incubating Enterprises Business Network Scale

Network	Symbol	Content
Network size	X11	Number of suppliers and enterprise customers
	X12	The number of similar enterprises with business partnerships
	X13	Number of research institutions with commercial partnerships
	X14	Number of non-research institutions with commercial partnerships
	X15	Incubators and government departments that provide capital, technology and information for enterprises
The intensity of the network	X21	Frequency of contact between your company and each supplier and corporate customers
	X22	Frequency of contacts between your company and each similar business with a business partnership
	X23	Frequency of contact between your company and each research institution that has a commercial partnership
	X24	Frequency of contact between your company and each non-scientific institution that has a business relationship
	X25	Frequency of contacts between your company and the incubators and government departments that provide funds, technology, information
Network heterogeneity	X31	The type of industry in which the organization works with your company
	X32	Compared with other enterprises in your network, your company is not much different from them in terms of products and services
	X33	Compared with other enterprises in your network, your company is not much different from them in terms of production

		equipment
	X34	Compared with other enterprises in your network, your company is not much different from them in terms of technological process

4.1.2.3 Mediation variable - resource integration capability

About the research of resource conformity ability, there have already been some research results. Using the research contents of Cui (2007) and Wang (2011) for reference, this thesis measures the ability of enterprises to select, absorb, allocate and utilize all available resources inside and outside the organization in the process of business establishment and growth.

A scale for measuring the ability of resources integration is constructed. The contents are as follows. See Table 4-3 for details.

Table 4-3 Resource Integration Capability Scale

	Symbol	Content
Resource integration capability	M1	Ability to identify and select required enterprise resources
	M2	Ability to absorb and acquire required enterprise resources
	M3	Ability to compose and configure existing enterprise resources
	M4	Effective use of enterprise resources
	M5	Ability to use existing resources to develop and extend other necessary resources

4.1.2.4 Control variables

Previous studies have shown that the age and size of enterprises are important factors. In this thesis, the age and size of enterprises are incorporated into the analysis model and studied as control variables.

Among them, enterprise scale is measured from the number of incubating enterprises' existing employees and their turnover in the previous year.

4.1.3 Data collection and description

The data were collected mainly by means of questionnaire survey, and the incubating

enterprises in Shanxi Emperor Penguin Innovation Incubation Park were taken as the research object. The samples selected in this thesis are mainly based on the following principles:

1) The establishment time of incubating enterprises is less than 42 months;

2) The incubated enterprise must be an independent operating entity, with the legal personality, and it cannot be a branch or subsidiary of the head office.

3) The personnel required to fill in the questionnaire are the core personnel of the enterprise, mainly including the company's leaders, managers or technical leaders.

In this survey, 300 questionnaires were distributed and 256 were returned, among which 212 were valid. The basic information of the survey samples is shown in the Table 4-4 and Table 4-5 below.

Table 4-4 The Description of Questionnaire Distribution and Recovery

Number of questionnaires issued	Number of questionnaires collected	Number of valid questionnaires	Questionnaire recovery	Overall efficiency of questionnaire
300	256	212	85.33%	82.81%

Table 4-5 Basic Information of Samples

Characteristics	Classification	Sample	%	Characteristics	Classification	Sample	%
Gender (Entrepreneurs)	Male	180	84.90	Turnover	< 100,000	21	9.91
	Female	32	15.09		100000−1 million	32	15.09
Age (Entrepreneurs)	20−39	126	59.43		1−2 million	33	15.57
	40−49	64	30.19		2−4 million	84	39.62
	> 50	22	10.38		> 4 million	42	19.81
Age (Enterprise)	0−12 months	40	18.87	Industry	Environmental protection and new energy	39	18.40

	12−24 months	84	39.62	Electronic/ communication	50	23.58
	24−36 months	76	35.85	Shipbuilding	2	0.94
	36−42 months	12	5.66	Agricultural high technology	3	1.42
Number of employees	< 10 people	32	15.09	IT industry	78	36.79
	10−30 people	73	34.43	Mechatronics	22	10.38
	31−50 people	79	37.26	Chemical	8	3.77
	51−100 people	20	9.44	Biological medicine	8	3.77
	> 100 people	8	3.78	Other	2	0.94

4.2 Reliability and validity test

Before the test of sample reliability and validity, descriptive statistical analysis is carried out on the sample data.

This mainly refers to the test on the basic statistics of each measurement item in the recovered valid questionnaire, including mean, standard deviation, slope, kurtosis and other contents.

Generally, if the absolute value of the skew (slope) of the sample data is less than 3, and the absolute value of kurtosis is less than 10, it can be considered that the obtained sample basically follows the normal distribution.

The specific contents are shown in Table 4-6 below.

As can be seen from the table, the values of the skewness (slope) and kurtosis of the sample data obtained in this study meet the above requirements that the absolute value of the skew(slop) is less than 3 and the one of kurtosis is less than 10, which can be used for subsequent data analysis and verification, namely the reliability and validity tests of the sample data.

Table 4-6 Descriptive Statistics of the Sample

	Factor	Number	Mean	Standard deviation	Slope	Kurtosis
Descriptive analysis of network measurement index of incubating enterprises	Size of the relationship network	X11	3.6692	0.68814	-0.061	-0.371
		X12	3.4489	0.60172	0.337	0.079
		X13	3.2941	0.55942	0.22	0.891
		X14	3.562	0.75151	-0.221	0.172
		X15	3.2406	0.6814	-0.167	0.279
	Strength of the relational network	X21	4.0976	0.71061	-0.25	-0.654
		X22	3.7168	0.68452	-0.069	-0.353
		X23	4.0502	0.74334	-0.787	0.994
		X24	4.4013	0.74375	-0.881	-0.009
		X25	3.921	0.77226	-0.391	0.114
	Heterogeneity of relational networks	X31	3.9072	0.8393	-0.692	0.486
		X32	4.0501	0.82462	-0.498	-0.12
		X33	3.1929	0.75942	0.138	-0.048
		X34	3.6572	0.72567	0.012	-0.495
		X35	3.5163	0.7958	0.022	-0.527
Descriptive analysis of measurement indicators of resource integration capability	Resource integration capability	M1	3.4728	0.86526	-0.098	-0.421
		M2	4.038	0.80383	-0.474	-0.251
		M3	3.5161	0.86036	0.069	-0.409
		M4	3.5441	0.82406	-0.148	-0.288
		M5	3.0084	0.87363	0.042	-0.193
Descriptive analysis of entrepreneurial performance measurement indicators of incubating enterprises	For-profit performance of entrepreneurial performance	Y11	3.687	0.76675	-0.422	0.007
		Y12	3.2941	0.8559	-0.179	-0.031
		Y13	3.556	0.77867	0.102	-0.405
	Growth performance of entrepreneurial	Y21	3.6036	0.75399	0.059	-0.581
		Y22	3.546	0.75799	-0.222	-0.159
		Y23	2.6294	0.86629	0.47	-0.088

	performance	Y24	4.0341	0.73918	-0.297	-0.555
	Innovative performance of entrepreneurial performance	Y31	4.0282	0.77005	-0.396	-0.482
		Y32	3.8496	0.88898	-0.416	-0.306
		Y33	3.8258	0.83839	-0.183	-0.434
		Y34	3.9032	0.81818	-0.272	-0.501

4.2.1 Reliability test

Usually, Cronbach's α coefficient is used for reliability test.

When the value of Cronbach's α coefficient is greater than 0.7, the reliability of the scale is relatively high.

When the value of Cronbach's α coefficient is between 0.5 and 0.7, the reliability of the scale is acceptable. If the value is less than 0.35, the index should be rejected.

Reliability analysis results show that Cronbach's α value of network size, network strength and network heterogeneity, profitability performance, growth performance and innovation performance, and resource integration ability of incubators are higher than 0.7. CITC value of all items is greater than 0.5, deleting any item cannot significantly improve the value of Cronbach's α coefficient, which generally has good consistency, which shows that the scale has good reliability.

The results of the degree of confidence analysis are shown in Table 4-7.

4.2.2 Validity test

The content validity and structure validity are two aspects to measure the scale validity.

In the aspect of scale design, this thesis synthesizes the content and main points in this thesis.

Referring to the relevant research results of stages, most of the scales adopt mature scale, or the scale adjusts slightly to some characteristics of incubating enterprises, and the items of the scale also take situational factors into account when setting. Therefore, the scale used in this thesis has good content validity.

Table 4-7 Results of Reliability Analysis

Factor	Item	CITC	Cronbach's α values after deleting item	Overall Cronbach's α
The network size of the relationship network	X11	0.685	0.834	0.848
	X12	0.736	0.819	
	X13	0.651	0.841	
	X14	0.776	0.806	
	X15	0.667	0.838	
Network strength of the relational network	X21	0.615	0.787	0.787
	X22	0.616	0.781	
	X23	0.794	0.575	
	X24	0.815	0.901	
	X25	0.872	0.88	
Network heterogeneity of relational networks	X31	0.859	0.887	0.906
	X32	0.801	0.909	
	X33	0.598	0.764	
	X34	0.698	0.716	
	X35	0.632	0.747	
Resource integration capability	M1	0.629	0.751	0.792
	M2	0.731	0.931	
	M3	0.801	0.917	
	M4	0.89	0.898	
	M5	0.907	0.893	
The for-profit performance of entrepreneurial performance	Y11	0.812	0.914	0.918
	Y12	0.752	0.917	
	Y13	0.827	0.9	
Growth performance of entrepreneurial performance	Y21	0.827	0.901	0.907
	Y22	0.844	0.897	
	Y23	0.826	0.9	

	Y24	0.696	0.904	
Innovative performance of entrepreneurial performance	Y31	0.831	0.875	0.898
	Y32	0.792	0.884	
	Y33	0.834	0.873	
	Y34	0.771	0.876	

As for the analysis of structural validity, it was suggested by Campbell (1959) and Rong Taisheng (2006) that each item measured should have a high load coefficient on the factors measured, while the load coefficient on other factors should be relatively low.

We use SPSS17.0 statistical software, principal component analysis method and orthogonal rotation to maximize variance, and then analyze the structural validity of the scales used in this thesis. The judgment criteria of KMO value are mainly based on the research suggestions made by Hair (1995) and other scholars. It is believed that the value of KMO is greater than 0.5, indicating that the data is more suitable for factor analysis (Hair, 1995).

The analysis results are shown in Table 4-8.

It can be seen from the table that,

Firstly, the KMO value of the incubating enterprise relationship network scale is 0.875, greater than 0.5. Bartlett's sphericity test has an approximate chi-square value of 1597.458，and a significance level less than 0.001, indicating that the sample is suitable for factor analysis.

After factor analysis, three factors were extracted to correspond to the network size, network strength and network heterogeneity, which were in line with the preliminary design goals of this thesis.

The cumulative variance interpretation ratio of factors reached 78.54%，greater than 50%, indicating that the scale content had a high explanatory ability. In addition, the scale of the network has a high load coefficient in F1 with the minimum load value of 0.774, the strength of the network has a high load coefficient in F2 with the minimum load value of 0.739, and the heterogeneity of the network has a high load coefficient in F3 with the minimum value of 0.738, all greater than 0.5, and there is no cross load.

Table 4-8 Results of Validity Analysis

	Item	Factor loading		
		F1	F2	F3
The network size of the relationship network	X11	0.774	0.161	0.123
	X12	0.821	0.159	0.198
	X13	0.886	0.215	0.083
	X14	0.898	0.213	0.104
	X15	0.836	0.219	0.057
Network strength of the relational network	X21	0.196	0.739	0.305
	X22	0.179	0.834	0.17
	X23	0.177	0.866	0.055
	X24	0.241	0.845	0.149
	X25	0.215	0.838	0.126
Network heterogeneity of relational networks	X31	0.112	0.199	0.738
	X32	0.141	0.185	0.841
	X33	0.057	0.114	0.846
	X34	0.063	0.118	0.871
	X35	0.196	0.099	0.811
Incubating enterprise relationship network	KMO value		0.875	
	Approximate chi-square values		1597.458	
	Degrees of freedom		105	
	Significance level		0	
	The cumulative variance		78.54%	
	Item	F4		
Resource integration capability	M1	0.787		
	M2	0.827		
	M3	0.761		
	M4	0.842		

	M5	0.763		
Incubating enterprise resource integration ability	KMO value		0.703	
	Approximate chi-square values		390.524	
	Degrees of freedom		10	
	Significance level		0	
	The cumulative variance		70.45%	
	item	F5	F6	F7
The for-profit performance of entrepreneurial performance	Y11	0.254	0.093	0.808
	Y12	0.26	0.269	0.75
	Y13	0.253	0.226	0.889
Growth performance of entrepreneurial performance	Y21	0.787	0.349	0.291
	Y22	0.858	0.332	0.234
	Y23	0.799	0.382	0.336
	Y24	0.87	0.197	0.258
Innovative performance of entrepreneurial performance	Y31	0.286	0.731	0.154
	Y32	0.257	0.818	0.153
	Y33	0.339	0.734	0.098
	Y34	0.161	0.75	0.348
Incubated enterprise entrepreneurial performance	KMO value		0.863	
	Approximate chi-square values		905.873	
	Degrees of freedom		55	
	Significance level		0	
	The cumulative variance		74.38%	

To sum up, the scale in this thesis has good validity.

Secondly, the KMO value of the incubating enterprise resource integration ability scale is 0.703, greater than 0.5. Bartlett's sphericity test has an approximate chi-square value of 390.524 and a significance level less than 0.001, indicating that it is suitable for factor analysis.

Also, after factor analysis, one factor was extracted, which was in line with the preliminary design goal of this thesis.

The variance cumulative interpretation ratio of the factors reached 70.45%, greater than 50%, indicating that the scale content was highly representative.

In addition, the resource integration capability has a high load coefficient on F4, and the minimum load value is 0.761, greater than 0.5.

To sum up, the scale in this thesis has good validity.

Thirdly, the KMO value of incubating enterprises' entrepreneurial performance scale is 0.863, greater than 0.5.

Bartlett's sphericity test has an approximate chi-square value of 905.873 and a significance level less than 0.001, indicating that it is suitable for exploratory factor analysis.

After the orthogonal rotation of variance maximization, three factors were extracted, which corresponded to profitability performance, growth performance and innovation performance respectively. These factors were in line with the preliminary design goal of this thesis, and the variance cumulative interpretation ratio of the factors reached 74.38%, greater than 50%, indicating that the scale content had a high explanatory ability.

In addition, profitability performance has a high load coefficient on F7 with a minimum load of 0.808, growth performance has a high load coefficient on F5 with a minimum load of 0.787, and innovation performance has a high load coefficient on F6 with a minimum load of 0.731, both greater than 0.5, and no cross load. To sum up, the scale in this thesis has good validity.

4.3 Correlation analysis

The correlation analysis method of Pearson's bilateral test was used in this thesis, and the specific analysis results are shown in Table 4-9.

The results of correlation analysis preliminarily indicate that there is a significant correlation between the business network, resource integration ability and entrepreneurial

performance of incubating enterprises explored in this thesis, and the correlation coefficients are all less than the critical value of 0.75, which also reflects that there is no serious collinearity problem among variables.

However, the specific impact and the hypothesis in this thesis have not been verified yet, which requires further exploration.

Table 4-9 Results of Correlation Analysis

Variable	1	2	3	4	5	6	7	8	9	10
1 Enterprise age	1									
2 Number of employees	0.674**	1								
3 Business turnover	0.681**	0.702**	1							
4 Network size	0.375**	0.419**	0.416**	1						
5 Network strength	0.443**	0.394**	0.401**	0.454**	1					
6 Network heterogeneity	0.367**	0.438**	0.37**	0.282**	0.366**	1				
7 Resource integration ability	0.395**	0.447**	0.408**	0.389**	0.422**	0.447**	1			
8 Profitability performance	0.452**	0.404**	0.434**	0.469**	0.507**	0.364**	0.566**	1		
9 Growth performance	0.486**	0.575**	0.561**	0.551**	0.584**	0.473**	0.594**	0.573**	1	
10 Innovative performance	0.405**	0.422**	0.43**	0.475**	0.558**	0.416**	0.536**	0.46**	0.626**	1

Note: Correlation is significant at the 0.01 level (2-tailed).

4.4 Regression analysis

In the previous section, the correlation between the elements was analyzed, but the

hypothesis in this thesis has not been verified.

Therefore, in this section, the method of multiple linear regression analysis will be adopted to further analyze the relationship between incubating enterprises' relationship network, resource integration ability and entrepreneurial performance.

See Table 4-10 and Table 4-11 for results of the regression analysis.

Table 4-10 The Results of Regression Analysis (1)

Variable	Resource integration capability		Profitability performance			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Enterprise age	0.139	0.058	0.271*	0.22*	0.17	0.158
Number of employees	0.284*	0.162	0.118	0.004	0.007	-0.04
Business turnover	0.155	0.087	0.207+	0.149	0.121	0.099
Network size		0.161+			0.244**	0.197*
Intensity of the network		0.188*			0.277**	0.222**
Network heterogeneity		0.262**			0.139+	0.059
Resource integration capability				0.455***		0.352***
R^2	0.233	0.447	0.247	0.495	0.491	0.565
Adjusted R^2	0.218	0.422	0.233	0.479	0.468	0.541
F value	14.707***	13.097***	15.953***	24.448***	15.909***	18.41***

Table 4-11Results of Regression Analysis (2)

Variable	Growth performance				Innovative performance			
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Enterprise age	0.102	0.057	-0.012	-0.021	0.164	0.117	0.041	0.032
Number of employees	0.344**	0.243*	0.213*	0.178+	0.201+	0.097	0.07	0.034
Business turnover	0.299**	0.247**	0.203*	0.186*	0.224+	0.171	0.128	0.111

Network size			0.256***	0.221**			0.228**	0.193*
The intensity of the network			0.308***	0.267***			0.353***	0.311**
Network heterogeneity			0.19**	0.13+			0.196*	0.132
Resource integration capability		0.409***		0.271		0.421***		0.277***
R^2	0.39	0.607	0.673	0.714	0.234	0.459	0.533	0.577
Adjusted R^2	0.379	0.595	0.656	0.697	0.22	0.442	0.511	0.553
F value	31.644***	38.229***	32.816***	33.077***	14.589***	20.612***	18.716***	19.022***

Note: *** means p<0.001, ** means p<0.01, * means p<0.05, and + means p<0.1

Based on the analysis, we know about the following results.

4.4.1 The regression analysis results of relation network and resource integration ability of incubating enterprises

Taking the network scale, network strength and network heterogeneity of incubating enterprise relation network as independent variables and resource integration ability as dependent variable, the influence of incubated enterprise relation network on resource integration ability was analyzed. The results of regression analysis are shown in model 1 and model 2.

Comparing the test results of model 1 and model 2, we can find that the number of R2 is significantly improved, indicating that the interpretation ability of the model has been strengthened, F value has reached a significant level, indicating that the fitting degree of the model is better.

The correlation coefficients β between the size, strength and heterogeneity of incubator network and resource integration ability were 0.161(P<0.1), 0.188(P<0.05)and 0.262(P<0.01), respectively, indicating that there was a positive correlation between incubator network and resource integration ability.

The hypothesis of H1, H1a, H1b and H1c was verified or we do not reject the hypothesis of H1, H1a, H1b and H1c, namely

H1: The incubating enterprise relationship network has a positive impact on the ability of resource integration.

H1a: The network size of incubating enterprise relationship network has a significant positive effect on resource integration capability.

H1b: The network strength of incubating enterprise relationship network has a significant positive effect on resource integration ability.

H1c: The network heterogeneity of incubator enterprise relationship network has a significant positive effect on resource integration ability.

4.4.2 The regression analysis of incubating enterprises' resource integration ability and entrepreneurial performance

Taking the resource integration ability of incubating enterprises as the independent variable and the three dimensions of the entrepreneurial performance of incubating enterprises as the dependent variable, this thesis analyzes the influence of the resource integration ability of incubating enterprises on entrepreneurial performance.

The results of the sub-regression analysis are shown in model 3 and model 4, model 7 and model 8, and model 11 and model 12.

As can be seen from the test results of the three comparison models, the number of R2 is significantly improved, indicating that the explanatory ability of the model is strengthened, and all F values reach the significance level, indicating that the model has a good fitting degree.

The influence coefficients of incubating enterprises' resource integration ability on the profitability performance, growth performance and innovation performance of entrepreneurial performance are 0.455($P<0.001$), 0.409($P<0.001$)and 0.421($P<0.001$), indicating that there is a significant positive correlation between the resource integration ability of incubating enterprises and entrepreneurial performance.

The hypothesis of H2, H2a, H2b and H2c was verified, or we do not reject the hypothesis of H2, H2a, H2b and H2c, namely

H2: resource integration ability has a positive impact on the entrepreneurial performance of incubating enterprises

H2a: resource integration ability has a significant positive impact on profitability performance.

H2b: resource integration ability has a significant positive impact on growth performance.

H2c: resource integration ability has a significant positive impact on innovation performance.

4.4.3 The regression analysis of incubating enterprise relationship network and entrepreneurial performance

Taking the network scale, network intensity and network heterogeneity of incubator enterprise relationship network as independent variables and taking three dimensions of incubator enterprise entrepreneurial performance-profitability performance, growth performance and innovation performance as dependent variables, the thesis analyzed the impact of incubator enterprise relationship network on entrepreneurial performance.

The results of regression analysis were as follows: model 3 and model 5, Model 7 and model 9, model 11 and model 13, as it is shown.

As can be seen from the test results of the three comparison models, the number of R2 is significantly improved, indicating that the explanatory ability of the model is strengthened, and all F values reach the significance level, indicating that the model has a good fitting degree.

In the incubating enterprise relationship network, the coefficient of influence of network size on the profitability performance, growth performance and innovation performance of incubating enterprise entrepreneurial performance is 0.244($P<0.01$), 0.256($P<0.001$) and 0.228($P<0.01$), respectively, indicating that there is a significant positive correlation between

the network size of incubating enterprise relationship network and entrepreneurial performance.

The hypothesis of H3, H3a, H3b and H3c was verified, or we do not reject the hypothesis of H3, H3a, H3b and H3c, namely

H3: The network scale in the incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H3a: The network scale in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H3b: The network scale in the incubating enterprise relationship network has a significant positive impact on growth performance.

H3c: The network scale in the incubating enterprise relationship network has a significant positive impact on innovative performance.

In the incubating enterprise relationship network, the influence coefficient of network strength on the profitability performance, growth performance and innovation performance of incubated enterprise entrepreneurial performance is 0.277 ($P<0.01$), 0.308($P<0.001$)and 0.353($P<0.001$), respectively, indicating that there is a significant positive correlation between the network strength of incubated enterprise relationship network and entrepreneurial performance.

The hypothesis of H4, H4a, H4b and H4c was verified or we do not reject the hypothesis of H4, H4a, H4b and H4c, namely

H4: The network strength in the incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H4a: The network strength in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H4b: The network strength in the incubating enterprise relationship network has a significant positive impact on growth performance.

H4c: The network strength in the incubating enterprise relationship network has a significant positive impact on innovative performance.

The influence coefficients of network heterogeneity on the profitability performance, growth performance and innovation performance of incubating enterprises in the incubated enterprise relationship network are 0.139(P<0.1), 0.190(P<0.01) and 0.193(P<0.05), respectively, indicating that there is a significant positive correlation between network heterogeneity and entrepreneurial performance of incubating enterprises.

The hypothesis H5 and H5a, H5b and H5c were tested, or we do not reject the hypothesis H5 and H5a, H5b and H5c, namely

H5: The network heterogeneity in incubating enterprise relationship network has a significant positive impact on entrepreneurial performance.

H5a: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on profitability performance.

H5b: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on the growth performance.

H5c: The network heterogeneity in the incubating enterprise relationship network has a significant positive impact on innovative performance.

4.4.4 Analysis of the mediating role of resource integration capability

The so-called mediating effect generally means that the independent variable X has an influence on the dependent variable Y. If X affects the variable Y through M, it is believed that M plays a mediating role in this influence process.

Baron and Kenny(1996) believe that mediating effect should meet the following four conditions.

Firstly, there is a significant correlation between independent variable X and mediating variable M.

Secondly, there is a significant correlation between the mediating variable M and the dependent variable Y.

Thirdly, there is a significant correlation between independent variable X and dependent variable Y.

Finally, when the mediating variable is introduced into the regression equation, the correlation between the independent variable and the dependent variable or the regression coefficient decreases, then the mediating variable plays a mediating role. When the correlation between independent variable and dependent variable or regression coefficient reduces to no significant correlation, the mediating variable is considered to play a complete mediating role. If the coefficient only decreases but is still significantly correlated, the mediating variable is considered to play a partial mediating role.

In the above article, the relationship between incubating enterprises' relationship network, resource integration ability and entrepreneurial performance has been analyzed. The following part will analyze the mediating role of resource integration ability in the process of relationship network affecting entrepreneurial performance.

The analysis results are shown in model 5 and model 6, model 9 and model 10, and model 13 and model 14.

As can be seen from the test results of the three comparison models, the number of R^2 is significantly improved, indicating that the explanatory ability of the model is strengthened, and all F values reach the significance level, indicating that the model has a good fitting degree.

4.4.4.1 Role of resource integration ability between network and profitability performance

In model 5 and model 6, the relationship between network size and profitability performance is still significant, but the relationship coefficient decreases to a certain extent, from $\beta=0.244(P<0.01)$ to $\beta= 0.197(P<0.05)$, indicating that resource integration ability plays a partial mediating role in the process of network size affecting profitability performance.

We do not completely reject the hypothesis H6a, namely

H6a: Resource integration capability plays partially an intermediary role between network size and profitability performance in the incubated enterprise relationship network.

The relationship between network strength and profitability performance is still significant, but the coefficient of the relationship decreases from $\beta=0.277(p<0.01)$ to $\beta=0.222$

($p<0.01$), indicating that resource integration ability plays a partial mediating role in the process of network strength affecting profitability performance.

We do not completely reject the hypothesis of H6d, namely

H6d: Resource integration ability plays partially an intermediary role between network strength and profitability performance in the incubated enterprise relationship network.

The correlation coefficient between network heterogeneity and profitability performance decreased from $\beta=0.139$ ($p<0.1$) to $\beta=0.059$, indicating that resource integration ability plays a complete mediating role in the process of network heterogeneity affecting profitability performance.

We do not reject at all the hypothesis of H6g, namely

H6g: Resource integration capability plays an intermediary role between network heterogeneity and profitability performance in the incubated enterprise relationship network.

In conclusion, resource integration ability plays an intermediary role in the process of incubating enterprise relationship network influencing entrepreneurial performance and profitability performance.

4.4.4.2 Role of resource integration ability between network and growth performance

In model 9 and model 10, the relationship between network size and growth performance is still significant, but the relationship coefficient decreases, from $\beta=0.256$($p<0.001$) to $=0.221$ ($p<0.01$), indicating that resource integration ability plays a partial mediating role in the process of the network size of the relationship network affecting growth performance.

We do not completely reject the hypothesis of H6b, namely

H6b: Resource integration capability plays partially an intermediary role between network size and growth performance in the incubated enterprise relationship network.

The relationship between network strength and growth performance is still significant, but the relationship coefficient decreases to a certain extent, from $\beta=0.308$($p<0.001$) to $\beta=0.267$($p<0.001$), indicating that resource integration ability plays a partial mediating role in the process of network strength affecting growth performance.

We do not completely reject the hypothesis of H6e, namely

H6e: Resource integration capability plays partially an intermediary role between network strength and growth performance in the incubated enterprise relationship network.

The correlation coefficient between network heterogeneity and growth performance decreased from $\beta=0.19(p<0.05)$ to $\beta=0.13(p<0.1)$, indicating that resource integration ability played a partial mediating role in the process of network heterogeneity affecting growth performance.

We do not completely reject the hypothesis of H6h, namely

H6h: Resource integration capability plays partially an intermediary role between network heterogeneity and growth performance in the incubated enterprise relationship network.

In conclusion, resource integration ability plays an intermediary role in the process of incubating enterprise relationship network influencing entrepreneurial performance and growth performance.

4.4.4.3 Role of resource integration ability between network and innovation performance

In model 13 and model 14, the relationship between network size and innovation performance is still significant, but the coefficient of the relationship is reduced from $\beta=0.228(p<0.01)$ to $\beta=0.193(p<0.05)$, indicating that resource integration ability plays a partial mediating role in the process of network size affecting innovation performance.

We do not completely reject the hypothesis of H6d, namely

H6c: Resource integration capability plays partially an intermediary role between network size and innovative performance in the incubated enterprise relationship network.

The relationship between network strength and innovative performance is still significant, but the coefficient of the relationship is decreased from $\beta=0.353(p<0.001)$ to $\beta=0.311(p<0.01)$, indicating that resource integration ability plays a partial mediating role in the process of network strength affecting innovative performance.

We do not completely reject the hypothesis of H6f, namely

H6f: Resource integration capability plays partially an intermediary role between network strength and innovative performance in the incubated enterprise relationship network.

The correlation coefficient between network heterogeneity and innovative performance decreased from $\beta=0.196(p<0.01)$ to $\beta=0.132$, indicating that resource integration ability played a complete mediating role in the process of network heterogeneity affecting innovative performance. We do not reject at all the hypothesis of H6i, namely

H6i: Resource integration capability plays an intermediary role between network heterogeneity and innovative performance in the incubated enterprise relationship network.

In conclusion, resource integration ability plays an intermediary role in the process of incubated enterprise relationship network influencing entrepreneurial performance - innovation performance.

To sum up, the resource integration ability plays a mediating role in the process of affecting entrepreneurial performance, and this hypothesis has been verified.

Among them, resource integration ability plays a complete mediating role in the process of network heterogeneity affecting profitability and innovation performance, and in other processes, it plays a part of mediating role, that is, H6 and its sub-hypothesis have been verified.

We do not reject the hypothesis of H6, namely

H6: Resource integration capability plays an intermediary role in the process of relationship network influencing the performance of enterprise creation.

In addition, in the regression analysis results, the Durbin-Watson test values are all around 2, which indicates that the correlation between residuals is not significant, indicating that the model has a good explanatory ability. Moreover, the VIF value is also lower than the threshold value, so the collinearity problem can be effectively solved.

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Chapter 5: Analysis of Research Results and Prospects

This chapter summarizes the results of the field research in the fourth chapter and sorts out the practical management significance of these results.

5.1 Research results

A total of 30 hypotheses were proposed in this thesis, and the specific contents and verification results are shown in Table 5-1.

Next, we will analyze and discuss the direct and indirect effects of incubating enterprises' relationship network and resource integration capability on entrepreneurial performance based on empirical results.

The main conclusions are as follows.

5.1.1 Influence of incubated enterprise relationship network on resource integration ability

The empirical test in this study shows that the network size, network strength and network heterogeneity in the relational network have a significant positive impact on the resource integration ability, which is, we suppose Hl, Hla, Hlb and Hlc are established.

This indicates that the resource integration ability of incubating enterprises can be improved by expanding the network scale, strengthening the network strength and enhancing the network heterogeneity of the relationship network.

5.1.2 Influence of resource integration ability on entrepreneurial performance of incubating enterprises

In this study, there is a significant positive relationship between resource integration ability and the profitability performance, growth performance and innovation performance of incubating enterprise entrepreneurial performance, which is, H2, H2a, H2b and H2c are established.

Table 5-1 The Results List of Hypothesis and Validation

Number	Hypothetical content	Verification results
H1	The relation network of incubating enterprises has a positive influence on the resource integration ability	Through the verification
Hla	The network scale of incubated enterprise relationship network has significant positive effect on resource integration ability	Through the verification
Hlb	The network strength of the incubated enterprise relationship network has a significant positive effect on the resource integration ability	Through the verification
Hlc	Network heterogeneity of incubated enterprise relationship network has significant positive effect on resource integration ability	Through the verification
H2	Resource integration ability has a positive impact on the entrepreneurial performance of incubating enterprises	Through the verification
H2a	Resource integration ability has a significant positive impact on profitability performance	Through the verification
H2b	Resource integration ability has a significant positive impact on growth performance	Through the verification
H2c	Resource integration ability has a significant positive impact on innovation performance	Through the verification
H3	Network scale in incubated enterprise relationship network has a significant positive impact on entrepreneurial performance	Through the verification
H3a	The network scale in the incubated enterprise relationship network has a significant positive impact on profitability performance	Through the verification
H3b	The network scale in the incubated enterprise relationship network has a significant positive impact on growth performance	Through the verification
H3c	The network scale in the incubated enterprise relationship network has a significant positive impact on innovation performance	Through the verification

H4	The network strength in the incubated enterprise relationship network has a significant positive impact on entrepreneurial performance	Through the verification
H4a	The network strength in the incubated enterprise relationship network has a significant positive impact on profitability performance	Through the verification
H4b	The network strength in the incubated enterprise relationship network has a significant positive impact on growth performance	Through the verification
H4c	The network strength in the incubated enterprise relationship network has a significant positive impact on innovation performance	Through the verification
H5	Network heterogeneity in incubated enterprise relationship network has a significant positive impact on entrepreneurial performance	Through the verification
H5a	Network heterogeneity in incubated enterprise relationship network has a significant positive impact on profitability performance	Through the verification
H5b	Network heterogeneity in the incubated enterprise relationship network has a significant positive impact on growth performance	Through the verification
H5c	Network heterogeneity in the incubated enterprise relationship network has a significant positive impact on innovation performance	Through the verification
H6	Resource integration ability plays an intermediary role between relationship network and enterprise performance	Through the verification
H6a	Resource integration capability plays an intermediary role between network size and profitability performance in incubated enterprise network	Part of the intermediary
H6b	Resource integration capability plays an intermediary role between network size and growth performance in the incubated enterprise relationship network	Part of the intermediary
H6c	Resource integration capability plays an intermediary role between network size and innovation performance in incubated enterprise network	Part of the intermediary

H6d	Resource integration ability plays an intermediary role between network strength and profitability performance in incubated enterprise network	Part of the intermediary
H6e	Resource integration ability plays an intermediary role between network strength and growth performance in the incubated enterprise relationship network	Part of the intermediary
H6f	Resource integration ability plays an intermediary role between network strength and innovation performance in the incubated enterprise relationship network	Part of the intermediary
H6g	Resource integration capability plays an intermediary role between network heterogeneity and profitability performance in the incubated enterprise network	Fully mediation
H6h	Resource integration capability plays an intermediary role between network heterogeneity and growth performance in the incubated enterprise relationship network	Part of the intermediary
H6i	Resource integration capability plays an intermediary role between network heterogeneity and innovation performance in the incubated enterprise relationship network	Fully mediation

This shows that incubating enterprises can promote the growth of enterprise performance, including performance in profitability, growth and innovation, through the improvement of resource integration ability.

5.1.3 Influence of incubating enterprise relationship network on entrepreneurial performance

It can be seen from the empirical hypothesis test results of this study that the network size of the relationship network has a significant positive effect on incubating enterprises' entrepreneurial performance, namely on the profitability, growth and innovation performance.

Network intensity has a significant positive effect on their profitability, growth and

innovation performance.

Network heterogeneity has a significant positive effect on incubating enterprises' profitability, growth and innovation performance.

At the same time, the network size, network intensity and network heterogeneity of incubator's relationship network have some differences on the impact of various dimensions of entrepreneurial performance.

Overall, the impact of network size and network intensity on entrepreneurial performance is slightly stronger than that of network heterogeneity, which indicates that incubator can improve on incubating enterprises' entrepreneurial performance by adjusting network size or network intensity first.

This thesis supplements the research on the impact of relationship network on entrepreneurial performance from three dimensions, namely network size, network intensity and network heterogeneity.

Enterprise performance is a description of the economic operation state of an enterprise, which is based on the resources owned by the enterprise, especially the commercial resources. Having more business partners can establish and provide a solid resource base for incubating enterprises and promote their acquisition of resources in scale economy.

The close contact with business partners ensures the stability of business cooperation and greatly reduces the probability of opportunistic behaviors, thus ensuring the stability of business resource acquisition of incubating enterprises and the sustainability of their business operations. The large difference in characteristics among network members, or the rich variety of resources within the network, provides the foundation for the incubating enterprises to obtain the scope economy.

5.1.4 Mediating effect of resource integration capability on entrepreneurial performance

From the verification research process, it can be seen that the incubated enterprise relationship network can not only directly affect the entrepreneurial performance of the incubating enterprises, but also indirectly affect their entrepreneurial performance through

their resource integration ability.

Among them, resource integration ability plays a complete mediating role in the process of network heterogeneity affecting profitability performance and innovation performance but plays a partial mediating role in other influencing processes. The network of incubating enterprises provides a resource base for resource integration and enterprise development.

Also, the level of resource integration ability affects the efficiency of resource utilization. Low integration ability of resources cannot give full play to the utility of resources, so it cannot bring more profits to enterprises.

5.2 Management enlightenment

After the analysis on the data from the case example, we find out results that have managerial references. In the perspectives of management, we think we can learn from the past and the findings. To improve the performance of incubators and incubating enterprises, it is essential to realize the importance of enterprise relationship network and resource integration capability and take actions.

5.2.1 Change positively in incubating enterprise relationship network

The positive change in incubating enterprise relationship network can greatly reduce the time of enterprise identification, acquisition, combination, allocation, utilization and innovation. It can also increase the efficiency of resource integration, and thus improve the ability of enterprise resource integration.

Moreover, it also expands channels for incubating enterprises to conduct resource acquisition and improve the utilization efficiency and the space of such channels, thus improving their resource integration ability.

5.2.2 Adopt suitable ways to enhance relationship network

There are many ways can promote the improvement of incubating enterprises' performance, including expanding the scale of relationship network, strengthening of the

strength of relationship network and improving the degree of heterogeneity of relationship network.

5.2.3 Improve integration ability

Incubating enterprises can improve their integration ability, improve the efficiency of resource utilization, achieve the goal of survival and development, and maintain the successful fruit of entrepreneurship.

5.2.4 Leverage the role of incubating enterprise relation network in resource integration ability

The relation network of incubating enterprises further influences their entrepreneurial performance through the intermediary role of resource integration ability. Incubators and enterprises should seek proactively ways to leverage this role, improving performance.

5.3 Research limits and prospects

Although some important conclusions have been drawn through the research in this thesis, there are still some deficiencies that need to be continuously improved and further deepened in future studies. These deficiencies are mainly shown as follows.

5.3.1 In the types of incubating enterprises

In this thesis, incubating enterprises and general new ventures is distinguished from each other, but only the former is studied here.

In future research, we can draw on the research ideas of this thesis, to further compare the differences between these two parties and analyze what common factors exist in the process of their influences on entrepreneurial performance and find out what commonalities and differences exist.

5.3.2 In sample size

The sample used in this study is not a large sample data in the real sense, and the factors such as locality, ownership nature and industry nature of the sample data are not taken into account.

In future studies, the research object can be targeted at the ownership nature of a specific industry or different regions or specific types to conduct comparative studies on industry differences, regional differences and ownership differences, so as to make the research more targeted and comparative.

5.3.3 On data selection

Due to the influence of incubating enterprises' relationship network and resource integration ability on entrepreneurial performance is long-term, some elements cannot be reflected currently, so the adoption of cross-sectional data has certain deficiencies.

In the future, researches using longitudinal data or panel data can be carried out, which will be more conducive to the comprehensive analysis and verification of the research content.

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Appendix

Questionnaire on the Relationship Network, Resource Integration Ability and Entrepreneurial Performance of Incubating Enterprises

Dear Sir/madam,

Hello! This questionnaire is about the network of incubating enterprises, resource integration ability and entrepreneurial performance. The questionnaire will be conducted anonymously. The questionnaire you fill in is mainly used for academic research. All information you provide will be kept confidential. At the same time, there is no right or wrong answer in the questionnaire, and there is no standard answer. Please fill it out according to the actual situation. Thank you.

Your participation is very important for the smooth development of this research. Thank you again for your support for this research!

I wish you good health and everything!

Part 1: Basic Information

1. Your working time in the company is ____years; your position in the company is _____.

2. The founder's gender:

A. Male

B. Female

3. Age of the company's founder:

A. Under 20 years old

B. Between 20 and 39 years old

C. Between 40 and 49 years old

D. Over 50 years old

4. Date of establishment:

A.0-2 years below B. 2-3 years C.3-4 years D. 4-6 years E.6-7 years

5. Total number of employees:

A. Less than 10 people

B. 10-30 people

C. 31-50 people

D. 51-100 people

E. More than 100 people

6. The turnover of your company last year:

A. Less than 100,000 yuan

B. 100-500,000 yuan

C. 50-1 million yuan

D. 100-1.5 million yuan

E. More than 1.5 million yuan

7. Industry:

A. IT industry

B. Environmental protection and new energy technology

C. Biomedical technology

D. Electromechanical

E. Electronic/communication

F. Automobile spare parts

G. Shipbuilding

H. Chemical

L. Agricultural high technology

J. Other

Part 2: The Investigation of the Influence of Entrepreneurial Relationship Network on Entrepreneurial Performance

1. The following is the description of the relationship network where your company is located.

Please evaluate it according to your cognition and understanding, and tick "√" in the

corresponding position according to the actual situation of your company.

	The number of business contacts the company has with the following organizations (units)	0-2	3-5	6-8 -	9 to 11	12 or higher
X11	Number of suppliers and enterprise customers					
X12	The number of similar enterprises with business partnerships					
X13	Number of research institutions with commercial partnerships					
X14	Number of non-research institutions with commercial partnerships					
X15	The incubators that provide capital, technology and information for enterprises and government departments					
	Average frequency of contact between the company and the following organizations	1 time every year	Once every six months	1-2 times each season	1 to 2 times a month	1 to 2 times per week
X21	Between your company and each supplier and corporate customer					
X22	Between your company and every similar company that has a business relationship					
X23	Between your company and every scientific research institution that has a commercial partnership					
X24	Between your company and every non-scientific institution that has a business relationship					
X25	Your company and provides funding, technology, information to incubators and government departments					
		1-2	3-4	5-6	7-8	>8

X31	The type of industry in which the organization works with your company					
	Rated items	Very agree - Neutral - Very disagree				
X32	Compared to other companies in your network, your company is different from them There is not much difference in products and services	1	2	3	4	5
X33	Compared to other companies in your network, your company is different from them There is not much difference in equipment	1	2	3	4	5
X34	Compared to other companies in your network, your company is different from them There is not much difference in process flow	1	2	3	4	5

2. The following are some opinions about the resource integration ability of your company. Please evaluate them according to your cognition and understanding, and tick "√" in the corresponding position according to the actual situation of your company.

	Rated items	Very disagree - Neutral - Very agree				
M1	Your company can identify and select the required enterprise resources	1	2	3	4	5
M2	Your company is able to absorb and obtain the required enterprise resources	1	2	3	4	5
The M3	Your company is able to combine and deploy existing enterprise resources	1	2	3	4	5
The M4	Your company can make effective use of enterprise resources					
The M5	Your company can use existing resources to develop and expand other resources needed					

The following are some opinions on the performance of your company. Please evaluate them according to your cognition and understanding, and tick "√" in the corresponding position according to the actual situation of your company.

	Rated items	Very disagree - Neutral - Very agree				
Y11	Compared with the average level of the market, your company has a relatively high market share (the proportion of product sales in the total market sales of this kind of products).	1	2	3	4	5
Y12	Your company's net income (net income/total sales) is higher than the market average	1	2	3	4	5
Y13	Compared with the market average, your company has a higher rate of return on investment (return on investment/cost of investment).	1	2	3	4	5
Y21	Compared with the average level of the market, the sales volume of your company has increased rapidly	1	2	3	4	5
Y22	Compared with the market average, your company's net income grows faster	1	2	3	4	5
Y23	Compared with the average level of the market, your company's market share is growing faster	1	2	3	4	5
Y24	Compared with the market average, your company's capital turnover rate is faster	1	2	3	4	5
Y31	Compared with your major competitors, your company has applied for more patents	1	2	3	4	5
Y32	Compared with your major competitors, your company has released more new products	1	2	3	4	5
Y33	Your company develops new products faster than its main	1	2	3	4	5

	competitors					
Y34	Compared with the major competitors, the output value of your new products accounts for a higher proportion of the total sales revenue	1	2	3	4	5