WHY SILICON VALLEY? AN "ENTREPRENEURIAL ECOSYSTEM" PERSPECTIVE ON REGIONAL VENTURE CREATION AND NEW VENTURE FUNDRAISING, EVIDENCE FROM CHINA

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ABSTRACT OF THE DISSERTATION

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The striking phenomenon of venture creation in regions such as Silicon Valley has attracted tremendous nascent entrepreneurs, venture capitalists, academic scholars and policy makers' attention. "*if you start a technology business somewhere other than the San Francisco Bay area, New York, or Boston, you're stacking the deck against yourself* "(Wessel, 2013). Due to the success of Silicon Valley in innovation and economic benefits, many initiatives and efforts have been implemented by regional governments worldwide to replicate the "entrepreneurial ecosystem" (E-ecosystem) (Nylund & Cohen, 2017).

However, compare to the widely held perception that E-ecosystem dramatically promote and accelerate venture creation, the E-ecosystem theory is undertheorized and underdeveloped, and glaring short of empirical analysis (Spigel, 2017). The fundamental questions for E-ecosystem such as what is entrepreneurial ecosystem and its main components, how do E-ecosystems incubate and accelerate venture creation, are still unresolved and ambiguous. Without the operational guidelines, the mission for regional

governments to nurture and foster an E-ecosystem is still far away and their efforts are not as fruitful as expected.

To fill up the gap in the literature and deepen the recognition about regional venture creation, I propose a theoretical framework for E-ecosystem theory and holistically examine the structures and mechanisms. In addition, by using a sample of 2,318,007 technology firms which created from 2004 to 2015 in 285 prefectural-level cities in China, I analyze the influence of E-ecosystem on regional venture creation and new venture fundraising. The empirical findings confirm the dynamic co-evolution and synergistic interactions in the E-ecosystem and provide practical recommendations for policy makers.

The first essay is to develop the E-ecosystem theory and conceptualize the role of E-ecosystem through literature review and synthesis. To clearly define the boundaries and differentiate it from the proximate systems, I comparatively analyze the knowledge ecosystem, business ecosystem, E-ecosystem and regional clustering simultaneously. Drawing on the dynamic co-evolutionary approach, we propose that E-ecosystems with key components fit, match and integrate well would lower the fixed cost and barrier, eliminate start-up bottlenecks, speed up the entrepreneurial opportunity identification, enhance the regional entrepreneurial competition and commercialization efficiency, and raise the start-up survive rate and growth rate.

The second essay is to empirically demonstrate the sponsorship influence of E-ecosystem on venture creation. To distinguish the E-ecosystem theory from resource

base theory and verify that E-ecosystems are more than resource clustering, I investigate the dynamic co-evolution and synergistic interactions among the key components as well as resource munificence. The empirical evidence highlights the synergistic interactions and provides strong support for E-ecosystem sponsorship. This analysis suggest that governors should no longer merely concentrate on resource munificence or provide resources separately, but pay attention to the component balance and promote the mutual fit and match in the E-ecosystem.

The third essay also explore and exploit the E-ecosystem theory by examining the effect of E-ecosystem on new venture fundraising. By utilizing a unique panel data from the dataset of (NECIPSD), I find that the regional E-ecosystems promote new ventures' external capital rising directly by decreasing the information asymmetry between new ventures and venture capitalists, but localized fundraising competition depress the fundraising rate. The contributions, limitations and future research directions are also discussed.

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Abstract

The aim of this paper is to discuss the striking phenomenon of venture creation in regions such as Silicon Valley. With special emphasis on the influence of "Entrepreneurial ecosystem" (E-ecosystem), we argue that investigating venture creation through a macro-level, holistic view is essential other than individual and organizational level perspectives. To conceptualize the role of E-ecosystem in regional venture creation, we discuss and compare the key components for E-ecosystem which have been frequently examined in existing literatures, and comparatively analyze the four proximate systems: knowledge ecosystem, business ecosystem, E-ecosystem and regional clustering. Drawing on the dynamic co-evolutionary approach, we propose that E-ecosystems with good fit, match and interaction among key components would lower the fixed cost and barrier for entrepreneurship, speed up the entrepreneurial opportunity identification and development, enhance the regional competition and accelerate the commercialization process, raising the regional venture creation efficiency.

Introduction

Why Silicon Valley

Silicon Valley has been recognized as a prominent E-ecosystem widely not only for co-location of the large and high-profile technology companies like Google, Apple, and Facebook, but also for the clustering of entrepreneurs, venture capitalists, research institutes, support infrastructure, and large quantity of start-ups. Silicon Valley, where dense social networks and local institutions foster the recombination of experience, skill and technology into new enterprises (Saxenian, 2001), is recognized internationally as home to many world's largest high-tech corporations. Serving as the leading E-ecosystem in the U.S., this region has the highest concentration of high-tech workers of any metropolitan area and captures the largest share of risk capital invested in new ventures (Mayer, 2011). Over the past decades, more than 10,000 companies have been established in this area and, for $26~30 billion per year VC investment in the U.S., one-third or more regularly invested in Silicon Valley. In 2010, in the heart of the Silicon Valley, Over 20,000 industrial patents are produced, ranking it the 17th compared to all nations globally(Engel, 2015) .

Silicon Valley's success in creating new ventures is not only attracting professional investors and nascent entrepreneurs, but also embraced by academic scholars, even college students. E-ecosystem is so important for venture creation that Wessel (2013) states :" if you start a technology business somewhere other than the San Francisco Bay area, New

York, or Boston, you’re stacking the deck against yourself ". The most important reason is that the environment provided by this E-ecosystem benefit and accelerates the venture creation process, making the venture emergence more likely to happen and success.

The main questions

For the significant benefits of E-ecosystems in innovation and economic, it has become a popular topic among academic scholars and comes into the regional governments' notice. A substantial number of extant researches on the agglomeration of venture creation in geographic areas concentrate their focus on E-ecosystem (Nylund & Cohen, 2017). However, there is a glaring lack the theoretical and empirical research in E-ecosystem (Spigel, 2017). Although researchers sought to leverage insights in this special topic and examine E-ecosystem from different perspectives, the results for previous studies are not as fruitful as expected. The concept for E-ecosystem is blurred and the methodology and models which have been utilized are underdeveloped and undertheorized (Spigel, 2017).

Due to the success of Silicon Valley in innovation and economic benefits, much of the academic and political discourse has centered on understanding or replicating the E-ecosystem (Nylund & Cohen, 2017). For example, Local governments in China provide a list of efforts, such as provide tax benefits, delegate government powers and investment regulation, reduce the threshold of market access, create massive incubations and offer substantial public subsidies, to foster entrepreneurial spirit and E-ecosystems like Silicon

Valley. Such initiatives and efforts are not only carried out in China, but also proposed in other countries in European, Asian and Africa world widely.

So far as we know, the characteristics and mechanisms for E-ecosystems are still ambiguous and the initiatives for regional governments to replicate Silicon Valley are unproductive. Venture creation is a complex and multidimensional phenomenon (Gartner, 1985) and vary widely according to different context and aims. Heterogeneous elements such as resources, knowledge, capital, entrepreneurs, evolve together and affect each other. Such sophisticated circumstance can not only hold by a single individual or organization, especially for modern society where divisions of work are based on specialization. Thus, E-ecosystem, as the professional social structure for venture creation, requires more examination and studies. In this theory paper, I will conceptualize the notion of E-ecosystem and discuss its special mechanisms and features. Furthermore, I will investigate the E-ecosystem's sponsorship and its influence process on venture creation. More specific, I aim to answer the following three questions:

1 What are entrepreneurial ecosystems and their main components?

2 The difference between E-ecosystem and other proximate systems.

3 How do E-ecosystems incubate start-ups and promote venture creation efficiency through a co-evolutionary approach.

Theory background

Venture creation

Social scientists have paid great attention to the process of venture creation, making it one of the most important topics in economic research. Venture creation has a prominent influence on regional economy development, job creation, unemployment reduction, innovation, and social stability(Rotger, Gørtz, & Storey, 2012). However, the venture creation process is still obscure. Researchers have labeled this process differently, such as organizational emergence (Gartner, 1993), start-up behaviors (A. H. Van de Ven & Poole, 1995), venture formation(Simon, Houghton, & Aquino, 2000), and organizational birth (Pennings, 1982). These synonyms indicate the same process that Shane and Venkataraman (2000) defined as individuals recognize and exploit business opportunities and create new ventures.

The venture creation process is not a single, ordinary, effortless activity. Instead, it is very complex and multi-dimensions. Venture creation demands nascent entrepreneurs to watch out for entrepreneurial opportunities, organize a stream of complex entrepreneurial resources, fight with their competitors, and collaborate with founders, academic institutions and government. Many of these activities are risky and unpredictable. The venture creation research covered a broad range of topics, such as how entrepreneurs recognize entrepreneurial opportunities, where entrepreneurs obtain resources and capitals, and whether entrepreneurs are over optimistic or not.

Micro-level entrepreneurship

At the micro-level, following Schumpeter's view that entrepreneurs are innovators who organizes and integrate economic resources, many scholars allocate the characteristics of entrepreneurs in the center of entrepreneurship research (McClelland, 1965). Over the last centuries, studies of entrepreneurship have provided many definitions for "entrepreneur". However, no existing theory in entrepreneurship could explain or predict when an entrepreneur may appear or engage in entrepreneurship (Bull & Willard, 1993).

On the one hand, scholars suggest that entrepreneurs are disposition compared with non-entrepreneurs and many studies examined the characteristics of successful entrepreneurs, such as personality, education, achievement needs (McClelland, 1965), and entrepreneurial orientation(Boso, Story, & Cadogan, 2013). It is believed that nascent entrepreneurs are often overly optimistic(Cassar, 2010) and they may benefit from their high optimism during the venture creation process (Hmieleski & Baron, 2009). On the other hand, many scholars distinguish entrepreneurs by their cognition factors(Gatewood, Shaver, & Gartner, 1995; Mitchell, Smith, Seawright, & Morse, 2000). R. A. Baron (2008) illustrated individual factors influence several aspects of entrepreneurs' cognition and entrepreneurship process. In addition, many scholars examined entrepreneurs from the behavioral perspective. For example, the knowledge spillover theory of entrepreneurship (Z. J. Acs, Braunerhjelm, Audretsch, & Carlsson, 2009) explains the formation of new ventures that individuals obtain their superiority from their context which are abundant of

new knowledge and opportunity.

Beside focus on entrepreneurs, Other scholars investigate the venture creation through the organization level and endeavor to distinguish the entrepreneurial firms from non-entrepreneurial firms (Collins & Moore, 1970; Thorne & Ball, 1981).For instance, conceivable characteristics for new ventures are investigated in previous studies. Many scholars made effort to explore the determinants associated with organization variation such as Networks (Semrau & Werner, 2014), Universities, Environment conditions (Z. J. Acs et al., 2009), government policies (Rotger et al., 2012), and so on. Social networks received lot of notices for its positive effect on new venture creation(De Carolis, Litzky, & Eddleston, 2009; Newbert & Tornikoski, 2012). From the resources base view, the human and social capital have been seen as important, strong and consistent predictors for start-ups (Davidsson & Honig, 2003). University as another resource which is a great pool for talents and new knowledge has tested many times as well. They are found not only boost venture emergence, but also foster the new ventures with intellectual property(Di Gregorio & Shane, 2003).

Explanations in the micro-level are promoted from different perspectives. However, the empirical results for many arguments are not inclusive. Many of them are very weak and contradict one another. Many antecedents discussed above are necessary but not sufficient prerequisite for venture creation (Shane & Venkataraman, 2000). For instance, scholars investigated entrepreneurs' personalities or traits which may distinguish

entrepreneurs from nonentrepreneurs (Brockhaus, 1980; Carland, Hoy, Boulton, & Carland, 1984; DeCarlo & Lyons, 1979) and the results are contradict one another. Below are explanations to answer why some previous studies turn out weak results.

Explain only parts of the phenomenon

As illustrated by Gartner (1985), four major perspectives influence venture creation process: the characteristics of entrepreneurs, the new created organizations, the environment surrounding the new venture, and the creation process. Most of the existing studies are only attempted to exploit the venture creation from one of the four perspectives，especially those scholars who explain the venture creation from the micro-level perspective(Gartner, 1985). Such arguments for venture creation are always restricted to special circumstance and limitations exist for empirical research due to subjective judgments.

No theory has discussed the dynamic fit process

Although some micro-level studies tried to explain the dynamic perspective of venture creation, limited existing literatures have explored the co-evolving features for the different elements in the venture creation process. Dynamic features for several key elements such as financial capital and human capital are examined in previous studies. Most of them investigate the change and evolution for these elements separately, presuming their transformations are parallel. In this paper, I argue that different elements co-evolve and interact with each other, integrating into an organic system.

Overemphasis on individual

A historical focus by scholars on individual entrepreneurs has led to a lack of appreciation for the combined influence of multiple actors and elements that facilitate the venture creation in the E-ecosystem(H. Van de Ven, 1993). Many scholars attempt to identify special characteristics for nascent entrepreneurs. This emphasize overstate entrepreneurs as the catalyst for entrepreneurial activity and represents the essence of entrepreneurship(Shaver & Scott, 1991). This stream of study has been almost the exclusive focus of entrepreneurship analysis(H. Van de Ven, 1993),leading to a bias in the entrepreneurship contribution analysis. Other participants, resources and events involved in developing an infrastructure for venture creation are overlooked.

Thus, a macro-level, holistic perspective on venture creation is need to gain a collective appreciation of entrepreneurship process. In this paper, I will use the E-ecosystem theory to explain the dynamic venture creation process. I argue that the rich diversity of complementary capabilities and resources in the ecosystem will incubate the new ventures and the dynamic co-evolving process will accelerate the development of start-ups.

Macro-level entrepreneurship

Entrepreneurship studies at the macro-level, such as environment conditions, market force, life cycles, local government policy, are not linked tightly to one another and disperse as separate fragments. These papers have been contributed to the existing body of

research but each of them focus on one discipline, being published in at least 31 separate academic journals by a number of scholars with disciplinary backgrounds in psychology, finance, marketing, economics, and so on(Bull & Willard, 1993). The high degree of research fragmentation intensifies our recognition about entrepreneurship in each discipline but impede us to estimate in terms of the overall picture as well.

Organizational ecology which emphases the selection mechanism (Wholey & Brittain, 1986) can explain why firms exist, but it is very weak to depict the venture creation process. Population ecology models which been employed to investigate the firm birth (H. E. Aldrich, 1990) possess the same issue. Even though the resource based theory is very prominent as many empirical studies shows the significant relationship between resource munificence and new venture performance, many existing conclusions often overlook heterogeneity in different types of applied resources(Amezcua, Grimes, Bradley, & Wiklund, 2013). The environment factors such as demographic characteristics (Tamasy, 2006), industrial structure, can be supportive, but it can also result in obstacles(Bull & Willard, 1993).

Several reasons lead to the absence of core theory for venture creation in macro-level entrepreneurship. First, one resource alone will not magically generate entrepreneurship (Florida & Kenney, 1988). Second, the venture creation process is inherently complex and challenging due to the tremendous uncertainties. Different variables influence entrepreneurs' motivation, decision, risk taking, implementation, and so on. Besides, these

variables also evolve from time to time, making this issue much more complicated. Furthermore, compared with fruitful investigations on venture performance that many prominent theories and research are discovered in the past decades, the concerning on venture emergence is rare and limited.

Holistic view for variations in regional venture creation

For the absence of core theory in macro-level venture creation, a holistic view to investigate entrepreneurship has been advocated. Instead of focus on individual level indicators, how the interdependencies between different components create and reproduce the overall ecosystem attracted more much attentions recently (Motoyama & Knowlton, 2017). Schoonhoven and Eisenhardt (1989) conclude that Silicon Valley as an incubator region nurture the emergence and growth of start-up firms. H. Van de Ven (1993) offers a social system perspective framework for entrepreneurship. Bahrami and Evans (2000) document that Silicon Valley as an "ecosystem" lowers the difficulty of launching a new technology firm. Especially, Neck, Meyer, Cohen, and Corbett (2004) use a two-phase case study to explore new venture creation within an E-ecosystem. They first presented a genealogy of high-technology companies in Boulder County, Colorado, and then interview the founders to develop a taxonomy. Based on the case study, they analyzed the key components in the ecosystem and the regional entrepreneurship activities. In the same vein, Spigel (2017) also explored the case of Calgary and Waterloo, Canada to investigate the configurations and components, and examine the mechanisms in the E-ecosystems.

Following this stream, I will propose and discuss the E-ecosystem theory in this paper, which is a more interactive and exhaustive research path for venture creation.

Regional variations for venture creation are collective outcomes for many antecedents. Micro-level indicators alone such as single resource, personality, policy and culture are unfit for explaining why more start-ups are generated in Silicon Valley than other areas. The collectivism feature for venture creation calls for the researches concentrate on the match mechanisms and co-evolution activities among the antecedents. By exploring the effect of E-ecosystems on the venture creation efficiency, this research provides a holistic view on regional entrepreneurship activities and intends to explain the regional variations of start-ups.

The E-ecosystem theory

Ecosystem

Ecosystem is defined as a system that includes all living organisms (biotic factors) in an area as well as its physical environment (abiotic factors) functioning together as a unit (Biology online 2012). Jackson (2011) defined it as "ecosystem is a complex and multidimensional set of relationships among the living resources, habitats, and residents of an area, whose functional goal is to maintain an equilibrium sustaining state". Tansley (1935) is the first scholar who provided the definition of ecosystem and discussed the relations between inorganic factors and organisms, consequently highlighting the existence of a frequent interchange of materials between biotic and abiotic systems or

biogeochemical systems.

Historically, the term ecosystem is only used by ecology scientists to describe the plants, animals, and microorganisms factors in a given area, interacting with all of the nonliving physical and chemical factors of this environment (Winn & Pogutz, 2013). An ecosystem can range in scale from an ephemeral pond to the entire globe, but this phrase is usually used to indicate a landscape scale system such as a grassland ecosystem (Levin et al., 2009). In this view, an ecosystem consists of many heterogeneous components that interact in parallel and have a range of basic properties associated with any complex adaptive system (Levin, 1998).

Moore (1993) innovatively used ecosystem to describe an economic community which supported by a foundation of interacting organizations and individuals. An "economic ecosystem" is an organic combination of organizations, individuals and other actors that co-evolve their capabilities and resources and integrate their dedications so as to form additional value and/or enhance efficiency.

Similar to the ecology studies, economic ecosystems not only refer to the biotic factors, such as individuals and organizations, but also include the abiotic factors, such as policy, resource, capital and culture. Although the study for ecosystem in social science field is still in the early stage, many scholars pay attention to the ecosystem realm and are exploring it in many specific sectors, such as innovation ecosystem, knowledge ecosystem, ecosystem service. One of the important topics in the ecosystem realm is the E-ecosystem.

The studies of E-ecosystem discuss how biotic factors, such as entrepreneurs, investors, researchers, engineers, and abiotic factors, such as capital, resources, culture, policy, co-evolve together. Bahrami and Evans (1995) document that, in much the same vein as a nature ecosystem's operation, a multitude of specialized, diverse entities which feed off, support, and interact with each other in the E-ecosystem, incubating venture creation.

However, the complex interactions among these components make it difficult to describe the venture creation processor predict an entrepreneur's behavior. In addition, the dynamic co-evolve process among the participants bring barrels for scholars to explore the nonlinear relations. Instead of solely trying to identify "who is the outstanding potential entrepreneur" or "what the talent entrepreneurs will do", it is beneficial to consider the evolutionary nature of entrepreneurship (Rae, 2000) and the co-evolving processes among the key components in the system. To corroborate this argument, this paper advocates a broader view on the venture creation process, which characterized by interaction, evolution and mutual reinforcement among the key components within the E-ecosystem.

Entrepreneurial ecosystem

I define the E-ecosystem as a special economic community which concentrate with talent pioneers，such as entrepreneurs, investors, engineers, researchers, as well as related resources, opportunities, capitals, policies, dedicate to create entrepreneurial firms. Besides Silicon Valley，there are other successful E-ecosystems, such as Washington, D.C, Chicago, Denver, Boston's Route 128, Seattle and Austin. An E-ecosystem has following

notable characteristics: 1 It is very diverse and has high mobility inside. 2 Contrast with other ecosystems, E-ecosystem places the entrepreneurs in focal point (Stam, 2015). 3 it aims to create new ventures to add new value, or improve efficiency, or advance the economics.

How successful for a start-up being depends not only the capability of the entrepreneur, but also relies on how effectively the entrepreneur co-opts and integrate the complementary knowledge, resources, and capabilities in the E-ecosystem(Willianson & De Meyer, 2012). The Entrepreneurial activities, especially for the venture creation, are results from an overtime co-evolution of complementary elements in the dynamic E-ecosystem(Neck et al., 2004; H. Van de Ven, 1993). H. Van de Ven (1993) concluded that entrepreneurship consists of an accretion of multiple knowledge, resource, institution and proprietary events involving many actors who transcend boundaries of many public and private sector organizations.

The innovative mechanisms and evolving infrastructure in E-ecosystems like Silicon Valley is such efficiency that it attracts talent pioneers, value knowledge and financial resource worldwide to gather together. Talent pioneers, including entrepreneurs, investors, engineers, and researchers, go to Silicon Valley simultaneously with diverse backgrounds and distinctive motivations, forming professional networks for venture creation. The dense networks and ties in the ecosystem spread information, disperse knowledge, exchange demands and supplements, facilitating the fit and match of complementary resources and

accelerating the entrepreneurial opportunity identification. In addition, a variety of regional institutions and organizations, including the Stanford University, R&D centers, several trade associations, local business organizations, and a myriad of specialized consulting, market research, public relations and venture capital firms, provide knowledge, technical innovation, financial capital, and networking services which the regions' enterprise often cannot afford individually (Saxenian, 2001).Based a holistic and integrative view, E-ecosystem theory will deepen our recognition and understanding about the factors and variables in venture creation process.

For the reason that E-ecosystem theory is underdeveloped and undertheorized (Spigel, 2017), the framework, content, boundary and mechanisms are obscure and ambiguous. To clarify the concept and boundary of E-ecosystem, we contrast four proximate systems in this paper: Business ecosystem, knowledge ecosystem, E-ecosystem, regional clustering. Furthermore, to illustrate the distinctive components in the E-ecosystem, we comparatively analyze the key elements that investigated frequently in previous studies.

Business ecosystem, knowledge ecosystem, E-ecosystem and Regional clustering

Although different economic ecosystems may have similar structures with complementary elements co-operate together through formal or informal networks, they vary based on their special functions and destinations. Basically, components in the ecosystems are all nested together with special contributions to their jointly destination. For instance, diversified organizations and individuals in the ecosystem interconnect

loosely and interact with each other to reach different destinations. The inter-organizational networks consist of both collaborative and competitive relationships (Moore, 1993). These networks or chains can facilitate the information exchange and resource flow. However, ecosystems operated differently based on their special destinations even their components are organized in a similar way. After Moore (1993)introduced the conception of ecosystem to depict the economic community, different types of ecosystem in the economic research have been promoted. These integrated ecosystems may not have strict boundary and hierarchical structure. However, they possess their own efficient way of reducing transaction cost and synchronizing supply and demand between complementary elements by unique structure frame and operate mechanism. To deepen our recognition about the E-ecosystem and understanding the different between four economic ecosystems: Business ecosystem, Knowledge ecosystem, E-ecosystem, Regional clustering, we review literatures in economic field and contrast them below.

First, the focal points in the economic ecosystems are different. In the Business ecosystems, the focal points are leading companies disperse in many industries. These huge and successful firms bound up with their followers as well as new ventures vertically to compete with one another. For the knowledge/innovation ecosystems, the focal points are universities, Research center, R&D department, and so on. They concentrate on knowledge generation and sharing. For E-ecosystems, entrepreneurs are the key roles in the daily operation and all other complementary resources gathering around them. There is

no standardization of process or formal hierarchical structures in the E-ecosystem. But entrepreneurs will try to manage the knowledge, finical capital, human resources, and assets effectively as an orchestrator, even if some resources are not belonging to them. Only the successful entrepreneurs could maintain, control, shape and integrate the resources and benefit from the E-ecosystem. For regional clustering, firms with similar characteristics and engage in the same industries are the main members (Tallman, Jenkins, Henry, & Pinch, 2004). Such comparable firms often compete and co-operate in the same time.

Second, even though distinctive ecosystems may operate under the similar social networks and carry out the proximate actions like knowledge sharing, their strategic destinations are totally different. For business ecosystems, firms from different industries or different positions of the supply chain contribute a specific component of an overarching solution (Christensen & Rosenbloom, 1995)，providing customer value to the society simultaneously. For knowledge/innovation ecosystem, research organizations like universities and R&D center connected together to create new knowledge and advance technological innovations. AsFinegold (1999) concluded, Universities, R&D centers, and other research organizations are catalysts of innovation, promoting the production and diffusion of knowledge. For E-ecosystems, the ultimate aim for participates is to incubate start-ups and create value through successful new ventures. For regional clustering, similar or related firms perform collectively to transfer knowledge and share common resources.

Porter (2000) defines a regional cluster as “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”. They can reduce transaction cost and obtain negotiation power through their tight geographical bonds in the vertical direction or horizontal direction.

Third, different ecosystems possess unique features and characteristics. For business ecosystems, under the leading firms' supervision, members with diversify background cooperate and compete together to provide maximum consumer values. Leading firms such as Wal-Mart or Microsoft will maintain the quantity and quality of the members to advance the whole ecosystem's competitive advantage. These leading firm will promote the alignment of a potentially large number of players, many of whom may not even be individually known (Willianson & De Meyer, 2012). For knowledge ecosystems, group members are more focused on producing knowledge and innovation collaboratively. Members usually disperse around the providing end in different industries. For E-ecosystems, group members have various backgrounds. The complex and multidimensional venture creation process needs different participants and resources. For regional clustering, lots of members who emphasize on the similar products or services are proximate to one another. Thus they have very low degree in background diversity and their competitive feature is prominent whereas other ecosystems advocate cooperative behavior.

Table 1-1 Distinguishing different economic ecosystems

Factor	Knowledge/innovation ecosystem	Business ecosystem	Entrepreneurial ecosystem	Regional clustering
Objective	Knowledge/innovation generation Overcome innovation challenge (Ander, Kapoor, 2010)	Customer value Competitive advantage (Iansiti and Levien, 2004)	Venture creation (H. Van de Ven, 1993) Build companies (Rice, Fetters, & Greene, 2014)	economics efficiencies (Lawson 1997) Knowledge sharing (Maskell 2001; Morgan, 1997) Location based comparative advantage (Dunning 1988) Transactional economics of agglomeration (Storper 1997) Share certain knowledge
Keystone Player	Universities, faculty and researcher organization R&D Center (Link and Scott, 2003) (Saxenian 2006)	Core firms Suppliers Retailers customers complementors	Entrepreneurs Investors Co-founders Venture capital	common suppliers Closely integrated small- and Medium- size firms (Tallman, Jenkins and Pinch 2004) NIDs of Northeast Italy and Southern Germany
Direction	Horizontal integration	Vertical integration	Vertical integration	Horizontal integration
Diversity	Low	High	High	Low
Density	High (Clarysse et al 2014)	Low (Clarysse et al 2014)	vaires	High
Key feature	Cooperative	Cooperative and competitive (Moore 1993) Mutually complementary	Cooperative	Competitive interaction (Becattini 1990) Subcontractors and Similar skilled labor, (Lawson, 1997) Common base of knowledge (Cooke, 1999)
Authors	Clarysse et al (2014)	Teece 2007/ Clarysse et al (2014) James Moore (1993)	Neck et al (2004)	Dunning 1988 Porter 1990, 1998, 2000

Even though some scholars mentioned the distinguish features for these ecosystems in previous research, the results are fragments and majority of them are discussed separately. Only Clarysse, Wright, Bruneel, and Mahajan (2014)compared the knowledge ecosystem and business ecosystem in the same time and explored how transfer knowledge ecosystem into business ecosystem. They concluded that companies in a knowledge ecosystem can make use of knowledge available in the region, but these companies may not necessarily mean such knowledge and activity will bring value and competitive advantage. In the same vein, I explore the similarity and different among these ecosystems simultaneously, promoting our recognition about E-ecosystem.

Complementary components in E-ecosystem

In existing literature, many scholars try to explain the venture creation by investigating single factor or reason, Such as social network(Zhang, Souitaris, Soh, & Wong, 2008), cognition orientation (Gatewood et al., 1995)) knowledge spillover (Guerrero & Urbano, 2014), guided preparation (Rotger et al., 2012), Culture(Mitchell et al., 2000)). However, the empirical research indicates that no single factor alone can spurs in venture creation process. Undoubtedly, many scholars propose to adopt the E-ecosystem theory and test the multiple factors simultaneously. These components, recognized as "externalities"(Alcácer, 2006; Porter, 1980), are necessary but not sufficient for venture creation.

However, there is no consistent agreement about what are the key components in the

E-ecosystem in previous literature. Scholars in this field raise different views on the complementary components in E-ecosystem. For instance, Daniel Isenberg, founder of the Babson E-ecosystem Project, outline six key domains for the E-ecosystem: conducive culture, enabling policies and leadership, availability of appropriate finance, quality human capital, venture-friendly markets for products, and a range of institutional and infrastructural supports(Isenberg, 2011). In addition, Steven Koltai who created and run the Global Entrepreneurship Program, proposed a six+six model high lights the six pillars essential to a successful E-ecosystem: identify, train, connect & sustain, fund, enable, and celebrate entrepreneurs; and the six participants who must be involved in their implementation: non-governmental organizations (NGOs), corporations, foundations, government, academic institutions, and investors. Also Bahrami and Evans (2000) note five key elements for E-ecosystem: venture capital, a talent pool of knowledgeable professionals, universities and research institutions, a professional service infrastructure, and customers and lead users of innovation. As the E-ecosystem theory is underdeveloped and the discrepancy opinions for key components exist, I systematically review the extant literatures which are highly fragmented and provide an overview of previous researches.

Different views about key elements in an E-ecosystem are presented in table 1-2. Some elements are very unique which mentioned by few scholars. For instance, only koltai&Company (2013) mentioned NGOs and Spilling (1996) highlighted living Condition as basic elements in an E-ecosystem. The inconsistent views about elements in

E-ecosystems are due to the different case studies that scholars employed. The importance of each element varies from one E-ecosystem to another as well as the importance of each resource for companies depends on different industries. For example, as the E-ecosystem in New York is more specialized in fashion industries, the market and leading users are much more important than research institutions. But for the E-ecosystem in Silicon Valley which focuses on semiconductor and internet, research institutions and venture capitals turn out to more important. However, despite the minor discrepancy, scholars reach agreement in most fundamental elements which we defined as key components.

Key components in E-ecosystem

Through a systematically review, I found several fundamental components which always mentioned and investigated in previous researches: Knowledge capital, financial capital, human capital, social capital as well as government policies, culture, and markets. These key components are required by most E-ecosystems and frequently discussed under different appellations.

Knowledge capital

Knowledge capital which produced by researcher centers and academic institutions promote entrepreneurial activities (Audretsch & Keilbach, 2007). Scholars utilized different item to indicate knowledge capital, such as academic institutions (Isenberg, 2011; Nadgrodkiewicz, 2013), University (Cohen, 2006; Neck et al., 2004; Spilling, 1996)

or knowledge spillovers. Knowledge and innovations are crucial sources of competitive advantage for start-ups, which protect new ventures as entrenchment from giant competitor's emulation. The idiosyncrasies of knowledge and information are necessary for entrepreneurial opportunities. Through the case study of University of Calgary, Chrisman, Hynes, and Fraser (1995) conclude that universities as engines for new knowledge and innovation contribute venture creation.

Financial capital

Financial capital is another critical resource for entrepreneurship process (Cooper, Gimeno-Gascon, & Woo, 1994). It is denoted as finance (Isenberg, 2011), fund (koltai&Company), capital service(Cohen, 2006; Neck et al., 2004), venture capital (Spilling, 1996; Zacharakis, Shepherd, & Coombs, 2003), financial resources (Rice et al., 2014) and investment capital (Spigel, 2017) in entrepreneurship literature. High levels of financial capital reinforce entrepreneurs' confidence and enable them to undertake ambitious strategies. It is so important for start-ups' survive that financial capital is often utilized to measure the success of new ventures.

Human capital

Human capital is comprised of experiences, skills, abilities which individuals possess through education and working. It is denoted as talent pool (Cohen, 2006; Neck et al., 2004), skilled labor source (Bruno & Tyebjee, 1982; Spilling, 1996), talent pool of knowledgeable professionals (Bahrami & Evans, 2000; Zacharakis et al., 2003) and

worker talent (Spigel, 2017) in entrepreneurship literature. The skills and abilities support entrepreneurs to overcome uncertainties and difficulties in the venture creation process. Venture capitals often take the entrepreneurs and other founders' skills and abilities as selection criteria for their decision making (Zacharakis & Meyer, 2000) as human capitals are critical for start-ups.

Social Capital

From a macro-level perspective, social capitals in a region not only indicate entrepreneurs' social ties, but refer to all networks and relationships among different individuals and organizations. Social Capital in the E-ecosystem provides benefits and value to all participants, allowing then gain access to other critical resources.

Table 1- 2 Different types of key elements in E-ecosystem

Author	Type of Key elements	
Daniel Isenberg(Isenberg, 2011)	1 Conducive culture 2 Policies and leadership 3 Finance	4 Human capital 5 Markets 6 Institutions and infrastructure
Steven Koltai(koltai&Company; Nadgrodkiewicz, 2013)	1 Identify 2 Train 3 Connect & sustain 4 Fund 5 Enable 6 Celebrate entrepreneurs	7 Non-governmental organizations 8 Corporations, 9 Foundations, 10 Government, 11 Academic institutions 12 Investors
Boyd Cohen (Cohen, 2006)	1 informal network 2 Formal network 3 University 4 Government	5 Professional and support services 6 Capital Service 7 Talent Pool
Neck, Meyer, Cohen, Corbett (Neck et al., 2004)	1 Incubator organizations 2 Informal network 3 University 4 Government 5 Professional/Support Services	6 Capital Sources 7 Talent Pool 8 Large Corporations 9 Physical infrastructure 10 Culture
Olav Spilling/ Bruno, Tyebjee (Spilling, 1996) (Bruno & Tyebjee, 1982)	1 Venture Capital 2 Experienced entrepreneurs 3 Skilled labor source 4 Suppliers 5 Customers or new markets	6 Government Policies 7 Universities 8 Land or Facilities 9 Supporting Services 10 Living Conditions
(Zacharakis et al., 2003) (Bahrami & Evans, 2000)	1 Venture capital 2 Talent pool of Knowledgeable professionals 3 Universities and research institutions	4 Professional Service infrastructure 5 Customer and lead users of innovation
(Rice et al., 2014)	University-based E-ecosystem 1 Senior leadership vision, engagement and sponsorship. 2 Commitment of faculty/administrative leadership 3 Achieving critical mass	5 Commitment to continuing innovation 6 Commitment of substantial financial resources 7 Commitment over a long period of time 4 Appropriate, robust and effective organizational infrastructure
(Spigel, 2017)	1 Supportive culture 2 Histories of entrepreneurship	7 Policy and governance 8 Universities

	3 Worker talent	**9 Support services**
	4 Investment capital	**10 Physical infrastructure**
	5 Networks	**11 Open Markets**
	6 Mentors and role models	

The Dynamic co-evolution in E-ecosystem

Literatures in clustering and agglomeration concentrate on low transaction costs and munificence resources. This mechanism is also apply to the E-ecosystems as nascent entrepreneurs are easier to access comprehensive resources in a geographically confined niche with low transaction cost. The benefits of co-location for suppliers, customers and specialized institutions which bring knowledge spillovers, input-output linkages and labor market pooling (Delgado, Porter, & Stern, 2010) are also discovered in E-ecosystem. However, the complementary components in the E-ecosystem are not only co-locate together, but also dynamic co-evolve with each other, which is unmatched by clustering. The co-evolution process has been discussed a lot in venture emergence and development (Carney & Gedajlovic, 2002; Levinthal & Myatt, 1994). The interdependence and interplay between key components produce synergistic outcomes which enhance the efficiency of venture creation.

E-ecosystem evolve through a set of complementary components which interact over time (H. Van de Ven, 1993). The entrepreneurship is a highly uncertain journey, including a sequence of developments in assembling resource endowments of basic research, innovation, financing, and competence capabilities, creating institutional legitimating, regulation, and standards(H. Van de Ven, 1993). Nascent entrepreneurs, as the most

prominent elements, face rapidly changing environments and make decisions under highly uncertainty. In order to respond quickly and effectively to such wide range of changes, they have to accumulate a lot of experience and knowledge, and make accurate judgments about the situation. As the entrepreneurs' perception and actions vary even in the same circumstance, many research analyzed entrepreneurs' characteristics like personality trait, learning preparation and entrepreneurial behavior. However, many scholars neglect or disregard the other evolving key components in the ecosystem, such as institutions which provide knowledge and information, investors who bring financial capitals, co-founders who supply special technology, experience and management skills, and governments which furnish the policies and rules. Such key components not only cluster together, but they also interact and match with each other. Most scholars neglect the dynamic co-evolving process among them and, to our knowledge, there is no empirical research that tests the venture creation from a system perspective.

Based on a semantic structure analysis with semi-structured interviews,Neck et al. (2004) holistically discussed the synergistic interaction among the key components in the E-ecosystem and examined the dynamic interplay among these different components, promoting the recognition of firm emergences from a regional perspective. From their qualitative analysis of E-ecosystem,Neck et al. (2004) conclude that the relationships among the components encourage, support and enhance regional level entrepreneurship activity. Although their research did not provide valid explanation for the venture creation

process in the ecosystem, it highlighted the important events and activities that occur within the E-ecosystem. Their research explained how ecosystem foster and transform basic resources into a commercially viable organization. Such events and activities not only include the formal conferences and road shows, but also relate to the informal discussions and communications among founders, partners, inventors, suppliers, and so on.

Many scholars have emphasized the central role of entrepreneurs in combining the key elements together to fill the business gap and exploit entrepreneurial opportunities (Mitchell et al., 2000). They argue that entrepreneurs use the formal and informal networks to collect the complementary components and integrate them into a mechanism organization through many distinctive events (De Clercq, Dimov, & Thongpapanl, 2013). However, as these studies overemphasize the entrepreneurs' driving force, many of them neglect the other components' initiative activity. Beside entrepreneurs' gathering behaviors, other key components, such as social networks, knowledge capital, financial capital, are also co-evolving simultaneously in the ecosystem. These components vary from time to time and flux among different organizations in the ecosystem frequently.

The dynamic co-evolution for the key components are seems irrelevant and directionless, but under a deep examination, all of these events develop under an invisible compass -- maximize their value by integrating into a new venture. For example, professors in the university frequently attempt to transfer their knowledge into innovations and engineers always search the opportunity to implement their patents into the

commercial products. At the same time, investors and venture capitals are searching for investment chances to obtain profits and excellent employees are quitting and joining start-ups to realize their values. Based on a superficial analysis, one may conclude that these flowages have no bearing and they are driven by different forces. However, all of these activities are linked together by an invisible force -- creating new ventures which bring benefit and value to the whole community. The E-ecosystem is not static community, but many complementors co-evolve together simultaneously, comprising a dynamic and flexible system.

A co-evolutionary approach means that, during a set of related events, components for the new firm may alter and change in all interacting populations, allowing the fit and match process which is driven by active roles in the E-ecosystem(Volberda & Lewin, 2003). Despite the concentration of key components in the ecosystem which increases the likelihood of integration, only the munificence of resources and capitals do not guarantee the success of venture creation. As the individual level network is incomplete with holes, obstacles and ill-defined nodes, the existing agents in the ecosystem interact with limited number of other players and the flux and transformation of resource is constrained. On the one hand, there are driving forces which expect the evolution and interaction among the key components in the E-ecosystem to create new ventures. On the other hand, the incomplete networks restrict the knowledge, financial capital, talents, and other resources to flow plenary. Such situation promotes the resources flux and people's communication,

advancing the co-evolution of E-ecosystem from time to time.

Mutual-reinforcing and self-reinforcing

Nothing starts out as an ecosystem. E-ecosystems are not born instantly but generated through a long time development. The critical mechanisms for the E-ecosystem emergence are the mutual-reinforcing and self-reinforcing process. In the early stage for E-ecosystem, a random reason leads to the resource gather together. However, this slight difference may pull the trigger of mutual-reinforcing and self-reinforcing processes. The mutual-reinforcing refers to the reciprocal attraction process between key components in the E-ecosystem. For instance, excellent entrepreneurs and outstanding investors are attracted by each other and co-locate together to seek cooperation opportunity. In addition, besides the co-location which frequently discussed in clustering literature, the co-evolution processes in the E-ecosystem generate mutualism between key components. Entrepreneurs are unable to create a competitive start-up without financial support from venture capitals as well as venture capitals can't discover investment opportunity and obtain return without entrepreneurs.

As Baum and Singh (1994) concluded, firms adopt to environments and also shape the environments. The self-reinforcing process indicates that successful ventures which incubated by E-ecosystems will generate valuable resources, in turn, flourish the E-ecosystems they locate. Successful ventures in the E-ecosystem produce financial return, practice employees with experience and skills and promote strong ties between

participators. As for instance, Silicon Valley incubated Google. In the same time, employees with skills and experience left Google in Silicon Valley and create high-tech start-ups with Google's venture capital. Such mutual-reinforcing and self-reinforcing processes accumulate munificence resources and promote E-ecosystems' development.

Distinctive components and Composition balance

One resource alone will not magically generate entrepreneurship and economic development (Florida & Kenney, 1988). But E-ecosystems like Silicon Valley are more than a random cluster of unrelated resources. In stand, almost all fundamental resources for entrepreneurship can be easily found in Silicon Valley and these resources are always sufficient. For instance, the global talent pool and substantial financial capital in Silicon Valley are remarkable. Resource munificence will increase new venture performance, as well as the survival rates for new firms(Amezcua et al., 2013).

When examine the stage of development for an E-ecosystem, the composition balance is a crucial indicator. In order to create a successful start-up with competitive advantages, the requirement for fundamental resources are must be satisfied. A new venture can't be survived without any fundamental resources, such as financial capital or human capital. The imbalance for key components in an E-ecosystem will raise the resource competition and resource price, encouraging participants engage in speculation rather than entrepreneurship. Many studies exclusively focus on the resource constrains and neglect that a composition imbalance in an E-ecosystem will impede venture creation activities.

The composition balance for an ecosystem will contribute the operating efficiency, benefit the resource combination and lower fixed cost and entry barrier for entrepreneurs.

Fit, match and interdependence

As nascent entrepreneurs implement their start-up plans, they can verify or reject their guiding assumptions and consider whether their efforts should be intensified, redirected, or discontinued (Dimov, 2010). Before or after entrepreneurs carrying out their business ideas, they will communicate with the customers, investors, and partners. Investors' evaluation, market knowledge, customers preference are all integrated through the presentation or communication. Entrepreneurs will receive the feedback and obtain additional information from their audiences, adding new knowledge to the business plans. These pertinent information will help nascent entrepreneurs update and refine their estimate about the opportunity (Dimov, 2010). In a lot of circumstances, the business plans are reinforced or enhanced; in other circumstances, the business plans are challenged or weakened, and then the business plans may be modified or shifted; In some special circumstances, the business plans may be dropped if the investors or partners offer very negative feedback and the entrepreneurs believe that the business model are not feasible.

However, most studies focus on only one side of these events--how entrepreneurs alter their perceptions, judgments and activities. Limited scholars explore the mutual influence process that the other side of these events is also transforming. Under the co-evolution process, members in the community actively or passively exchange ideas,

resources and commitments (Carney & Gedajlovic, 2002). Participants, such as investors, researchers, government, are also learning and changing during the co-evolution process. For instance, investors may change their ideas after a short conversation with the entrepreneurs or investment failure and governments may modify their policies according to the regional economic condition.

During these dynamic fitting and matching process, participates in the E-ecosystem will accommodate themselves to raise coalescent opportunity. Participants not only share the information but also propose their needs to each other. When co-founders communicate, they will disclose their skills, experiences, knowledge and objectives, and, also raise their own needs, such as compensation and time schedule. In order to magnify the operation opportunity, both of them may modify themselves, alter the original expectations and resign themselves to each other. Furthermore, if the equivalence between them cannot be reached, they will switch to other potential cooperators and reappraise their own condition. Participants in this integrating process get feedback from the each other, modify their strategy, adjust their attitudes, and accommodate themselves to the situation (Maskell, 2001). Such accommodations between components in the E-ecosystem will provide more entrepreneurial opportunities or speed up the entrepreneurial opportunity identification. The interexchange enhances the reciprocal influence and consolidates the linkage among the participators. Matches between players not only are important to venture creation, but also influence new venture survival and development in the future(Gimeno, Folta, Cooper,

& Woo, 1997). With the concentration of resource and participants, the fitting and matching processes for resource combination are accelerated in E-ecosystem. The agglomeration economies (Malmberg & Maskell, 2002) are engendered not only between the participants, but all key components within the E-ecosystem.

Despite the evolution for people in the E-ecosystem which can be easily observed, other components, such as policy, culture, infrastructure, are also evolving and progress for emerging ventures, paralleling to nascent entrepreneurs' effort to advance new ventures by their perception and judgment (Kor, Mahoney, & Michael, 2007).In a high level of E-ecosystem, the policy, culture and infrastructure are very supportive to venture creation. Many invisible obstructs and barriers which may exist in other local community are eliminated through a long time development. Through the dynamic co-evolution, participants in E-ecosystem will affect the local rules, policies, public perceptions, institutional boundaries, and so on. For instance, Webb, Tihanyi, Ireland, and Sirmon (2009) investigate how the institutional boundaries are changed by entrepreneurial activities and how informal economy is explored. Consequently, heterogeneous elements combine together through fitting, integrating and matching.

Synergistic Interactions

Inside the E-ecosystems, the dynamic co-evolution, knowledge sharing and mutually influence will speed up the fitting and combining process. In addition, the advantages of the bundle of components will be exploited maximally as the context and culture in the

ecosystem boost entrepreneurship related interactions. Entrepreneurs, as the most active role-player in the process, have to line up these key components in an appropriate order. As these components are clustering in one region and the fitting processes carried out closely, the probability for the synergistic combination will be promoted. For instance, as the investors inside the E-ecosystem are familiar with each other, the social networks are very stable and trust among these investors are fairly close. If an entrepreneur obtained the trust from one of these investors, it will be much easier for him/her to convince other corresponding investors who are concentrating in his/her field. As we see, many investors act as a group and operate in conjunction, smoothing the collaboration. In addition, a lot of investors will be a mentor for the nascent entrepreneurs and provide skills and experiences in the new venture, enhance the new ventures' survive rate and growth rate.

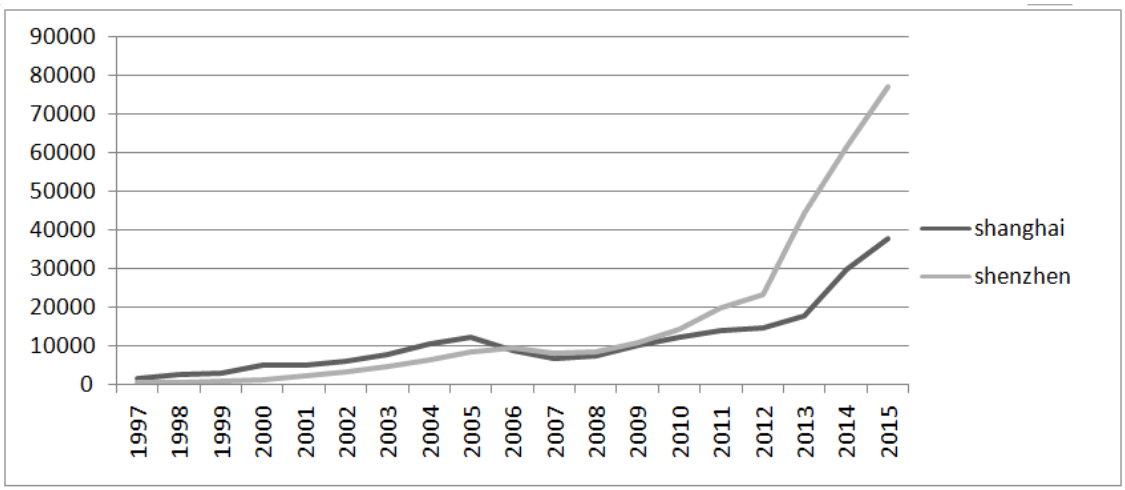
As a result, inside the E-ecosystem, entrepreneurs gain more benefits than their competitors who work outside, Venture capitalists find more investment opportunities, and researcher implements more innovations into commercial products. Success at creating a new venture by commercializing an entrepreneurial opportunity neither rests on a unique capital or a talent entrepreneur, nor depends on the control of access to potential market, but is based on the dynamic interaction for all the elements in the E-ecosystem. I'm not going to map the whole conceptual territory of every component in E-ecosystem. Instead, I want to handle a handful of key components in the ecosystem. These components are necessary (but not sufficient) to create new ventures. The dynamic co-evolving process

within the E-ecosystem will be tested in the next study.

Venture creation efficiency in E-ecosystem

The overall efficiency of regional venture creation is influenced by the fit, match and co-evolution between the components in a local E-ecosystem. The fit, match and co-evolution increase the venture creation efficiency through entrepreneurial opportunity identification, lower fixed cost and entry barrier, regional competition, commercialization process, as well as resources munificence. For instance, Silicon Valley and Boston route-128 have comparable venture creation rate in 1980, but Silicon Valley surpass eminently after that. The large quantity of start-ups in Silicon Valley are benefited not only from the resource munificence which also occupied by Boston route-128, but also from the mutually fit and match among key components, such as evolution(local dynamics), culture (more risk-taking and less hierarchical), fund(VC and PE), Policy (prohibiting noncompeting covenants), talents (new immigrant) (Saxenian, 2001). In addition, Shenzhen, a small town in China 1970s, has outpaced shanghai for the regional tech-venture creation after 2006.

Figure 1- 1 Tech-venture creation in Shanghai and Shenzhen from 1997 to 2015



Data source: National Enterprise Credit Information Publicity System Database (NECIPSD)

Accelerate entrepreneurial opportunity identification

E-ecosystem will provide more entrepreneurial opportunities to entrepreneurs or speed up the entrepreneurial opportunity identification. There are two concepts of explaining entrepreneurial opportunities by whether they are found or created (Z. J. Acs et al., 2009), it is not going to interference our recognition that E-ecosystem provides more opportunities for entrepreneurs. Because the E-ecosystem may both speed up the entrepreneurial opportunity discovering and create more entrepreneurial opportunities. As the dense and diverse network ties in the ecosystem create efficient path for the knowledge sharing and innovation communicating, entrepreneurs are much easier to discover opportunities or generate new ideas. In addition, from the opportunity creating perspective, the abundant resources in the ecosystem raise the feasibility for entrepreneurs to seize entrepreneurial opportunities. The resource-munificent context also eliminates many

potential bottlenecks in the venture creation process.

Lower fixed cost and entry barrier

The resource-munificence and support infrastructure in the E-ecosystem will lower the fixed cost and entry barrier for nascent entrepreneurs. In modern society where divisions of work are based on specialization, start-ups could only focus on a professional field, which means new ventures have supplier and customers. They have to outsource the peripheral activities to support infrastructures such as accounting firms, executive search firms, real estate firms and law firms (Bahrami & Evans, 1995). These support infrastructures can not only hold by a single individual or organization. By sharing the common resources and support infrastructure in a same E-ecosystem, new ventures benefit for lower fixed cost and entry barrier.

Enhance regional competition

E-ecosystems will enhance the regional competition for start-ups. Start a new business is not a single well-known action. Many researchers labeled this complicate process with chaotic and high failure (Cooper et al., 1994). Like a nature ecosystem, the plumy condition in E-ecosystem not on only promote new venture creation, but also attract many new and existing firms from other locations. The density of new ventures raises the local competition, forcing the new ventures to improve their core-competitiveness and enhance their competitive advantage.

Accelerate venture creation and commercialization

E-ecosystem will accelerate the venture creation and commercialization process. The "dynamic" aspect of entrepreneurship has been acknowledged in many studies. The series actions which entrepreneurs perform in order to create a new venture are investigated and summarized, such as: locate business opportunity, accumulate resources, explore markets, production and build an organization(Gartner, 1985). The complex and multidimensional process of venture creation bring serious uncertainty and impediment, increasing the risk and time consumption. However, like a huge entrepreneurship accelerator, E-ecosystem not only exposes the entrepreneurs to complementary resources, but also helps them to combine different elements together efficiently, fairly speeding up the integration process. In addition, there are always seed users in the E-ecosystem who are always attempt to use the fresh products or services. Thus, E-ecosystems reduce the threshold of market access and accelerate the commercialization process.

Under a long time of operation and optimization, the culture, policy, regulation, institutions and other related infrastructure in the E-ecosystem will embrace the venture creation. The friendly environment will lower the difficulty of launching a new technology and nurture the growth of start-up firms (Schoonhoven & Eisenhardt, 1989). The accumulated management skills and experiences in the E-ecosystem will help new ventures to overcome many common problems, increasing survive rate and growth rate.

Discussion

As the E-ecosystem received limited attention from scholars, practitioners, and policy makers, the effect of E-ecosystem on venture creation process and changes is still far from known. Only the obvious benefits and advantages are mentioned in existing literature. Limited studies examine the operation foundation and look into the circulation process inside the ecosystem. There is a lack of clarity regarding the mechanisms by how the E-ecosystem operate and to what extent it influences the local venture creation. Moreover, as I discovered many advantages for E-ecosystem, we are still knowing nothing about the potential cost and offsetting for these benefits.

As the benefits for E-ecosystem are so fascinating, tremendous local governments intend to build up their own "Silicon Valley" worldwide. However, most of these local governments make tardy progress, despite their great efforts in resource investment, tax policy, technology innovation, and so on. To avoid future failure in building up an E-ecosystem, it is important to investigate the mechanisms immediately, filling up the shortage of research in this gap.

Conclusion

From a holistic perspective, a new venture is a combination of complementary resources. To create a new venture, entrepreneurs have to accumulate different resources and compile them into an organic organization. This complex and multidimensional process is more likely to happen and be actualized in a good E-ecosystem. Through the

dynamic co-evolution, mutual influence and synergistic interaction, E-ecosystem provide more opportunities to nascent entrepreneurs, eliminate many potential bottlenecks in the creating process, speed up the fitting and matching for different elements, and raise the local competition between new firms.

One of problems concerning the entrepreneurship process is that it symbolizes a static approach to understanding knowledge, capital and resource(Cope, 2005). Thus, the density-dependent perspective is not fresh. Most of these researches investigated only one or two inputs and discussed them fragmentally. Very few papers inspected the entrepreneurs' dynamic learning perspective and explored their on-going behaviors. The assumed permanence of entrepreneurs' active ability, including learning, changing, adapting and managing, have attracted scholars' attention away from the dynamic entrepreneurial context.

To investigate whether and how the E-ecosystem affect venture creation. I analyze several key components in the ecosystem and examine their influence on the regional venture creation in the next study. It's not new that these key components are important for venture creation. However, I emphasize the composition balance among these components rather than just the importance for one of them. The equilibrium among the components will eliminate the potential bottlenecks and raise the opportunity for new ventures to exceed the invisible threshold.

The purpose of this dissertation is to understand what makes places like Silicon Valley

special and to develop a theory about how E-ecosystem influence the development of new ventures. I propose that the synergistic interaction and dynamic co-evolution among various components of the E-ecosystem enhances nascent entrepreneurs' likelihood of creating and developing new ventures by providing them with diverse essential resources. Unlike prior studies, this research conducts a macro level analysis focusing on the regional level E-ecosystem

Paper 2: Synergistic effect for entrepreneurial ecosystem sponsorship in venture creation

Abstract

In order to nurture entrepreneurship spirit and foster venture creation, many local governments carried out particular policies and strategies, such as provide tax benefits, delegate investment regulation, and offer public subsidies. However, despite the tremendous initiatives and substantial efforts, the mission that build-up another "Silicon Valley" is still far away. By utilizing entrepreneurial ecosystem (E-ecosystem) theory, we argue that the governors' misinterpretation which merely focus on resource munificence and overlook the synergistic interaction among the elements, explains parts of the unsuccessful outcomes. We propose that the dynamic co-evolution and synergistic interactions among the distinctive components in the E-ecosystem have a crucial sponsorship effect in venture creation. To test this conjecture, we empirically investigate the sponsorship effect by using a sample of 2,318,007 technology firms which created from 2004 to 2015 in 285 cities in China. We find that not only the complementary resources in the E-ecosystem contribute the venture creation, but also the synergistic interactions in the ecosystem leverage and accelerate the entrepreneurship process. These findings confirm the agglomeration efficiencies for complementary components in the E-ecosystem and recommend local governments to concern about components balance and

synergistic interactions in the E-ecosystem as well as resource munificence.

Theory background

Venture creation positively affect the regional economy development, job creation, unemployment reduction, innovation, and social stability, strengthening governors emphasize on entrepreneurship. Many local governments implemented many polices and strategies in order to promote venture creation and raise the number of new firms. However, new ventures are always geographically concentrated and founding rates vary in different regions, which can't be manipulated or changed easily by any individual or organization. Many economists have noticed this clustering for a long history.

Many of them attribute this phenomenon that firms could have higher survive rate by agglomerating together rather than higher founding rate (Maskell, 2001). They explain that collocation strategies will produce agglomeration benefit such as transaction efficiency, economies of scale and knowledge sharing, and increase firms' survive rate. Recently, some scholars proposed another explanation that the higher birth rate for new ventures in the original location also impact the geographic agglomeration(Zoltan J Acs & Armington, 2006). For instance, Sorenson and Audia (2000) investigated the footwear production in the United stated and argued that the higher founding rate may explain the existing geographic distribution of footwear producers. Researches in this vein which focus on founding rate attracted more attentions rather than clusters which emphasize on agglomeration benefit recently. According to this inference, local governments consolidate

their anticipation about venture creation and advocate entrepreneurship as well as venture performance.

To boost entrepreneurship, local governments devote great efforts to ameliorate entrepreneurial sponsorship community. However, despite the tremendous efforts and numerous investments, the mission that build-up another "Silicon Valley" is still far away for them. An important reason is that , in the past time, local governments adopt the selection and interaction definitions of fit for venture creation, focusing on single contextual factors affect single structural characteristics(Drazin & Van de Ven, 1985). Abundant of researches only focus in one or two antecedents for venture creation rather than from a holistic perspective. For instance, many studies emphasized the important role of nascent entrepreneurs' characteristics and actions at the early stage but overlook the bottlenecks which come from the shortage of some other specific resources in the E-ecosystem. Because ventures receive almost all of their inputs from the nascent entrepreneurs and thus their development can be deemed largely dependent on entrepreneurs(Dimov, 2010). Drazin and Van de Ven (1985) concluded that such reductionism treats which only focus on how single contextual factors affect single structural characteristics are restricted. Many antecedents are necessary but not sufficient prerequisite for venture creation(Shane & Venkataraman, 2000)

A system approach, which address simultaneously the many elements, resources, participants and criteria that must be considered holistically (Drazin & Van de Ven, 1985),

is more appropriate to investigate regional venture creation. In the same vein, I propose that, in order to promote entrepreneurship, researches as well as governors should not only concentrate on single contextual factors, but also emphasize on all complementary components and their inner synergistic interactions in an E-ecosystem. Because E-ecosystems not only contribute the venture creation directly through resource munificence, but also promote venture creation through its ability to attenuate the bottlenecks and leverage the synergistic interactions between distinct resources.

E-ecosystem - The Mecca for entrepreneurship

E-ecosystems which have abundant resources, favorite culture, entrepreneurial spirit, related infrastructures, supportive government policies, and so on, are often regarded as the Mecca for entrepreneurship. As nascent entrepreneurs lack resources and rarely can afford capital, or generate revenues at early stages, most of them choose to set up the start-ups in an E-ecosystem. Wessel (2013) states:"if you start a technology business somewhere other than the E-ecosystems like San Francisco Bay area, New York, or Boston, you’re stacking the deck against yourself ". In this paper, E-ecosystem is defined as a special economic community which concentrate with talent pioneers，such as entrepreneurs, investors, engineers, researchers, as well as related resources, opportunities, capitals, policies, dedicate to create entrepreneurial firms.

E-ecosystems evolve through a set of complementary components which interact over time(H. Van de Ven, 1993). In the E-ecosystem, key components, such as human capital,

knowledge, finance, network, policies and culture, not only gather together, but also interact and match with each other.Neck et al. (2004) holistically discussed the synergistic interactions among the key components in the E-ecosystem and examined the dynamic interplay among the components, promoting the recognition of firm emergences in a region level. A sequence events and activities in the E-ecosystem, such as road shows, conferences and informal discussions will reinforce the mutually fitting and matching process, transforming the basic resources into commercially viable organizations. Furthermore, the flux of resources, capitals, technologies and talents among different organizations in the E-ecosystem will enhance the interactions and communications. Under such interconnections, participants in the ecosystem may alter their original expectations and resign themselves to each other, accelerating the entrepreneurial opportunity identification. Such co-evolutionary approach may modify and change in all interacting populations, allowing the integration and match process (Volberda & Lewin, 2003).

The huge quantities of interactions inside the E-ecosystem make it difficult for scholars to distinguish the mutually influences among the key components. For instance, as Zuckerberg created Facebook, it is difficult to sort out whether Zuckerberg facilitate the Social Network Service (SNS) market or the growing SNS market which fostered by MySpace, contributed Zuckerberg's success. But, undoubtedly, entrepreneurs and customers will influence each other and the mutual reinforcement will speed up the entrepreneurial opportunity identification and the commercialization for the new ventures.

Besides customers, entrepreneurs also interact with the researchers, employees, investors, suppliers, co-founders and so on. In the Silicon Valley, the resource mobility is very high. Information, capitals, technologies and talents are circulating frequently and freely and they integrate together organically in the E-ecosystem to produce value and wealth. The bureaucratic controls which exist in the traditional business and impede resources transformation are attenuated in the E-ecosystem(Hamel, 1998). Furthermore, a successful operating E-ecosystem is not based on resource enrichment, but depends on its ability to attract resources and talents(Hamel, 1998).

E-ecosystems in China

China, one of the biggest economic entity in the world, is still under the rapid grow stage. There is no country in the world like China which possesses rich diversity and great disequilibrium of venture creation. As some regions in the east coastline in China are highly developed, others are still underdeveloped and lagged behind. By examining the hundreds of municipal-level cities in China, we find that the complexity and sophisticated circumstances provide us a very good target to investigate.

First, As the fast growing economies, China has become a major economic force in the world(Bruton, Ahlstrom, & Wan, 2003). However, most of the entrepreneurship literature still exclusively focused on North American and European research sites(Bruton, Ahlstrom, & Obloj, 2008). Very sparse research has explored the entrepreneurship activities in this "economic elephant". This paper is trying to shield lights on this gap,

promoting our recognition about the regional entrepreneurship activities in China. Second, as the manufacturing workshop of the world, China still lack the entrepreneurial expertise to develop entrepreneurial ventures(Wright, Liu, Buck, & Filatotchev, 2008). It is crucial for scholars to investigate how the initial resources and expertise are accumulated for entrepreneurial venture creation. Third, in the past decades, China is always critiqued for its imitation and the products with low quality. To revise this expectation and transfer from imitation to innovation, many macro-level strategies are implemented by both the central government and many local governments, such as China's Five Year Plan, Industry Park Plan, Returnee Entrepreneurship Plan and Mass Entrepreneurship and Innovation. All these policies and strategies are seeking a formula to facilitate innovation and entrepreneurship. Whether and how such strategies work is a matter of considerable interest. Besides, China, as one of the most dynamic economic entity, provides good opportunities to explore the E-ecosystem transformation.

Compare with other counterparts in economies, the government, legal and financial institutions are underdeveloped and face environmental turbulence (Li & Atuahene-Gima, 2001). In 1990s, it was believed that violations in patent and copyright, unfair competition and contracts were common in China and the private ownership problem constrained the entrepreneurship (Tsang, 1996). The financial market was weak and small. In 2001, the VC industry in China (U.S. $2.5b) were much smaller than Singapore (U.S.$8.5b) (Zhang et al., 2008).

But this situation has changed since the later 1990s, Chinese government carried out many national policies are quite favorable to innovation and entrepreneurship (Engel, 2015). Entrepreneurs with good skill and experience received warm welcome, especially for individuals have working or education experience abroad. Many science park and innovation center are established with local policies and cultures vary by regions in China. Private equity (PE) and Venture Capital (VC) industries are booming after 1998 in China (Batjargal & Liu, 2004) and they are playing as one of the important role in entrepreneurship and innovation in China. With a steady economic transformation over the past 20 years (Ahlstrom & Bruton, 2002), the diversity and dynamic economy in China provides us a good research target.

Entrepreneurial firms VS Small Business

The difference between entrepreneurs and small business owners has been investigated thoroughly as many scholars treat the entrepreneurs as an entity(Brockhaus, 1980). The distinct characteristics and their applications for entrepreneurs, managers/small business owners are examined repeatedly. However, the investigation between entrepreneurial firms and small business is not so eminent. Many studies of entrepreneurship equate small business and entrepreneurial firms and overlook difference between them. From a teleology perspective, both small business and entrepreneurial firms are commercial organizations. However, from a dynamic co-evolution perspective, the basic requirements and sequential activities for small business and entrepreneurial firms

have many differences. Although there is much overlap between entrepreneurial firms and small business, these concepts are different (Carland et al., 1984).

If ventures are in the early stage, it is not easy to distinguish entrepreneurial ventures and small business. Based on the data from Small Business Administration, there are 2000,000 small businesses in the US and only a portion of them belong to entrepreneurial ventures. The indeterminacy factors which can be used to distinguish entrepreneurial ventures and small business lead to confusions in many areas, even in the government's statistics process. According to U.S. Small Business Administration, "a small business concern shall be deemed to be one which is independently owned and operated and which is not dominate in its field of operation". However, this rule is also satisfied by the early stage entrepreneurial firms. But not all new ventures are entrepreneurial firms, the key difference is that whether they grow over time(Carland et al., 1984). They define the entrepreneurial firms and small business in the following way:

"Small business venture: A small business venture is any business that is independently owned and operated, not dominant in its field, and does not engage in any new marketing or innovative practices.
Entrepreneurial venture: An entrepreneurial venture is one that engages in at least one of Schumpeter's four categories of behavior: that is, the principal goals of an entrepreneurial venture are profitability and growth and the business is characterized by innovative strategic practices."

Although many people or even some scholars mixed entrepreneurial ventures and small business together, I distinguish them in this paper. Not only they have different outcomes for profitability and growth, but also E-ecosystems influence them differently for

their innovative strategic practices. Unlike small business which can be supported easily by friends and relatives, entrepreneurial firms require abundant of professional components, such as knowledge, management skills, excellent team, venture capital, lead-users, social networks, and so on. With these requirements, entrepreneurial firms always confront bottlenecks and incapable of survive without E-ecosystem sponsorships. Thus, in this study, we will concentrate on new technology firms which are more proximate to entrepreneurial firms. We argue that E-ecosystem influence more on entrepreneurial firms than small businesses.

The role of E-ecosystem sponsorship

E-ecosystem, as a particular resource munificence community for venture creation, provides a loose and comfortable context for entrepreneurs. In addition, E-ecosystems eliminate potential bottlenecks for venture creation, providing more entrepreneurial opportunities. It's much more difficult for entrepreneurs to create entrepreneurial firms than small business for the sophisticated integration process. It also takes much more time for entrepreneurs to successfully commercialize the entrepreneurial firms than small business. However, E-ecosystem will benefit the integration process and accelerate the venture commercialization by providing useful networks and ties. In a word, as entrepreneurial firm creation is more innovative strategic practices, I argue that the high level of E-ecosystem will hatch more competitive firms.

The absence of core theory for E-ecosystem is obstructing scholars' endeavor in this

field. Few achievements are reached in the existing literature and the specific guidelines for E-ecosystem have not as yet been elucidated. For instance, the definition for E-ecosystem varies from one study to another. Also, the key components for the ecosystem are outlined differently (Isenberg, 2011) (koltai&Company; Nadgrodkiewicz, 2013） (Cohen, 2006). (Bruno & Tyebjee, 1982; Neck et al., 2004; Spilling, 1996). As the whole E-ecosystem are so complex and dynamic, I cannot list the all elements in the system and map the boundary for it.

Constructs and Hypotheses

In this research, I will emphasize on the four key components in the E-ecosystem: human capital, knowledge capital, social capital and financial capital. Because these four components are shown to be positively related to entrepreneurship repeatedly and recognized generally as antecedents for venture creation in previous researches. For example, Isenberg 2001 mentioned financial capital which is defined as fund by koltai&Company; Nadgrodkiewicz, (2013), capital service by Neck et al., (2004) and Venture capital by Spilling (1996). Isenberg (2011) also mentioned human capital which is defined as talent pool byCohen (2006), Neck et al. (2004) and knowledgeable professionals by Zacharakis et al. (2003).An extensive body of studies investigated these four elements, providing matured research foundations and constructive theory guidelines. The knowledge spillover theory not only explain how knowledge capital provoke entrepreneurial opportunities, but also explore the relationship between knowledge and

venture creation process(Audretsch, 1995).

In addition, the mobility and variability for these components are higher than most other components in the E-ecosystem, such as universities, culture, government policy, and supportive infrastructure. The strict boundaries and hierarchical structures in E-ecosystems are attenuated and these resources flow frequently from this organization to the other. In Silicon Valley, the good flow property and uniformity win considerable critical and public acclaim. The interchanges of resources and capitals promote the co-evolution and synergistic interaction in the ecosystem. Thus, by concentrating on these most dynamic components, we intend to capture the evolutionary and synergistic interaction features in the Ecosystem and empirically test the relationship between these features and venture creation in different regions.

1 Knowledge capital

Many studies have explored the positive impact of knowledge on the entrepreneurial activity(Zoltan J Acs, Audretsch, Braunerhjelm, & Carlsson, 2004; Audretsch & Keilbach, 2007) and propose that an intensive knowledge context will contribute to new venture emergence. According to (Zoltan J Acs et al., 2004), entrepreneurs identify and exploit entrepreneurial opportunities via knowledge spillovers. The E-ecosystems cultivate opportunities to the nascent entrepreneurs in two steps. First, a context that is rich in knowledge generates entrepreneurial opportunities for those ideas created (Z. J. Acs et al., 2009). With the benefits of social network and infrastructures in the E-ecosystem,

entrepreneurs have more opportunity to reach radical innovation and new knowledge. Second, through formal or informal entrepreneurial ties and events which concentrated in the community, E-ecosystems enhance entrepreneurs' sensitivity and strengthens their capacity to recognize and explore the potential opportunities(Sorenson & Audia, 2000).Lots of research shows that a large portion of firms are set up based on the new knowledge and technical innovations created by universities, R&D centers and other research organizations. For instanceArdichvili, Cardozo, and Ray (2003) and Rasmussen, Mosey, and Wright (2014) conclude that the environment for U-BEEs(University based E-ecosystem) is particular as university spin-offs usually involve the formation of a business opportunity based on radical or disruptive technology or tacit knowledge emerging from academic research. Knowledge spillover theory of entrepreneurship (KSTE) (Audretsch, 1995) provides a good explanation for this exploitation process and suggest that entrepreneurial opportunities are endogenous variables via knowledge spillover. Many scholars have concluded that location matters by emphasizing the influence of geographical proximity to knowledge sources and new firms formation (Cassia & Colombelli, 2008). Individuals' start-up intentions would be higher in this specific knowledge context (Guerrero & Urbano, 2014). In the same stream, I argue that E-ecosystems with abundant of new knowledge and technology innovation will promote the venture creation.

Although new knowledge or innovation is an essential resource for an entrepreneurial

opportunity, it is not sufficient for entrepreneurs to recognize these opportunities and wrap up well into business plans. One reason is that entrepreneurs had to acquire and employ some form of market related competency to construct the business models(Rasmussen, Mosey, & Wright, 2011). Both “academic” knowledge and “market” knowledge is essential to successfully exploit a business opportunity. As career academics often lack the ability to interact with the market in order to position their work relative to commercially available technologies (Rasmussen et al., 2011), it more easier for entrepreneurs to interact with investors and lead-users inside the E-ecosystem and combine "academic" knowledge and "market" knowledge together.

H1 There is a positive relationship between an E-ecosystem’s concentration of knowledge capital and the number of new venture created.

2 Financial capital

H. E. Aldrich and Martinez (2001) argue that the transformation of an idea into an organization requires entrepreneurs to acquire and mobilize resources. From the resource-based view (RBV), firms are recognized as “bundles of resources” which form the structure and create competitive advantage (Wernerfelt, 1984). Resources which are valuable, rare, costly to imitate, and difficult to substitute can provide firms with a sustained competitive advantage over their competitors (J. Barney, 1991). There are two paths that firms can obtain their resources, acquire strategically from the environment or built internally. As most new ventures have no time to develop and accumulate resources

internally, most resources for the new ventures are assembled by entrepreneurs from the E-ecosystem in their early age. An important threshold for nascent ventures is to gain sufficient credibility to access and possess key resources such as knowledge, financial and human capital to form competitive advantage(Rasmussen et al., 2011). Vohora, Wright, and Lockett (2004) also suggest that entrepreneurs need the "ability to gain access to and acquire an initial stock of resources which are required for the business to begin to function". Thus, the ranges of initial resources which entrepreneurs obtain or have accesses are become a crucial antecedent for start-ups. On the one hand, entrepreneurs have to explore and exploit entrepreneurial opportunities. On the other hand, entrepreneurs have to assemble and organize value resources, including, funds, assets, human, technology, reputation.

In previous research, different kinds of rare resources have been discussed from the RBV perspective, from tangible resources to intangible resources. Financial capital is one of the most visible resources inside the new ventures. Cooper et al. (1994) suggest financial capital is one of the most crucial resources for entrepreneurship process. In addition, it can transfer into other form of resources when needed, creating a buffer against deficiency of capability or random shocks. Also, the financial capital will allow entrepreneurs to carry out aggressive strategies flexibly which may provide barrier to imitation(Cooper et al., 1994).Inadequate financial resources are cited frequently as one of the primary reason to explain the failure of emerging business. With the benefits of financial capital in the

E-ecosystem, nascent entrepreneurs are more likely to reach this threshold and create new ventures. Our second hypothesis is

H2 There is a positive relationship between an E-ecosystem's concentration of financial capital and the number of new ventures created.

3 Human capital

Human Capital, conceptualized by(Becker, 1964), refers to learned skills and expertise that individuals develop through their prior training, experience and education. On the one side, the formal education will increase individuals' knowledge and recognition. On the other side their working experience and practice action also enhance their non-formal education learning(Davidsson & Honig, 2003). Specific training courses outside the campus also play an important role in educational structures. In addition, the importance of human capital in entrepreneurship process is also proposed by(Cooper et al., 1994). Interestingly, although lots of previous research has found the positive relationship between human capital and venture performance, the results for human capital and venture creation are mixed.Unger, Rauch, Frese, and Rosenbusch (2011) found a significant but small relationship between human capital and venture creation success. Batjargal (2007) investigate the human capital by western experience of entrepreneurship which is positive and startup experience of entrepreneurship which is negative. Dimov (2010) also examined the relationship between human capital and venture emergence and found the coefficient for entrepreneurial experience is not significant and the coefficient for industry experience

is positive and significant.

An important reason for the mixed results is that methods which are utilized to measure human capital for entrepreneurship are inconsistent, such as education (Cooper et al., 1994), salary, working experience(Zacharakis & Meyer, 2000), and so on. In existing literature, studies testing the relationship between human capital and venture performance often use the same measurements and most results are positive and significant. However, when testing the relationship between human capital and venture creation, scholars are at a loss what to do. Because there is no theory to explain who would be a better candidate for entrepreneurship. Previous researches which intend to distinguish entrepreneurs from nonentrepreneurs are inconclusive (Brockhaus, 1980; Carland et al., 1984; DeCarlo & Lyons, 1979). No one knows who will be the next entrepreneur and what kind of personality is better for an entrepreneur.

As there is no standard method to measure human capital for venture creation, we will employee general human capital other than management know-how to capture the human capital in an E-ecosystem. General human capital, represented here by the entrepreneur's education, may reflect the extent to which the entrepreneur has the practice to obtain relevant skills and knowledge. Management know-how is more related to industry experience. It reflects managerial skills and knowledge, without regard to the kind of business(Cooper et al., 1994). In the other end, generic human capital is the human capital resources that are “transferable across a variety of firms”(J. B. Barney & Wright, 1997). As

the knowledge and capacity for entrepreneurs are much more complex than managers in a specific industry or position, in this paper, we pay more attention to the general human capital rather than the management know-how skills.

Although it is wildly accepted that education frequently producing non-linear effects in supporting the probability of becoming an entrepreneur, or in achieving success(Davidsson & Honig, 2003). I suggest that the abundance flux of general human capital within the E-ecosystems will enhance matching and interaction of heterogeneous resource, promoting nascent entrepreneurs' venture creation process.

H3 There is a positive relationship between an E-ecosystem's concentration of human capital and the number of new ventures created.

4 Social capital

Social capital refers to the ability of individuals to extract benefit from their social structures, networks, and memberships. This theory has been developed by the sociologists and promoted to explain the industry creation, career success, firm performance, and so on(H. E. Aldrich & Fiol, 1994). Network provides benefits and value to its members by allowing them access to different kind of resources that are embedded within the social network(Bourdieu, 1985). Social network as vessels and channels in an E-ecosystem, transfer knowledge and information and provide more fit and match opportunities for resources. It is especially important for nascent entrepreneurs. First, in the early stage of venture creation, entrepreneurs can't accumulate resources, such as reputation, culture,

alliances, expertise. A lot of these resources are generated based on a long time operation. Second, accesses to rare resources are often restricted for nascent entrepreneurs as their social ties are weak and the structural holes exist. Undoubtedly, the structural holes set up barriers for entrepreneurs to obtain resources easily (Burt, 1997). However, this individual level weakness could be improved by regional level social capital in the E-ecosystem as the networks and ties inside the ecosystem are complete and dense. Once a nascent entrepreneur shows his/her model business to other individuals in the E-ecosystem, the existing social networks in the system will bring him/her investors, leading-users, suppliers actively or passively.

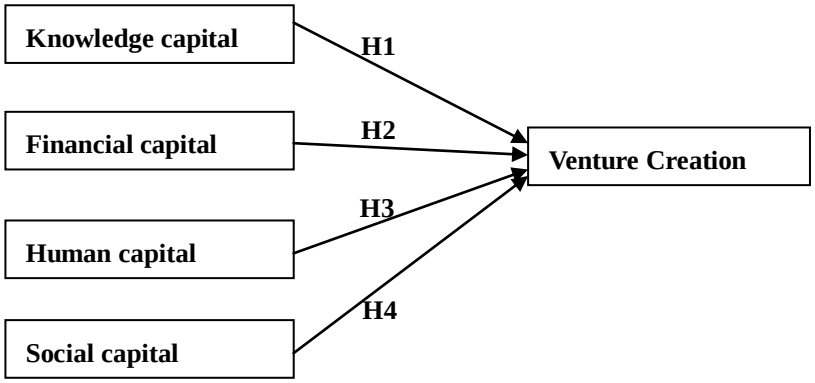
In this study, I focus on the broad regional level social capital utilization. Since heterogeneous resources spread widely in the E-ecosystem, entrepreneurs have to connect and gather these resources together. Traditionally, scholars use partnership or family members to measure individual level or organizational level social capital. Because firms, especially small business or family business, are operate on account of the family and relative ties. However, as we are focus on the entrepreneurial firms in this paper, the regional level social capitals are important as well as individual level social ties. Despite a small group of nascent entrepreneurs are still depending on their family relationships, a lot of them are using the professional social networks, such as industry associations, investment conference, to create entrepreneurial ventures. For instance, many investors and entrepreneurs know each other based on the industry conference. Nowadays, social

structure in E-ecosystem plays a more and important role in venture creation, especially for entrepreneurial firms. Comparing to the traditional firms where lots of co-founders are family members or friends, founding teams' back ground are much more diverse in recent entrepreneurial firms.

Thus

H4: ***There is a positive relationship between an E-ecosystem's concentration of social capital and the number of new ventures created.***

Figure 2- 1 : Step 1 direct effect



Synergistic interaction

It's not a new topic in resource base view that resource munificence will contribute venture creation. However, scholars tend to discuss resources separately while ignoring how the interdependencies between these elements create and reproduce the overall ecosystem (Motoyama & Knowlton, 2017). From knowledge spillover theory (Audretsch & Keilbach, 2007) to social ties theory (Burt, 1997), scholars prefer to investigate different resources in the entrepreneurship process rather than empirically examine the synergetic

interactions and agglomeration economies for these resources. Although the prominent effect of interactions among different elements for new venture creation has been highlighted by Gartner (1985) for a long time, limited researches has verify these influences from a holistic perspective. The synergetic effects of key elements in the E-ecosystems are often underestimated. Coleman (1988) emphasized the synergistic interactions and examined the indirect effects. Florin, Lubatkin, and Schulze (2003) also investigated the indirect effect of human capital, financial capital, social capital by testing the positive relationship between the interaction of these elements and venture performance. But they concentrated on venture performance rather than entrepreneurship process. To address this gap, this article examined the internal interactions between the valuable elements. We argue that beside the resource munificence, E-ecosystem also benefits venture creation by synergistic interactions between different components in the system.

Based on E-ecosystem theory, different key components are co-evolving simultaneously and flux actively among different organizations, comprising a dynamic and flexible system. These elements interplay with each other and the mutual-reinforcing enhance the fitting and matching process. Through the co-evolution, participants may resign themselves to each other and heterogeneous resources may alter and change for the integration, bringing about the mutualism. The underlying mechanism is that the E-ecosystem maximizes the integration opportunities for different elements. The mutually

integration processes contribute the entrepreneurship by normalizing and legitimizing support within the large community.

It's much easier to produce a single product or provide one-time service rather than manufacture a huge number produces and distribute them to tremendous customers with certain standard and under low cost. A new venture is supposed to accomplish such undertaking, applying the new knowledge and innovation into a large-scale manufacture and provide tremendous products and service with low cost. To achieve this aim, entrepreneurs have to build up factories, business premises, and supportive infrastructures. Undoubtedly, the fixed cost and entry barriers are escalated into a high level, such as the semiconductor industry in Silicon Valley. Through the interactions between knowledge capital and financial capital in the E-ecosystem, entrepreneurs leverage the power of finance and overcome the restrictions from entry barriers and fixed cost, disseminating the new knowledge to public through general products and service. In addition, the mutual-reinforce mechanism between financial capital and knowledge capital are also investigated.

H5*: The interactions between knowledge capital and financial capital in an E-ecosystem have a positive effect on its ability to create new ventures.*

New ventures commercialize the new knowledge and create value by applying the new technology or innovation into produces or services. However, the skills to produce new knowledge and the skills to utilize innovations and integrate them into our daily life

are often belongs to different individuals. The interaction between entrepreneurs, managers, scientist and researchers will overcome this deficiency and barrier, yielding more entrepreneurial opportunities. Once the feasibility of commercialization are tested, entrepreneurs, scientists and other founders could combine together to create a venture. Such interactions between knowledge capital and human capital occur insensitively in E-ecosystems, facilitating venture creation.

H6*: The interactions between knowledge capital and human capital in an E-ecosystem have a positive effect on its ability to create new ventures.*

Not all knowledge and innovations are valuable unless they are implemented in an appropriate product or service. Knowledge and information create limited value in the labs or universities, but benefits great amount of customers after it combined with merchandises or services. The interactions between knowledge capital and social capital will overcome the mismatch barrier and promote entrepreneurial orientation. Social networks like vessels dispatch and allocate resources in E-ecosystems, allowing the knowledge sharing and dissemination. It will create the bridges between scientist, customers, entrepreneurs, and so on, and accelerate entrepreneurial opportunity identification.

H7: *The interactions between knowledge capital and social capita in an E-ecosystem have a positive effect on its ability to create new ventures.*

As ventures are a bundle of complementary resources, how to drive the resources, especially the talent pools, together and organize them into an efficient entrepreneurial

team is an arduous journey. Large-scale manufacturing capabilities for new ventures require not merely financial capital to overcome the fixed cost, but the regulatory know-how, market knowledge, and access(Rothaermel & Deeds, 2006). Rare and value resources, especially the human capital, are difficult to evaluate and challenging to combined them together. Tremendous start-ups failed because the conflicting value judgments among investors, entrepreneurs, co-founders and employees. However, human capital could attract financial capital especially in the early age for new ventures (Baum & Silverman, 2004). In addition, through the interactions between financial capital and human capital in the E-ecosystems, it will be easier to answer "how much it worth for what you know (human capital)". Because more bargain opportunities are provided and the negotiation process between financial capital and human capital promote the fit and match. Entrepreneurs, engineers, managers, investors, even the whole leading teams, are more precisely to position each other and combine into prototypes of start-ups.

H8: ***The interactions between financial capital and human capital in an E-ecosystem have a positive effect on its ability to create new ventures.***

Based on the network theory, social capital contributes venture creation directly by transferring the supplements and requirements of diverse resources. Furthermore, its productive potential is also determined by its interactions with financial capital (Coleman, 1988; Florin et al., 2003). Venture capitals with rich social networks are more likely to find

out the investment opportunities they are seeking. The supreme social networks in E-ecosystems increase the mobility of social capital and decrease the information asymmetry between entrepreneurs and investors.

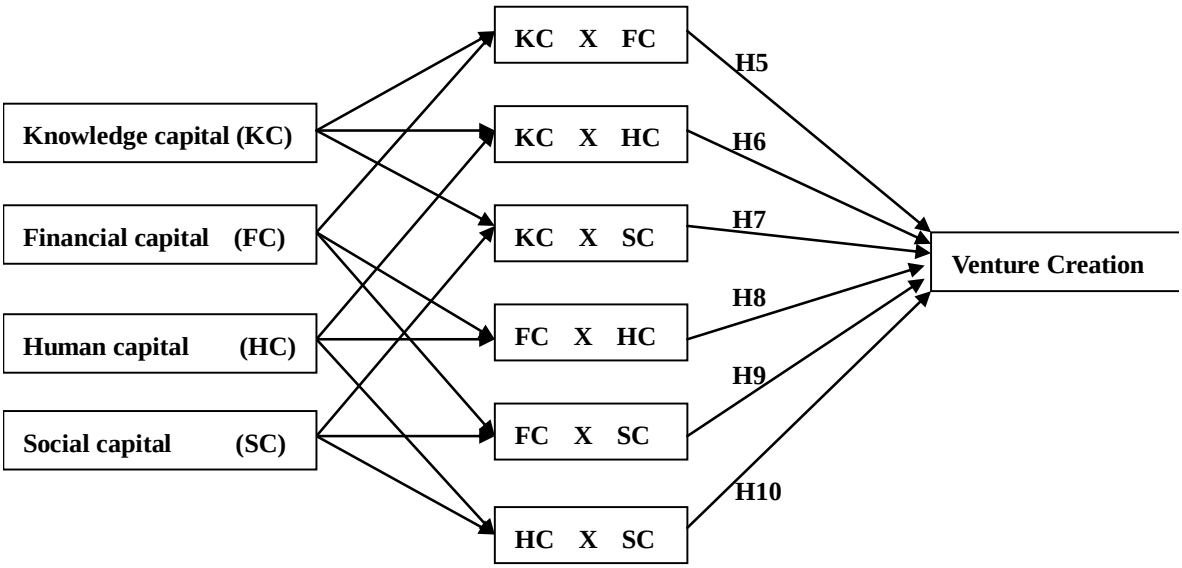
H9: ***The interactions between financial capital and social capital in an E-ecosystem have a positive effect on its ability to create new ventures.***

Marsden (1990) proposed that better educated and trained individuals are more likely to participate in social circles and clubs which possess rich resources. In the other end, individuals who involve in elite social networks have better opportunities to practice and learning. The better human capital leads better social capital and vice versa (Lin, Cook, & Burt, 2001). Thus, the mutual reinforcing process in the E-ecosystem will promote the fit, match and combination between these elements and increase venture creation efficiency. For instance, Computer Science students who graduated from Stanford University are very competitive for the excellent education and training, and many of them got good positions in different technology companies in Silicon Valley. The resemblance and similarity drive them to keep close or loose relationships and they will set up clubs, conferences, or regular conversations specialized in computer and internet technology frontier. In the other end, more individuals with experience and skill in computer and internet will be drawn into such specialized social networks. Human capital not only shapes, but also shaped by social capital. As Zhang et al. (2008) summarized that "what you know (human capital)" influence "who you know (social capital)" and "whom you choose (network utilization)".

The interactions between human capital and social capital increase the trust for talents and provide more opportunities for them to cooperate.

H10: ***The interactions between human capital and social capital in an E-ecosystem have a positive effect on its ability to create new ventures.***

Figure 2- 2: Step 2 Indirect effect



Data & Methods

Sample

Unlike previous researches on entrepreneurship with small, nonrandom samples, I use the National Enterprise Credit Information Publicity System Database (NECIPSD) which has been established by State Administration for Industry & Commerce of the People's Republic of China (SAIC) from 2014 and represents the population of all enterprises founded in China. The data comes from the enterprises' annual reports which required by

the government and collected by the Administration for Industry & Commerce at all levels in China. I find 5472 city-year observations which cover the period 1997-2015. During those years 2,860,493technology firms appeared in the database and 2,543,898 of them located in the 333 prefectural-level cities. These data have several advantages over the widely used "Chinese Industrial Enterprises Database"(CIED) (Nie, Jiang, & Yang, 2013; Song, Storesletten, & Zilibotti, 2011). First, unlike the above-scale requirement of annual sales for an enterprise of above 5 million RMB (~$750,000 US, 20161) to be included in the CIED data, the NECIPSD covers all enterprises without sales requirements in China and includes more than 80 million enterprises. This makes our data more suitable to study new ventures in their early years from a system view. Second, while 90% of the enterprises covered by CIED are in "industrial classification for national economic activities" (defined as: mining industry, manufacturing industry, mining industry, production and supply of electricity, gas and water) (Nie et al., 2013), our data covers all manufacturing and service sectors. Thus, it provides a more comprehensive representation of the Chinese economy and the trajectory it has followed since the 1990s in particular when concerning new ventures. Table 1 summarizes the number of new enterprises in each year under different scales during 2004-2015.

[1] The minimum requirements for inclusion in the CIED data were increased to 20 million RMB (~$3 million

Table 2- 1 New tech-enterprise created in China

New venture / Year	Total New Tech-enterprise	Under 5 million RMB	5-10 million RMB	10-50 million RMB	Above 50 million RMB
2004	88504	73141	7355	6465	1543
2005	98686	81603	8447	7045	1591
2006	106709	86818	9711	8236	1944
2007	102474	81766	10442	8382	1884
2008	109059	86106	11776	9153	2024
2009	140769	109912	15797	12474	2586
2010	163685	124393	19949	15859	3484
2011	195042	147560	24501	19111	3870
2012	206458	156625	25852	20138	3843
2013	269613	204266	35126	25580	4641
2014	481727	338056	78420	55269	9982
2015	636367	419306	122964	79491	14606

New ventures have to register in the government and report their scale once they created

I. 5 million RMB (~$750,000 US)

II 10million RMB (~$1500,000 US)

III50million RMB (~$7500,000 US)

Third, comparing with the CIED, the NECIPSD includes more basic but less financial information at the enterprise year level. The dataset includes: unique identification number, name, establish year, address, industry, contact information, law suits, ownership structure, main managers, registration type, intellectual property right, annual reports, patents, Foreign investment, and so on. Fourth, although a lot of financial information is absent in the dataset, such as operation profit, cost and tax. It is a valuable dataset which provide the exhaustive information of all enterprises in China, considering the great complexity and huge distinctions in different regions.

We use the Prefecture-level city as a unit of analysis2. We argue that Prefecture-level city is the right unit for empirically test our theory of E-ecosystems since the urban core and adjacent communities have a high degree of economic and social integration. While there are more than 600 cities in China, only333 are Prefecture-level cities3.

Furthermore, we focus on new technology companies for their profitability and growth and engage in innovative strategic practices. New technology firms are employed as entrepreneurial ventures in this research where E-ecosystems will play a more important role in them emerge stage. Technology firms needs complementary resources, such as financial and intellectual property(Katila, Rosenberger, & Eisenhardt, 2008) and they also require more skills than one individual, which necessitate diverse team members to cooperate together (Gartner, 1985). Thus, in contrast with small business, such as grocery stores which will emerge in most communities, technology enterprises require a good E-ecosystem to sponsorship their creation and growth.

In previous researches, a lot of scholars investigated the technology firms in specific industry affiliations (Flatten, Engelen, Möller, & Brettel, 2015), such as biotechnology firms Sorenson(T. Stuart & Sorenson, 2003), IT hardware, software, telecommunications,

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[2]Prefecture-level cities (Metropolitan Area in US terms) are an administrative unit comprising urban core (*a city in US terms)*containing a large population nucleus, together with adjacent communities of mostly rural.
[3]Criteria for exclusion are: 1) non-farming population is less than 250,000; 2) value of industrial production value is lower than 2 billion RMB;3) The value of industrial production is less than 35% of the prefecture city GDP; 4) annual federal budget for the prefecture city is lower than 200 million RMB. [4] SOOPAT is a China patent database. The data source is provided by State Intellectual Property Office of the P.R.C.

or use the venture banked firms as high-tech firms (Podoynitsyna, Song, van der Bij, & Weggeman, 2013). However, technology enterprises not only exist in these innovative industries but also emerge in other traditional sectors without regard of venture capital. To investigate the E-ecosystem from a broad view, we exam all technology enterprises without regarding industries. In according with (Neck et al., 2004)that used the R&D/Manufacturers directory to detect the 999 technology firms. In this research, we employ the NECIPSD as enterprise directory to find the new technology firms. Even though some of these new technology firms that we find may not satisfy the three criteria provided by Haiyang (Li & Atuahene-Gima, 2001)4. This method is still acceptable considering the entrepreneurial firms are small, uncertain and high mobility.

These criteria allowed us to identify 5472 firm-year observations, accounting for 2,543,898 new technology enterprises which located in Prefecture-level cites. Since some of our covariates are also measured at the Prefecture-level city level, we merged the NECISD with three additional datasets: China City Statistical Yearbook, Census of Population and SooPAT[5].The merging process forced us to exclude firms located outside the urban core, enterprises founded during 1997-2003, and 48Prefecture-level cities with restricted variables, such as Lhasa, Bijie, and Tongren. The final data used for analyses

[4]Technology firm criteria: 1 that the management of the firm be composed of engineers or scientists; that 30 percent or more of its employees be technical employees; 3 that it spends 3 percent or more to total sales on R&D

[5]SooPAT, created in 2007, is a professional patent database. Both China Chinese patents and patents worldwide are included. The quantity of the collection is over 72 million in 98 countries.

includes 3420 city-year observations, 2,318,007 technology firms that were founded during 2004-2015, and located in 285 prefectural-level cities.

The data for NECIPSD is not new, however, the dataset is unique insofar which merger all dataset in 31 regions in China together. Very limited researches examine such a comprehensive set of enterprises in China so far. According to the government requirement, all enterprises in China have to send the annual report to the State Administration for Industry & Commerce of the People's Republic of China (SAIC). If enterprises do not submit the report to the SAIC by the stated period every year, SAIC will put these enterprises on the abnormal operation list and warn them to comply their obligations. In addition, if enterprises do not submit the report more than 3 years, they will be blacklisted and never be returned to normal. As a new and comprehensive dataset, NECIPSD possesses several limitations and restrictions. First, NECIPSD presents very limited financial information compared with CIED which provide exhaustive information about the firm performance. Thus, even though we can detect the new ventures emergence through this dataset, we can't chase the dynamic development process for each observation. Second, for the reason of hug economic development distinctions in China, regional differences exist in the NECIPSD dataset. For instance, annual reports for each enterprise are provided in many well developed provinces but are absent in some undeveloped provinces in China.

Dependent variable

Level of technology venture creation in a regional level E-ecosystems

For the dependent variable, I measure entrepreneurship level by the rate of technology firm births per 10,000 persons in a city (Audretsch & Fritsch, 1994). We calculate the level of technology venture creation by counting the number of technology firms created in a city in a year and divided this number by city population (in ten thousands).The population data are from the China City Statistical Yearbook, which provided by National Bureau of Statistic of the People's Republic of China. One of our main goals is to find the ecosystem's different sponsorship in venture creation. As the scale of E-ecosystems vary based on the population of the city, it will be better to compare the relative number of new ventures to the population, rather than their absolute numbers of venture created. From the NECIPSD dataset tracking series, 2,318,007 technology firms were founded in 285 prefectural-level cities during 2004-2015. We interpret the entrepreneurship rate as the outcome of an E-ecosystem.

Independent variable

Concentration of knowledge capital: patents per capita

Knowledge spillover is an important indicator for entrepreneurship. In order to calculate the concentration of knowledge capital in the regional E-ecosystems, we divide the number of new patents in the city at year by the city population as the knowledge capital. Patents are recognized as the output of innovative efforts and technology

knowledge in a region(Zoltan J Acs, Anselin, & Varga, 2002; Clarysse et al., 2014; Gilbert, McDougall, & Audretsch, 2008; Plummer & Acs, 2014), they are employed reasonably to estimate the level of new knowledge. In this paper, the data of patents are from the SooPAT database which created in 2007. Although there are several different patent databases in China such as SooPAT, Baidu, their data resources are all from State Intellectual Property Office of People's Republic of China (SIPO).

Concentration of financial capital: saving deposit per capita

To calculate the concentration of financial capital, the individual savings for the city are used to make the measurement. This method is different from many other researches which focus on investors, such as VC and PE. One important reason is that the investment industry was not well developed in China and VC or PE investments are very rear in China several years ago. Professional investors do not exist before 1998 in China and the industry of VC/ PE develops after then. Another reason is that most private enterprises in China are developed from family' supports. Like most other places in the world, nascent entrepreneurs in China are also relying on financial capital from "FFF": friends, family and fool, in their early stage. Banks and other professional financial institutions are more partial to state-owned enterprises or other big firms. Thus, we measure the concentration of financial capital by individual saving per capital (in ten thousands). We also collected the data of individual savings from the China City Statistical Yearbook.

Concentration of human capital: college students' enrollment rate

In this paper, we employed the college students' enrollment rate to measure the human capital of a city. The data for college students' enrollment rate are also from China City Statistical Yearbook which provided by the National Bureau of Statistics of the People's Republic of China. Different indicators have been considered as proxies of human capital in previous literature, such as education level (Cooper et al., 1994), salary (Pe'er, Vertinsky, & King, 2008), working experience(Zacharakis & Meyer, 2000). However, there is no agreement that which indicator is better to measure human capital in entrepreneurship research. High education and good experience are good indicators for venture performance, but they may not good antecedents for venture creation.

According to the tremendous university spillover theory (Di Gregorio & Shane, 2003; Rasmussen & Borch, 2010; Rasmussen et al., 2011), the share of college students is a good measurement for the level of human capital (Armington & Acs, 2002). Thus, we use the proportion of college students to capture the level of human capital in a city. Besides this method is widely used, high educated individuals are more likely to capture the new knowledge and create innovative technology firms.

Concentration of social capital: social organization per capita

In the individual level or organizational level, ties and relationships among individuals are often used as indicators for social capital(Davidsson & Honig, 2003; Marsden, 1990). However, this method is not easy to measure macro level social capital in a region with huge population. Instead, following previous researches, we utilize the

density of social organizations in a region to determine the concentration of social capital. For instance, Glaeser, Laibson, Scheinkman, and Soutter (2000)calculated the civic organizations, bowling centers, golf clubs, religious organizations, political organizations, and so on to measure regional level social capital. Also, Putnam (1993) counted groups in civil society, sports clubs, bowling leagues and other associations to measure social capital. In this study, the numbers of social organizations in a city are utilized to capture the social capital in a city. The data are from China Civil Affairs' Statistical Yearbook which provided by Ministry of Civil Affairs of the People's Republic of China.

Control variables

Many studies examined the regional variation in new firm formation and tested a lot of explanatory variables. Generally, the most frequently measured determinants are unemployment, population density, industrial restructuring, and availability of different resources(Armington & Acs, 2002). Recognizing that unemployment is an important driving force for entrepreneurship, we included the unemployment rate for control variables. Also, as salary has unambiguous implications for transitions to entrepreneurship (Dobrev & Barnett, 2005), we included salary in control variables. In addition, as the government plays an important role in economic development in China, we control the government's influence, especially for their direct investment, by calculating the fiscal allotment in education and technology. Chinese government implemented many strategies in entrepreneurship and innovation, such as Five Year Plan, Industry Park Plan, Returnee

Entrepreneurship Plan and Mass Entrepreneurship and Innovation. Most of these policies and strategies will reflect in the fiscal allotment. Furthermore, as damaging boom and bust cycles in the economy may affect venture creation (Paul Alan Gompers & Lerner, 2004), we control the calendar year effect (from 2004 to 2015) by using 12 year dummy variables. In addition, to capture the different effects of polices from local government, especially from the province management level, we included 320 interaction dummy variables for year and province.

Analysis

For this regional-level ecosystem analysis, we have a large N and small T balanced panel data set. The cross-sectional structures help to control of unobservable factors. For the reason that the individual constants are very significant, thus the fixed effect model, which is same with the Least Square Dummy Variable Model (LSDV), is employed to test our hypotheses rather than the pooled regression model. In addition, the result of Hausman test (Hausman, 1978) showed that fixed effect model are more efficient than random effect model.

Before the regression, the correlations and distribution of the variables are conducted. Table 2 reports descriptive statistics for the variables used in the analyses. In addition, we test the Pearson correlations among the independent variables in Table 3. Several correlations between the variables are high. However, the high relations make sense as these variables are connecting with local economic development, such as household saving

and local government expenditure for education and technology. Concerning the multicollinearity problem, we run the analysis of variance of inflation (VIF). The results ranging from 2.56 to 3.07 revealed the multicollinearity is acceptable(Si & Cullen, 1998).

Table 2- 2 Summary information Descriptive statistics

Variable	Obs	Mean	St.dev	Min	Max
Tech venture creation(per 100 million persons)	3417	28122.85	36826.36	0	218371.1
Average Salary (in RMB)	3372	29825.19	14235.59	9127.21	69693.69
Registered Unemployed(per ten thousand persons)	3401	106.44	73.89	11.61	406.91
Expenditure for Education per capita(in RMB)	3416	843.57	728.39	92.12	4042
Expenditure for Science and Technology per capita(in RMB)	3412	98.37	178.64	.27	1116.97
Knowledge capital(Patents per ten thousand persons)	3417	13.09	24.29	0.04	150.66
Financial capital(Household Saving per ten thousand persons in million RMB)	3406	316.45	251.92	33.07	1436.00
Human capital (Students Enrollment of Regular Institutions of Higher Education Per ten thousand persons)	3239	407.98	353.39	17.95	1723.09
Social Capital(Social organizations per ten thousand persons)	3416	6.89	4.98	1.03	25.59
Population (in ten thousand persons)	3417	130.84	144.61	19.84	1017.57

Thus, the average level for venture creation in the 285 prefecture-level cities during 2004 to 2015 are 28122 tech start-ups per 100 million persons, 29825.19RMB per year for salary~ close to U.S.$4500, 106.44 individuals registered unemployed in 10 thousand persons, 843.57 RMB per capita for expenditure for education, 98.37RMB per capita for expenditure for science and technology, 13.09 patents created per ten thousand persons, 316.45 hundred RMB per capita in household saving, 407.98 students enrollment of regular institutions of higher education per ten thousand persons.

We also find big variations in these variables. For instance, in Shenzhen, the education

expenditure is close to 10,000 RMB in 2015, but in average expenditure in China is only 843.57 RMB. The numbers of education expenditure are under 843.57RMB in most other cities, less than 10 percent per capita in Shenzhen. In addition, during 2004 to 2015, 291143 tech start-ups created in Shenzhen, 287112 tech start-ups created in Beijing, and 180256 tech start-ups created in Shanghai, occupying 32% of tech start-ups in all 285 cities. The variances for technology venture creation are very significant.

Table 2- 3 Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9
Tech venture creation	1								
Average Salary	0.39	1							
Registered Unemployed	0.05	0.01	1						
Expenditure for Education	0.63	0.77	0.07	1					
Expenditure for Science and Technology	0.70	0.53	0.07	0.77	1				
Knowledge capital	0.57	0.52	0.04	0.63	0.69	1			
Financial capital	0.67	0.67	0.14	0.83	0.73	0.64	1		
Human capital	0.17	0.22	0.18	0.19	0.17	0.19	0.31	1	
Social Capital	0.08	0.20	-0.01	0.18	0.03	0.15	0.09	0.10	1

Correlations greater than .03 are significant at *p* _ .05.

Table 2- 4 Results of Fixed effect model (Std. Err. adjusted for 285 clusters in city)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Control variables								
Average Salary	.253	.296	.1856	.253	.197	.245	.244	.228
	†	*		†				†
Registered	21.141	20.048	19.831	21.139	19.841	21.456	19.002	16.829
Unemployed	*	*	*	*	*	*	†	†
Expenditure for Education	1.349	.897	2.010	1.350	2.463	1.002	1.025	1.238
Expenditure for Science&Tech	16.613	11.564	.12.823	16.622	13.604	17.901	.17.612	6.625
Direct effect								
Knowledge	389.719	127.626	206.348	389.349	380.622	377.882	367.942	32.520
Capital(KC)	***		*	**	***	***	***	
Financial Capital	71.556	60.381	69.405	71.563	48.310	64.624	70.306	29.815
(FC)	***	***	***	***	***	***	***	
Human Capital	-6.245	-5.621†	-13.887	-6.246	-22.910	-6.506	-23.166	-38.858
(HC)	*		**	*	***	*	***	***
Social Capital	1131.17	1232.474	1171.704	1130.295	1346.4	699.894	126.876	201.750
(SC)	***	***	***	***	***	**		
Indirect effect								
KC X FC		.351						.413
		*						*
KC X HC			.320					.168
			***					†
KC X SC				.029				-6.847
FC X HC					.030			.023
					***			**
FC X SC						.924		.949
HC X SC							2.138	2.118
							***	***
Constant	-10047.4	-8930.57	-6869.721	-10042.54	-3976.093	-7406.226	-3014.331	6020.949
	**	**	*	***		*		
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year X Province	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effect								
R square	0.717	0.716	0.707	0.717	0.698	0.714	0.690	0.642
VIF	2.56	2.66	2.59	2.61	2.63	2.62	2.62	3.07
N	3171	3171	3171	3171	3171	3171	3171	3171

† p <.10 *p<.05 **P< .01 ***P<.001

Results

The regression results are shown in the Table 4 and all models use the robust cluster feature for standard errors. In the first step, we test our covariates and independent variables in model 1 which is a baseline comparison model. In the second step, we tested the hypothesized synergistic interactions from Model 2 to Model 7. We centered all variables before using moderation regression analyses(West, Aiken, & Todd, 1993). In the last step, we tested the direct effect and indirect effect together in Model 8. The year fixed effects are included in all models. We also added the fixed effects of interactions between year and province as the province government have an eminent influence in local economic development. Collinearity statistics for the models revealed no problem.

Model 1 reports results for the four direct effect hypotheses (H1, H2, H3 and H4). For the reason that the dependent variable (tech venture creation) is small, we calculate the number of new tech ventures per 100 million persons. It has been magnified for 10,000 times as the knowledge capital, human capital, financial capital and social capital are measured per ten thousand persons. Thus, economic implications for the coefficients have to be divided by 10,000. The coefficient for knowledge capital is 389.719 and significant ($P<0.001$), which means the rise of 1 unit of patent per capita will increase 0.0389719 tech venture creation. The coefficient for financial capital is 71.556 and significant ($P<0.001$), which means the rise of 100 RMB household saving per capita will increase 0.0071556 tech venture creation. The coefficient for human capital is -6.245

and significant (P<0.05), which means the rise of 1 percent of individual are enrolled in regular institutions of higher education will decrease 0.06245 tech venture creation. The coefficient for social capital is 1131.17 and significant (P<0.001), which means the rise of 1 unite of social organization per capita will increase 0.113117 tech venture creation.

Thus, hypothesis 1, 2 and 4 are supported: There is a positive and significant relationship between an E-ecosystem's concentration of knowledge capital, financial capital, social capital and the number of new ventures created. Hypothesis 3 is not supported and human capital had a negative effect on the venture creation. Although the negative coefficient is not consistent with the E-ecosystem theory, this result is reasonable as the empirical tests for the human capital are mixed in previous researches. The existing indicators for venture performance are no longer valid for venture creation. No theory has been proposed to explain who will be better to be an entrepreneur. Thus, we have no certain answer for what kind of indicators is more appropriate to measure human capital for venture creation.

Results for the six interaction hypotheses are reported from model 2 to model 7. We found the interaction coefficient for model 2(P<.05), model 3 (P<0.001), model 5(P<0.001) and model 7(P<0.001) are positive and significant. Although we haven't found significant indirect effect for model 4 and model 6, the coefficient for the interactions are also positive.

Finally, the direct effect of different capitals and the indirect effect of synergistic interactions are tested simultaneously. The direct effects for knowledge capital, financial

capital and social capital are no longer significant ($p>.05$). Only the human capital is still significant and negative. In the other hand, we find significant effect for the interactions between knowledge capital and financial capital ($p<.05$), financial capital and human capital ($p<.01$), human capital and social capital ($p<.001$). The effect of the interaction between human capital and knowledge capital is positive and close to significant ($p<0.1$). Thus Hypotheses 4, 5, 7 and 9 are supported. We haven't found significant results for Hypotheses 6 and Hypotheses 8. In addition, the relationship between the interaction of knowledge capital and social capital and venture creation are negative.

A portion of the direct effect is replaced by indirect effect as several direct relationships are no longer significant after we added the interactions in the model. This result not only sustain Coleman (1988)'s view that productive potential of social capital lies in the interactions with human capital, but expand this theory to other interactions between for key elements. This substitution phenomenon has also noticed and illustrated by Florin et al. (2003). As the interaction influences are often underestimated by extent researches, more attentions are required for the indirect effect in the future research.

Conclusion

In this paper, I examined the direct effect and indirect effect in the sponsor relationship between E-ecosystem and venture creation. As shown in the results of analysis, both direct effect and indirect effect for the venture creation are existing. But the direct effect is attenuated after I included the indirect effect. This finding suggests that the

interactions between different components create a sponsorship for venture creation. It also confirms that the co-evolution and synergistic interactions in the E-ecosystem exist and play as an important role in entrepreneurship process.

In extant literature, resource based theory is well developed and empirical evidence has shown many rare resources are critical for venture creation. However, most studies overlook the synergistic interactions between the key components and neglect the substantial sponsorship from E-ecosystem. Many resources are necessary but not sufficient prerequisite for venture creation(Shane & Venkataraman, 2000)and such reductionism treats are restricted(Drazin & Van de Ven, 1985). This paper suggests that we should no longer treat resources and capitals isolated and the agglomeration economies in the E-ecosystem are proved.

In addition, my research provides another tentative explanation that why technology firms are geographically concentrated. Existing explanations such as knowledge spillover (Audretsch & Lehmann, 2005), specialized labor markets(Krugman, 1991) and social ties (Shane & Cable, 2002)are more concentrated on the firm performance and survive rate. My results suggest that a good E-ecosystem will increase the venture founding rate, especially for technology firms. More technology firms are created in the regions with good E-ecosystem.

Discussion

In this paper, I explored the E-ecosystems in China and answered two questions:

whether and how E-ecosystems influence venture creation. This study finds that, compare with resource munificence, components balance and synergistic interactions in the Ecosystem are important as well. It lends evidence to E-ecosystem theory, that venture creation are nurtured and accelerated in the E-ecosystem. Create start-ups inside an E-ecosystem are more feasible for nascent entrepreneurs as bottlenecks and restrictions are attenuated.

Implication for theory

Entrepreneurship ecosystem theory is undertheorized and underdeveloped. Following the previous paper in my dissertation which introduced the E-ecosystem theory, this paper empirically tests the relationship between E-ecosystem and venture creation. In particular, it found the synergistic interactions in the E-ecosystem sponsor the venture creation. To some extent, this finding provides the fundamental evidence that E-ecosystem plays a critical role in venture creation.

This paper also contributes to the conception of entrepreneurial firms. The concepts for entrepreneurial firms and small business are ambiguous and indistinguishable. This research suggests that entrepreneurial firms and small business have different outcomes. Entrepreneurial firms are potentially associated with high profitability and growth. In addition, entrepreneurial firms are more innovative, requiring professional resources, such as knowledge and management skills. The rigorous requirements for entrepreneurial firms drive entrepreneurs to set up new ventures inside the E-ecosystems as the feasibility is

higher.

Implication for practice

Local governments which intend to promote venture creation and develop E-ecosystems often make efforts in providing subsidy or real estate. However, other essential components such as knowledge, social capital, supportive infrastructure, are often neglected. This misinterpretation brings about many failures in practice. The isolated resources provide by the government always can't coalescent with other elements and achieve the governors' aim.

My research suggests that local government should pay attention to the resource balance and the synergistic interactions in the E-ecosystem. The isolated resources are useful but not sufficient to entrepreneurship. In stand, governors should explore the local conditions and foster the E-ecosystem base on the specific requirements. Searching the bottlenecks in the community and filling up the gaps are also crucial as well as value resources.

Limitation and future research

Due to the constraints of entrepreneurship literature, the measurements of human capital for venture creation are inconsistent. The reliability and validate for the human capital which are satisfactory for venture performance may not favorable for venture creation. In this paper, the relationship between human capital and venture creation is negative and not support my hypotheses. Future studies can exploit new method and

improve the measurement of human capital. Second, although the samples of cross-section dataset are random and massive, they are restricted in China. Researches from other counties and regions are needed. Third, I analyzed four key components in this paper, covering only parts of the whole E-ecosystem. Many other important components, such as culture, government policies, and supportive infrastructures are excluded. Therefore, future researches which investigate these components are also required. Different types of components might have different interplay mechanisms and the influences on venture creation may vary

Paper 3 ： The two-fold influence: how regional entrepreneurial ecosystem shape new venture fundraising in China

Abstract

This study examines the influence of entrepreneurial ecosystems (E-ecosystem) on new venture fundraising in China. While many existing studies focus on the endogenous factors in the new venture fundraising process, such as new ventures' features, nascent entrepreneurs' social networks, venture capitals' characteristics and financial contracting, this study stresses the importance of a macro-level exogenous factor - the E-ecosystem. Specifically, by utilizing a unique dataset (NECIPSD) in China, we investigate whether and how E-ecosystems affect the new ventures' external capital raising. Following information asymmetry theory and organizational ecology theory, we propose that the regional E-ecosystem not only promote new ventures' external capital raising directly by decreasing the information asymmetry between new ventures and venture capitalists, but also depress the fundraising indirectly by intensifying the entrepreneurial finance competition between the new ventures. However, our result indicates the direct-positive effect is prominent and significant but the mediating effect of entrepreneurial fundraising competition is not supported. This paper offers a useful exogenous understanding of regional new ventures' fundraising and provides practical suggestions to entrepreneurs and

local government for promoting entrepreneurial financing.

Executive summary

This paper analyzes the new technology venture's fundraising in China by investigating the two-fold influences for city-level E-ecosystems. To explore why there is a sharp distinction for entrepreneurial financing cross areas, we compare the new tech ventures' fundraising rate in the 288 prefecture-level cities in China. We argue that, besides the endogenous factors between the entrepreneurs and financiers, the E-ecosystems in the local areas also influence the new venture fundraising process. On one hand, E-ecosystems will accelerate new venture fundraising by decreasing the information asymmetry between entrepreneurs and investors. On the other hand, E-ecosystem will fortify the new venture emergence and intensify the competition for entrepreneurial financing.

By employing a panel data from the National Enterprise Credit Information Publicity System Database (NECIPSD), we explore the direct-positive and indirect-negative effects for E-ecosystems in entrepreneurial fundraising process. Though panel data regressions, we assess the two-fold influence of E-ecosystems on entrepreneurial fundraising. The finding indicates that the city-level E-ecosystems will increase the fundraising rate for new ventures and localized fundraising competition will decrease the fundraising rate for new ventures. However, the mediating effect for localized fundraising competition is not supported in our study.

Overall, this study provides valuable information by exploring the fundraising

mechanisms in regional level. These mechanisms indicate that governments should not provide financial capital isolated, but attempt to build a proper E-ecosystem for nascent entrepreneurs where different resources and elements integrated organically. Nurturing an E-ecosystem is an appropriate and effective way for regional governments to promote new venture financing and economic development. In addition, many technology ventures moved their locations to cities with munificence financial resource without regard the fundraising competitions. Our results encourage new ventures to seek venture capital in well developed E-ecosystems, but they have to execute the fundraising process after they build core competitiveness.

The paper is organized as follows. In Section 2, we raised the question that why entrepreneurial fundraising has the huge disproportion in different areas and why governments' initiatives and efforts are not working when they attempt to promote entrepreneurial financing. In section 3&4, we discussed the fundamental theories and literature that focus on new venture fundraising, providing the background for our research. We emphatically explained the critical role of information asymmetry in venture financing process. In section 5, we provided the notion of E-ecosystem and explained why E-ecosystem will influence new venture fundraising. Section 6&7 discussed the direct influence and indirect influence for E-ecosystems and proposed our hypothesis. After that, we provide the measurement and results.

Introduction

According to the resource base theory, resource munificence, especially the financial capital, influences new ventures' survival and performance (Alvarez & Busenitz, 2001). Nascent entrepreneurs, who usually face the resource shortage problem, have to continually seek external vital resources to survive and develop(H. Aldrich, 2008; Pfeffer & Salancik, 1978).Given the importance of new venture fundraising, it has been frequently utilized to measure the success likelihood of new ventures(Beckman, Burton, & O'Reilly, 2007).

However, entrepreneurship scholars have tended to view the entrepreneurial fundraising as separate from the field of macro-level situation (Denis, 2004). Most previous studies focus on the endogenous factors for the entrepreneurial fundraising process, such as new ventures' features, nascent entrepreneurs' social networks, venture capitals' characteristics and financial contracting. These researches provide valuable knowledge and solutions for problems in the fundraising process, such as agency problem and information asymmetry problem. However, studies exploring fundraising across regions are limited and insufficient. Although there are some investigations concentrate on regional tax polices (Poterba, 1989), regulatory change (Paul A Gompers & Lerner, 1999), direct local government investment in new ventures(Lerner, 2002), and so on, little incumbent literature answer the questions that how to alleviate the fundraising in regions

lacking it and strategies that government can utilize to stimulate regional entrepreneurial finance.

Policy makers around the world have become increasingly concern about the tech industry start-ups and the entrepreneurial finance (D. Cumming, 2007). Various initiatives have been implemented by governments to promote venture creation and stimulate fundraising(Pollock & Scheer, 2002). Many local governments even created public funds in order to finance the new tech-firms at their early stage(Wright, Lockett, Clarysse, & Binks, 2006). For example, in several European countries, such as France, Sweden, governments attempted to stimulate fundraising for tech firms and provide subsidy repeatedly(Cieply, 2001; Heydebreck, Klofsten, & Maier, 2000; Pollock & Scheer, 2002). In China, local governments reduce investment regulations, delegate government powers, simplify administrative examination and provide substantial public subsidies. Many of them are very aggressive, attempting to boost new venture fundraising in a short time.

In addition to the fundamental problems, there is a remarkable variation in entrepreneurial fundraising across different areas and cities. In the United States, three states- California, New York and Massachusetts- account for approximately 60% of the total venture capital pool (Florida & Kenney, 1988). At least one-third of the Nation's total venture capital pools were awarded by Silicon Valley companies during the 1980s and early 1990s. In China, new ventures in four cities- Beijing, shanghai, Shenzhen, Hangzhou, have attracted more than 50% of the total fundraise from 1994 to 2016. Undoubtedly, local

governments in the middle and west of China, which are undeveloped and lagged behind, attempted to modify this situation. Since previous studies provide limited knowledge about this issue, local governments have no instructions to follow and the outcomes for their initiatives and efforts are unsuccessful.

This study attempts to provide more information about this issue and try to improve local government's policy and practice. We do not separate entrepreneurial fundraising from the macro-level conditions in which it is embedded and, specifically, focus on regional E-ecosystems. We propose that both benefits and drawbacks for the new venture fundraising exist in the E-ecosystems. On the one hand, E-ecosystem will benefit a new ventures' fundraising by providing complementary resources, reducing screening and monitoring cost, and decreasing information asymmetry between new ventures and investors. On the other hand, well operating E-ecosystems enhance the density for start-ups, and therefore intensifying the fundraising competition between them.

To test our arguments, we use the National Enterprise Credit Information Publicity System Database (NECIPSD) which has been established by State Administration for Industry & Commerce of the People's Republic of China (SAIC) in 2014. Our analysis provides managerial implications to nascent entrepreneurs, improving the decision-making in entrepreneurial fundraising. In addition, this research also provides guidelines for local governments about how to serve new ventures and promote regional new venture fundraising.

Theory background

Academic studies of entrepreneurial fundraising increase gradually since the 1990s. New businesses such as Google, Amazon, Alibaba, have become a critical component for economic development, job creating, and innovation. At the same time, VC/PE emerged as one of the most fundamental component influencing new venture's development and success (Denis, 2004). As the importance of venture fundraising has been recognized by scholars, participators and governments, it has become a prominent topic of research in many areas, such as entrepreneurship, economics and finance.

The entrepreneurial fundraising are perceived as a "search and match" process between entrepreneurs and financiers (Giordani, 2015). It is very difficult for entrepreneurs to gain trust from investors due to information asymmetry. Entrepreneurs possess better information about themselves and opportunities they pursue than potential financiers(Amit, Glosten, & Muller, 1990). Also new ventures lack record and their strategies are highly uncertain(Zhang et al., 2008).Entrepreneurs have very limited accesses to financial resources and very few of them have enough personal resources to finance very-early-stage ventures (Aram, 1989). Structural holes in the social network impede the information transformation and divide the market into segments. Since the acquisition of financial capital is so important for starting a new business(H. Aldrich, 1999), Entrepreneurs may act opportunistically when they try to attract trust from investors(Cooper, Woo, & Dunkelberg, 1988). For example, entrepreneurs may overstate the merits of their ventures

or project the outcomes over-optimistically(Cassar, 2010). They may also deliberately deliver inaccurate information and increase the information asymmetry, making the problem more serious. In some circumstances, nascent entrepreneurs can only use parole agreement to protect their deals with investors while investor may swerve from his ideas from time to time. Furthermore, the cost for monitoring entrepreneurs and keeping the new ventures on the right trajectory of achieving certain milestones are not negligible for investors(Lerner, 1995). Venture capitalists must have to weigh up the potential cost and benefit before and after the investment. Thus, the information asymmetry and uncertainty impede the "equivalence" to be reached between entrepreneurs and investors.

Studies focus on entrepreneurial financing examined this issue from different perspectives, such as effectiveness of variables, mechanisms for fundraising, and the decision making process. Several predictors were theorized and empirically examined such as founding teams (Eisenhardt & Schoonhoven, 1990), founder's personality (Kimberly, 1979), social network (Street & Cameron, 2007), (Batjargal & Liu, 2004; Kwon & Arenius, 2010; T. E. Stuart & Sorenson, 2007), and Tax policy(Paul A Gompers & Lerner, 1999). Also, different theories are utilized to explain this "search and match" process, such as impression management theory(Parhankangas & Ehrlich, 2014), agency theory (D. J. Cumming, 2005), information asymmetry theory (Denis, 2004), financial contracting theory (Kaplan & Strömberg, 2003). Impression management theory suggests that entrepreneurs are seeking to influence the image investors have of them in order to win

their trust and finance(Parhankangas & Ehrlich, 2014). They will send positive signals to financiers through verbal statements, expressive behaviors and attempts to improve potential negative perceptions. The pecking order theory argues that due to information asymmetries and moral hazard, friends and family will be the main investors in the early stage rather than professional investors(Wright et al., 2006). Most of these explanations and theories use arguments of information asymmetry as a central tenet in venture fundraising process.

It is remarkable that previous studies of new venture financing focused on the endogenous factors rather than exogenous factors. Scholars usually start with the individual or organizational-level perspective rather than the macro-environmental perspective. An important reason for this issue is that, in most countries, private investors and entrepreneurs are the main stakeholders who play roles in the entrepreneurial financing process. In addition, endogenous variables, such as financial contracting (Kaplan & Strömberg, 2003), entrepreneur's social networks, identity and characteristics of investors, venture capital monitoring (Lerner, 1995), are more likely to be formulated or modified by the above stakeholders. Indeed, most studies recommend to the parties involved to implement allocating cash flow right, voting control, and decision making. The endogenous focus in prior literature seems to ignore another force -- governments and third party organizations, which is important as well in new venture financing, especially in countries like China. Incorporating other stakeholders, public organizations and

governments requires the researchers to theorize and operationalize entrepreneurial financing, from the macro-level perspective.

Limited studies examined the venture fundraising from a holistic perspective. Although a resource munificence environment is critical to the venture financing and entrepreneurship success(Chandler & Hanks, 1994). The environments which new ventures embedded in are rarely empirically tested. Apparently, the financial capital munificence in the ecosystem will increase the fundraise probability for new ventures. Besides, policies and regulations have also been investigated as important constructions which potentially affect venture capitalists' decision (D. Cumming, 2007). For instance, the employment retirement income security act (ERISA) and capital gain tax rates are discussed in academic studies. In 1994, the capital gains tax rate was reduced from 28 percent to 14 percent on investments in small companies held for five years, promoting more financial capital to participate the venture capital fundraising(Paul A Gompers & Lerner, 1999). Jeng and Wells (2000)find that early stage venture capital investing is negatively impacted by labor market rigidities. In addition, the general health of the economy may also affect commitments to venture capital funds. When the economy is growing, venture capitalist is more likely to increase the investment since they believe there may be more attractive opportunities for entrepreneurs. Thus, the growth in gross domestic product (GDP), returns in the stock market, interest rate, and market capitalization growth may all influence venture capital financing from the macro-level

perspective. Jeng and Wells (2000) find that IPOs and private pension fund levels are also important for venture capital investing.

Even though studies above have discussed the variables of venture fundraising in a macro-level perspective, very few attempt to explore the disproportion of entrepreneurial finance in different areas. The questions that why the disproportion of entrepreneurial finance exists and how to promote new venture fundraising in an area are under socialized and vague. For this article, we test the influence of regional E-ecosystems on new venture fundraising. We argue that E-ecosystem in the local region will decrease the information asymmetry and affiliate the "search and match" process between entrepreneurs and financiers. Thus, E-ecosystem will be an effective way to raise new ventures' fundraising opportunities.

Information Asymmetry in Venture fundraising

How entrepreneurs overcome information asymmetry between themselves and potential investors is the central issue in the venture financing sector (Shane & Cable, 2002).Information asymmetry force investors to make adverse selections(Akerlof, 1970). In addition, entrepreneurial firms are short of the record of reputation, which raises the severity of information asymmetry issue. Thus, informational asymmetry has become the key and center to understanding the venture capital industry(Amit, Brander, & Zott, 1998).Different explanations or solutions are promoted to address this important issue, such as allocation of contractual rights(Kaplan & Stromberg, 2001), staging of capital

(Venkataraman, 1997), risk shifting (Paul A Gompers & Lerner, 1999), social ties(Venkataraman, 1997), geographic proximity(Lerner, 1995), and monitoring cost (Kaplan & Strömberg, 2004; Kaplan & Stromberg, 2001)

First, it has been discussed in many papers that agents can help reduce information asymmetry (Chaplinsky & Haushalter, 2010; Eckbo & Masulis, 1992). Agents expand new venture's network of investors (Dai, Jo, & Schatzberg, 2010). Agency theory suggest that appropriate performance criteria will keep agent within bounds and align their behaviors with principal, reducing the information asymmetry(Eisenhardt, 1989).

Second, from an economic perspective, the allocation of contractual rights will shift risk from investors to entrepreneurs to reach a balance(Shane & Venkataraman, 2000).Financial contracting theory address the problem of risk and uncertainty which also bring by the information asymmetry(Kaplan & Stromberg, 2001). The financing contracts, which focus on security issues, profit sharing and ownership controlling, shift part of the risk from the investors to entrepreneurs(Denis, 2004).

Third, monitoring mechanisms are developed by investors as many of them lack the broad participation(Paul A Gompers, 1995). Besides the contracts and agreement, venture capitalists choose to invest in the new ventures which locate closely to them and they are familiar with. One important reason is that monitoring entrepreneurs is costly and cannot be performed continuously (Paul A Gompers, 1995),leading new ventures and venture capitals to cluster in E-ecosystems like Silicon Valley, Boston and New York.

Forth, entrepreneurs' commitment and experience, as well as performance and reputation, are usually used to increase their credibility and win investors' trust(Baum & Silverman, 2004). For instance, compare with imitator firms, good innovator firms are more likely to obtain VC funding, and hence bring products to market significantly faster(Hellmann & Puri, 2002). That's why features for entrepreneurs and new ventures are investigated, such as founding teams (Eisenhardt & Schoonhoven, 1990), founder's personality (Kimberly, 1979), social network (Street & Cameron, 2007).

Fifth, some organizational scholars suggest that social ties are utilized by investors to overcome the information asymmetry. For instance, Venkataraman (1997)proposed that social relationship is a key force for ventures to fund. Busenitz, Fiet, and Moesel (2005) discussed whether new venture teams have influence on venture financing. Sorenson and Stuart (2001) proposed that social capital set up the bridge between investors and entrepreneurs, showing how inter firm networks affect the geographic- and industry-localization of VC investments. Social ties create a well-grounded channel for information transfer between entrepreneurs and investors. Moreover, it potentially reduce the monitoring cost as the social ties eliminate some uncertainties and provide decision makers with private information (Shane & Cable, 2002).

A majority of these researches begin with the individual-level or organization-level perspective, and scholars often overlook heterogeneity factors in a broader perspective. Very limited studies examine the issue of the venture financing from a macro-level

perspective, such as the relationship between venture fundraising and regional economic development, industry innovation (Kortum & Lerner, 2000), employment, macroeconomic situation (Ning, Wang, & Yu, 2015). In this paper, we try to fill up the research deficiency for venture fundraising by investigating the E-ecosystem in local cities. Since the obstacles such as "market" frictions and information asymmetry hidden the process of entrepreneurial finance, we propose that E-ecosystem, which attenuate such obstacles and bottlenecks, will stimulate and promote this "search and match" process.

E-ecosystem and venture fundraising

E-ecosystem

E-ecosystem is a regional dynamic evolving system where entrepreneurs, investors, mentors, researchers and other relevant individuals and organizations interacting with local resources, opportunities, capitals, policies, culture and so on, to create entrepreneurial firms. Complementary components accommodate in the local community, creating a special context to promote new venture emergence and development. It is found that entrepreneurs seldom leave their original location to start entrepreneurship or relocate their new ventures to obtain advantages or solve resource constrain problems. A common view is that entrepreneurship is not a single event but a complex process and many different roles of participators influence its success (Gartner, 1985).In the E-ecosystem, participators and resources integrate together organically and synergistically. The intense communications between different participators create a favor information-sharing and

co-ordination place for nascent entrepreneurs. The accessibility of information, convenient geographical location and well developed social networks affiliate the search and match for new venture fundraising.

In this paper, we use ecology theory and information asymmetry theory to discuss the two-side effect of E-ecosystem on the new venture fundraising. A developed E-ecosystem, such as Silicon Valley, Boston route 128, will have many high-quality key components, such as financial capital, human capital, social capital, and knowledge capital. The interaction of these key components maintains the E-ecosystem in a good composition balance among different resource and capitals. The co-evolution among the key components brings synergistic effect where the coordination and cooperation for participators are enhanced.

Resource-munificence

The resource-munificence environment, especially for the financial capital, in the E-ecosystems will enhance new ventures' likelihood to access external financial capital. Furthermore, new ventures locate in a good E-ecosystem with high concentration of rare resources, such as knowledge, advanced skills and experience, spillovers from universities, will give the signal to investors that they have better opportunity to possess and utilize these resources. The clustering resources in the E-ecosystems raise the new ventures' reliability for investors. In addition, as a self-reinforcing community, regional E-ecosystems attract the complementary resources like financial capital around different

industries and regions (Zacharakis et al., 2003). Also both entrepreneurs and investors will be attracted by the E-ecosystems, increasing their interaction based on the invisible paths.

Social network

Even though entrepreneurs are searching for financial capital and financiers are seeking for investment opportunity, structure holes impede and prevent them to reach consensus. However, by facilitating and improving the social networks between financiers and startups, E-ecosystem will promote their communication and interaction (Sorenson & Stuart, 2001). For the dense and "customized" social networks, resources have high mobility and flow among different organizations inside the E-ecosystem like water. The information like a nascent entrepreneurs' requirement or a financier's expectation will transmit frequently and rapidly through professional ties and relationships, accelerating the fit and match process. Social networks not only set up bridges between the new ventures and venture capitalist, but also decrease information asymmetries between them(Burt, 1997). The extant professional ties and relationships in the E-ecosystem enhance investors' ability to obtain both public and private information. Through a set of interviews, Shane and Cable (2002) suggested that entrepreneurs who were not successful in obtaining financing were outside of the financiers' social networks. Undoubtedly, the existing dense social networks in the E-ecosystems eliminate the structure holes and decrease information asymmetry.

Screening and monitoring cost

In the process of entrepreneurial financing, pre-investment screening and post-investment monitoring are important assignment for venture capitalist (Kaplan & Stromberg, 2001). They conclude that the screening activities, financial contracts and monitoring activities are closely related. Beside the efforts in seeking investment opportunities, venture capitalists are active monitors (Gorman & Sahlman, 1989) as they believe the monitoring is necessary for new ventures in the early stage (Sapienza, Manigart, & Vermeir, 1996). Drawing on the high screening and monitoring cost, how to ensure the new ventures on the right trajectory but minimize the transaction costs becomes an important issue for venture capitalist.

Although studies on screening and monitoring cost are limited in entrepreneurship, this topic is not new in subcontracting and outsourcing(Pe'er & Keil, 2013). A system of specialization among firms in clusters reduce the search, transaction, transportation, coordination and monitoring costs (Piore & Sabel, 1984). We suggest that E-ecosystem will reduce these costs substantially. First, E-ecosystem will increase the competition between proximate new ventures and spotlight the outstanding candidates. Venture capitalists spend less time and cost on screening new ventures. Second, in the E-ecosystem, the new ventures are not isolated, but cluster together and co-evolve with the suppliers, lead-users and competitors simultaneously. Thus, the real quality of new ventures, which could not observed by investors directly (T. E. Stuart, Hoang, & Hybels,

1999), will emanated by other participators frequently. The close distance for participants and the information sharing assist venture capitalists to supervise and monitor the new ventures.

Third party affiliation

In evaluating a new venture, external investors have to rely on observable attributes at the time of assessment and unobserved determinants of the start-up's quality(T. E. Stuart et al., 1999). In the absence of perfect information, investors search for various indicators to proxy for the real potential of the new ventures and their future return. Both observable and unobservable resources will be utilized by entrepreneurs to enhance their ability to attract venture capitalists. However, while patents (Hsu & Ziedonis, 2008), alliances, team experience and founder backgrounds(Shane & Stuart, 2002), have been recognized as selection criteria, it is challenging to identify a signaling effect above and beyond the productive value of the respective resources(Hoenig & Henkel, 2015). Thus, T. E. Stuart et al. (1999) suggest that investors could not observe the quality of new ventures directly, but only evaluate it based on observable attributes that are thought to co-vary with its underling but unknown quality.

Plummer, Allison, and Connelly (2015)found that" startup's characteristics and actions are signals that remain relatively unnoticed, but such signals will be amplified when a startup combines them with a third party affiliation that enhances the signal's value, thus increasing the likelihood of receiving external capital ".Based on third party affiliation

theory, new ventures as the better informed party can send signals of quality to the less informed party through the suppliers and customers in order to reduce information asymmetries(Spence, 1973). These signals will be recognized as better quality and more valuable for venture capitalists. Because the suppliers, customers, especially the competitors have less motivation and willingness to send out the inaccurate signals. The asymmetric information can be reduced by the credible signals from the new venture (Janney & Folta, 2003).In a word, through a third-party affiliations, suppliers, customers, governments, even competitors in the E-ecosystem, may transfer the signals and intensify new ventures' credibility to venture capitalists (Gulati & Higgins, 2003).

Hypotheses

E-ecosystem and entrepreneurial fundraising rate

Statements above lead to our argument that a well-developed E-ecosystem will benefit new ventures' fundraising. Factors such as resource munificence, social network, screening and monitoring cost, third party affiliation in the E-ecosystem will promote the "search and match" process between new ventures and investors, mainly through decreasing the information asymmetries. New ventures in well-developed E-ecosystems are more likely to gain external capital rather than their competitors. This perception is in the same stream with Pe'er and Keil (2013)'s suggestion that new entrants choose locations strategically to access the benefits and appropriate resources. For the same cognition, investors may use the location of new ventures in an E-ecosystem as an advantage and send

the signal to financiers. Nascent entrepreneurs often introduce their new ventures proudly to investors if located in Silicon Valley or Route 128. We propose that new ventures in the E-ecosystems have higher probability to obtain external financial capital as E-ecosystems advance the "search and match" process and decrease the information asymmetry between new venture and financiers.

Thus

H1 a high level E-ecosystem has a positive relationship to the entrepreneurial fundraising rate.

Localized fundraising competition and entrepreneurial fundraising rate

From a population perspective, scholars argue that organization performance are negatively affected by the population density at the time of founding (Suarez & Utterback, 1995). New ventures are short of resources and continuously seek for external capitals. High founding density will promote a competitive environment, reflecting a competitive and dynamic structure(Suarez & Utterback, 1995; Utterback & Suarez, 1993). Organizational ecologists agree that high entry rates will lead to a high fail rate. Using density-dependence theory, Carroll and Hannan (1989)find that density at time of founding has a negative effect on organizational survival rates. They argue that high density at time of founding results in resource scarcity for new entrants. Consequently, the resource scarcity may reduce the likelihood for new vent to get financed, lowering the chance of survival.

However, results of empirical studies for geographic density are mixed (Carroll & Hannan, 2000). Amezcua et al. (2013) indicate that many researchers have aggregated the regional level entrepreneurship activity into the state level or national level, inducing measurement errors (Amezcua et al., 2013).Thus, in this paper, I bound the E-ecosystem in the city level and measure the founding density base on the population for each city. Because many previous studies examine the competition for financial resource at the regional level (Hannan, Carroll, Dundon, & Torres, 1995).In a word, the high level of new venture density will lead to scarcity of fundraising, leading new ventures created in the ecosystem suffer from the liability of scarcity(Geroski, Mata, & Portugal, 2010).

Thus,

H2 a high level of new venture's localized fundraising competition has a negative relationship to the entrepreneurial fundraising rate

Localized fundraising competition

The influence of E-ecosystem on firm birth has been discussed frequently and consistently by academic scholars, business participators and politicians(Stam, 2015). In addition, the phenomenon of high birth rate of new ventures and the competitiveness on venture creation for E-ecosystems are acknowledged widely(Motoyama & Knowlton, 2017; Neck et al., 2004). Sorenson and Audia (2000) find that geographic concentration is not result from economic efficiency, but though high firm birth rate. The heterogeneity for E-ecosystems in different types of resources promotes a special supportive structure for

venture creation(Amezcua et al., 2013). Localized E-ecosystem will increase the density of new venture creation, aggravating the fundraising competition in the local business community.

However, for the ecology theory, individuals and organizations evolve in relation to their environments. While at the same time, these environments also evolve in relation to the entities and organizations(Lewin, Weigelt, & Emery, 2004). In the same vein, E-ecosystems which increase the firm birth rate are also affected by the outcomes of new ventures. Specifically, in one hand, the high birth rate of new ventures in the E-ecosystem will increase the localized fundraising competition. In the other hand, the birth of new ventures will attract more financial resources into the localized E-ecosystem. Initially, when a community exist limited organizations but fulfilled with munificence resources, good legitimating and supporting networks, the founding rate for the startups will increase. However, once the number of organizations increase, the competition for resources would dominate the system evolving (Manigart, 1994). Thus, when the number of new ventures has a certain increase in an E-ecosystem, startups take strategic actions to eliminate the environment restrictions, such as relocation, alliance, seeking external resources. Consequently, geographic density exerts great competition force among the organizations (Amezcua et al., 2013), promotes the regional resource scarcity and increase local competition for financial capital.

Furthermore, the new ventures which incubated by the same E-ecosystem are often

related, sometimes proximate, to each other. Because new ventures in the same E-ecosystem are sharing the same resource, knowledge, VCs, and benefit from the same supportive infrastructure, incubators, government policies. For instance, Silicon Valley is famous for the semiconductor industry. The similarity between these new ventures will also enhance the competition for financial capital as many venture capitalists often concentrate on certain industries. As more ventures are emerged in the E-ecosystem and many of them are proximate to each other, the competitions for entrepreneurial fundraising are enhanced.Thus

H3 localized fundraising competition partially mediates the relationship between E-ecosystem and the entrepreneurial fundraising rate

Data& Measurement

We estimate the equations using the city-level panel dataset assembled from National Enterprise Credit Information Publicity System Database (NECIPSD) and ITjuzi Dataset(ITjuzi). New ventures span a 19 years period from 1997 to 2015 and cover 288 municipal-level cities. We use the NECIPSD which has been established by State Administration for Industry & Commerce of the People's Republic of China (SAIC) in 2014 and represents the population of all enterprises founded in China. The Chinese government requires all enterprises to report to the Administration for Industry & Commerce at all levels annually, creating a huge database. We merge the NECIPSD dataset with ITJUZI dataset. ITJUZI dataset includes the most comprehensive data for

venture capitalist investment in China. There are several superiorities to use this database.

First, for the great variation and high speed development, China is an appropriate target for this research. Many regional E-ecosystems in east China are well developed, such as Beijing, Shanghai and Shenzhen. However, many other ecosystems in West and Central China are still in the initial stages and lagged behind. As more than 700,000 tech-firms are created in Shenzhen in one year in 2015, many cities with millions of population are still short of entrepreneurial activities in the West of China. The huge diversity provides us a remarkable opportunity to observe notable dynamic changes in E-ecosystems and investigate their influence on new ventures' creation and fundraising

Second, to capture the features of the regional E-ecosystems, I employed the prefecture-level cities in China as a unit of analysis since the urban core and adjacent communities have a high degree of economic and social integration. For more than 600 cities in China, 333 of them are prefecture-level cities and, excludes cities which are lack of complete data, 285 cities become our sample. From 1997-2015, 2,860,493 tech-firms are included in the database and 5472 city-year observations are founded for our sample. Such a big and comprehensive sample covers all manufacturing and service sectors.

Third, comparing with the CIED database which only focus on big companies (Nie et al., 2013; Song et al., 2011), the NECIPSD is a more exhaustive dataset which provide all scale companies in China, provide valuable information about venture creation and venture financing. In addition, to investigate the relationship between E-ecosystem and venture

financing, we combine the NECIPSD with China city Statistical Yearbook, Census of Population and SooPAT database to measure the E-ecosystems.

Forth, ITjuzi is the biggest VC/PE investment dataset in China. It track more than 100,000 high-tech companies and record more than 40,000 investments carried out in China. In addition, the dataset not only provide investment volume but lots of other information is collected, such as the time, location, investor, industry, entrepreneur, and so on.

E-ecosystem

The E-ecosystem is measured by multi-items. We use the four main elements in the ecosystem: Knowledge capital, social capital, financial capital, human capital, to capture the features of E-ecosystems. To be more specific, we evaluate the E-ecosystem by looking at 1) knowledge capital, by dividing the number of total patents in the city at year over the city population.; 2) financial capital, by measuring the saving deposit per capita; 3) human capital, by using the college students' enrollment rate from China City Statistical Yearbook; 4) social capital, by dividing the number of social organizations over the population in a city.

The measurement for indicators that I proposed to evaluate the E-ecosystem, i.e., social capital, financial capital, human capital, and knowledge capital, is well developed and widely used. Although such measurement may be not sufficient to consider every element that affect the ecosystem such as government policy, local institutions and culture,

we argue that the most crucial feature of the E-ecosystems are incorporated in this measurement. Following(Audretsch & Belitski, 2013), We measure the E-ecosystem in the city level. We calculate the E-ecosystem by the mean of four indicators.

Entrepreneurial fundraising rate

Fundraising rate = the number of invested new tech-ventures / the number of new tech-ventures

In this paper, the dependent variable was the new ventures' fundraising rate measured by the proportion of invested technology firms per all technology firms created(Audretsch & Fritsch, 1994). The numerator is the number of all tech-venture invested by VC/PE and the denominator is the number of all venture created per year per city. This method is a little different from traditional ways that many scholars connect the new ventures with financial capitals through the incubation or local economic system and carry out surveys in a certain location or among a group of related individuals(Neck et al., 2004; Spigel, 2017). We explore all tech-firms that created in prefecture-level cities as our sample and calculate how many of them are invested by capitalists. In the ITjuzi dataset, we find 22427 tech-companies which have got entrepreneurial financing from venture capitalists. Many of them are invested more than one time. Totally, we find 35254 investment records for the 22427 tech-companies6, including 3954763.324 million RMB investments. For the

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6 According to previous researches, I change the several millions/ billions into 3 millions/billions, change the unknown in to 3 millions. and change 3millions and up into 3 millions.

We calculate 1 dollar into 6.3 RMB, calculate 1 Hongkong dollar into 0.8 RMB, calculate 1 Taiwan dollar into 0.21 RMB, calculate ponds into 8.8 RMB, calculate Euro into 7.73 RMB, Calculate 1 Yen into 0.06 RMB

22427 tech-companies, 17423 of them are created in the 287cities between 1997-2015 and got financial capital from VC/PE. All 17423 companies can be found in the NECIPSD dataset, including 2336347.386 million RMB investments.

Fundraising competition

Fundraising competition = the number of new tech-ventures / the total volume of investment

Localized fundraising competition indicates the new firms compete for the financial capital. According to Feldman and Audretsch (1999), we measure the fundraising competition as the number of new tech-ventures created in the city relative to the number of total volume of financial capital invested per year per city. In a regression context, a positive relationship between E-ecosystem and fundraising competition indicate that E-ecosystem promote new tech-venture births. While a negative coefficient for this relationship supports that good E-ecosystems attract more financial capital for new ventures.

Entrepreneurs understand that there are more resources and opportunities in a good E-ecosystem; however, they also recognize that there are more competitions as much more new ventures are founded within the ecosystem. The munificence influence between E-ecosystem and new ventures' outcome make it very confusing that whether the mediating effect of competitions among new ventures are still exist. Different from(Glaeser, Scheinkman, & Shleifer, 1995) and (Feldman & Audretsch, 1999) that only focus on founding density by the area. We focus on the fundraising competition which not

only investigates the density of new ventures but also exam the amount of venture capitals in a city. However, the positive relationship between E-ecosystem and new venture density is certified in Paper2, we

Control variables

Finally, we include several control variables which may influence the entrepreneurial financing process. Entrepreneurial activity(Audretsch, Keilbach, & Lehmann, 2006) and venture capital investment are both found to be greater in regions with higher growth. The general health of the economy may affect commitments to venture capital funds. We include the growth in gross domestic product (GDP) in each city as reported by the local government. Also early stage venture capital investing is found negatively impacted by label market rigidities Jeng and Wells (2000), we add the unemployment rate in the equation as control variables.

Based the special environment in China, we can't ignore the influence from the Chinese government, including the policies from the central government and local government. Thus, the investments from central government are added as control variables. The most important investments from central government are expenditure for education and expenditure for science and technology. To control the influence from the local government, we add the dummy fixed infect of year and province for unobserved influence within city or province. Also the local salary level is included.

Results

Descriptive statistics, including means and standard deviations of the study variables were calculated and provide in Table 3-1. We also calculated the pearson correlation coefficients to capture the patterns of the relationships Table 3-2. In this study, given the research model and taking into account previous studies(Guerrero, Cunningham, & Urbano, 2015; Guerrero & Urbano, 2014), we utilized the path regression analyses to examine the direct and indirect influence between E-ecosystem and venture fundraising rate. This statistical technique has been widely adopted in the behavioral sciences(Shook, Ketchen, Hult, & Kacmar, 2004) and provides a good measurement for E-ecosystem as it allow us to examine several independent variables simultaneously. We run all regression analyses in Stata13.1.

Table 3- 1 **Summary Information of Descriptive statistics**

Variable	Obs	Mean	St.dev	Min	Max
Gross domestic product per capita (in RMB)	5154	33683.77	38265.06	1841.20	481692.4
Registered Unemployed (per ten thousand persons)	3402	9.27	11.20	0	133.58
Expenditure for Education per capita(in RMB)	5157	617.77	743.77	0	9957.86
Expenditure for Science and Technology per capita(in RMB)	5157	72.81	203.21	0	4282.82
Average Salary (in RMB)	5112	22683.9	15841.11	675	141387
Entrepreneurial fundraising rate(per 1 million new ventures)	5265	1453.31	10803.04	0	333333.3
Localized fundraising competition	798	64.38	340.07	0	8780
Entrepreneurial ecosystem	3229	18235.3	20758.83	752.81	244700
Population (in ten thousand persons)	3417	130.84	144.61	19.84	1017.57

Tech venture creation is calculated per 100 million persons

Entrepreneurial fundraising rate is calculated per 1 million new tech ventures

Table 3- 2 **Descriptive Statistics and Correlations of Study Variables**

Variable	1	2	3	4	5	6	7	8
Gross domestic product (GDP)	1							
Registered Unemployed	-0.18	1						
Expenditure for Education	0.85	-0.14	1					
Expenditure for Science and Technology	0.73	-0.15	0.76	1				
Average Salary	0.70	-0.19	0.81	0.54	1			
Localized fundraising competition	-0.02	-0.04	-0.01	-0.02	0.03	1		
Entrepreneurial ecosystem	0.85	-0.20	0.82	0.79	0.65	-0.04	1	
Entrepreneurial fundraising rate	0.06	-0.02	0.04	0.08	0.01	-0.06	0.30	1

Correlations greater than .05 are significant at *p* _ .05.

Although several inter correlations among the variables are very high (≥ 0.80) (Hair, Black, Babin, Anderson, & Tatham, 1998), none of the study's variables have high correlations and significant. It is acceptable that control variables such as GDP, central government's expenditure for science and technology have high correlations as these variables are all connected with the economic growth.

Multiple hierarchical regression analysis was implemented to test all hypotheses. To assess the mediating effect of localized fundraising competition, we run the regression method according to the R. M. Baron and Kenny (1986). In model 1, we test H1 whether E-ecosystem (IV) is significantly affecting the entrepreneurial fundraising rate (DV). In model 2, we test H2 whether localized fundraising competition (mediator) significantly affect the entrepreneurial fundraising rate (DV). In model 3, we test whether the E-ecosystem (IV) significantly affect the localized fundraising competition (mediator). In model 4, we test H3 that whether the effect of IV on DV has diminished or not when the

mediator is added to the model. As the dataset is a large N and small T balanced panel dataset, we implemented the fixed effect model rather than the pooled regression model.

Table 3- 3 **Results of fixed effect model**

	Model 1	**Model 2**	**Model 3**	**Model 4**
Variables	Entrepreneurial fundraising rate	Entrepreneurial fundraising rate	Localized fundraising competition	Entrepreneurial fundraising rate
Control variables				
GDP	-.006	.039	-.000	-.019
Registered Unemployed	-1.382	470.427*	3.891	196.653
Expenditure for Education	-.151	-.531	0.015	-1.464†
Expenditure for Science and Technology	.678	1.404	0.024	.401
Average Salary	-.011	.150	-.002	.061
Main effect				
Entrepreneurial ecosystem	0.056**		-.003†	.208**
Localized fundraising competition		-5.889***		-4.565**
Constant	-928.456	180.747	208.280*	4454.721*
Year fixed effect	Yes	Yes	Yes	Yes
Year X Province	Yes	Yes	Yes	Yes
R square	0.014	0.085	0.760	0.03
VIF	2.03	2.85	3.05	3.18
N	3137	601	589	588

† p <.10
*p<.05
**P< .01
***P<.001

Table 3-3 contains the results of the four regression models which are utilized to exam the hypotheses. The results in Model 1 show the positive relationship between E-ecosystem and entrepreneurial fundraising rate, supporting hypothesis 1. Specifically, the coefficient for E-ecosystem is 0.056 ($P < 0.01$). The results in Model 2 show the

negative relationship between localized fundraising competition and entrepreneurial fundraising rate, supporting hypothesis 2. Specifically, the coefficient for fundraising competition is -5.889 ($P<0.001$). However, when we add the fundraising competition in model 4, we haven't find a striking diminish of coefficient for E-ecosystem but increased. Thus, the hypothesis 3 is not supported and the result in model 3 shows the negative relationship between E-ecosystem and localized fundraising competition. In sum, hypotheses 1 and 2 were fully supported, but hypotheses 3 was failed

Discussion

Based our original expectation, we should find two-folds influence for E-ecosystem on entrepreneurial financing. First, E-ecosystems should have a direct-positive effect on entrepreneurial fundraising rate. Second, E-ecosystem should has an indirect-negative influences on entrepreneurial fundraising rate where localized fundraising competition mediating this relationship. However, the mediation effect for localized fundraising competition is not supported in our analysis. It has investigated frequently for the influence of E-ecosystem on firm birth(Stam, 2015). Many researches show the positive relationship between E-ecosystem and new venture creation. The high firm birth rate can be discovers in many e-ecosystems. We also find the evidence that E-ecosystem fortify new ventures in Paper2. Then, why E-ecosystems do not promote localized fundraising competition in China?

An explanation is that, although a good E-ecosystem promote entrepreneurship, it

also attract financial capital from other places, or translate more local capital fund into venture capital. E-ecosystem is a self-reinforce community with positive feedback loop. On one hand, E-ecosystem will incubate new ventures and promote their growth. On the other hand, the flourish of enterprises will consolidate the E-ecosystem by attracting more mobile resources and becoming a source of resources. While new ventures thrive and prosper in the E-ecosystem, the brilliant outcomes will attract a lot of high mobility resources and inspire more youths to join the entrepreneurship. For instance, the success of high-tech companies like Google and Amazon draw peoples' attention worldwide. Talents, such as IT engineers, nascent entrepreneurs, academic researches, and mobile resources, such as venture capital and knowledge, move to Silicon Valley simultaneously, seeking the next entrepreneurial opportunity. In addition, E-ecosystems like Silicon Valley is renewed and nurtured by a "flexible re-cycling" process (Bahrami & Evans, 1995). The incumbent firms and new start-ups could become a source of value resources. They not only generate knowledge, skills and experiences, but also generate business opportunities and market for small suppliers. In addition, the "ashes" of failed enterprises could be adopted or utilized by other start-ups. Thus, when we calculate fundraising competition as new tech-ventures over the total volume of venture capital, both the new tech-venture birth and amount of venture capital are increased in China.

This positive feedback loop will attenuate the resource scarcity which promotes the geographic density. Even though the high density of start-ups increases the consume rate of

incumbent financial capital, the flourish of start-ups also attracts and generate more financial capitals simultaneously, declining the entrepreneurial financing competition. Accordingly, the positive effect for E-ecosystem on entrepreneurial fundraising competition will be attenuated by the self-reinforce process. In addition, China face the rapid growth period in the past decades. Before 2000, VC and PE are very rare in China, but they are playing important roles in economic growth, especially in technology industries.

Implication

This paper has examined how E-ecosystem influence entrepreneurial financing. This study makes several important contributions. First, the results provide useful information for nascent entrepreneurs that E-ecosystem will attenuate the information asymmetry between entrepreneurs and investors. It will more easy for them to convince investors to place money in their new ventures if the new ventures are located in a high-level E-ecosystem. Second, nascent entrepreneurs will face more fundraising competition if they set their new ventures in good E-ecosystems. By doing so, this study theoretically and empirically suggest that entrepreneurs do not relocate their new ventures to the good E-ecosystems except they have core-competitiveness. But if the new ventures are very competitive, good E-ecosystems will bring more financial capitals and promote their growth.

Third, to our knowledge, our paper is the first attempt to use a large-scale database to

examine the influence of E-ecosystems. It provides evidence that E-ecosystem not only promote new venture emergence, but also support new ventures survive by enhancing their fundraising opportunity. Previews researches tend to investigate venture financing through endogenous factors and the exogenous factors are often neglected. Although some researchers mentioned the macro-level factors through the institution, limited studies examine this question because the deficiency of data. This study shed light on how regional E-ecosystems shape entrepreneurial financing and encourage researchers to make further systematic research.

This study's findings have several practical implications for entrepreneurs and regional governments. First, regional governments should not provide the financial capital separately but construct a good E-ecosystem to promote entrepreneurial fundraising rate. As many local governments in China intend to develop the economic and industries, they provide very nice polices and tax rate for entrepreneurs or new entrants. However, without a good E-ecosystem, new ventures fail after they exhaust the precious financial capital got from the local government. Professional financiers also unwilling to invest in such circumstance as they believe that the local governments are participate too excessively and the information asymmetry is serious. That is an important reason that why local government in China failed regardless of their great effort. Second, entrepreneurs should create their new ventures in a good E-ecosystem even though they may face more serious competitions. The spillovers from the ecosystem will not only enhance their' survive

opportunities by fundraising, but also save the time for "search and match".

Limitation and future research

Previous entrepreneurship literature produced an impressive list of factors which affect the venture financing process. However, most of these variables are endogenous factors which are related to data of the new venture or investors' decision making. The exogenous factors, especially for the macro-level indicators, such as the regional economic environment, local entrepreneurial culture, public innovativeness are rarely investigated. Although some micro-level exogenous factors such as the third-party affiliation are examined by different studies, the information for macro-level exogenous variables is rarely available.

For future research, more attentions are needed for macro-level exogenous factors in the entrepreneurial financing process, because these variables are always neglected by investors and entrepreneurs. As entrepreneurial financing happens in a particular place at a given time, individuals such as investors or entrepreneurs are unlikely to change or modify the macro-level exogenous factors such as the E-ecosystems; these variables are always ignored or neglected. However, these ignored macro-level exogenous factors are principal strategies and chief executives for government to promote regional entrepreneurial financing.

Also, in this paper, we have not empirically test the self-reinforce influence for the E-ecosystems which attenuate the localized fundraising competition. The recycling and

self-reinforce mechanisms in the E-ecosystems are discussed repeatedly. However, empirical results for these argue are limited. More studies are required to provide evidence and deepen our recognition.

Conclusion

Efforts have been made to promote capital support for entrepreneurship. The governments want to strengthen the investment and financial system, expanding the various venture capital fund or the start-ups. Many local governments set up investment funds by themselves through direct government venture capital funds(Lerner, 1995, 2002).

However, the mismatches between start-ups and investors exist. Several reasons lead this result: first, many new investors are new entrants. Before becoming investors, they are not working even familiar with the tech industries. Especially, the channel of communications for the participators such as government, investors, entrepreneurs are absent. Even though all these resources and elements are supported and provided, they are not co-evolving and operate together. The mismatch for the elements reflects that a well-operated E-ecosystem is needed for venture creation and entrepreneurial financing. This research provides the information for the local government that how to enhance entrepreneurial financing and high light the importance of the E-ecosystem. Just support funds without channels and networks for participators in the system will lead to inefficiency.

Dissertation Conclusion

Through the dynamic co-evolutionary approach, this study explores and exploits the entrepreneurial ecosystem theory. Although E-ecosystem theory attracts more and more scholars' attention and the application of the term has gained momentum in recent years (Auerswald & Dani, 2017), the roots and foundation are still weak and fragile. The poverty and inequality for empirical investigation aggravate this issue even more. Some criticisms arise which inquire the difference between resources based theory and E-ecosystem theory, regarding the important common characteristic of resource munificence. Without studies clearly lay out the main differences and specific features, E-ecosystem theory is considered as tautology and ambiguous.

Current studies are in favor of employing case studies to explore E-ecosystems. Many proposed the frameworks and elements for each E-ecosystem located in distinct countries and regions. However, scholars identify unique elements for each E-ecosystem under different context and their results are inconsistent. Faced with this troublesome circumstance, we comparatively analyze the previous literatures and argue that the necessities for elements are change under different circumstance. For instance, university is much more important for an E-ecosystem specialized in technology companies' creation while leader customers are more critical for an E-ecosystem specialized in nurturing financial firms. In the other end, some kernel elements are frequently

mentioned and examined, such as human capital, financial capital, knowledge capital, and social capital. These fundamental elements are not only indispensable, but also reveal the features for the E-ecosystems as they retain higher mobility and transfer rapidly.

Current case studies generalized the framework and content for E-ecosystems, but the internal operation mechanisms are seldom mentioned and dynamic features are fairly treated. Recently, Stangler and Bell-Masterson (2015) suggest to use density, diversity, fluidity, and connectivity as vibrancy indicators for E-ecosystem. However, the core logic that why E-ecosystems do better is still missing. To fill up this gap, we develop E-ecosystem theory by utilizing the co-evolutionary approach and argue that E-ecosystems with good fit, match and interactions among key components would lower the fixed cost and barrier for entrepreneurship, speed up the entrepreneurial opportunity identification and development, enhance the regional competition and commercialization efficiency, and raise the start-up survive rate and growth rate. The composition balance, mutual fit & match and synergistic interactions in the E-ecosystem is also important to venture creation as well as resource munificent.

To reinforce our proposition, we test the relationship between synergistic interaction and venture creation and the empirical results proof our argument. The synergistic interactions between the key components positively influence entrepreneurship. In addition, we empirically investigate the relationship between E-ecosystem and entrepreneurial financing and find that E-ecosystems promote entrepreneurial fundraising

rate while localized fundraising competition depress entrepreneurial fundraising rate. In a word, this study answered the previously raised questions.

Limitation and Future research

As the necessity for each element varies based on certain circumstances, we do not explore every resource in the E-ecosystem but comparatively analyze the existing studies concentrate on this field. We use only four key components in the E-ecosystem to test the synergistic interactions and find four out of six effects are positive and influence. Future studies could make more effort on other elements and test whether the synergistic interactions are also work or not.

Besides synergistic interaction, the antecedents for composition balance and the level of fit & match requires further investigation. To consolidate E-ecosystem theory, more empirical research needs to be conducted. In our second paper, we find that the human capital has a negative relationship for venture creation. The key reason is that the measurement for human capital utilized in the study is borrowed from venture performance but not venture creation. Individuals who do a good job in the existing company do not guarantee that they will suitable for entrepreneurship. We still don't know who are good entrepreneurs and the method to measure the human capital for entrepreneurship.

In the third paper, the mediating effect for localized fundraising competition is not

supported as the relationship between E-ecosystem and fundraising competition is not significant. We propose that E-ecosystem's self-reinforce process attenuate the venture financing competition. This proposition has not been testified in our research. In addition, the absent for empirical studies in dynamic process, such as fit & match and feedback mechanism cause more future researches. As the research field for entrepreneurship only progress for decades, there are still abundant of gaps which haven't been settled.

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