The drivers of technology development in "New Silicon Valley" Hangzhou: a Resource-Based Perspective

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Abstract. This study takes the "New Silicon Valley" Hangzhou to discuss the relationship about the resources and development. The resource-based view provided a systematic approach for analyzing the role of Hangzhou in terms of its potential sustained competitive advantage in technology development. In this study, we suggest that each resource can enhance the technology development, but the potential of each resource should not be viewed in isolation. Two intervening variables are talents and capabilities. We not only integrate three resources, but also study at their interface. Thus, we put forward eight propositions include the interplay, isolated impact and combined affect.

Introduction

Hangzhou is the capital of Zhejiang province and it's a political, economic and cultural center. The city has persisted in the implementation of the strategy of "Reviving the City through Science and Education" and promoted the development of science and technology through innovation. The city has encouraged the establishment of hi-tech enterprises and R&D centers actively. Over 80% of colleges, universities and research institutions of Zhejiang Province are gathered in Hangzhou. The city has 36 general colleges and universities with 409,600 undergraduate students and 29,700 graduate students. Among them, the prestigious Zhejiang University enjoys abundant research resources. There are over 80 national-level research institutions and over 300 thousand scientific and technological professionals working in Hangzhou.

Literature review

Resource-based review(RBV) is a major theory in strategic management [Liang et al. , 2010]. The RBV focused on competitive advantage stemming from specific internal firm resources while traditional strategy research focused on advantages deriving from industry and competitive positioning [Wernerfelt 1984; Acedo, Barroso, and Galan 2006; Turba 2011]. According to the RBV, a firm's resources can provide a sustainable competitive advantage if those resources are valuable, rare, imperfectly imitable, and non-substitutable (VRIN) [Barney, 1991]. It has been widely used to analyze attributes under different terms such as resources, capabilities, and routines [Goh et al. , 2007] and competitive advantage. Resource is classifies into tangible, intangible, and personnel-based resources. Capability is defined as competency that is built by combining resources [Grant 1991]. The RBV literature discusses a variety of isolating mechanisms, which act to preserve the sustained competitive advantage. We choose the three representative resources to study the drivers of technology development in Hangzhou.

After a detailed reading of literature, we select three main resources include policy, fund and

university. In our model, talents and capabilities essentially link resources and the development of technology (is shown in figure 1). Below, we describe the interplay of the three resources (p1,p2,p3). Moreover, we discuss the relationship about three resources and development (p4,p5,p6). As combination, we clarify the talents and capabilities contribute to the development (p7,p8).

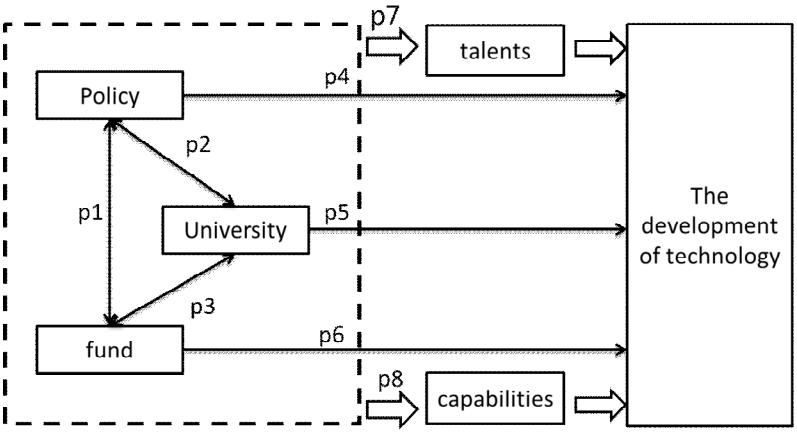

Figure 1 theoretical model linking *resources* and *the technology development*

Proposition 1: Policy support brings more funds for technology development. Otherwise, fund promotes the government to formulate and execute more policies about the development.

Policy plays an important role on the development. In Hangzhou, the government builds three towns and three valleys named "New Silicon Valley". In fact, this policy attracts more enterprises to locate in Hangzhou, especially the information technology enterprises. Three towns called Cloud Town, Dream Town, Fund Town, three valleys called Cloud Valley, Xixi Valley, Sensing Valley. Otherwise, the three towns and valleys make the government pay more attentions on the technology development.

Proposition 2: Policy impacts the development of university by employment, entrepreneurship support and so on. The university promotes the development of the city by the knowledge and graduates.

Policy is an intangible competitive advantage. For example, a lot of preferential policy for financial talents, it is will be advantage for the financial college. Otherwise, the university impacts the government. One way is knowledge effect because the university is the brain trust of the government. The university gives suggestions of development for government through theoretical research. Another way is the graduates play an important role about the development of technology.

Proposition 3: (Zhejiang) University attracts funds from the government, society and schoolfellows. The funds contribute to the development of university.

In 2014, the R&D fund of Zhejiang University is $4.89 billion in total. There are three main sources, the government, society and schoolfellows. Zhejiang university gain 739 national natural science foundation projects in 2014, reached $88 million. The scientific research funds from society reached $0.3 billion. The donation is almost from the schoolfellows, also reached $38.7 million. Otherwise, the fund promotes the development of university. Based on the Essential Science Indicators, 17 subjects ranked top 1% of the world's academic institutions.

Proposition 4: Policy is more likely to lead to the development of technology by finance, incubation platform and patent protection.

The policy is one of the most important resources for technology development. First, the government supports the innovation of science and technology by finance. During 2014 in Hangzhou, the venture capital guiding funds totaled $0.62 billion. The finance gives the enterprises

big support because the capital is the core for small and medium-sized enterprises (SMEs). Second, the government promotes the construction of incubation platform to cultivate enterprises. The incubation platform in Hangzhou involves 8,133 enterprises among which 4,336 are still incubating. Third, the policies of Patent protection give the technology inventor power to study.

Proposition 5: (Zhejiang) University is more likely to lead to the development of technology by innovation system and science parks.

Zhejiang University's innovation system called the system of "2 + 2". Two systems are knowledge innovation system, and the scientific research innovation system. Two platforms are industry-university-institution platform, martial industry platform. The science parks provide start-up businesses with a range of resources and services related to inaugurating the firms. Zhejiang University National Science Park serves as a radiating source and incubating base for the university faculty and students to start high-tech business and industrialize research achievements. At present, over 100 hi-tech incubating enterprises have set up their branches in the park.

Proposition 6: Fund is more likely to lead to the development of technology by government support, angel investment and fund platform.

Sufficient fund is the biggest competitive advantage of enterprises. Where does the fund come from? There are three ways. One way is the government support. Hangzhou government compensates loan interest, provides re-lending support, sets up a pool fund for small and medium-sized enterprises to reduce credit risks. The second way is the angel investment. There are many venture capital institutions, many Angel investors in Hangzhou. Another way is the fund for the platform as technology center, R&D center and enterprise institute. The fund for enterprises' technology innovation strategy is for industry-university-institution alliances, funding for Science and technology projects.

Proposition 7: The combination of three resources brings the talents of technology and management who play the most important roles in the development.

The combination of three resources brings the talents. There are main two types of talents, one is scientific talent, and the other is entrepreneur. The symbol of the technology development is the quantity of the scientific talents. Talent aggregation effect is apparent in Hangzhou. A number of high-level innovative teams, which own independent intellectual property rights, or master core technologies are coming to Hangzhou. The other type of talents is entrepreneur, the ones come from Alibaba and universities occupy the majority. By the statistics, about 30,000 former Alibaba employees who are starting to establish business. And more than 19,000 university students set up about 8,876 enterprises.

Proposition 8: The combination of three resources means the capabilities of development. The capabilities divided into political capability, economic capability and cultural capability.

The combination of three resources means the capabilities. The capabilities can be divided into political capability, economic capability and cultural capability. Political capability makes the enterprises possible to connect with the government, and gain the support of them. Economic capability comes from the money for enterprises likes the blood of body. Cultural capability is heterogeneity of competitive advantage. It could not be imitated easily. To be highlighted, integration is the fourth kind of capability which is tacit. We shall study their roles of science and technology development from systemic view.

Conclusions

In this paper, we analyze the relationship between the resources and the development in "New Silicon Valley" Hangzhou. My theorizing not only helps integrate three resources, but also offers

contributions to further study at their interface.

Contributions. First, we clear and definite the role of each resource plays on the technology development. Yet, thus far, many studies have explicitly modeled the role of the resource. This paper selects the most important resource from previous studies. Second, we discuss the interplay of each resource. The framework gives the impact mechanism of them. Third, we discuss the relationship on combined perspective. The result shows that the talents and capabilities are intervening variable.

Further research. For the limited collection on data, we lack of empirical studies. The future study should try to retrieve more directly materials to research the mechanism not only between the resources and the development, but also the interface of resources. In addition to data, we can also use cases to prove our propositions.

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