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Technology entrepreneurship : a process framework

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Chapter 5 Case and cross case analysis

This chapter presents the research findings. The patterns of entrepreneurial actions have been identified. Interpretation of the data reveals a coherent entrepreneurship process framework which is characterized by frequent and iterative testing, and maneuvers of experimentation and adaptation until a status of configuration is reached. For the entrepreneurs in this study, addressing the deep uncertainty associated with technology and market is the central challenge in managing the entrepreneurship process. Just as the founder of HOBBY and many other entrepreneurs, who made similar comments, describes during the interviews:

“Investing in R&D to invent new technologies, and develop new technical solutions is not the only challenge to be solved. In addition, we also have to put a lot of efforts, even more efforts than that for R&D, to develop a product and create a market, educate potential customers, and getting people to know and accept our relatively new products.”

In this process framework, entrepreneurs are first inspired by fleeting initial ideas. Subsequently, they invariably pursue courses of actions which ultimately result in configuration as the outcome of the whole process. These patterns of actions are organized into three sub-processes: conceptualizing, implementing, and adapting. That is, the entrepreneurs attempt to: 1) elaborate, develop, and test the initial idea until they are convinced of the viability associated with the conceptualized idea; 2) acquire resources from resource holders to implement the conceptualized ideas; and 3) constantly adapt the actions and plans in response to changes occurring in the conceptualization and implementation processes. Together, the iterative processes take an initial idea into an entrepreneurial configuration. I expound on each process next.

5.1 The emergence of an initial idea

5.1.1 An initial idea – the initial input

The answer to the question of “what initiates the entrepreneurship process?”, according to the conventional entrepreneurship literature, is a recognized “opportunity” (Shane, 2003: 12) or a business plan (Blank, 2013). This kind of post-hoc description, however has largely neglected the question of how this “recognized

opportunity” and this “plan” occur to entrepreneur in the first place? Furthermore, what are the initial forms?

The analysis of the cases shows that a variety of initial ideas may initiate the entrepreneurship process. Here I use the term “initial idea” because the ideas that trigger the entrepreneurship process in fact are different from the business idea, which usually includes detailed descriptions regarding how to recombine resources in a way that allows for the pursuit of entrepreneurial opportunity (Shane, 2012). For the cases in this study, the initiating factor: *(1) is vague, and does not yet have an explicit goal; (2) is spontaneous, not necessarily result of planned activity like scanning of the external environment; and (3) has no timeline of the implementations.*

The initial ideas observed in this study come in a variety of forms. For example, in the case of THUNDER, a start-up which designs and manufactures Magnetic Induction Lamps, the founder describes how the entrepreneurship process came about:

“...If you ask me what pushed me to leave my job and start engaging in the magnetic lighting, I would say, it’s my belief on the future of this new technology. Compared to the LED technology, the Magnetic lighting technology is of higher efficiency in electromagnetic power conversion, and is more environmentally friendly. With these technical features, it has a huge potential to develop a wide range of industrial downstream applications, e.g., soilless cultivation of rice, water disinfection and so on...”

The technical superiority of the magnetic induction lamp and its prospective applications, of course, are just the entrepreneur’s perception that exists in his mind alone at that moment. It’s a belief emerging from his interpretation of the external environment. This founder didn’t have a specific image of the final product he would develop, nor a clear “goal” or “time schedule” regarding the implementation of this envisaged project at the point in time when he first sensed the idea.

Furthermore, as for the belief in the future of certain technologies or certain industries, the shape of those initial ideas spans a whole range of factors. They include, for example, the idea of developing a solution for a technology deficiency, which was sensed in the case of HERO. In the case of TRAVEL, it was integrating technical project results to develop a solution for an emerging market. In the case of HOBBY, it was as simple as investing in a hobby. Hence, it is clear that THUNDER is not the only case where the developmental process begins with initial ideas. The following table gathers the initial factors of all cases in this study.

Table 5 The initial input for the entrepreneurship process

Case	Initial idea
HERO	To develop a technical solution for a deficiency in the existing chemical treatment approach in manufacturing Integrated Circuits (IC).
ROAD	To commercialize the technical knowledge accumulated from years' work in the emerging Integrated Circuit (IC) designing industry in China.
ZEBRA	To develop a solution for sewage treatment based on results from a government-founded research project.
TRAVEL	To develop a "smart driving" system for the emerging Chinese market, by integrating research results generated from scientific work that the founder has performed in different fields, e.g. image processing, mapping, and sensor technology.
THUNDER	To engage in the development of the Magnetic Induction Lamp which is envisaged as the future in the lighting industry for its higher efficiency in electromagnetic power conversion, and environment-friendly features.
GIANT	To develop 3G and Wi-Fi solutions for SMEs and potential customers located in places where a fiber optic cable connection is not available or is not suitable.
VENUS	To develop facial recognition solutions for TV stations and video editing companies which can intelligently blur the faces in the videos.
WIND	To develop a concentrated solar power system, by teaming up with two friends who were working in the associated research fields.
MARS	To build an internet-based B2B platform for software outsourcing, to bridge the service buyer from North America with service providers from mainland China.
HOSO	To create a cloud computing-based HR management system which is envisaged as the last area remaining under-developed in the business software market.
CAPITAL	To find a proper project in the emerging 3G industry.
HOBBY	To invest in the founders' hobby of playing with aircraft models which could be dated back to their childhood.

5.1.2 Three paths towards the formation of initial ideas

The various forms of an initial idea have provided a snapshot of what the initial input triggering the entrepreneurship process looks like. Yet, another relevant question remains unaddressed: how do these initial ideas emerge? In an attempt to answer this question, I examine the founders' resumes, and as well their answers to the questions I put during the interviews – “how and when did the idea occur to you?” and “what made you to come up with this idea and start a business to exploit it?”

The interpretation of the data suggests three possible paths towards the formation of the initial input. The formation occurs according to the link between the initial idea and the knowledge base of the founders before the idea emerges, and also between the temporal sequence of the relevant knowledge accumulation efforts and the ambition of becoming entrepreneur - a personal appeal to start a business. These three paths⁶ are as follows: (1) “sensing via experiencing”-- this refers to a situation in which the knowledge accumulated bears a close connection to the initial idea, and the knowledge accumulation efforts occurred before the ambition was formed; (2) “sensing via observing”-- this describes a situation in which knowledge accumulation has a close connection to the initial idea, but the knowledge accumulation is instead driven by the ambition of becoming an entrepreneur; and (3) “sensing via visioning”-- this depicts a situation in which the link between knowledge accumulation efforts and the initial idea was not obvious. The entrepreneur is mainly driven by the ambition of becoming an entrepreneur and other endogenous factors such as one's hobby, for example.

5.1.2.1 Sensing via experiencing

Five cases within this study show that individuals run into technical ideas whilst they were engaging in the field before an entrepreneurial ambition had formed. The initial ideas, in such cases, grew out of the work which the individuals had been doing in a function as engineers or researchers, for example. The knowledge gained from work plays a crucial role in the initial idea formulation thus.

HERO is a good example that falls into this group. It is a start-up that develops chemical solutions for the manufacturing of Integrated Circuits (IC). The founder describes how and when the idea occurred to her:

⁶ Parts of earlier version published as: Zhou, Z., Katzy, B.R. (2011) Creation theory: an alternative theory towards technology entrepreneurship, In *Proceedings of EuroMOT 2011: “Platforms and innovation: In search of efficiency and effectiveness”*, Tampere, Finland, 2011.

“...The project idea could be dated back to the period when I got my first job in the field of semiconductor manufacturing in 1990s. This field was completely new for me, because before this experience, I was studying analytical chemistry and working as an environment protection analyst in the construction sector. As my work in this new field proceeded, I found a technical deficiency existing in the chemical treatment approach used in manufacturing semiconductors. The existing approach consumes a large amount of water, and is also potentially dangerous to workers...”

The idea of developing a new chemical treatment grew out of a technology deficiency discovered during the founder’s daily work. What’s more, she became inspired to further exploit this issue and to think of a solution by taking relevant courses at Stanford University, discussing her ideas with colleagues from work and professors in the class. As she further describes:

“...The more I learned about the existing chemical treatment, the more I became confident about the value of my solution. This inspired me to further pursue this idea...”

HERO is not the only observation from this study which entails entrepreneurs running into their initial ideas unintentionally. Similar stories are also heard from the cases of ROAD - a start-up that designs and manufactures Integrated Circuits (IC), ZEBRA – a start-up that develops sewage treatment solution, TRAVEL – a start-up that builds ‘smart driving’ systems, and THUNDER – a start-up that develops magnetic induction lamps. The evidence illustrating how initial ideas emerge in these five cases have been presented in the following table 6.

For these 5 cases, despite the diverse forms which their initial ideas took, all the founders had already been engaging in technology research which was closely associated with those initial ideas for quite some time. They delivered research efforts not because they were preparing for entrepreneurial projects. Rather, it was part of their daily jobs. Furthermore, all the entrepreneurs who sensed the initial ideas in this way have engineering or research backgrounds. Specifically, the founders of HERO and ROAD had been working in the R&D department within large companies for over 10 years; the founders of ZEBRA and TRAVEL were professors working at universities for over 10 years; and the founder of THUNDER was working as a researcher for three years at the largest research institute in China - Chinese Academy of Science (CAS).

Table 6 Evidences of sensing via experiencing

Case	Description
HERO	“...The project idea could be dated back to the period when I got my first job in the field of semiconductor manufacturing in 1990s. This field was completely new for me, because before this experience, I was studying analytical chemistry and working as an environment protection analyst in the construction sector. As my work in this new field proceeded, I found a technical deficiency existing in the chemical treatment approach used in manufacturing semiconductors. The existing approach consumes a large amount of water, and is also potentially dangerous to workers...”
ROAD	“...I have been working in the R&D department in a large company in the USA, another two founders have similar backgrounds and were also doing jobs as engineers at large companies as well. We were colleagues and none of us had any entrepreneurship experience. We were thinking of doing something that could turn our knowledge into some products and services. The intention to engage in the entrepreneurship was sparked when we met the people from ‘530 program’ in 2006. Since then we started to assess the viability...”
ZEBRA	“...The leading founder works in the university. He is a well-known professor in the field of water pollution control. The idea appeared from a nationally founded research project which was coordinated by him. He wanted to apply the research results in the practice...”
TRAVEL	“...The founder has been working for the R&D department in an industrial company and at the university full time for almost 15 years. This allows him cutting edge knowledge regarding mapping, sensor and image processing technologies...he thought about a smart driving solution out of the knowledge accumulated...”
THUNDER	“...The project idea emerged from my experience in the lighting research institute of Chinese Academy of Science (CAS). I was working there for three years as researcher. Later I left the CAS, and started engaging in the Magnetic Induction lighting research by myself...because I believe that Magnetic Induction Lighting is the future in the lighting industry for its higher efficiency in electromagnetic power conversion, and more environmentally friendly features...”

I label this path towards initial idea as “sensing via experiencing” because 1) the initial idea sensed is based on the technical knowledge or experience accumulated from the entrepreneur’s previous work, and the technical knowledge plays an essential role in the initial idea; 2) the formation of this initial idea is not initiated by the ambition to become an entrepreneur. Despite the important role of

research experience in sensing that initial idea, still, it is worthwhile noting that the initial idea is the combined result of knowledge and the ambition of becoming an entrepreneur. Without the ambition to become an entrepreneur, knowledge does not turn into ideas by itself.

5.1.2.2 Sensing via observing

In addition to sensing via experiencing, there are five cases within this study which point to an alternative path for forming an initial idea. This path starts with the ambition of becoming self-employed, followed by the efforts attached to looking for a proper idea. In such cases, the initial ideas typically emerge from market research and are driven by a perceived market demand.

The process of how the founder of MARS came up with the initial idea fits well into this path mold. MARS is a company that aims to develop an internet-based software-outsourcing platform (B2B) for stakeholders involved in the software outsourcing value chain, in particular for SMEs. This platform is supposed to create value for both contractor and subcontractor by tracking and monitoring the workflow and quality of software co-contract activities, guaranteeing the payment security. The founder of MARS had previously worked for IBM, Oracle, Netscape and Sun Microsystems as a software engineer. Moreover, he is also a serial entrepreneur, having several successful entrepreneurial experiences in the IT field. During the interview, the founder described how he and his team got to the initial idea:

“...The platform we want to develop is based on three years’ market observation. We saw the demand before launching this company. The idea is not only a technical platform. If we look at the technological aspects, all the technologies to be used for the development of the platform are not new. Only the well-combining of the technical platform and market expertise can address the identified market demand...”

Other than following the path of sensing via experiencing, the case of MARS suggests an alternative path for illustrating the emergence of an initial idea. As the resume of the founder reveals, he didn’t have technical research experience or management experience that was close to the business of software outsourcing platform, despite his vast experience in the IT field. During the interview, after he answered the question of how he came up with this idea, he added:

“...The information flows among different networks, communities in the Silicon Valley, allow you easily get what is happening out there...”

Furthermore, as for the case of MARS, similar ways of forming initial ideas can also be observed in the cases of GIANT – a start-up that develops 3G solution for SMEs, VENUS – a start-up that develops facial recognitions solution, WIND – a start-up that develops concentrated solar panel systems, and HOSO – a start-up that develops cloud-computing-based HR management solutions. I label this kind of sensing mechanism as “sensing via observing” because 1) the initial idea sensed is close to the market knowledge that is based on the observation of the external environment, and the interpretation of market demand plays an important role in the initial idea; 2) the technical knowledge accumulation effort is driven by the ambition of becoming an entrepreneur.

The following table collects the evidence of five cases that fall into this category. As the data show, the formation of the initial idea is triggered by the ambition of becoming an entrepreneur. After the ambition is formed, the prospective entrepreneurs usually engage in searching actions (e.g. scanning the changes in the environment, monitoring market) to identify unmet gaps, and only later come back to the technical aspects, to form initial ideas. In such cases, the uncertainty regarding technology development is relatively low compared to the ideas sensed via experiencing. Moreover, although the initial ideas are associated with technology, it is not a must that the entrepreneurs have direct research experience associated with the technology. Pronounced knowledge regarding the technology is not a prerequisite for sensing the new idea. Different from the strong engineering/research backgrounds that the entrepreneurs of “sensing via experience” have, entrepreneurs of “sensing via observing” have more entrepreneurial experience or management experience. Specifically, the founders of GIANT, VENUS, WIND, and MARS are serial entrepreneurs. For the case of HOSO, the founders don’t have entrepreneurial experience, yet six of them were working in management positions of large companies.

Table 7 Evidences of sensing via observing

Case	Description
GIANT	“...Before coming to Wuxi I was the co-founder for a start-up operating in the field of wireless communication and was in charge of the software development in that company... the idea we are engaging now comes from the investigation of the unmet market demand of 3G and Wi-Fi solutions for SMEs and for the remote area where the fiber optic cable network hasn’t reached yet...”

Table 7 Evidences of sensing via observing (Continued)

Case	Description
VENUS	“...It was in 2008, one of my friends came over and asked me to join him to do something in the field of facial recognition computation... We were quite confident about the market potential for this technology, but we didn't know where to start...later another classmate from my college time came and brought the idea of providing facial recognition solution for TV stations...the market became clear. It's hard to say no...”
WIND	“...My business partners and I had been working in the USA for quite some time. We had long been thinking of doing something together. Actually before setting up this business, I had one start-up in the field of wireless communication since 2004 in Beijing, but the business there has nothing to do with this one I'm running...this idea emerged from my scanning of the market and network. I identified the surging solar panel market in China, and I see the connections between this market demand and the expertise from my network...”
MARS	“...The platform we want to develop is based on three years' market observation. We saw the demand before launching this company. The idea is not only a technical platform. If we look at the technological aspects, all the technologies to be used for the development of the platform are not new. Only the well-combining of the technical platform and market expertise can address the identified market demand...”
HOSO	“...All the founding members were friends. We started thinking about a potentially proper idea for doing something together 6 years ago...We saw an opportunity in the intelligent H&R management...HR management is the only area that has not been fully exploited in the field of business software service...”

5.1.2.3 Sensing via visioning

As many cases within this study fall into the groups of “sensing via experiencing”, and “sensing via observing”, two remaining cases show that the way in which they formed the initial ideas cannot be well explained by these two paths.

For example, the case of HOBBY, a start-up that designs and manufactures unmanned helicopters. One of the two founders explains how they formed the initial idea:

“...It’s our hobby. I think almost every boy is fascinated by aircraft models just like when we were young boys. But my family couldn’t afford it at that time. Now we have time and some money that could be invested in our hobby...”

The brother founders had no working experience in the unmanned helicopter field. The younger brother was working in a chemical engineering company as a system development engineer after his graduation with a Master of Science degree in physics in the 1980s in Japan. In 1997, he launched his own business in the IT field. Moreover, the older brother had also been an entrepreneur in the field of IT software. In this case, the initial idea of developing an unmanned helicopter has no clear relationship with their experience in the way that the path of sensing via experiencing shows, neither does the idea emerge from considerable market searching efforts in the way that the path of sensing via observation indicates. They simply wanted to invest in their hobby.

Table 8 Evidences of sensing via visioning

Cases	Description
CAPITAL	“...At the beginning of 2006, we were planning to do something in the emerging 3G industry. It was just emerging. We believe it’s a future industry. ...It is the future of 3G industry that drives us into becoming entrepreneurs...”
HOBBY	“...It’s our hobby. I think almost every boy is fascinated by aircraft models just like when we were young boys. But my family couldn’t afford it at that time. Now we have time and some money that could be invested in our hobby...”

A similar pattern can be found in the case of CAPITAL - a start-up that designs and manufactures Mobile Internet Devices (MID). Both founders of CAPITAL had no direct experience associated with MID. They also hadn’t conducted searching efforts, for, the market for the MID was only a concept existing in the eye-catching media at the point in time when they sensed the idea. I label this

path as “sensing via visioning” because 1) the link between the founder’s working experience and the initial idea is not clear; 2) the initial idea has a strong emotional element in being a dream, hobby, or vision. The table 8 presents the evidences of “sensing via visioning” regarding the cases in this study.

The “sensing via visioning”, to some extent, could be considered sensing via observing as well. For the cases that fall into sensing via observing, the prospective entrepreneurs sometimes sensed initial ideas, also without direct involvement in that field. Yet, compared to the “sensing via observing”, the “sensing via visioning” is more endogenously driven. The entrepreneurs come up with the ideas not because they see a concrete demand based on scanning the environment. Rather they simply believe in the future of the ideas or are committed to the ideas for their own personal reasons. Very often, only very little explicit information regarding technology and the market is available. In such cases, prospective entrepreneurs come up with an idea purely because there is an alleged, imagined or expected future out there, or because there are some hidden endogenous factors playing a role in the way of hobbies or dreams.

These three possible paths towards the initial idea illustrate the emergence of the initiating conditions for the entrepreneurship process. The findings suggest that there is no single way towards the initial idea. “Sensing via experiencing” and “sensing via visioning” as two complementary patterns are thus added to the widely accepted pattern of “sensing via observing”. These observations add evidence regarding the initial conditions of the entrepreneurship process, for which scholars have traditionally taken a simplified approach, by now claiming that the initial inputs of the entrepreneurship process need not necessarily be a business idea that includes a detailed description on how to recombine resources in a way that allows creating value (Alvarez, Barney, & Anderson, 2012; Sarasvathy, Dew, Velamuri, & Venkataraman, 2005).

5.2 Conceptualization: testing, developing the initial idea and becoming an entrepreneur

The individuals do not implement ideas directly upon sensing them. They harbor doubts about the viability of their idea and are not yet sure if the sensed idea could become an operational venture bringing an acceptable outcome in the end. In this sense, until the moment when individuals actually decide to start a business, they remain prospective entrepreneurs.

Before making the decision to start a new business and explore the sensed ideas, prospective technology entrepreneurs in this study apply great dedication in the pursuit of a variety of actions to test, develop and filter those ideas by means of interacting with the external environment. I label these kind of actions as “conceptualizing actions”⁷. The observations are in line with the process of objectification in a previous study (Wood & McKinley, 2010) in which prospective entrepreneurs engage in a variety of actions to interact with the environment and make sense of the initial idea. Moreover, as these actions proceed, different forms of feedbacks are generated, which in turn help prospective entrepreneurs to make their ideas explicit and concrete, and ultimately help convince them of their viability, so that they then take the leap to become entrepreneurs.

5.2.1 Informal interaction and formal engagement

Entrepreneurs in this study use a variety of forms of actions to interact with the external environment. Prospective entrepreneurs speak, for example, to their friends, to colleagues from work, and to family members about their ideas to gain an opinion regarding their viability. The table 9 collects conceptualizing actions that have been performed by the entrepreneurs in this study, which can be grouped into “informal interaction” and “formal engagement”.

Informal interaction. The informal interaction refers to a situation in which individuals communicate with external stakeholders in the form of a short conversation or verbal exchange. As the cases reveal, the informal interactions can take various forms and with a variety of external stakeholders. They are not constrained to the people that entrepreneurs know well. More generally, they are comprised of these factors: 1) those people who are quite close to the entrepreneurs in daily life, for example, family members, friends; 2) knowledgeable people from the entrepreneur’s personal network. They are experts in certain fields, for example, colleagues from work, or professors from universities; and 3) experts who have achieved a high level of individual competence in a given domain which the entrepreneurs might not be familiar with personally, but which they somehow managed to gain access to, for example, VCs introduced via friends.

⁷ Giones, F., Zhou, Z., Miralles, F., and Katzy, B.R. 2013. From Ideas to Opportunities: Exploring the Construction of Technology-Based Entrepreneurial Opportunities. *Technology Innovation Management Review*, June: 13-20.

Table 9 Various forms of conceptualizing actions

	Examples
Informal interaction	Speaking to friends and family members Talking to colleagues from work Talking to mentors from studies Talking to experts from personal network Talking to potential customers Talking to potential investors
Formal engagement	Applying for innovation programs Participating in business plan competitions Applying for IPR Searching for entrepreneurship partners Participating in academic events Looking for sponsorship Doing technology experiments Conducting market research

Formal engagement. Besides the informal interactions, entrepreneurs from this study also take a more formal way to test, to develop, and to evaluate initial ideas. Compared to informal interaction, the formal engagements are well documented by the entrepreneurs and require active testing actions, rather than verbal information exchanges. They can be taken in the forms of applying for IPR, searching for entrepreneurship partners, doing technical experiments, doing market research, looking for sponsorship, and participating in business plan competitions, attending research seminars and so on. The external stakeholders involved in the formal engagement, compared to those involved in the informal interactions, are mostly independent organizations or individuals who are not part of the personal network of the prospective entrepreneurs, for example, VCs, business angles, and business plan competition organizations.

Different from the proposition of Wood and McKinley (2010) that entrepreneurs engage in the conceptual elaboration of initial ideas only via information exchange, the technology entrepreneurs in this study actively engage in testing, and experiment with the technology underpinning the initial ideas. They move back and forth between technology research and the conceptual analysis of their initial idea.

9 of 12 cases (excepting MARS, GIANT, and HOSO) told stories of how they tested and experimented with the technological component for their initial ideas

before they started a business. These testing/experiments mostly took the form of doing technological research, participating in technical research seminars, and filing for patents. For the cases that didn't engage in the technological experiments and testing before they started their business, one possible explanation is that the uncertainty regarding the technology development was quite low. All three of these cases are market demand driven. Just as the case of MARS aforementioned, the technologies that are used for the initial ideas are not new.

5.2.2 Conceptualizing interactions yield general feedbacks and new information

By undertaking these various conceptualizing actions, the conceptualization of the initial idea is enhanced by the response received. The cases in this study show that, as the interactions proceed, the external environment provides feedback in various forms. Quite often, after the prospective entrepreneur has presented an idea to others, she or he would hear comments like "...it's a very promising idea, I think it's quite viable in my eyes, if you find a good partner...well, one of my friends is working in the field, he might be a good candidate for that..." or "...it's a great idea, I think you will be successful with the implementation of this idea..."

These various responses, according to their impact on the development and evaluation of the initial ideas, can be categorized into groups which I would call "general feedback" and "new information". New information helps to make the initial ideas become concrete and more explicit. Furthermore, general feedback stands for other people's general perception about the viability of the ideas, and it includes both positive and negative feedback.

Positive feedback. Positive feedback stimulates prospective entrepreneurs to stay in the field and keep pursuing the sensed ideas. HERO is a good example to illustrate the role of general feedbacks. After the founder has sensed the technical deficiency in the semiconductor manufacturing process, she initially was not sure if it was a good idea or not. It took her more than 10 years to ultimately make up her mind to start a business exploring her idea. When I asked her what kept her pursuing this idea for over 10 years, she said:

"...When I came up with the idea of developing a solution for technical defects, I wasn't sure about its viability. To test it [technical idea], I started looking into books, talking to colleagues from work and professors at the university. They gave me quite some encouraging feedback. I would

say, this encouragement made me more confident about the viability of my idea...”

Two years after she sensed the initial idea, she found a new job in Fujitsu to continue her work as chemical analyst for the IC manufacturing process and subsequently worked there for eight years. In 2001, Fujitsu was shut down, and at that point in time, the idea of deploying this new technology in China first emerged in her mind. With this idea, she conducted a variety of activities to test its viability. For example, in 2002, the founder came back to China and visited almost all the research institutes on microelectronic technology (e.g. research institutes of microelectronics in Beijing and Shanghai) to seek out entrepreneurship partners. She got quite a number of proposals, but she turned them all down on account of the poor technical environment in China at that time – the potential partners were not able to provide complementary resources (e.g. competent technical personnel, experimenting devices). In the same year, built upon the technological idea, her husband wrote up a business plan and participated in a business plan competition organized by a business journal in Oregon. The business plan was rated among the top ten business plans in that event.

With the winning business plan, she was invited to make a presentation at Intel. It turned out that Intel was interested in her idea as well. In later 2002, Intel sponsored her in the form of providing her with experiment devices and researchers. The inspiration which this maneuver allowed the founder was tremendous.. Just as she said during the interview: “I really believed that I had won already.” However, setting up a new research unit at Intel is not easy. In 2006, the idea of following up on her project in China arose again and she started gathering and comparing entrepreneurship policies and applying for the support of innovation programs. In this long conceptualization process, the overall feedback which she received as a result of those actions,, played an important role. Just as the founder summarized her experience by the end of the interview:

“...As for the survival of this project, I would attribute it greatly to the people I met who really appreciated the technology, not only those providing resources. Their encouraging comments mattered a lot to me, for example, the department director I met in Fujitsu, my colleagues, and the experts from Chinese Academy of Science (CAS). Without these people, I have to say, I would have already given up a long time ago...”

The development process of HERO clearly shows the role of positive feedback in the conceptualization process. It kept the founder grounded in the field,

and encouraged her subsequent entrepreneurial actions, for example, by means of staying involved with peers to conceptualize ideas. In addition to the case of HERO, the founders of CAPITAL, THUNDER, MARS, and ROAD also provided detailed descriptions that positive feedback kept them remaining active in the field in pursuit of the initial ideas.

New information. Furthermore, overall feedback played an additional vital role in hooking up the prospective entrepreneurs with key information. That is, the interaction with external stakeholders generated feedback in the form of new information. With that new information, ideas became explicit and concrete. All the respondents provided detailed descriptions about the new information received as a result of the conceptualizing actions which they took. Such new information included, for example, new ideas about the potential market, or new information regarding implementation. A good example is the case of CAPITAL. At the onset, after the two founders came up with the idea of doing a project associated with MID, they didn't know what to begin with. But instead of waiting or mapping it out on their own, they went about interacting with people from their network. Gradually, they came to the conclusion to start with R&D activities that were related to the MID, and tried to build relationships with chip manufacturers via their private network.

The following table provides evidence on the conceptualizing actions and associated new information and overall feedback. This result adds to the widely held argument that the knowledge of entrepreneurs matters in developing initial ideas (Shane, 2000), and suggests however that responses generated from social conceptualizing actions play an essential role as well.

Table 10 Evidences of conceptualizing actions

Case	Description
HERO	"...To test it [technical idea], I started looking into books, talking to colleagues from work and professors at the university. They gave me quite some encouraging feedback. I would say, this encouragement made me more confident about the viability of my idea..."
ROAD	"...I was thinking about how doing something with friends, working at a big company, sometimes, doesn't bring the feeling of achievement...at the beginning when I first heard of '530 program', it only seemed interesting to me...this triggered me to know about the policy and I was serving [as a member] at the Association of Chinese Overseas Scholars which provided me with access to this information. As the interactions proceeded, I became more confident about my plan to set up a business in China..."

Table 10 Evidences of conceptualizing actions (Continued)

Case	Description
GIANT	“...After I got the idea, I talked to my friends to see the viability of my idea. I didn’t have much experience in marketing nor in the hardware in the 3G solution...that’s why I turned to my friends. Two of them became co-founders later. One of them is in charge of marketing, and another one takes care of the hardware part of the product...”
CAPITAL	“...The founders were serving in the Association of Chinese Engineers in the United States. This helped them to build up a large social network. The connections with Intel were also via the people they knew from the social activities organized by the Association...”
VENUS	“...In an effort to test our idea, we sent our business plan to a famous venture capitalist (VCs) in Beijing. Surprisingly we got a detailed reply. In that letter, he said, he liked my technology and idea, but from a VC’s point of view, they were not going invest money in this project, simply because the market is too small in their eyes. It’s a niche market...to some extent. It’s bad news on the one hand, but we were enlightened by this reply...”
ZEBRA	“...We are quite confident about our technology, but not on the market side. This technology has the potential to be applied in various water treatment areas, like sewage water, industrial wastewater. In order to identify the target market for our technology, we started contacting engineering projects. For example, through our network, we went to the potential customers who need the service on water treatment, to learn their needs, and working setting. From these activities, we made our product/service idea concrete...”
WIND	“...After coming up with the idea of developing a concentrated solar power system, I started thinking of the geographical location for my project...after visiting several cities to seek the possibilities to establish the project... we heard about the 530 program when we were in search of a good opportunity...after the consulting and discussion with friends, we thought it might be a good chance to make use of governmental resources to make it happen...”
TRAVEL	“...The market research on the developed countries revealed that the market for intelligent vehicle system is emerging, at the same time that China is soon to become the largest auto market. These two results make us believe that our product could create markets here in China...”

Table 10 Evidences of conceptualizing actions (Continued)

Case	Description
THUNDER	"...Since 2000, I have already started engaging in the Magnetic Induction Lamp research on my own. I have engaged in many technical research seminars to test my ideas...during the research, when I encountered some technical problems, I always went back to the CAS to ask for help... After several years' efforts, my work received quite a reputation in various academic fields. By October 2004, the project reached the stage of small scale testing, and a couple of patents were approved, and some papers were published as well..."
HOBBY	"...Starting 2005, we did some market research, and it turned out that in the field of unmanned helicopter, there are only a few companies that are involved in the rotor helicopter. It is more challenging than developing fixed-wing unmanned aircraft, which means the entry barrier is higher... We believe it might be better for us to engage in the rotor helicopter..."
MARS	"...There is a small community in Silicon Valley which consists of former colleagues, friends. The information flows within the Silicon Valley, among different networks, communities, allow you to easily grasp what is happening out there, what is viable, and what is not..."
HOSO	"...All the team members are my friends, we have known each other for a long time. For the project we are doing, it could be dated back to 6 years ago. In the past 6 years, we did market research and engaged in product development, and made financial plans..."

5.2.3 The conceptualizing process creates the entrepreneur

Together with the observations on the emergence of initial ideas, the data suggests that becoming an entrepreneur is not a linear process as many conventional research claims (Ruef, 2005), which starts with the entrepreneurial ambition to become an entrepreneur, scanning of the environment, and, after the unmet demand has been identified, starting a new business to develop products and service to address the gap. Instead, we see that the process involves a lot of back and forth flows, spans a long period of time, even involving the person giving up the idea completely for a while, and entails a lot of information exchanges that result from social interactions.

For the cases where initial ideas were sensed from experiencing, the individuals run into the initial ideas and are pushed into entrepreneurship as the interactions with external environment proceed. Just as previously mentioned, the founder of TRAVEL had almost 15 years of research experience in the fields of

sensor technology and mapping related to intelligent vehicle systems before he came up with the idea of developing a smart driving system. Moreover, the initial idea didn't turn him into an entrepreneur immediately.

Like the founder of TRAVEL, other entrepreneurs who formed initial ideas via experiencing, including the founder of HERO, THUNDER, ROAD, and ZEBRA, all share similar paths of becoming an entrepreneur. They all share the following qualities in that they all 1) ended up founding companies, 2) didn't have any prior business training, and 3) were doing R&D related work in large organizations before turning into entrepreneur, and 4) the initial ideas had a close relationship to the work they were doing. Their career as an entrepreneur happened as a result of the interactions which took place between the ambition to become an entrepreneur, knowledge accumulation, and positive feedback.

For the rest of the cases in this study, including those sensing via observing and sensing via visioning, the processes of becoming an entrepreneur appear to have more linear features. They all start with the ambition of becoming an entrepreneur followed by the idea developing and then actions of conceptualization. Upon examining the data, however, they also show a more detailed social process which is characterized by iterative interactions with the environment.

In the case of VENUS, for example, after the first entrepreneurial attempt failed, one of the founder's friends came over, and suggested to him that they do something related to the facial recognition solution together. The first idea that came to their mind was to develop facial recognition software for a TV station and a video editing company. This idea had been turned down due to the "small market size". Later, after a series of conceptualizing actions, the founders decided to start with R&D. But still, one issue regarding where he should locate his business remained to be solved. In the beginning he was planning to settle his business in Shanghai. However, it turned out that their potentially biggest competitor at that moment had already acquired significant support from the Shanghai government. Coincidentally, he was invited by his friends and came to Wuxi for a visit, and ultimately became an entrepreneur in Wuxi.

To summarize, becoming an entrepreneur is a social process. In this process, prospective entrepreneurs interact with the external environment to test, develop and evaluate their initial ideas. As the interactions unfold, they receive overall feedback and new information which are strongly linked to the viability of the initial ideas. These feedbacks in turn push them into entrepreneurship. This is in significant

contrast to the prevailing image of a lonely entrepreneur who maps out a novel idea (Shane, 2008: chapter 3).

5.2.4 The role of “530 program” in creating entrepreneurs

Thus far, the interpretation of the data has suggested the role of new information and positive feedback in pushing individuals to become entrepreneurs. However, given the very unique setting of this study, it cannot be denied that the “530 program” also played a role in the developmental process of all cases. It is beyond the scope of this study to include a complete analysis of how the institutional environment influences the firm formation, but it is worth paying some attention to this issue.

The goal of the “530 program” is to attract oversea Chinese, in particular those highly educated ones, back to Wuxi, and to start a business. To do so, the program provides the approved projects with seed funds, free office space, and free accommodation. Without the favorable conditions of this program which ultimately facilitate and diminish the risk of their prospective ventures, these people would have remained in their prior engagements. All the interview participants admit a “facilitating” impact in driving them to start up a business in Wuxi, rather than somewhere else. For example, a representative quote comes from the founder of HERO:

“In 2007, I first heard of the ‘530 program’ and found it really attractive. It provides a package covering the basic issues you would have to take care about of yourself without this program. Although you didn’t expect that the package would matter a lot, still it greatly relieved my concern about starting a new business in Wuxi.”

These observations are in line with the findings of previous studies which state that governmental efforts in terms of providing resources lower entry barriers, and encourage the formation of new firms (Meek, Pacheco, & York, 2010). However, it doesn’t allow us to draw a similar conclusion that the institutional changes impact the emergence of initial ideas as previous studies show (Sine & David, 2003). In fact, as I presented in the section of 5.2.1, in 9 of 12 cases, except the cases of MARS, GIANT, and HOSO, the entrepreneurs already had the initial ideas to engage in the field, though those ideas were still vague. In this sense, the preferable conditions offered by the “530 program” act as new information which makes initial ideas concrete, and mitigates the concern regarding the viability of the ideas. To summarize, the “530 program” helps to conceptualize ideas.

5.3 Implementation: co-creation of conceptualized idea by convincing external stakeholders

Once ideas have survived the conceptualizing cycle, there is no longer doubt on the entrepreneur's side about the decision to further implement the conceptualized ideas. They are convinced of the viability of the ideas, and believe that proper implementation of these ideas will bring them acceptable results.

Before attaining the acceptable results, entrepreneurs need to acquire resources from external resource holders, e.g. investors, suppliers, and customers. This is a central challenge for entrepreneurs in this study, for at least three reasons. First, they lack resources and a proven profile for convincing external stakeholders about the viability of the conceptualized ideas (Higgins & Gulati, 2003). Second, the information asymmetry between entrepreneur and resources holders exists so that resource holders possess less information about the conceptualized idea (Amit, Brander, & Zott, 1998). Third, this challenge is exacerbated by the typical uncertainty associated with technology development and market creation (Lazonick, 2010).

The entrepreneurs are all aware of the challenges of convincing external stakeholders to acquire resources from them. To address these challenges associated with the information asymmetry, and with unproven competence and uncertainty, they engage in a variety of actions.

According to the impacts on addressing these challenges, I group these entrepreneurial actions attempting to acquire external support into two categories: "claim conveying actions", and "legitimizing actions"⁸. By taking these actions, they intend to: 1) communicate information, in particular the entrepreneurs' claim to external participants, to gain attention and to address the information asymmetry; 2) legitimize the information disseminated, to raise and reinforce the belief of the external resource holders about the conceptualized idea.

⁸ Parts of earlier version published as: Zhou, Z., Katzy, B.R. (2011) Creation theory: an alternative theory towards technology entrepreneurship, In *Proceedings of EuroMOT 2011: "Platforms and innovation: In search of efficiency and effectiveness"*, Tampere, Finland, 2011.

5.3.1 Conveying the entrepreneur's claim

Conveying the claim is an essential part of convincing external stakeholders. Prior to achieving a consensus on a certain belief or claim, the organization needs to communicate with its targeted stakeholders (Rindova & Fombrun, 1999). In the setting of technology entrepreneurship, this becomes particularly important because the entrepreneurs' claims or beliefs are mostly associated with a high level of tacit knowledge in the early stage of technology entrepreneurship (Katila & Mang, 2003; von Hippel, 1994). As a result, the entrepreneur needs to devote significant efforts in order to completely and clearly pass on his message to the external stakeholders and make them understand. By doing this, the potential information asymmetry between entrepreneur and resource holders is unleashed.

The data indicate that entrepreneurs use three methods for conveying information to the external environment: 1) point-to-point contacting, 2) presenting at professional events, and 3) leaning on media channels.

5.3.1.1 Iterative point-to-point communicating

Not surprisingly, entrepreneurs very much rely on the iterative point-to-point communication to convey their claim. This is especially true for the very beginning, when the entrepreneur doesn't have much concrete things to show about his or her claim (e.g. prototype of the final product) (Luksha, 2008). All entrepreneurs in the study have realized the importance of point-to-point communication and explicitly engaged in a variety of actions to convey their idea to external resource holders. As the founder of VENUS tells:

"...In the year of 2009, right after we developed our facial recognition computation solution, I was planning to build a pilot market. The biggest challenge for me is that the concept of facial recognition has been used like a buzzword that has been overused by some opportunists. People knew it, but also held heavy doubts about the solutions that are connected to this buzzword. To relieve their concern, what I did was to visit potential customers one by one, explain my solution to them again and again. If you don't do it, they ignore you..."

With its iterative and interactive features, the point-to-point contacting is useful for conveying a tacit message to the targeted individual or organization. Moreover, it also allows the entrepreneur to learn how other stakeholders will react to his or her idea or product concepts, and to figure out what they think of his or her claim.

All the 12 cases confirmed the importance of point-to-point communication in selling uncertain ideas. It is the most effective way to convey a message in terms of the accuracy of the information and appropriateness to the targeted stakeholders. Yet, at the same time, these sort of direct communicative channels also have limitations. The new venture may not be able to reach the right stakeholders. It is very often the case that the people you talk to might not be interested in your idea, or be interested, but not able to understand it. Even if the entrepreneur finds the right stakeholder, it could happen at the wrong time and in an improper context. As the founder of HERO describes:

“...After I won the business plan competition in Oregon, someone came to me and said Intel might be interested in my work. With his help, I was invited to make a presentation at Intel. It was a kind of interview presentation. First, I made a presentation to a colleague from the R&D department. Unfortunately, he didn't get my idea...but I was a bit lucky that instead of kicking me out, he asked his colleague to come over and to listen to my presentation again...after 5 minutes presentation, they decided to sponsor me...”

In short, the observation reconfirms knowledge from prior studies (Luksha, 2008; Rindova & Fombrun, 1999). The point-to-point communication is important in conveying tacit information because of its iterative and repetitive communication features. However, it also raises the issue of cost in terms of time and money, which is crucial in the beginning phase of entrepreneurship.

5.3.1.2 Presenting at professional events

In addition to point-to-point interaction, presenting at professional events, e.g. industrial conferences, fairs, business plan/idea competitions, exhibitions, and technology market tours, is another frequently used way to convey information regarding the product and the company. It is a way of riding a wave of publicity to access potential buyers, suppliers, and partners. Here is how the CEO assistants of CAPITAL describe how they disseminate information about their companies and products:

“...For marketing purposes, we present at industrial exhibitions quite often, for example, at the beginning of this year (2010) we participated in the exhibitions held in USA, in Taiwan (June 2010). We attended domestic exhibitions as well, for example, like the ones in Dalian, Shenzhen. Moreover, we are also interested in joining forums, conferences, in delivering speeches,

and setting up an exhibition booth. I would say, the combination of various marketing approaches works pretty well...”

The founder of WIND also takes a similar strategy:

“...The main channel for accessing the potential customer is solar panel exhibitions and relevant industrial fairs. We usually attend twice every year. One trip to a domestic one within China, and make another one to an international one...”

Presenting at professional events not only helps to gain access to potential customers, but also to co-developer/co-creators as well. For such an event, typically the participants come from almost every stage of the industry value chain. Participants include technology developers, industrial players like parts suppliers, investors, end-users and journalists as well. At these events, entrepreneurs expect to garner attention from potential buyers, suppliers, and partners, which might lead to a collaboration agreement, for instance, a technology development agreement, a market agreement, an investment agreement or an OEM (Original Equipment Manufacturer) agreement. For example, CAPITAL achieved a co-development agreement with one research group in University of California, Berkeley by participating in a working tour organized by the government. The CEO assistant describes how it happened:

“... In January 2010, CAPITAL signed a strategic cooperation agreement with a research group in University of California, Berkeley to jointly develop MID applications in water, air sensor and control system, as well as an intelligent transportation system. The cooperation is attributed to the technology exchange workshop held in Berkeley. The workshop is part of the business tour organized by the Wuxi government. One researcher from UC Berkeley gave a presentation about his research on the internet of things. After the workshop, our CEO built contacts with the researcher immediately for the common interests...In this project, we will provide the device, and share industry application relevant knowledge with them.”

Presenting at professional events mostly happens as soon as companies have succeeded at some interim achievements, for example a technology demo, or presenting on stage when the new ventures need to get external relationships for assistance in marketing and manufacturing, or delivering the message to the end-user through a journalist-which is also described as a ride on publicity.

5.3.1.3 Leaning on media channels

Relying on media channels is defined as using both the traditional media channels (i.e., the newspaper, journals, magazines and newsletters) and internet-based channels (i.e., online industrial forum, bloggers) to convey information. With media channels, the entrepreneur can communicate information regarding its venture and product to a big audience, in a unidirectional way. The cases within this study suggest that most entrepreneurs are aware of the value which these media channels bring. As the CEO assistant of CAPITAL explains during the interview:

“...In 2009, we got two contracts with two large industrial customers...as to the question of how they got these two contracts, I would say we were well known in China in this field in terms of technology development. The reputation is partly due to media articles. We are good at disseminating by articles. Just as an example, before we reached the stage of prototype, Chinese Forbes Magazine spent two and half pages introducing our company. Quite a number of companies (potential customers) found us through this article. In addition, we also have a good relationship with large portal websites in China, for example Sina, Tencent...”

However I only observe a few efforts that aim at disseminating information via these conventional communication channels. There are two possible rationales: 1) most businesses within this study take a Business to Business (B2B) model, and the recipients of traditional media are mostly end users. Therefore it doesn't make much sense to disseminate information via traditional media. 2) This kind of one-way communication doesn't fit into the early stage of the start-up, because final “product” mostly is not well defined at the beginning given the high uncertainty. Moreover, it is also worthy noting that in addition to information conveying, conveying the claim via media channels can also have a strong social meaning. This will be discussed in the later part of this chapter.

Overall, cases in this study show that there is a blend of disseminating activities that conveys the information from entrepreneur to external parties. This is in line with previous studies that multiple repetitions of communications are necessary for encouraging the external stakeholders to learn about the entrepreneurs' message (Luksha, 2008). The point to point contacting appears to work most efficiently when the entrepreneur intends to convey tacit or vague information. The iterative interactions that are embodied in this way of communication allow for the addressing of tacitness. Such tacitness can be minimized by repetitive interaction between the entrepreneur and external participants (von Hippel, 1994).

As the entrepreneurial process proceeds, the tacitness of the entrepreneur's claim decreases, because the entrepreneur achieves certain accomplishments like product prototype, or patents. Presenting at professional events then becomes more efficient. With this information conveying mechanism, entrepreneurs are able to ride on a wave of publicity, and to access potential customers, suppliers, and partners.

In addition to the point-to-point communication and presenting at professional events, entrepreneurs are also aware of the value that conventional media bring. However, I only observed a few efforts in this direction. Furthermore, it is worth noting that the media are becoming more and more sophisticated with the introduction of the Internet. It provides an alternative way to convey the entrepreneur's claim. It is well accepted that the internet-based media brings significant benefit to both disseminating information and searching for information (Sawhney, Verona, & Prandelli, 2005). The cases also show that the entrepreneurs have started learning to use it as a way to convey information.

5.3.2 *Legitimizing conveyed claims*

Although conveying the entrepreneur's claim is crucial, it is not enough to convince the resource holders. The following quote from the founder of VENUS precisely illustrates the challenge that most entrepreneurs in this study face:

"...Presenting our ideas to external actors is the first step, people mostly like it. But one question will definitely follow, 'We like your ideas, but do you have something concrete to show us?'"

These challenges have close links to the issues of the lack of resources, unproven profile (Higgins & Gulati, 2003) and uncertainty (Lazonick, 2010), discussed in prior studies. The data suggest that entrepreneurs deliberately perform actions that convey a social meaning beyond the intrinsic content of information regarding their products and companies. I label these sort of actions as "legitimizing actions".

The interpretation of the data further suggests three types of legitimizing actions: "achieving interim accomplishments", "networking with legitimized stakeholders", and "harnessing third parties' neutrality", which are closely related to the following questions: what has been achieved regarding the development of technologies or products? who is the company working with? what are other people saying about the company and product? "Achieving interim accomplishments" refers to actions reaching substantial progress concerning the implementation of the

objectified idea. Such substantial progress, for example, includes technological achievements like filing patents, and market achievements like developing a product prototype. “Networking with legitimized stakeholders” refers to actions of building both formal and informal connections with established organizations and individuals with social influence. “Harnessing third parties’ neutrality” refers to actions using third parties like public media, the government, and industrial organizations to achieve a greater level of trust concerning the disseminated information regarding company and product.

5.3.2.1 Achieving interim accomplishments - Actions speak louder than words

An interim accomplishment is a concrete achievement that a start-up has reached. It includes, for instance, patented technologies or partly working products. They are important in convincing resource holders, as, images of the ultimate technologies and products are now available. This reduces the uncertainty of technology and product development perceived by external resource holders (Zott & Huy, 2007).

The interpretation of the data further suggests that entrepreneurs usually engage in two different categories of achieving activities: achieving technical interim accomplishment, and achieving product interim accomplishments.

Achieving technical interim accomplishments. The data show that entrepreneurs use intellectual properties (IP) and technology prototypes, to represent the technical achievements. By doing so, entrepreneurs attract support for further technology development. The founder of HERO explains in the interview, for example, how the national science foundation granted her with a research project after the first trial failed:

“...We were joining one research institute from CAS to apply for a national grant on this field. But unfortunately, the first trial failed. Later we were planning to give another try. And during the preparation I said inadvertently that I have made a concept machine with my colleague from Intel. The people from CAS got excited about this information, and in the second version of the application, we highlighted this achievement, and our research proposal got approved...”

Similar observations on the impact of demonstrating interim achievements can be drawn from the actions of applying for patents. Conventional belief regards Intellectual Property Right (IRP) as an important mechanism for protecting knowledge, and for building and sustaining competitive advantages. Furthermore,

holding IPRs facilitates the process of resources acquisition from external resource holders. The founder of VENUS explains:

“...Indeed, IPR does help an organization to protect their knowledge to some extent. However, it doesn’t mean that much for new ventures in China...it takes time and money to for the filing, and you never know if it will work out or not...you might ask then why I still apply for IPR? The answer is quite simple, it helps you to get external resources...just for example, if you want to apply for government support, patent matters a lot...”

Achieving product interim accomplishments. Apart from achieving technological accomplishments, the entrepreneurs also use partly working products, product prototypes, and pilot market testing to show product interim achievements. The entrepreneurs believe that this can release the resource holder’s concern about market uncertainty. The demonstration of product interim achievements helps to attract external stakeholders involved in the commercialization, such as customers, investors and marketing partners. The founder of VENUS explains how he got a deal via a product demonstration of the trial version:

“...The facial computing recognition market is huge, but it was messed up due to low quality solutions offered by many other companies. In 2009, I was told by one of my marketing partners, one public security bureau in Shandong was going to do a wide search through a number of companies to get a facial computing recognition system. The person in charge of this project is a real expert in this field and he wasn’t really expecting my solution to perform a good job. But after a trial version of my solution, he really got excited about our trial system, because it helped them narrow down the search scope to three suspects based on an obscure snapshot from CCTV system. And we won a project from them...”

The following table summarizes the entrepreneurs’ actions to achieve interim accomplishments. In the implementation, entrepreneurs utilize a variety of forms of achieving interim accomplishments to acquire resources. They do not wait until the last moment when the final product is ready.

Table 11 Evidences of achieving interim accomplishments

	Technological interim accomplishments	Product interim accomplishments
Definitions	Actions to achieve technical accomplishments in the technology development process	Actions to achieve accomplishments in the product development process
HERO	<ul style="list-style-type: none"> • Patents • Technology prototype 	
ROAD	<ul style="list-style-type: none"> • Patents 	<ul style="list-style-type: none"> • Products (e.g., DVB-H circuit receiver for digital cable TV) • Products (demo version)
GIANT	<ul style="list-style-type: none"> • Software copyrights 	<ul style="list-style-type: none"> • 3G solution (demo version) • Pilot market test
CAPITAL	<ul style="list-style-type: none"> • Patents 	<ul style="list-style-type: none"> • Product prototypes with education application • Products (demo version)
VENUS	<ul style="list-style-type: none"> • Software copy rights • Patents 	<ul style="list-style-type: none"> • Solution (demo version) • Pilot market test
ZEBRA	<ul style="list-style-type: none"> • Patents 	<ul style="list-style-type: none"> • Product (demo version) • Pilot market test
WIND	<ul style="list-style-type: none"> • Patents 	<ul style="list-style-type: none"> • Product (demo version) • Pilot market test
TRAVEL	<ul style="list-style-type: none"> • Patents 	<ul style="list-style-type: none"> • Product (demo version) • Product prototype
THUNDER	<ul style="list-style-type: none"> • Patents • Technology prototypes with different technical parameters 	
HOBBY	<ul style="list-style-type: none"> • Software copyrights in China • Technology concept machines with different technical parameters 	<ul style="list-style-type: none"> • Product prototypes • Product (demo version)
MARS	<ul style="list-style-type: none"> • Patents • Software copyrights 	<ul style="list-style-type: none"> • Demo version of platform
HOSO	<ul style="list-style-type: none"> • Software copyrights 	<ul style="list-style-type: none"> • Demo version of system • Pilot market test

All in all, interim accomplishments are important for entrepreneurs to convince external resources holders for several reasons. First, the interim achievements provide an image of the final form of the product/service or a company,

thereby reducing the tacitness of the conveyed claim or message (von Hippel, 1994). Second, the interim achievements also signal the competence of the entrepreneur and the ventures, which partly addresses the unproven profile described in previous studies (Higgins & Gulati, 2003; Zott & Huy, 2007).

5.3.2.2 Networking with legitimized stakeholders - staying near vermilion to get red

The second type of legitimizing actions is networking with legitimized participants. The legitimized participants are those organizations with a proven profile or individuals with social influence. It is also crucial for new start-ups, which lack substantive achievements and solid reputations (Higgins & Gulati, 2003). The linkages with those established organizations or people are likely to have influence in convincing resource holders, in addition to the wider described role of access to resources (Ozcan & Eisenhardt, 2009; Rindova, Williamson, Petkova, & Sever, 2005). Many entrepreneurs (e.g. the founders of HERO, CAPITAL and THUNDER) make similar comments as the CFO of TRAVEL during the interview:

“...People care about with whom you are working. People have a widely hold belief that the technology or idea is more credible if the entrepreneur is working jointly with research institutes or universities or companies with reputations...”

The data indicates three types of networking actions: “multisided alliance building”, “social networking”, and “doing business with big players”.

Multisided alliance building, in this study, is defined as a contractual agreement between the entrepreneur and external stakeholders about jointly developing the envisioned future. Such an agreement usually involves clauses of resources investment, revenue-sharing, equity-investment, or knowledge-sharing. In this case, the stakeholders involved in alliance building are co-creators of the new venture. Like the entrepreneurs, they are convinced of the viability of the envisaged business or the value of the technology.

In addition to the contents in the agreements, alliance building also carries social meaning. As an example, the alliance with Intel helped the founders of CAPITAL to get quite some attention from the media and the local government. Just as the CEO assistant of CAPITAL described:

“...According to the agreement with Intel, our company is one of the five companies that can get the most advanced chips from Intel before those chips are available on the market. In addition to the chips, this agreement brings us more value, just for example, the media coverage, mainly because of the name

of Intel, Chinese Forbes Magazine wrote one special report about our company, at a time when we were still at the stage of developing the product prototype. And because of this report, we got some potential partners for co-developing products for downstream applications...”

Building a multisided alliance is the most useful way to legitimize the start-up, according to the entrepreneurs in this study. In addition to the substantial resources (e.g. technical knowledge, monetary investment), collaborating with external stakeholders helps to acquire more resources (Higgins & Gulati, 2003). At the same time, it is also one of the most difficult challenges mainly because of the unproven profile of new ventures, and the tension which arises as the new venture faces the matrix of needing resources from external stakeholders and at the same time weighing the potential risk of misappropriation of its own resources by those external stakeholders (Katila, Rosenberger, & Eisenhardt, 2008).

Organizational social networking. Contrary to the multisided alliance building which involves knowledge or capital investment and return, organizational social networking is like the social networking in greater society, but it is more between organizations and individuals with social influence. It refers to a range of actions associated with building linkages rather than alliance forming with those participants who might become the partners for an alliance, or with those who have non-capitalized resources (e.g. market information, technology information). By doing so, the entrepreneurs believe that it will signal they are part of the legitimized group or close to them.

Such networking activities include, for example, participating in academic exchange seminars, visits between the governmental innovation office and the entrepreneurial start-ups. These kinds of networking activities help to attract more attention from external participants. As the founder of THUNDER said:

“...Disseminating information on the frequent networking activities like participating in the industrial exhibition, organizing academic seminars, help in attracting more attention from a broad ranges of participants, for example, the venture capitalist, and potential customers...”

And doing business with big players. A third way of networking with legitimized players is doing business with big players. The acceptance by big players signals the competence of the start-up, and it enhances the legitimacy in the eyes of other stakeholders. Big companies are normally not the end-user that the start-up targets. Instead they very often include those customers that are interested in buying the start-up’s technology. Research institutes, for example, buy emerging rather than

well-developed technology from new ventures for further development. I call these kinds of customers “intermediary customers” because these kind of customers: 1) are not targeted by the start-ups, but 2) have access or connections to the end-users that the start-ups aim to reach.

Very often, these big players work with the start-ups in the same direction but with a somewhat different focus. In addition to profiting from the reputation of the big players, the entrepreneurs sometimes use the transactions with big players as a pilot market test. This is particularly true for the start-ups working in the emerging industries where the market still needs years to mature. For example, the founder of HOBBY says:

“...Till now (July 2010), most of the customers are research institutes like CAS...they took our product doing some extra developments and resold them, or they just took it for research...they are not my target customers to be honest, but given the fact that there is no existing market for the products, and there is a urgent need of finance to support R&D activities...it might be not a bad thing... accepted by top research institutes signals the superior features of my products as well...”

Despite the positive influence, yet similar to the building of alliance with legitimized stakeholders, it is challenging for a young start-up to do business with a big player directly precisely because of the lack of a proven profile. As a result, they very often take an “indirect” strategy. The entrepreneurs drop these big names on their websites or brochures by doing side business with the big players. This side business only has a loose connection with the business that the entrepreneurs intend to achieve. The description from the founder of MARS on why he was doing side business with big players, is a good example:

“...Yes, we were delivering software service for two international companies Papal, and Bilis. To be honest, it’s more like a software sourcing service. I got this contract via my private network. It has nothing to do with my core business I’m developing. But still I think it is quite important for us; it definitively gives us a lot of credibility and was critical for getting supports/aid from other participants. Moreover, the payment from these software outsourcing service can also help us to survive...”

Doing business with bigger players to achieve legitimacy somehow is closely related to the description of the impact of the product development achievements beforehand. However, unlike with the actions toward achieving product development milestones which emphasize the development of the products, doing business with

big players hones in more on the social influence of the key stakeholders (Wood & McKinley, 2010).

Table 12 Observations of networking with legitimized stakeholders

Case	Multisided alliance building	Organizational social networking	Doing business with big players
HERO	<ul style="list-style-type: none"> • Government backed venture capital • Research agreement with an institute from CAS 	<ul style="list-style-type: none"> • Interactions with research institutes 	<ul style="list-style-type: none"> • Co-developing technology with Semiconductor Manufacturing International Corporation (SMIC)
ROAD	<ul style="list-style-type: none"> • State-owned venture capital corporation (Wuxi Industrial Group co. Ltd) • Co-develop product with Semiconductor Manufacturing International Corporation (SMIC) and China Resources Semiconductor (Crsemi) 	<ul style="list-style-type: none"> • Interactions with Jiangnan Univ 	<ul style="list-style-type: none"> • Outsource the manufacturing to the big IC makers - SMIC
GIANT		<ul style="list-style-type: none"> • Interactions with research institutes (China Mobile Research Center for Internet, Machine and Sensor application; China Unicom Research Institute for Internet, Machine, and Sensor) • Interactions with Jiangnan Univ 	<ul style="list-style-type: none"> • Sell products to China unicom • Collaboration with Huawei for marketing channels • Collaborating with Shanghai Motor for 3G solution- data transfer unit (DTU) • Deliver outsourcing service for an American company (ATG)

Table 12 Observations of networking with legitimized stakeholders (Continued)

Case	Multisided alliance building	Organizational social networking	Doing business with big players
CAPITAL	<ul style="list-style-type: none"> • Coalition building with Intel • Downstream players CDMA • Research Institutes in UC Berkeley • State-owned industrial VC 	<ul style="list-style-type: none"> • Interactions with government • Interactions with Microsoft • Interactions with Research institutes and universities • Interactions with academician and industrial experts 	
VENUS	<ul style="list-style-type: none"> • Collaboration with the biggest home security service provider 		<ul style="list-style-type: none"> • Sell products to the policy bureaus
ZEBRA		<ul style="list-style-type: none"> • Part of the university research 	<ul style="list-style-type: none"> • Pilot demonstration in Baogang Group
WIND		<ul style="list-style-type: none"> • Interactions with Rochester Univ 	<ul style="list-style-type: none"> • Sell products to China Nuclear Power Engineering Co., Ltd
TRAVEL		<ul style="list-style-type: none"> • Interaction with research institutes in China • Interaction with Universities • Interactions with a French company 	<ul style="list-style-type: none"> • Sell product to top research institutes in the field of automobile research (Tongji Univ, Shanghai Jiaotong Univ, and Jilin Univ)

Table 12 Observations of networking with legitimized stakeholders (Continued)

Case	Multisided Alliance Building	Organizational social networking	Doing business with big players
THUNDER		<ul style="list-style-type: none"> • Interactions with academician • Interactions with government officer, big industrial players, Oslan, Philips 	
HOBBY	<ul style="list-style-type: none"> • Working with a company in electricity energy sector 	<ul style="list-style-type: none"> • Frequently invited to join the exhibition, and demonstration events organized by the governments • Interactions with Southeast University 	<ul style="list-style-type: none"> • Sell product to CAS research institutes • Collaborating with North Industrial Group Corporations (CNGC) for technical solution
MARS		<ul style="list-style-type: none"> • Frequent Interactions with Paypal, Cisco, and Oracle 	<ul style="list-style-type: none"> • Doing business with Bilis and Yahoo
HOSO		<ul style="list-style-type: none"> • Interactions with Shanghai Foreign Service Co.Ltd and China Open Tennis Amateur Competition Association 	<ul style="list-style-type: none"> • Doing business with the local government as pilot project

Overall, the alliance building is difficult. As the table shows, most cases are silent in terms of alliance building, but active in social organizational networking and doing business with big companies. These observations are in line with the propositions of previous studies that in addition to the access to the resources (Gulati, 1998; Katila et al., 2008), networking with legitimized participants (e.g., prestigious customers, investors) also helps to acquire external resources for new companies which lack substantive achievements and solid reputations (Higgins & Gulati, 2003).

5.3.2.3 Harness the third parties “neutrality”

A third type of legitimizing action is termed “harnessing third parties’ neutrality”. It refers to actions that entrepreneurs take to add credit to the information they disseminate to the outside by engaging with third parties. The third parties are organizations or individuals who are not involved in a direct interest relationship with the entrepreneurs. They include, for example, the industrial organization, industrial association, media, and governments.

The entrepreneurs in this study are aware of the importance of third parties for disseminating information. The data show that entrepreneurs attempted to achieve these goals through actions such as conforming to regulations, rules, standards, and expectations created by third parties (Zimmerman & Zeitz, 2002) (e.g. participating in top ten innovative enterprises awards), achieving media commitments (e.g. attending eye-catching events, delivering speeches that make the story “newsworthy”), and profiting from the reputation of a group or an industry (e.g. joined industrial association). Just as the founder of WIND tells:

“...To deliver a speech at the top 10 potential innovative start-ups in China, does not really make sense, in my eyes. It’s just a title. There are quite a few ‘awards organizing’ organizations, they charge the attending organizations and make money out of that...people believe that title matters...in my case, of course, I’m not going to pay for it. It’s an award ceremony organized by one of the most influential magazines, <The Founders>. It might be a good opportunity to espouse my company in the flashlights...”

All in all, harnessing the third parties “neutrality” is important for at least two reasons. First, the innovations are assumed to have an ambiguous value for the adopters, which indicates that the adoption of the innovation is influenced by the opinions of other stakeholders involved (e.g., prior adopters) (Greve, 2011). Second, as the study on the adoption of gasoline-powered cars in the early 20th century (Rao, 2008) reveals, the wining of a publicized race helps to legitimize the gasoline-powered car makers and overtake electricity-powered car makers and therein become the mainstream automobile. This highlights two generally held beliefs: 1) winners are better, and 2) a contest organized by third parties is considered as impartial testing. The information about the company or the product/service from third parties is more trustworthy in the stakeholders’ eyes because of the perceived neutrality. Given the entrepreneur’s self-interest, the information disseminated by the entrepreneurs directly is usually viewed with less credibility by stakeholders.

5.3.3 The interactions between actions of claim conveying and legitimizing

More than the identification of claim conveying actions and legitimizing actions, the interpretation of the data also suggests that there are interactions in between those actions.

The actions of claim conveying impact the legitimizing actions. For example, presenting at professional events, on the one hand is used for communicating information about the company and the product to a variety of stakeholders, for example suppliers, end-users, and investors. On the other hand, it is also a way of signaling that the venture is part of the network or community. As the founder from the CAPITAL described in a report:

“...In April, 2009, we attended the Intel information technology summit in Beijing. Our product for an education application was among the 8 best practices of MID applications introduced by the Intel. You know in the year of 2008, we even didn't get an entry ticket for this event, but now we are sitting next to big players in the field like Aigo and Lenovo...”

Now we turn to the interactions in between legitimizing actions. In addition to the close relationship between claim conveying and legitimizing, the data also suggest that there are reinforcing interactions between legitimizing actions. For example, the achievement of interim accomplishments facilitates networking with legitimized stakeholders. These networking activities then further facilitate the new networking activities. These observations are in line with the findings of previous studies that the preexisting network can facilitate the formation of new networks that often lead to increased resources access (Podolny & Baron, 1997; Vissa & Chacar, 2009).

5.3.4 The sequence of technology development and market creation

Many of the claim-conveying and legitimizing actions described here appear quite obvious and most entrepreneurs are aware of their potential impacts. As a result, one might think that all entrepreneurs would make similar use of them and, consequently, little differences regarding the resource acquisition would result. I found variations in the variety, however, as well as the sequence of using these implementation actions.

Two extreme cases are found that follow a linear way of thinking, in the way that acquiring resources for market creation only took place after the development of the technology had been completed.

THUNDER - a company that designs and manufactures Magnetic Induction light bulbs is one of these two cases. Despite the fact that THUNDER was officially launched in 2008, its developmental process could be traced back to 2000. Already then the founder had already started engaging in the Magnetic Induction Lighting technology on his own.

The research of Magnetic Induction Lamp is capital intensive. The founder still successfully got a lot of support and managed the development of the technology. As the founder described during the interview:

“...For the development of the technology, I obtained a lot of support from other companies and people. For instance, the company provides mold devices for experimenting and testing. They didn't get money for offering these molds since 2005. I believe that they are convinced of the future of this technology as well. Without this support, the development of the technology wouldn't go that fast...”

To explain why THUNDER got so much support, the founder further describes:

“...We have a reputation in the research field...basically we regularly participated in industrial exhibitions. And we keep contacts with research institutes and potential investors. For example, the director of institutes of optics, fine mechanics and physics were visiting my company. If the academic has approved your work, usually, the customer comes to you. For example, the visits from Germany and England are due to my reputation in my academic field. They took my samples and made comparison tests with products from Osram and Philips...”

By the time of July 2010, THUNDER had achieved impressive progress in terms of patents, and the development of a technology prototype. However, the financing became a big concern and the funders started to lay off employees because of the financial crisis within the company. He tried several times to get external financing with marketing resources, but the venture capitalist agreed to invest only when the company had reached sale first. That made no sense in the founder's eyes, however. In order to survive, he went back to his personal network to borrow money.

A similar developmental process can be observed in the case of HERO. Like in the case of THUNDER, HERO had also achieved impressive progress in terms of patents, financial support for R&D research, and research collaborations with well-known research institutes and big companies. From 2010 on, for example, Hero

started to carry out research and development work which was supported by the key programs of the Ministry of Science and Technology (MOST) in China.

By the time of July 2010, despite the financial pressure, the founder believed that it was still too early for her project to go to the market because not enough patents had yet been filed. The founder believed that only enough patents could efficiently protect her technology competency. To sustain her strategy, the founder eagerly sought out external financing to purchase experimenting devices and to accelerate the research and development progress.

The developmental processes of HERO and THUNDER strongly indicate a sequential way of addressing the technology development and market creation. Both founders were almost exclusively focusing on the technology development before putting the product on the market for commercialization. In contrast to the concurrent involvement of market creation stakeholders that other cases show, these two cases rarely engaged in the potential stakeholders related market creation during the technology development process.

The observations of the study don't allow discussing the impact of the sequence of the implementation actions on the final performance of the ventures. However, the developmental processes of HERO and THUNDER do suggest that the development of technology and market creation cannot be seamlessly bridged. As the data show, both cases faced financial constraints for the market development.

5.4 Adaptation towards entrepreneurial configuration

In the previous section two processes were described that deal with the conceptualization of the initial idea and the co-creation of the conceptualized ideas. From those two processes, we got a picture of how entrepreneurs act in the environment during the entrepreneurship process. In this section, I switch the focus to the “discontinuity” of entrepreneurship – the adaptation process, and look at the adjusting actions and changes that take place in the entrepreneurship process.

To illustrate the changes, I borrow some ideas from business model research (Osterwalder & Pigneur, 2010; Zott & Amit, 2010; Zott, Amit, & Massa, 2011). The business model, as a helpful concept for delineating a running enterprise, has drawn considerable attention from both scholars and practitioners in the past decade (Blank, 2013; Zott & Amit, 2008). In particular, the business model canvas helps to draw a visual chart to describe a firm’s important operating activities, and group them into clusters: offering (value proposition), infrastructure, customers, and finances. The offering consists of a “value proposition” which is the collection of products and services a firm offers to meet the needs of customers; the “infrastructure” includes key activities in executing a company’s value proposition, key partners and key resources that are necessary to create value for the customer; “customers” include customer segments (target customers), product delivery channel, and customer relationship; at last, “finances” include cost structure and revenue streams of the venture.

With this tool, I can describe a venture as an organizational system composed of various running activities and plans/ideas regarding activities at any point in time. Therefore it is a good method to compare the actions that happen during the non-linear (discontinuous) phase of adaption. A comparison of the planned and realized actions will give hints about the adaptation process. In the following section, I use the term of “idea component” to present concrete operational activities included by the business model canvas.

5.4.1 The transformation of business

The following table compares the business description of the start-up at the time when they were just launched and at the time when the interviews took place. I do not include only the activities that have been implemented, but also incorporate the planned and yet-to-be-implemented idea components at both points in time. To

distinguish these two types of idea components, the planned one is bracketed. This allows for a more extensive examination of the adaption process.

Table 13 The transformation of business

Case	Conceptualized idea	Business description in August 2010
HERO	<p>Founded in March 2009</p> <p>Offering</p> <ul style="list-style-type: none"> • (A new chemical treatment to be applied in the process of manufacturing IC) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (IPR protection) <p>Customers</p> <ul style="list-style-type: none"> • (IC manufacturer) <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • (Government subsidies) 	<p>Offering</p> <ul style="list-style-type: none"> • (As a national lab providing testing service for stakeholders involved in the IC manufacturing industry) • (A new chemical treatment to be applied in the process of manufacturing IC) <p>Infrastructure</p> <ul style="list-style-type: none"> • (Co-develop technology/product with potential downstream customer) • IPR protection • R&D with CAS <p>Customers</p> <ul style="list-style-type: none"> • (IC manufacturer) • (Solar panel components makers) <p>Finances</p> <ul style="list-style-type: none"> • National research and development subsidies • (Make revenue for providing testing service)
ROAD	<p>Founded in December 2006</p> <p>Offering</p> <ul style="list-style-type: none"> • (Develop Digital Video Broadcasting – Handheld circuit) <p>Infrastructure</p> <ul style="list-style-type: none"> • (Internal R&D) 	<p>Offering</p> <ul style="list-style-type: none"> • 485 communication circuit based automatic electricity meter • DVB-H circuit • (Software development unite) • (Mixed signal integrated circuit) • (GaAs process based RF integrated Circuit) <p>Infrastructure</p> <ul style="list-style-type: none"> • Fabless manufacturing • Collaboration with university • Internal R&D • (Co-develop products with other companies)

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
ROAD	<p>Customers</p> <ul style="list-style-type: none"> • (Selling via private network) • (Mobile device manufacturers) <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • State-backed VC • Self-funding • (Sale from DVB-H circuit) 	<p>Customers</p> <ul style="list-style-type: none"> • Selling via sale agent (commission based) • Selling via private network • (Direct sale to manufacturer) • Mobile device manufacturers <p>Finances</p> <ul style="list-style-type: none"> • Equity investment from Wuxi industrial group • Sales revenue • (Government backed loan)
ZEBRA	<p>Found in August 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (Wastewater treatment solution) <p>Infrastructure</p> <ul style="list-style-type: none"> • University based R&D <p>Customers</p> <ul style="list-style-type: none"> • (Sewage Treatment companies) • (Promoting via government) • (Selling via private network) <p>Finance</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • Self-funding 	<p>Offering</p> <ul style="list-style-type: none"> • Environmental protection padding • Wastewater treatment solution <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D based in university • (Building manufacturing device) <p>Customers</p> <ul style="list-style-type: none"> • (Big Industrial companies) • Selling via private network • (Selling via sales agent) <p>Finances</p> <ul style="list-style-type: none"> • National research subsidies • (Equity investment) • Sales revenue
TRAVEL	<p>Founded in September 2009</p> <p>Offering</p> <ul style="list-style-type: none"> • (Industrial Personal Computer based smart driving system) 	<p>Offering</p> <ul style="list-style-type: none"> • (Embedded system based smart driving system) • Industrial Personal Computer based smart driving system

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
TRAVEL	<p>Infrastructure</p> <ul style="list-style-type: none"> • University based R&D • (Internal R&D) <p>Customers</p> <ul style="list-style-type: none"> • (Private car market) • (Selling via sales agent) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • Seed fund from “530 program” 	<p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D based in University <p>Customers</p> <ul style="list-style-type: none"> • University automobile labs/research institutes • (Public transportation/Taxi company) • Selling via private network • (Changing sales agent) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • Sales revenue • (National research fund) • (Industrial VC with market resources)
THUNDER	<p>Founded in July 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (Magnetic Induction Lamp) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (Self-manufacturing) <p>Customers</p> <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • Self-funding • (Government subsidies) 	<p>Offering</p> <ul style="list-style-type: none"> • (Magnetic Induction lamp based applications, e.g. water purifying, soiless culture, magnetic powered rice cooker, and applications in telecommunications) <p>Infrastructure</p> <ul style="list-style-type: none"> • (Self manufacturing by build alliance with the biggest manufacturer of CRT for TV) • Internal R&D • (Applying for product safety certificate) <p>Customers</p> <ul style="list-style-type: none"> • (Companies in the fields of horticulture and water purification) • Promoting via industrial exhibition/fairs • (Selling via sales agents) <p>Finances</p> <ul style="list-style-type: none"> • (Applying for national research subsidies) • Self-funding • (Financing from private network)

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
GIANT	<p>Founded in July 2009</p> <p>Offering</p> <ul style="list-style-type: none"> • (3G solution for small business) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (Collaboration with China Unicom) • (Self-manufacturing) <p>Customers</p> <ul style="list-style-type: none"> • (Small business with a size of 10-100 people) <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • State-backed VC • Self-funding 	<p>Offering</p> <ul style="list-style-type: none"> • DTU mobile data terminal for vehicle • (Security system for occasional events) • (Mobile office solution) • (Mobile banking system) • Software outsourcing service <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (Internal manufacturing) • Collaboration with China Unicom • Collaboration with Shanghai Motor <p>Customers</p> <ul style="list-style-type: none"> • Selling via private network • Selling via sales agent • (Public transportation company) • (Shanghai Motor) • (China Unicom) <p>Finances</p> <ul style="list-style-type: none"> • (Equity finance from industrial vcs for market consideration) • Sales revenue from software development • (Government research subsidies)
VENUS	<p>Founded in November 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (Facial recognition solution for TV station and video processing companies) 	<p>Offering</p> <ul style="list-style-type: none"> • (Chip integrates the facial computation technology) • Home security solution • Camera system for public transportation company

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
VENUS	<p>Infrastructure</p> <ul style="list-style-type: none"> • International R&D <p>Customers</p> <ul style="list-style-type: none"> • (Selling private network) • (TV station and video processing companies) <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • Angel investment • Self-financing • (Government support) 	<p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • Internal manufacturing • (Building new joint ventures for home security solution and camera system) <p>Customers</p> <ul style="list-style-type: none"> • (Building a marketing team) • Selling via private network • Selling via sales agent, e.g.Ccom company • Public transportation company • (Places with need of security system) <p>Finances</p> <ul style="list-style-type: none"> • Sales revenue from camera system for public transportation companies
WIND	<p>Founded in August 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (Concentrated photovoltaic solution) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (OEM) <p>Customers</p> <ul style="list-style-type: none"> • (Energy company) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • (State-backed VC) • Seed fund from “530 program” 	<p>Offering</p> <ul style="list-style-type: none"> • (Concentrated photovoltaic solution) • Solar energy batteries components • Solar tracking device <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • (Self-manufacturing) • OEM <p>Customers</p> <ul style="list-style-type: none"> • Promoting via industrial exhibitions • Energy companies <p>Finances</p> <ul style="list-style-type: none"> • (Equity investment with market resources) • Sales revenue • State-backed VC

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
MARS	<p>Founded in September 2009</p> <p>Offering</p> <ul style="list-style-type: none"> • (Internet based platform for software outsourcing) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D <p>Customers</p> <ul style="list-style-type: none"> • (Software outsourcing service providers from mainland China) • (Software outsourcing service buyers from North America) • (Promoting via Internet) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • Seed fund from “530 program” 	<p>Offering</p> <ul style="list-style-type: none"> • (Online trading and monitoring platform for animation outsourcing) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D <p>Customers</p> <ul style="list-style-type: none"> • (Selling via sales agent) • (Promoting via Internet) • (Selling via private network) • (SMEs involved in animation outsourcing) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • (Industrial VC with market resources)
HOSO	<p>Founded in September 2009</p> <p>Offering</p> <ul style="list-style-type: none"> • (HR management system) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D <p>Customers</p> <ul style="list-style-type: none"> • (Inc. 500 sub-unites in China) • (Private network) <p>Finances</p> <ul style="list-style-type: none"> • Seed fund from “530 program” • Self-funding 	<p>Offering</p> <ul style="list-style-type: none"> • HR management system <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D <p>Customers</p> <ul style="list-style-type: none"> • Building marketing team • (Government, large enterprises, Listed companies, Inc. 500 sub-units in China) • (Promoting by organizing industrial forum) <p>Finances</p> <ul style="list-style-type: none"> • (Both angle investment and institutional investors) • National research fund

Table 13 The transformation of business (Continued)

Case	Conceptualized idea	Business description in August 2010
CAPITAL	<p>Founded in August 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (MID device with industrial applications) <p>Infrastructure</p> <ul style="list-style-type: none"> • (Collaborating with Intel) • Internal R&D <p>Customers</p> <ul style="list-style-type: none"> • (Industrial customers) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • Funding from state-backed VC • Seed fund from “530 program” 	<p>Offering</p> <ul style="list-style-type: none"> • (Cloud computing service) • (Application for transportation industry) • MID device for end-users <p>Infrastructure</p> <ul style="list-style-type: none"> • Collaborating with Microsoft, Intel China, and University of California at Berkeley • Internal R&D • Outsourcing manufacturing service <p>Customers</p> <ul style="list-style-type: none"> • Promoting via fairs and exhibition; with magazine and industrial magazine • (Industrial companies); firms operated in electricity and education sectors <p>Finances</p> <ul style="list-style-type: none"> • (Equity financing for growth) • Bank loan • Sales revenue from customized MID
HOBBY	<p>Founded in November 2008</p> <p>Offering</p> <ul style="list-style-type: none"> • (Unmanned helicopters) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • Purchasing engines <p>Customers</p> <ul style="list-style-type: none"> • (Industrial firms) <p>Finances</p> <ul style="list-style-type: none"> • Self-funding • Seed fund from “530 program” • (Government subsidies) 	<p>Offering</p> <ul style="list-style-type: none"> • Customized unmanned helicopter • (Customized solution for firms in the field of agriculture) <p>Infrastructure</p> <ul style="list-style-type: none"> • Internal R&D • Collaborating with China North Industries Group Corporation • Purchasing engine; design other components <p>Customers</p> <ul style="list-style-type: none"> • Promoting via industrial exhibition/fairs, demonstrating events • Research institutes; firms in electricity sector • (Industrial firms, e.g. agricultural companies) <p>Finances</p> <ul style="list-style-type: none"> • (Investment with market resources) • Sales revenue • National research fund

The conceptualized idea depicts the business activities and plans associated with the future activities of a start-up at the time when it was just launched. As the table shows, even if the entrepreneur was convinced of the viability of the conceptualized ideas, it is interesting to see that the conceptualized idea somehow remained “vague” in terms of the running activities and plans associated with the offer, infrastructure, customers, and finances, as the table shows.

For most cases, the conceptualized business canvas is relatively clear on the initial funding activities and conducting R&D activities. A lot of other information regarding the customers (e.g. marketing channels, customer segments) was missing however. This is not rare for the cases where the initial ideas emerge from experiencing and visioning. For example, in the case of THUNDER, after the founder had started the company in July 2008, he still didn't have any plan regarding the target customers, marketing channels strategy. During the interview he explains, “...as long as your work has been accepted by academic or research institutes, there shouldn't be a problem, I'm still quite confident of this...” Similarly, HERO, CAPITAL, and HOBBY also share the same remark that they were mostly silent on the plan regarding the customers at the beginning.

Compared to the cases which sense the ideas from experiencing and visioning, the cases where the ideas emerged from observation (GIANT, VENUS, MARS, WIND and HOSO), show more detailed information and planning regarding the 4 clusters of the business model canvas. In the case of VENUS, for example, the founders intended to offer a facial recognition software for TV stations and video editing companies based on internal research and development, and sell it via a private network. To support the running of this company, the founders invested their own money, as well as a seed fund from the “530 program” and angel investment.

Despite the variation of the extent of the details in the conceptualized ideas, the juxtaposition of the conceptualized idea against the business description of the cases at the time when the interviews took place clearly shows that the business of all cases changed dramatically, including those cases that had a relatively detailed conceptualized idea. For example, just as described above, the founder of VENUS had a detailed plan from the beginning. He wanted to develop a facial recognition software for TV stations and video editing companies. But after two years of development, VENUS grew into a company offering and planning to offer a variety of products (e.g. home security solution, a camera system for public transportation, and a chip that integrates the facial computation recognition technology). In addition

to the new market segments, VENUS also extended its marketing channels by teaming up with big companies, sales agents, and by setting up a small marketing department within the company.

The frequent changes of idea components as the entrepreneurship process unfolds are in line with the conceptual ideas in a previous study, that during the implementation process, entrepreneurs adjust their expectations and understanding of what is feasible and valuable and come up with new idea components (Chiesa & Frattini, 2011). Looking into the developmental processes of the cases, the data suggest that the adaptations were taken both in the forms of sensing new idea components and abandoning idea components.

5.4.2 Adaptation in the form of sensing new idea components

As the implementation process unfolds, the entrepreneurs in this study sense many new idea components regarding the offer, infrastructure, customers and finances. The new ideas components are in a variety of forms. According to the relationship between the sensed new idea components and the existing business, I grouped the sensed ideas into two categories: 1) elaborating ideas, 2) new ideas.

I label the new idea component as “elaborating idea component” when it reinforces the implementation of the existing idea. For example, a company follows the initial general strategy of developing industrial applications without a concrete industry focus, and later comes up with the idea of making an application for hotel management. Looking into the idea components that elaborate the existing business, the interpretation of the data suggests that the elaborating idea component can be further divided into groups of elaborating on the technology development, and elaborating on the product/service development.

Elaborating on the technology development. All cases involved in this study are required to address both the technology and market creation. In those cases where the ideas emerged from the experiences and visioning, the entrepreneurs are clear about their technical elements, but remain without a detailed plan on the element of product/service and customer. Yet interestingly, the entrepreneur continues elaborating on the technology development instead of addressing market development. If we take the case of CAPITAL as an example, we see that after the founders had settled down in Wuxi, they still didn't have target customers or a concrete marketing plan. Instead of first figuring these issues out, the two founders continued their R&D work, and sought the possibility of building a collaboration with Intel to get money for the further funding of their R&D activities. The way that

CAPITAL started the entrepreneurial process is typical for cases where the ideas emerge from experiencing. Similar patterns can be observed in the cases of HERO, ROAD, ZEBRA, TRAVEL, THUNDER, and even VENUS, where the idea emerges from observing. Right after the founder had launched VENUS, he abandoned the initial idea of developing a facial recognition software for TV stations and video editing companies due to the perceived small market size. Instead of immediately figuring out another market demand, the funders decided to reinforce the R&D activities.

And elaborating on the product/service development. Unlike the cases where the ideas emerge from experiencing and visioning and where there is no focus on market development, most cases in the group of “sensing via observing” have a strong emphasize on elaborating the product/service right from the beginning. The relevant R&D activities are expected to support the market demand. The strategy for the case of MARS, for example, is clear from the early beginning. All technology development activities and other associated activities are centered on this perceived market demand.

Despite the different focus on only technology development at the beginning also in the cases “sensing ideas from experiencing” and “sensing ideas from visioning”, the entrepreneurs slowly switch their focus to the elaboration of the market as the process unfolds. In the case of TRAVEL, for example, it turned out after years of development that the idea of providing an industrial personal computer based system didn’t work out. They held onto a similar technical capability, and changed their R&D activities to meet the market of private cars however. Yet as I previously presented in section 5.3.5, not all the cases showed similar changes in their developmental processes. The cases of HERO and THUNDER remained focused on the technology development, although they started to realize that they should switch gears at the time that the interviews took place.

New ideas. In addition to sensing new idea components to reinforce the existing business, very often entrepreneurs sense a idea component that only has a loose connection to the existing business. I label this as a “new idea”, instead of an idea component. MARS signed a software-outsourcing contract with Paypal and Bilis, for example. This kind of business has no crucial connection with the B2B software platform they were developing. When I asked the founder why this kind of deal/contract was concluded, he explained:

“...Well, in deed, this kind of contract has nothing to do with my core business...but doing this kind of project can bring cash helping my company

survive...for sure...It won't become part of my business, if I had planned to take this as the core business, I wouldn't have come to Wuxi..."

Similar stories can be found in the developmental processes of TRAVEL, GIANT, and VENUS. Although the data suggest that most entrepreneurs will abandon these new ideas after a certain period of time, these kind of new ideas still matter in the early stage of the entrepreneurial processes, in particular when start-ups face financial constraints and lack of a reputation.

Despite the significant transformations, the data suggest that the changes mostly involved activities that are not part of the core expertise of the ventures. For the cases where the ideas emerge from experiencing, the entrepreneurs rarely adapted the R&D activities. The entrepreneurs stayed with their specific core domain including technological or market expertise. For example, just as the above-mentioned case of VENUS shows, despite the various changes, the technology solution underpinning these product strategies (facial recognition algorithm) remained unchanged.

All in all, the observation regarding the sensing of new idea components is quite close to the patching and thickening process described in the study of organizational changes in the big company (Siggelkow, 2002). For Siggelkow, patching and thickening refers to the emergence of highly interdependent ideas that reinforce the existing core business as well as the creation of a new core element and its reinforcement by new elaborating elements. Different from his observation in established companies, new ventures are in search of a core business element. In this sense, in the technology entrepreneurship setting, the sensing of a new idea component is characterized by experimenting. The entrepreneurs try and test until they achieve a status wherein the start-up focuses on the core business which is reinforced by a set of idea components.

5.4.3 Adaptation in the form of abandoning idea components

Testing and experimenting inevitably involves the abandoning of ideas components. "Abandoning ideas components" refers to actions where the entrepreneur suspends the implementing of certain entrepreneurial ideas, or gives up plans that are yet to be implemented. It doesn't mean that the entrepreneur completely quits the business. It's more like abandoning an idea component embodied in the business model canvas. For example, in the case of THUNDER, in the early beginning of 2010, the founder was planning to acquire equity investment from an industrial venture capital, but it turned out that they preferred the ventures in the growth stage. As a result, the funder

decided to go back to his private network for external financing to bridge the gap between research and market.

Investigating the reasons for abandoning, the interpretation of the data suggests two sources: 1) internal misfit; and 2) external misfit.

Internal misfit describes an internal environment misfit in which actions/plans don't meet the entrepreneur's vision. Mostly they are able to do it, but don't want to do it. In the developmental process of Capital, for example, right after the venture unveiled a product prototype of MID, a company in the education field came over seeking the possibility to co-develop a customized MID for educational purposes and Capital agreed. However, as the collaboration proceeded, it turned out that the final product the customer wanted was low-end and didn't need much powerful computing. This was not in line with the founders' strategy. Just as the informant commented during the interview, "The product they want is just not on the same page with the product we are developing." As a result, instead of developing the whole solutions, the CAPITAL only worked on the software development part of the product.

External misfit. In addition to the internal misfit, entrepreneurs also abandon idea components due to external misfits. The external misfit refers to a situation where the entrepreneurs' actions or ideas conflict with the external environment, i.e., the market strategy doesn't fit the market structure, or there are conflicts with institutions or the idea simply goes beyond the needs of the stakeholders. If you look, for example, at TRAVEL, a start-up that develops intelligent vehicle systems, at the beginning, you see that the founder was planning to develop an industrial personal computer (IPC) based smart driving system. However, after less than one year's operation, he realized that the product based on the industrial control system was becoming too expensive for the private automobile market. The perceived market turned out to be much smaller than expected. He therefore abandoned the idea of selling this product to private automobile owners, and instead switched the idea to a product based on a different platform.

The following table illustrates the abandoning of ideas because of internal and external misfits.

Table 14 Observations of abandoning ideas caused by misfits

Case	Internal misfit	External misfit
HERO		The founder was planning to sell the solution to manufacturer directly. After market research, she decided to get one potential customer involved in the development of the solution.
ROAD		The founder was planning to build its own distribution channels, given his company is doing kind of B2B business. However, later, it turned out the dominant marketing strategy that works in USA is difficult to be applied in Chinese market. As a response, they outsourced to external sales agent.
GIANT	The founder was initially planning to be the provider of terminal devices for telecommunication. After marketing research, the founder believes that working on the system integration would bring more value added profits.	The founders were trying to recruit employees locally with an intention to avoid the high turnover rate, but it turned out that they were not able to find qualified staff. As a compensating strategy, they outsourced some activities
CAPITAL	Right after the company had unveiled a product prototype of MID, a company in education field came over seeking the possibility to co-develop a customized MID for childhood education and CAPITAL agreed on this. However, as the collaboration proceeded, it turned out that the wanted product didn't need much powerful computing. As a result, instead of developing the whole solutions, CAPITAL works only on the software development part of the product.	In the beginning of 2010, when the company was trying to figure out another domain for industrial applications, they were also planning to do the content on their own. But that didn't work out, just as the informants said during the interviews: "it was so complicated for us to do everything. Each industrial application requires incorporation with operators; every industrial application involves at least one operator. It's impossible for us to have it all."

Table 14 Observations of abandoning ideas caused by misfits (Continued)

Case	Internal misfit	External misfit
VENUS	The initial idea for the VENUS was to develop facial recognition to blur faces for digital video. But later, the founders abandoned the ideas because the market is too small in their eyes.	The founders were planning to sell the facial recognition software. However, after the investigation of the market environment, in particular, and of the environment regarding IRP protection, the founders determined that developing a chip that integrates the facial computation technology is safer.
ZEBRA		Instead of trying to replace the existing system directly, ZEBRA switches to the customers who don't have the pollution treatment systems yet.
WIND	The founder turned down an investment proposal from an industrial VC, and keeps looking for the VCs who could bring market access.	
TRAVEL	At the beginning, the marketing was outsourced to a company, but it didn't work well. Given the fact that all the sales are achieved with the research institutes, the founders thought of a new marketing strategy, for example segmenting the market, relying on a private network.	At the beginning, the funder of TRAVEL was planning to develop an industrial personal computer (IPC) based smart driving system. However, after around one year's operation, he realized that the product based on the IPC had become too expensive for the private automobile market. The perceived market turned out to be much smaller than they expected. He therefore abandoned the idea of selling this product to private automobile owner, and switched the idea to a product based on a different platform.

Table 14 Observations of abandoning ideas caused by misfits (Continued)

Case	Internal misfit	External misfit
THUNDER	After years of operation, the founder abandoned the strategy of doing everything on his own, and instead, he planned to collaborate with a sales agency, and hire marketing people.	The founder was planning to acquire equity investment from Lenovo capital for the commercialization of the developed technology, but it turned out that they prefer the ventures on the growth stage. As a result, the funder decided to go back to his private network for external financing to bridge the gap between research and market.
HOBBY		The founders were planning to sell their products to potential customers directly. After two years testing, however, it turned out the market was just emerging. Therefore, they switched their strategy to an indirect one to shape the market by attending exhibitions, fairs, and industrial events frequently
MARS	The founder is fully aware of the importance of using IRP in acquiring government subsidies. After the first round of support from the government, the funder decided not to proceed with the IPR application for his software platform, because it's way to expensive and consumes too much time	
HOSO		They were targeting at subunits of Inc. 500 in China, but after the financial crisis, the budget for the IT system shrank dramatically. As a response, they decided to switch their target customers to the government, and fast-growing Chinese companies.

Although, the data suggest that the abandoning of ideas is caused by misfits, it is worth noting that not every misfit will lead to the abandoning of ideas. The misfit is a time associated construct. Therefore the original misfit can evolve into the status of a fit, as the entrepreneurial process unfolds. Just as the founders of HOBBY describes, “at the beginning, there was no market for unmanned helicopters at all.

When I was trying to contact potential customers, very often they asked me does the helicopter easily fall off. Now after years of efforts, for example, we do the demonstration, and attend some events like natural disasters exercises, slowly some potential customers show interest in our product.”

To some extent, the creation of a configuration is a process of transforming the external misfit into a “fit” situation. The speech by the founder of CAPITAL in this study well describes this process:

“...No dream, no gain. A real execution is to realize the dream. The CEO needs take the role of executing. Cloud computing is the future. But before getting there, we need to do quite a lot. MID, including iPhones, are intermediates. What shall we do before cloud computing is mature? MID with its powerful computation capability, and storage capacity also allow the device not to convey all the data back to the “cloud”. And further, data could also be stored in the small size servers in the companies. For cloud computing, it’s for people who have a dream. Without dreams, the small size, middle size, and big size servers are not able to support it. Now cloud computing is a buzz word, it is not for nothing, but also needs someone with insights/perceptions to draw it up, and keep it in a sustained way...”

5.5 Summary

To summarize, the main result of this study is a process framework of entrepreneurship which derives from a number of concrete findings: First, three paths towards the initial ideas have been extracted. It adds “sensing via experiencing” and “sensing via visioning” as two complementary paths to the widely accepted path of “sensing via observing”. Experiencing refers to the situation when ideas emerge from engagement in the field but not necessarily driven by an ambition to become an entrepreneur. Visioning is the situation where ideas emerge not because of the specific unmet market demand, nor is the knowledge accumulated from deep engagement in the technical field. The entrepreneurs simply want to pursue their ideas because they believe in their future, or they just find them interesting.

Moreover, the results also show that the initial ideas which trigger the entrepreneurship process, are vague, simple, and incomplete in comparison to a detailed business plan. This is in contrast to the general belief that the first thing every founder must do is create a business plan to describe the size of demand/market, the product/service to be developed, and a strategy that can lead the new venture to success. The cases in this study show that instead of tirelessly sketching a plan until it is perfect, the entrepreneurs accept vague ideas and start engaging in the field.

Second, I then found that the entrepreneur engages in a “conceptualization process” of many iterative interactions with external stakeholders and actively tests and experiments with underpinning technologies where entrepreneurs develop their ideas further. Instead of sketching a perfect plan on their own, entrepreneurs mostly take a “going out” approach, when interacting with external stakeholders, to ask for feedback on their ideas. The feedback on the aspects of the idea, in turn make those ideas more explicit and also acts as a basis for the entrepreneurs’ growing confidence.

The third finding of this research has to do with the implementation process through which entrepreneurs acquire resources from their environment. They convey claims regarding their products and their company and legitimize the new venture in the diverse, and, over time changing interests and values of external stakeholders. This result first reconfirms the propositions in existing literature that new ventures heavily rely on point-to-point communication channel building. As the entrepreneurial process proceeds, the entrepreneurs utilize communication outlets like presenting at professional events and engaging the media. Apart from the three ways of claim conveying, the results also suggest three means that entrepreneurs use to convey social meaning beyond the intrinsic content of the information

disseminated, and to convince resource holders to support the start-ups. They are 1) achieving interim accomplishments in terms of technical interim achievements and product interim achievement; 2) networking with legitimized participants in the form of building multisided alliances, organizational networking, and doing business with big names; and 3) harnessing the third parties' neutrality.

The fourth finding of this research is the identification of adaptations that trigger and sustain the entrepreneurship process. Adaptions occur in the developmental processes of new ventures as “abandoning idea components” and “sensing new idea components”. The data also suggest two causes for the abandoning of idea components: internal misfit and external misfit.

In conclusion, these four findings characterize technology entrepreneurship as an iterative process consisting of conceptualizing implementing, and adapting actions, towards the creation of entrepreneurial configuration. This is distinct from an evolutionary economic rationale where learning takes place on the level of the economy through variance, selection and retention (or abandoning) of individual entrepreneurial projects. In place of the Darwinian “survival of the fittest” learning approach, here it is conceptualized as a process of frequently testing ideas, gathering feedback, and revising entrepreneurial ideas until they reach a status of a configuration. This result also stands in contrast to the decades-old formula that an individual writes a business plan, pitches it to investors, registers a company, hires people, develops a product, and starts selling. Technology entrepreneurship is a social design process. The following figure summarizes the findings of this study.

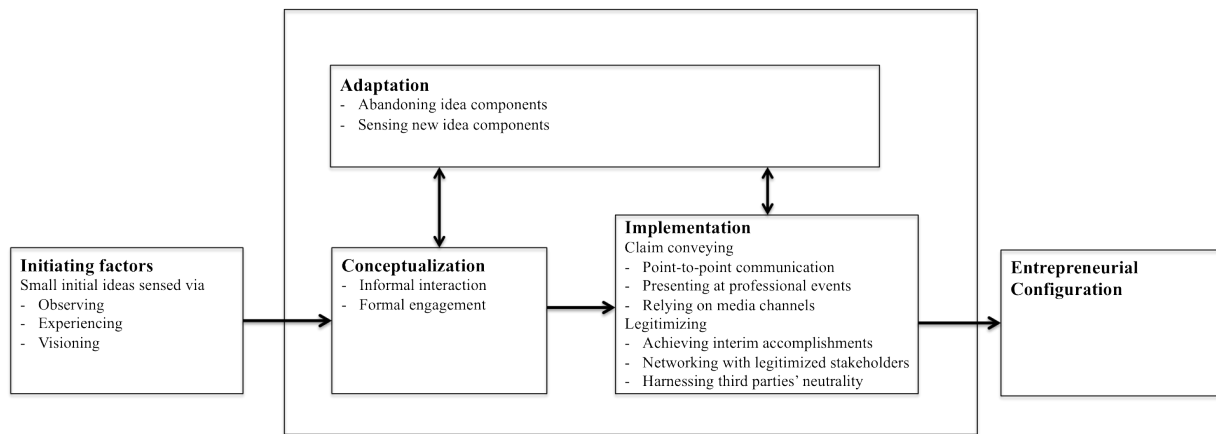


Figure 8 The elaborated social design process of entrepreneurship

