Kyoto University,
Graduate School of Economics
Discussion Paper Series

Invisible Defense Mechanism:
Qualitative Research on Strategy of Entrepreneurs Swimming with Sharks

Sachiko Hata and Yasuo Sugiyama

Discussion Paper No. E-23-001

Graduate School of Economics
Kyoto University
Yoshida-Hommachi, Sakyo-ku
Kyoto City, 606-8501, Japan

September 2023

Invisible Defense Mechanism: Qualitative Research on Strategy of Entrepreneurs Swimming with Sharks

Sachiko Hata[1] and Yasuo Sugiyama[2]

August 30, 2023

Abstract

This research explores how entrepreneurs deploy defense mechanisms when facing the potential misappropriation of their own resources by established corporate partner "sharks." The prior literature has examined legal and timing defenses, along with social defenses that utilize the network structure of investment relationships with power imbalances between young firms and large firms. By conducting qualitative analysis based on 41 semi-structured interviews with entrepreneurs' firms, broader and more detailed defense strategies were identified, including seven (invisible) defense mechanisms, such as "balanced coopetition," "eliminate information asymmetry," "agile implementation of ideas," which were not immediately identifiable as defense mechanisms."

Keywords: Open Innovation, Startup, Entrepreneurs, Qualitative research, Defense mechanism
JEL classification: M10, M13, M21

[1] Graduate School of Economics, Kyoto University. Address: Yoshida-honmachi, Sakyo, Kyoto 606-8501, Japan

[2] Sugiyama Jogakuen University. Address: 17-3, Hoshigaoka-motomachi, Chikusa, Nagoya, Aichi 404-0802, Japan

I. INTRODUCTION

How do startups protect themselves from being exploited by the large firms with which they partner? For startups, building a close business and capital relationship with a large firm has great appeal in that it allows them to utilize the greater resources of the large firm and increase their name recognition by being reported as an interest of the large firm. On the other hand, there is an inherent risk that the partner firm may misappropriate the outcome and value of the collaboration in which the startup has invested its limited and valuable resources, or that the partner firm may take away the unique value that the startup originally possessed. This study explores the mechanisms of startup defenses in this tense relationship, described metaphorically as “swimming with sharks” (Katila et al., 2008).

Large firms are becoming increasingly involved in the entrepreneurial ecosystem. There are a variety of activities, such as the establishment of corporate venture capital (CVC) by large firms, the holding of pitch events to promote collaborations, and the operation of acceleration programs, and as a result, the number of contacts between entrepreneurs and large firms is increasing. Additionally, the point of contact between entities is where the different norms of the two sides collide. Startups and large firms operate under different norms, and as the opportunities to share the space increase, these differences become more apparent. The inability to cope with the differences in speed and business processes often leads to potential collaborations falling through.

Many studies have explained the benefits and implications of alliances between startups and large firms from the perspective of large firms. On the other hand, there are relatively few studies from the perspective of entrepreneurs, but based on the fact that alliances with large firms tend to generate economic value but much of that value is proprietary to the large firms (Alvarez & Barney, 2001), the risks of relationships with large firms and their protection have been discussed. Various aspects of the relationships between startups and large firms have been explained from perspectives such as appropriability mechanisms, governance difficulties due to information asymmetry and the resulting adverse selection, opportunistic behavior as explained by transaction cost theory, and power

imbalances due to resource dependence and network structure. The strength and secrecy of patents, lead time, ownership of complementary assets, learning, and being first to market in appropriability literature have been argued to be points of defensibility in past research (Levin et al., 1987; Miozzo et al., 2016; Ahuja et al., 2013; Cohen et al., 2000), and strategies such as selective and strategic disclosure of information in the economics of information (agency theory) (Riepe & Veer, 2018), delaying the timing of financing to rebalance resource dependence (Katila et al., 2008), and preventing malicious actions from entities that value maintaining relationships with venture capitalists (VCs) by establishing relationships with influential VCs at the center of the network (Hallen et al., 2014) have been raised.

However, few studies have examined the concrete practices of the entrepreneurial side to draw the whole picture of entrepreneurial practice. By taking the practices as a starting point and combining them with consideration of the interrelationships among the defense mechanisms explained by each theory, it may be possible to clarify the relationships among the theories and to present concepts that have not been explicitly discussed in past studies. We may also see more subtle and advanced patterns in the nature of the relationship between large firms and startups in an environment where large firms are routinely involved with startups. In addition, although past studies have discussed the defense of startups as a weak position, given the rapid spread of open innovation, it is necessary to consider the defense of alliances with large firms, considering that startups possess strengths that large firms cannot possess alone. Against this backdrop, the purpose of this study was to explore how startups protect themselves while “swimming with sharks” in an environment where large firms play a major role in new business creation.

This chapter will conceptualize and clarify the practices in building alliances and collaborative relationships between startups and large firms based on the above issues, and show the explanatory possibilities and limitations of existing theories on startups’ defense against unauthorized theft of technology and ideas. The research setting was Japanese startup firms. The data used in the analysis were obtained through semi-structured interviews with the managers of 41 startups that had the goal and experience of building collaborative and capital relationships with large firms. The data gathered

through these interviews were then conceptualized and categorized through thematic qualitative text analysis (Kuckartz & Kuckartz, 2002; Kuckartz, 2014; Kuckartz & Sato, 2018). To preempt the conclusions, the defenses presented as six conceptualized categories include seemingly non-defensive measures including eliminating information asymmetries, inverse governance through capital relationships, and agile implementation of ideas. It was found that the managers made clear use of their wisdom to protect themselves from the potential risk and adversity posed by the "sharks" in their relationships with large firms.

II. LITERATURE REVIEW

In research on alliances from the perspective of startups, the risk of misappropriation by large firms has been discussed extensively. Alvarez and Barney (2001) found that while alliances with large firms create economic value, much of that value becomes proprietary to the large firms. This paper pointed out that the risk of a startup being taken advantage of by a large firm is highest when the only value it brings to the partnership is a new technology, and explained the mechanics of this difference in positioning in the relationship in terms of learning speed. The difference is that for a large firm to learn a new technology from a startup, it is enough to understand how the technology itself works as it is incorporated into the product or process, but for a startup to learn the organizational resources of a large firm to commercialize the technology, it needs to fully understand and mimic the capabilities that have been complexly distributed throughout the organization, typically over many years, and the startup will often lack the financial or managerial resources to do so. The authors explained that this difference in learning speed increases the risk for startups. When large firms gain understanding of a new technology, they may impose unreasonable demands on startups or shift resources elsewhere. Countermeasures taken by startups include commercializing independently without partnering with larger firms, limiting large firms' access to technology to slow down learning, defining partnerships through detailed and elaborate contracts (but it is impossible to fully predict all potential risks and

points of concern), building trust (but overreliance may lead to further exploitation), and providing resources other than a single technology to the partnership.

Katila et al. (2008) likened the scenario where a startup maintains a relationship with a large firm that has attractive resources while being careful not to be exploited to "swimming with sharks." A central debate in organization and strategy is how firms acquire resources (Penrose, 1959), and what motivates relationship formation is resource dependence on other firms (Emerson, 1962; Pfeffer & Salancik, 1978). However, the paper also contrastively directs attention to the existence of a fundamental tension in the formation of alliances, which is the fear of misappropriation of one's own resources by the partner, which prevents the formation of relationships (Gulati & Singh, 1998). As such, this study demonstrated that startups choose large firms as partners when they have effective mechanisms to protect their own resources. Legal defense mechanisms such as patents and trade secrets were also shown to be more likely to protect specific inventions, and timing defenses are effective in revising funding plans and building relationships at a later stage when the technology is more mature.

There is some debate on the mechanisms of defense. If the empirical research on the relationship between startups and large firms is organized according to the theoretical mechanisms of the associated risks and their corresponding defenses from the perspective of startups, four theoretical streams can be proposed: ownership, agency, resource dependence, and network.

The first theoretical perspective is that of appropriability (Schumpeter, 1950; Arrow, 1962; Teece, 1986; Winter, 2006). Patent strength, secrecy, lead time, learning, ownership of complementary assets, first-to-market, and complementary capabilities in downstream activities have been discussed as mechanisms of appropriability (Levin et al., 1987; Miozzo et al., 2016; Ceccagnoli, 2009; Ahuja et al., 2013; Cohen et al., 2000; Huang et al., 2013). Additionally, It has also been pointed out that patents are avoidable and incomplete as a appropriability mechanism. (Levin et al., 1987).

Dechenaux et al. (2008) analyzed the impact of appropriability on the commercialization of existing inventions, measuring four appropriability mechanisms (Levin et al., 1987) (patent strength, secrecy, lead time, and learning), and argued that risk decreases when patent is strong and secrecy are effective,

and that patent scope and learning increase risk. Laursen and Salter (2014) argued how the openness of firms and appropriability are related, focusing on patents, design registrations, confidentiality, lead time, product complexity, trademarks as protection mechanisms. They pointed out that the realization of innovation requires information acquisition and cooperation from external organizations, but at the same time, it is necessary to obtain returns from innovative ideas, which means there is a contradiction between the need for openness in the creation of innovations and the need for protection in their commercialization.

As for the impact of appropriability on business performance, Ceccagnoli (2009) verified that the strength of patent protection and the retention of specialized complementary assets increase the profitability of R&D.

Diestre and Rajagopalan (2012) examined the relationship between the capabilities and motivations of pharmaceutical firms and the formation of partnerships based on the relevance of technology, development experience, diversity of the therapeutic areas of drug products, and the range of applicability of new technologies between biotech startups and pharmaceutical firms. The results indicated that even if value created by the alliance is expected to be high due to the high relevance of the technology, startups will avoid forming alliances with pharmaceutical firms if the firms are believed to have strong motivations for misappropriate the technology and sufficient capacity to develop the technology further if successful.

In addition, when a startup receives investment from CVC provided by a large firm, if the parent firm of the CVC and the startup are in the same industry, the startup will often avoid that particular CVC due to the high risk of intellectual property theft or bad faith dealing. However, if the industry has a strong regime of intellectual property protections, the risk of being in the same industry may be sufficiently mitigated so as to make avoidance of investment unnecessary (Dushnitsky & Shaver, 2009).

Second, agency theory literature have examined mechanisms using theories of adverse selection and governance of alliance partners that arise due to information asymmetries. Yang et al. (2014), in discussing the difference between exploratory and exploiting alliances, found that large firms partner

with technology startups for advanced technologies. The success of exploratory alliances depends on the willingness of large firms to integrate their knowledge base. In addition, when the alliance is exploratory, large firms with strong bargaining power may undermine the interests of the startup due to the high degree of uncertainty as well as the difficulty of concluding a contract for the allocation of results in advance.

In addition, when a large firm decides to invest in a startup through a CVC arrangement, a situation arises where acceptance of CVC requires disclosure of information on the technical contents, while the startup may wish to abstain from disclosing technical information for fear of information leakage to the CVC operating firm. As such, it has been argued that investors tend to stop investing in startups due to information asymmetry, while startups tend not to accept nondisclosure or investment in order to avoid a moral hazard (Dushnitsky & Shaver, 2009). In addition, startups have also been found to defend themselves by making strategic and selective disclosures in their alliances to prevent themselves from being disadvantaged in their relationships with large firms (Riepe & Veer, 2018).

The third theoretical perspective is that of resource dependence theory (Pfeffer & Salancik, 1978; Casciaro & Piskorski, 2005). Katila et al. (2008) argued that investment by large firms and CVCs can serve as a complement or substitute to technology development efforts by large firms. Therefore, their argument was that once large firms and CVCs access the technology of startups, the relative leverages in the relationship shift in favor of the large firm due to its since-reduced dependence on the startup. Similarly, in a partnership between a large firm that provides complementary resources and a startup that provides technology, both parties try to learn about each other's technology and supporting structures/complementary resources, but the learning speed of the large firm will almost always exceed that of the startup, which is explained by the fact that the degree of dependence changes during the partnership, weakening the bargaining power of the startup (Alvarez & Barney, 2001). Patents, trade secrets, and the timing of capital relationship building as described by Katila et al. (2008) above have been discussed in past research as a defense for startups against the problems caused by their resource dependency. Bengtsson and Johansson (2014) investigated collaborations with large firms in a rapidly evolving industry in terms of how startups control the liabilities of being small and being new

(Stinchcombe, 1965). Their research revealed that in scenarios where large firms attempt to control new technologies by partnering with startups, the startups will behave strategically by building new relationships with other firms and expanding into niche markets to amplify their strengths in order to avoid being dominated. The behavior of startups to reduce their dependence on a single partner by engaging in multiple relationships was described as a portfolio strategy for defending against large firms.

In addition, Villanueva et al. (2012) explained that in terms of interdependence (Casciaro & Piskorski, 2005), the full degree to which both sides of the relationship are co-dependent determines the flow of resources to the startup. The startup becomes dependent on other entities that possess the capacity to acquire resources, and is forced to engage in an imbalanced relationship until it finds an alternative to such asymmetric dependency. Villanueva et al. (2012) pointed out that the argument that the high degree of dependence this creates is a risk for startups has two assumptions: that power is zero-sum, and that the party with power appropriate the value. The authors explained that both parties embedded in a relationship promote involvement in the relationship based on the extent of their dependence on each other (Ring & Van de Ven, 1994), that the value that can be created from the relationship increases as both parties become more involved, and that even greater value is created over time because the exchange relationship is embedded in a longer and broader context of social relations (Granovetter, 1985). The flow of resources to the startup in the bilateral relationship between it and the external organization was then measured at two points in time, and as a result, the flow of resources to the startup was found to be negatively correlated with the dependency advantage of the exchange partner and positively correlated with co-dependency with the partner.

Fourth, the perspective of network theory discusses the reduction of the risk of misappropriation from the perspective of the network structure of capital relationships between startups and established firms in technology industries. Research related to this perspective has shown that startups' relationships with VCs, third parties at the center of the network, provide a form of social defense against CVCs, who value good relationships with VCs as central players. Startups have been shown to play a role in mitigating vulnerability due to their dependence on CVCs while mobilizing resources

(Hallen et al., 2014). However, Colombo and Shafi (2016) argued that in Europe, where culturally, avoidance of uncertainty tends to be at odds with individualism, timing defenses are ineffective because, unlike in the U.S., entrepreneurs have a lower social status and the VC market is comparatively underdeveloped, resulting in fewer financing options and an environment where social defense mechanisms do not function as an alternative to legal defenses but remain complementary tools.

Thus, although numerous studies have considered which defense mechanisms are effective, the comprehensiveness and details of the defense mechanisms actually used are not fully understood. In addition, has discussed the defense measures by startups as a whole, taking into account the interrelationship of the defense mechanisms explained by each theory. Although there have been attempts to theorize focusing on specific defense mechanisms, no research that deepens our understanding of the phenomenal aspect of startup defense by dealing with a wide range of specific measures from a holistic perspective with respect to the question of “how startups with insufficient resources and tactics mobilize to defend themselves” could be found. Hallen et al. (2014), who discussed the social defense of building a relationship with a central VC as a measure that can be adopted by startups with few resources available for defense, partially incorporated this perspective into their explanation. However, there have also been cases where patents were not sufficiently protective, and a holistic discussion of defensive measures by startups is needed. Additionally, while each study explains the defense mechanism found in the specific inter-firm relationship and data, etc., to be analyzed by positioning it in different theoretical frameworks, there have also been cases where the explanations derived by different theories diverge even when the same variable is the subject of the analysis. By examining the interrelationships between defense mechanisms, which have been explained differently by theory, it is believed that our understanding of the defense mechanisms used by startups in relation to large firms can be deepened. Indeed, a holistic discussion of what defense mechanisms are employed by startups and how they can be explained in the context of the related phenomena is needed.

III. METHODS

Research Design

The research design of this study is qualitative research using qualitative text analysis. The purpose of the study was to answer the exploratory question of how startups protect themselves from their partners. In order to answer the research questions of "how" and "why," qualitative research was chosen for its suitability for constructing theories rooted in real-world phenomena and for answering the exploratory questions of "how" and "why" (Yin, 1994).

As an approach to qualitative text analysis, first, we collected the data necessary to produce categories and code systems using the "constant comparison method" (Glaser & Straus, 1967) to reach theoretical saturation. Next, with prior knowledge and awareness of the research questions as described in Chapter 1, data collection, analysis, and interpretation of the data were conducted to construct concepts and theories (Kelle, 2007). Here, it should be emphasized that the approach taken by this study was slightly different from the grounded theory approach of Glaser and Strauss (1967). The difference is that the methodological assumptions are slightly different. This study aimed to interpret the data with prior knowledge and awareness of the issues. From the hermeneutic standpoint that the meaning of a text can only be interpreted as a totality of its parts, and that the meaning of a part can only be understood when the text as a whole is understood, the hermeneutic spiral process, which assumes that the interpreter has some prior understanding of the text and that the interpreter deepens his or her understanding through repeated readings of the text, followed by subsequent further readings of the text while applying such understanding, was adopted in combination with the constant comparative method.

The "constant comparison method" is an approach to the analysis of qualitative data that uses explicit coding and analytic procedures as a means of tentatively testing hypotheses and systematically calculating theories with the aim of theoretical saturation. The procedure involves the analyst coding events in his or her data into as many analytical categories as possible, and performing the coding process such that the categories and their properties emerge by simultaneously comparing events until

theoretical saturation is reached (Glaser & Straus, 1967). As the aim of this study was to comprehensively explore how startups and entrepreneurs deal with open innovation, the approach of collecting a large amount of data, not in the form of case studies or comparative case studies but by coding them into categories and comparing them until theoretical saturation is achieved, was adopted. However, based on the idea that the categories and characteristics depend on the framework of interpretation based on the awareness and knowledge of the problem at the time the research is started, and that they do not emerge automatically, a method that combines different methods from the "constant comparison method" was adopted.

This approach takes the position that the center of analysis is the category and code system, the coding process; that coding is itself a procedure of data interpretation; and that analysis is the same as data interpretation (Strauss, 1987; Strauss & Corbin, 1998). In addition to qualitative content analysis (Kracauer, 1952), which is the process of finding and interpreting the meaning contained in a text, the work of understanding and interpreting the content of a text plays a major role.

Having selected this position, data were collected by interviewing entrepreneurs. The data were then conceptualized using the method of theme-centered qualitative text analysis (Kuckartz & Kuckartz, 2002; Kuckartz, 2014; Kuckartz & Sato, 2018). This method allows for a detailed description and theoretical interpretation of the dataset, and the analysis process is iterative and multi-step, as discussed below.

Data Collection

In order to comprehensively explore how startups and entrepreneurs manage their relationships with large firms in open innovation, data were collected from startup managers who had experience and orientation in collaborating and partnering with large firms through semi-structured interviews. In order to ensure the diversity of the target firms and to confirm that they actually had a positive orientation toward building relationships with large firms, the following two steps were taken in the selection of startups.

First, we asked for the cooperation of three organizations that were working to promote collaboration between startups and large firms: (1) a private-sector consulting firm that organizes pitch events where entrepreneurs offer presentations, (2) a private-sector research institute that organizes open innovation frameworks in which startups and large firms are members, and (3) an industry-academia collaboration promotion organization at a university that supports startups in the pharmaceutical field and promotes industry-academia collaboration. A wide range of startups were selected from among those participating in each organization, accounting for the industry, firm size, number of years since establishment, entrepreneurial attributes, shareholders, existence of mentors, business stage, etc., to the extent that the available information allowed. After adding the candidate firms, each firm was asked to cooperate through each organization or directly with the approval of the organization.

Next, semi-structured interviews were conducted from October 2018 to October 2019 with 50 entrepreneurs and executives from 41 startup firms (mainly early stage, including seed and middle stage) in the IT, AI, biopharmaceutical, manufacturing, and service sectors. The semi-structured interviews, which allowed for a high degree of freedom in terms of data collection, were chosen because, although the interviewees were given a rough idea of the questions to be asked based on their prior awareness of the issues, they were permitted to develop their stories in accordance with their answers, which allowed for a richer understanding of the context and circumstances with respect to each entrepreneur or startup. This was thought to be likely to lead to a deeper understanding of the actual circumstances faced by the interviewees.

Each interview lasted from 60 to 120 minutes and was conducted by one or two people. Supervisory staff from the three aforementioned organizations were sometimes present at the interviews, but they did not intervene directly. All interviews were recorded using two IC recorders and interview content was converted to text. In the case of multi-person interviews, participants' impressions and interpretations were shared with each other immediately afterward, and for all interviews, including single-person interviews, participants' impressions and interpretations were summarized in the form of interview notes within 24 hours. These interview notes later served to set the tone for the analysis

of the data, as to how the text of the statements that were cut out for coding purposes should be interpreted.

To supplement these interview data, information on entrepreneurs and startups was obtained from several data sources as secondary information. Newspaper and magazine sources used included four Nikkei newspapers including the Nihon Keizai Shimbun (including regional pages) and Nikkei Business, as well as corporate IR information and various industry magazines. In addition to the official websites and IR information of the firms, TechCrunch Japan, GRASSHOPPER, THE INDEPENDENTS, ONLY STORY, eiicon, Entrepedia (name of the firm was changed to INITIAL during the course of this study), and other media were used as sources of information.

Data Analysis

Based on the standpoint described in the research design, data were conceptualized using the method of theme-centered qualitative text analysis (Kuckartz & Kuckartz, 2002; Kuckartz, 2014; Kuckartz & Sato, 2018). This method was adopted because it allows for a detailed description and theoretical interpretation of the data set. The analysis process is iterative and multi-step, as follows.

First, the interview texts were analyzed based on the research questions of what defensive behaviors are employed by startups. During the data collection process, recursive notes were made by highlighting central terms and concepts, marking important passages, and analyzing the flow of discussion and debate.

Second, the first code was created by textualizing what defensive behaviors they employ in any given situation, and the first main theme category was created at the start of the coding process. The actual content of the interview texts was used in the analysis. While the main categories were derived directly from the research questions and existing research, and had already influenced the collection of the interview data in that they were thematic in nature when the interviews were conducted, the categories as themes that emerged as a result of the interviews and were discovered unexpectedly through the process of reading the texts were also included. This also includes categories as themes

that were unexpectedly found through the process of reading the text. Notes were taken with respect to any new themes that emerged during the course of processing the texts as part of the study analysis.

Third, initial coding and coding of all text data were performed using the main categories and coding scheme. All texts were reviewed line by line to identify the themes in each passage, which were then assigned to categories based on the overall evaluation of the text. The overall rating was determined by using the entire text and the interview notes compiled within 24 hours of interview completion. A single passage was assigned to multiple categories in cases where a single text passage contained multiple meanings. This differs from classical content analysis in the assumption that a single theory in the same text may be related to different themes. We adopted the method proposed by Kuckartz et al. where the coded text may overlap and become intertwined among multiple themes.

Fourth, the first theme was checked against the coded data and the entire dataset. All texts belonging to the same main category were then grouped together. They were then determined and elaborated as categories and data to be presented in the final analysis. After checking the textual data contained in the main categories, if there were categories that required further subdivision, subcategories were constructed based on the data. The list of subcategories was then systematized, summarized, and integrated into general and abstract categories as needed, and definitions for the subcategories were established.

Fifth, as a second coding process, all data were coded using an elaborate category system. For those parts of the text that had already been coded into the main category, the data were read again and then assigned to newly defined subcategories. Distinctions between the main themes were clarified, and the subcategories were summarized and merged during the course of the analysis, or new subcategories were added as necessary. In instances of additions, all data were re-read and coded again. This process of coding was repeated until the procedures of structuring and systematizing the data were completed.

Lastly, the results of the category-based analysis and the overall analysis were presented. The analysis focused on themes and sub-themes. The method of analysis used during this study involved presenting the results of the category-based analysis with respect to the main categories. For each category and subcategory, focus was placed on what kinds of statement were made and what points

were ignored or only briefly touched upon in order to examine the content that should be presented. In addition, the relationships among the subcategories belonging to a single main category were examined to see if any patterns could be found. The firms that participated in the interviews are summarized in Figure 3.

IV. RESULTS

Based on the above analysis, the mechanisms of entrepreneurial defense against "sharks" was conceptualized as follows and categorized into the seven categories below. Each concept includes multiple specific behaviors by entrepreneurs, and the background is a discourse that supports each specific behavior. First, "sharks'" experiences of entrepreneurs are shown to be a prerequisite for understanding these defense mechanisms.

Experiences of "sharks"

Two types of harm were identified, "inequality" and "stolen technology." There are several types of "inequality". An entrepreneur in an industry with a strong IP protection system always negotiated with large firms to avoid being taken advantage of.

"The partners always know our weakness. It is easy for them to know from various information sources how much investment we received. And they are also able to grasp our burn rate by calculating with our scale of research and development. Then, they know how many years we are able to operate under the current financial and research situation. They take those things into consideration and think slyly. They think, for example, our choice would be limited whether to put in a new investment or take their (tough) offer under current situation…"

The above statement shows the situation of "asymmetric information and ability." There were several cases of "imposing rights conditions advantageous to large firms" and "sudden change of contract details". The following experience is one example. After talking about joint development for

the national project for over a year, the partner large firm suddenly changed to favorable conditions for them just before the final document submission and the project broke down since the entrepreneur could not accept it.

Apart from "asymmetry of information and ability," they are experiences of entrepreneurs without enough human resources. This was not only the case for early-stage startups.

There were experiences of harm from "stolen technology."

"In fact, there are a lot of events where information is stolen…"

The above statement was made by an entrepreneur in an industry with strong IP protection. There were many experiences that the large firms break contact after asked about the technology of the startup, regardless of the strength of the IP protection in the industry. Even the entrepreneurs who did not speak about actual damage made several mentions of large firms being very risky, as they are only interested in the technologies and not in the startups. There were also multiple examples of damage when "large firms apply patents without permission of the startups."

"They said, 'we want to proceed [this business] a little further, we want you to tell us a little bit more about it' … then … we show them information a little by little …, since we are a so-called startup, we wanted to conclude joint research, as we had yet to do any fundraising… (…) then, they said that they understood, and we suddenly lost contact. We wondered what they were doing … for about three months, no matter how many times I called, he was absent and there was no reply to our e-mails … then, three months later, suddenly he called us back. Then, he said 'shall we conclude the NDA [non-disclosure agreement]*,' and I was glad. However, he had applied for the patent during that period. He said awfully, 'let's do it together since we have issued a patent, we are safe now.' I thought we were going to perform a trial, … though that firm was really big … I negotiated with their senior management … and I said 'we will sue you.'"*

The above discourse is about past experience, but the situation where technical information is targeted did not change significantly thereafter.

"It's still there. They come saying they are interested in, and they ask about our technology, … then, contact is lost."

A similar case was revealed by several of the entrepreneurs.

"By hook or by crook"

"This has happened many times (the case where technical information is stolen)".

On the other hand, there were many mentions of the so-called large firm counterparts being reliable, and there was no obvious damage. However, as the interviews progressed, most interviewees showed their defenses, such as not using the template contract of the large firms, not talking with the firms who do not respond to the confidentiality agreement, obtaining information on movement of partner firms from their own network, and strictly defining disclosure information at each contract stage. This was the case, regardless of the strength of the industry's IP protection system. Rather than trusting large firms, they were wary of taking measures after recognizing the power asymmetry in the relationship with large firms. The defense mechanisms and behaviors of the entrepreneurs are explained in the following sections.

Defense mechanisms against sharks

The entrepreneurial defense behaviors mentioned in conjunction with the above damage experience of sharks were conceptualized according to a thematic qualitative text analysis method. The defense mechanisms protecting against sharks are sorted into the following seven categories as also displayed in Table 1.

Insert Table 1 about here

---

1. Legal defenses. Although not included in the above table, a legal defense offers protection using the IP protection system. But there is recognition that IP alone cannot offer protection. Most entrepreneurs act on the idea of what else they can do, in addition to patents.

2. Rules for information disclosure policy. Setting rules for the content and method of disclosed information in advance avoided the risk of disclosing information that would be disadvantageous to the firm in individual negotiations, and the firm's corporate value was not compromised.

Tighten disclosure content at each stage. Protection is offered by avoiding unfavorable information disclosure due to individual correspondence and misjudgment by strictly defining the details of disclosure at each stage, such as before the conclusion of a confidentiality agreement, after the conclusion of a confidentiality agreement, or following the start of joint research.

"Of course, we have patents, and in the first place we have a clear policy of information disclosure… such as… never reveal 'this' information. (…) There are cases in which we are developing and suspect that large firms are getting our information. In such a case, we can almost eliminate such a firm by insisting to conclude an NDA. Therefore, it is a major premise to conclude an NDA basically for suspicious firms. In addition, we will not disclose as little as possible. After doing that, we collaborate a little as a taster, then continue for about half a year, and, if we can build a trusting relationship with the counterpart, we start collaboration."

The same applies to industries with strong IP protection systems.

"Such firms don't like to enter into non-disclosure agreements. Because concluding non-disclosure agreements puts some restrictions on them; they can't do anything that works for them. Therefore, the information to be shown before the conclusion of the confidentiality agreement can be unavoidably put together in a package, but it does not include the important points. (…) How much information to show before the contract, how much information should be provided as primary data after a non-disclosure agreement, and how much information should be provided at each stage of research. We spend a lot of time deciding these things. Therefore, there is information that is not given even to collaborators. (…) I use the most energy when judging information to be disclosed before signing this non-disclosure agreements."

Prior literature has shown that strategic and selective information disclosure defenses are used in conjunction with social defenses following the creation of an investment relationship through CVC

(Riepe and Veer, 2018). This study shows that this exists even before the establishment of collaborative relationships.

No disclosure, even to members. Important information is shared with only a limited number of members within the firm, thereby protecting it by reducing the possibility of information leaking outside the firm. In order to thoroughly manage technical information, only a limited number of members in the firm share information.

"We don't share any really important information with anyone. Even with our internal members. Only few internal members know about the core logic. The counterpart firms repeatedly ask for disclosure, but we refuse and never disclose it."

Partner only upon acceptance of a non-disclosure policy. Adhering to the policy of not disclosing at the start of business, collaboration only occurs with partners who accept the policy and build up results. This avoids the risk of information leakage. Due to the power imbalance with large firms, it is not easy for startups to exert their bargaining power, and requests for disclosure of technical information are often imposed. In order to increase bargaining power, it is necessary to create a track record of collaboration, and, in order to prevent the outflow of the firm's technology, a protection was devised whereby startups only partners with those firms that accept the terms of non-disclosure and agree to accumulate a track record first.

"We may not be bullish unless we have the ability to negotiate. (…) From the beginning, we consistently stated that, for the time being, … we collaborate 'only with' firms that acknowledge our non-disclosure policy. We build a track record and accumulate collaborations results. … And even after that, we tell the counterpart that we don't disclose our information and get it convinced."

3. Inverse governance through capital relationship. Entrepreneurs prevent stakeholder from being out of control by investing in their startups. The reason for the concept of "inverse" governance is as follows. Usually, the funding party controls the management of the firm that receives the funding (= use governance). However, in the case seen in this study, the entrepreneur who was the recipient of the funds governed the source of the funds. In other words, it was "inverse" governance.

Match interests. Entrepreneurs select partners to invested in them with matching interests to protect their value from being lost. An entrepreneur doing business in an industry with a strong IP protection system prevented damage by encouraging partners to make investments and matching interests when technical information disclosure was required due to the progress of collaboration, where theft is a concern.

This method does not protect against unintended acquisitions. However, at the time of the start of the cooperation, after determining the coincidence of each other's directions, capital relations were used as a means of promoting cooperation.

"We basically think that it is necessary to let them have stocks and to receive investment when we work closely with the partners. (...) If there are real partnerships, we don't need to doubt the partners. The investors also suffer their own damages if they do something harmful to us. (...) We encourage initial investment when we feel an ongoing collaboration is likely."

"When we have to be careful about information disclosure, the time will come to judge how to collaborate with the partners more closely. We want to break through to survive. Therefore, we offer to receive initial investment when we think the partner is good to work with."

The entrepreneur who made the above statement also spoke about a case where large firms were looking to steal the technologies from his startup, and he is extremely cautious about large firms.

Encourage shareholders to check each other. To prevent certain stakeholders from being under control and taking action to destroy their value, other shareholders with the same interests are used to monitor and persuade others, in order to defend the startup. The following statement is an example. A startup worked with one of several shareholders (Firm A). The firm also developed a business with another firm (Firm B) that had a superior technology. Firm B wanted to invest in the startup for further collaboration. The investment from Firm B was to increase the corporate value of the startup. Therefore, the entrepreneur wanted to receive funding. However, Firm A, which wanted the startup to use its own technology further, opposed accepting the investment. In order to overcome the situation, the entrepreneur talked in advance with shareholders outside Firm A. At a meeting where all

shareholders gathered, all other shareholders persuaded Firm A that it would increase the value of this startup. As a result, Firm A was convinced after all.

"Of course, I had talked to all the shareholders in advance. Firm A will say that, then, you say this way, like that. It worsens the relationships that I say the same thing by myself. They agree somehow when they are convinced by other shareholders. I have to … arrange … their power balance … well … Therefore, I think I spend a lot of time talking to stakeholders. (...) 'There will be a discussion, so please take this kind of role.' I always make such a pre-arrangement."

4. Inverse governance through social relationships. Entrepreneurs defend themselves by clearly indicating the cost to their firm of a detrimental act, by using a third party name that has social power, by using a third party that is expected to suffer a large cost in the future from a disadvantage, or using social frameworks with a lot of surveillance.

Clearly indicate well-known mentors and lawyers. The entrepreneurs showed that startups also have the ability and power to negotiate with large firms and prevent themselves from being condescended, defending themselves by eliminating those who are out to cause them harm.

Trade within a framework between universities. Entrepreneurs defend themselves by increasing surveillance by conducting transactions involving multiple parties, reducing their willingness to betray their firm.

Inverse governance through social relationships includes behaviors, such as clarifying relationships with prominent lawyers or industry authorities, conducting transactions within a framework, such as a strong inter-university agreement if the risk of betrayal is high, and talking about collaboration progress to the third parties, in order to prevent betrayal. In addition to the social defense using the network structure discussed in the prior literature, defenses also used the power of a wider third party and increased surveillance.

5. Elimination of information asymmetry. Entrepreneurs obtain information through their own sources to suppress or avoid potential risks from large firms behaving opportunistically because of the

difference with large firms with capital power in the amount of information, ability to collect information, and organizational routines for collecting information.

Examine the products and papers of counterparts. Entrepreneurs defend themselves by examining the products and papers of firms that approach them. They are particularly wary of theft of technical information if there is anything related to their technology.

"Beware of the manufacturer, we examine thoroughly what kind of products they have, and what kind of papers they published (before the meeting with large firms concerning collaborations)."

They are wary of all potential risks based on investigating the real intentions of the approaching big firms in advance.

Gather information about movements in partner firms at academic conferences. Entrepreneurs defend themselves by gathering information on the movements of their counterparts at conferences where industry-related or closely connected people gather to seek out the intent behind their approach to the startup. One example is that biotechnology startups are worried about whether potential partners (mega-pharmaceutical firms) definitely launch pharmaceutical products researched and developed by startups.

"Large firms sometimes have projects similar to ours. They do acquire competitors to 'reduce their competitors.' In fact, they do not develop to launch relevant pharmaceutical products after the acquisition in such cases. We have to identify their true intention (behind their alliance proposals). (…) We need to pre-fetch information. Therefore, we participate in academic societies, and that kind of thing ... Though it doesn't come out on the surface as a topic in those academic societies (…) That firm seems to do this kind of things, this firm seemed to do that recently, things like that. Then, we obtain information. (…) The judgement at that time is not always correct. However, unfortunately, we can only judge with the available information at that time."

Large firms do take over competitors to crush competitive products in all industries. Entrepreneurs defend themselves to reduce this possibility by examining the movement of potential partners.

Do not use the contract templates of large firms. Large firms have and use their own contract templates, which are formulated in language that is favorable to them. Therefore, startups defend themselves by correcting contract terms or negotiating the use of their own firm templates.

"Legal documents of the large firms ..., they often use contract templates that state all rights of the collaboration achievements belong to the large firms (laughs). (...) We carefully watch and negotiate to shear rights or share out costs while discussing the common goals of the collaboration we are aiming for. "

There were many mentions that large firms with little experience in open innovation always used their own contract templates.

Share the reputation of large firms. Entrepreneurs defend themselves vigilantly by sharing information in startup communities about large firms' behaviors that have disadvantaged startups.

"We hear so many things, such as that startup worked with that established firm and they were told this kind of things."

"We ask VCs for advice as they have that kind of experiences."

"Well, yes, we have (the connection in the entrepreneurial community). (...) (Keep connected to obtain information?) Yes, yes."

"There are communities where we can share a variety of fresh stories, successful stories and failed stories to get informed and defend."

Various and large amounts of information are exchanged and shared in entrepreneurial communities, though this depends on the entrepreneurs. Entrepreneurs gathered information about the behavior of large firms with strong vigilance in various formal and informal networks. On a regular basis, they meet and communicate with other entrepreneurs, senior managers of other firms, and VCs that do not always invest in them. Some entrepreneurs belong to organized networks, such as "dojos" hosted by ex-entrepreneur investors. They often ask for referrals and meet with related people through those networks when necessary. Regular communications in those entrepreneurial communities also acts as a means to eliminate information asymmetry and to defend themselves. In addition, some entrepreneurs have experiences working in large firms or investing in startups and understand their

ways of thinking and behaviors in negotiations. They are able to think of measures to defend against large firms or investors.

6. Balanced Coopetition. Entrepreneurs defend themselves by balancing competition and coordination, so that certain partners do not have the opportunity or motivation to harm the firm. Entrepreneurs protect themselves by avoiding partners and methods that are likely to occupy collaborative outcomes or lose their value. "Selection of how to assemble" functioned as a defense. Some entrepreneurs selected not to jointly develop with large firms. Entrepreneurs indicated that the joint development with large firms itself is simply a castle in the air, and that great benefits are earned only for the large firms. Those discourses exist regardless of the strength of IP protection in the industries. In some cases, consideration of the business distance and technology distance from the partner firms operated as a defense. Entrepreneurs avoided the risk of proprietary by carefully choosing partners that did not overlap and were not complementary in the technology or business areas, for example, the partner's technology is in the same field, but their own technology is very specific, or the partner operates in the same industry, but in a different business area within that industry.

Negotiate with multiple partners. Entrepreneurs defend themselves by creating a competitive state that does not depend on a specific (large) firm by negotiating with multiple firms and talking to multiple firms to avoid a specific partner firm from taking action to destroy the value of the startup.

"It's not good to negotiate with just one counterpart. ... Basically, choose a counterpart with good conditions while talking and negotiating with multiple firms ... just like ... that firm will give us XX, so, how about you?"

Do not become overly competitive. Entrepreneurs defend against harmful actions by large firms that might destroy the value of a startup by selecting a business field at the start that is not overly competitive with large firms.

"What we are conscious of when we work with a large firm is, ... how far, ... we enter the "center" of management issues for large firms, ... and we walk together with the large firms by solving the

issues together. That is what we think when we select a counterpart and work together. (…) Because I think it will not work well if it is done competitively."

As in the above, this defense mechanism also includes the protection of not competing with large firms by making the problem solving of a particular large firm the job of the startup.

No joint development. Joint application of patents as a result of joint development offers great benefits to large firms and is of little benefit to their firms because startups and large firms have different business widths. Therefore, they defend by not collaborating in the form of a joint development.

Choose a partner with higher interdependence. Entrepreneurs choose partners that will benefit from continuing to work with the startup, which leads to avoiding situations where the collaborations discontinue or where the value of the collaborations are diminished if the partners damage the startups.

Entrepreneurs whose business stage progressed experienced more damage, were increasingly vigilant, and were able to avoid the situation of being forced to grab the funds and contract, thereby avoiding these risks. It was found that entrepreneurs learned from communication with mentors or among entrepreneurs as a source of acquiring defensive measures. This also related to selection of investors, such as the CVC, VC, or business firms. This was expressed in actions and ideas, such as selecting investors who were not deeply involved in management.

One serial entrepreneur had been forced by a VC to transfer his business due to an insufficient valuation. From that experience, in his second startup, he wanted to receive investment from a set of firms through collaborations and received the investment from business firms. He also took measures to avoid the situation where the startup is influenced by the circumstances of the business firms.

"We make them have a very small share. We don't want at all the business firm to have 10% or 20%. We allow them to have their share if they have the market capitalization and the price that we want."

The above entrepreneur had a clear stance on large firms and investors. There are many things that can be learned from communication with mentors, he said. "The view is different from the previous startup." Though there were many investment proposals from VCs, he selected investors in a wary manner.

7. Agile implementation of ideas. The ability to speedily execute the ideas of the startups is a defensive measure. Detailed know-how is accumulated by the speed of hypothesis verification, which is also one of the characteristics of a startup, and it leads to difficulty of imitation. It also gives them confidence that they are always able to stay ahead, even if imitated by the established firms, because the hypothesis verification cycle is much faster for them than for established firms.

Uneven distribution of knowledge about how to execute ideas. Accumulation and continuation of know-how through repeated hypothesis testing is necessary to implement and commercialize ideas. Theft of superficial ideas alone does not lead to commercialization. This results in a defense.

"I think it doesn't matter if they steal only the idea. It doesn't matter if it could be replaced by just an idea. The really important point is why this mechanism is put in until this system or product is built up. And I don't tell anybody about it."

Confidence in the agility to commercialize. Startups are always ahead of large firms in terms of the speed of their hypothesis verification cycles for implementing and commercializing ideas. This results in a defense.

"How fast you can do hypothesis testing, the power to actually move is more valuable. In the end, it would be meaningless if there was no such person. There is a lot of similar information everywhere."

There was no such discourse in industries like biopharmaceuticals or where the technology itself was highly specific to the business.

Most of the entrepreneurs interviewed for this research belong to early-stage startups, however, there are variations in terms of industry and business stage. They also came from a wide range of entrepreneurial backgrounds, which became the source of defense measures, and there were differences in the presence of mentors and the depth of interaction with entrepreneurs. Though the number of firms is not enough to subdivide each industry, when dividing into biotechnology, pharmaceuticals, IT, and other service industries, and considering the strength of the IP protection in industries, as used in previous research, there were some differences in entrepreneurial discourse. The ideas also influenced the choice of where to obtain funding and investment.

V. DISCUSSION

This study exhaustively articulated the defensive mechanisms that entrepreneurial firms use to "swim with the sharks." Some of these mechanisms, such as the "agile implementation of ideas," "balanced competition," and "elimination of information asymmetry," do not appear to be defensive measures on their face. Mechanisms not considered in past studies were also discussed, such as "defense by inverse governance," "defense by capability and capacity," and "defense by resolution of information asymmetry." The social defenses shown in existing studies also indicate that in addition to social defenses using network structures, institutional mechanisms such as inter-university collaboration frameworks, which are highly monitored as social entities, and socially powerful titles are also used defensively.

"Inverse" governance. The first is inverse governance. "Inverse governance through capital relations" will be explained in terms of the economics of information, but in the opposite direction. Essentially, the principal invests money in the agent to acquire the right to be reported to and the right to comment on, thereby transforming the agent's behavior. However, this defense is the opposite: the principal (startup firm) regulates the agent (large and established firm), the issuer of capital, by allowing the agent (large and established firm) to invest. The mechanism of "encouraging shareholders to regulate each other" is a mechanism to create a situation where developments do not occur solely due to the interests of a specific agent (large firm = shareholder) by dispersing multiple agents (large firm = shareholder). In addition, in "inverse governance through social relations," governance is made possible through the actions of entrepreneurial firms to restrict their own freedom (by having third parties monitor them), resulting in the realization of a framework under which the behavior of large firms can be monitored.

This will also be discussed from the perspective of resource dependence theory. By relying on large firms for resources, entrepreneurial firms create a situation in which they are easily controlled by those firms, which are external actors. However, by contrast, the very variables that create the situation of

dependence (i.e., investment and acceptance of board members) make the startup firm critical to the large firm, creating a commitment (to the relationship with the startup firm) and a hidden dependency (on the entrepreneurial firm) on the part of the large firm. In essence, if a large firm invests capital in a startup firm, a conflict of interest will arise in that the loss of the startup firm will be a loss to the large firm, creating an incentive for the large firm to act protectively with respect to the startup firm. In addition, if a large firm sends one of its officers or executives to a startup firm, this creates a structure where there will be a conflict of interest between that executive and the startup firm, and if something happens that could cause the startup firm to lose money, that executive as an individual will defend the startup firm. Therefore, the results of this study indicate that the increase in resource dependence of the startup firm itself has a structure that changes the resource dependence of the large firm, and that this structure functions as a defense for the startup firm. The results also suggest a relationship between the same variables in different theories.

The relevance of defenses in existing research will now be presented. Unlike social defenses (Hallen et al., 2014), which use relationships with VCs located at the center of the network, “inverse governance through social relations” describes a form of defense mechanism in which a startup monitors a large firm in consideration of the condition that the startup firm is also monitored, but independent of the network structure. This manner of defense mechanism can be used by any startup firm in any position. Also, unlike the control of dependence through the coordination of multiple alliances (Bengtsson & Johansson, 2014), a wide range of third parties other than the alliance partner are mobilized in the defense mechanism.

Because of its small size, a startup firm depends heavily on numerous external actors. Startup firms also exist within a network of one-to-many relationships. How startup firms form these one-to-many relationships is also the focus of defense mechanisms. This study explains that a startup firm that exists in such a network, forming one-to-many relationships, uses a defense mechanism that mobilizes all third parties as stakeholders and monitors.

It is argued that the core of the “shark problem” is a power imbalance due to changes in resource dependence (Katila et al., 2008; Hallen et al., 2014). However, it has been said that an increase in

mutual dependence as the sum of the dependence of both sides of the relationship leads to an increase in resource flow to the startup firm (Villanueva & Sapienza, 2012). However, the mechanism by which a startup firm in a weak position can utilize one-to-many relationships as a defense is a social defense by a startup firm existing within its network and using various external stakeholders, including both partners and non-partners. Dependence on various stakeholders, including both partners and non-partners, changes the degree of dependence of the other party (giving incentives to the other party), and as a result, it functions as a mechanism that protects the startup firm.

Appropriability mechanism from a weak position. The discussion of the appropriability mechanism assumes a kind of equality. For a small startup firm, a patent that involves a lengthy and expensive legal battle is a not realistic course, and sending executives to a large firm, investment, etc., may also be impracticable. The special defense mechanisms that emerge from a weak position and the inability to mobilize resources have not been sufficiently explored to date. The results of this study describe the existence of a defense mechanism that can be implemented from a position of weakness. Normally, information asymmetry would lead to adverse selection. However, the input gathered through the study revealed that some startup firms entered into relationships with large firms. The following three defense mechanisms, able to be implemented even from a position of weakness, can be considered to have underpinned these relationships. In the "elimination of information asymmetry" mechanism, the startup firm, which is in a weak or less-informed position, attempts to compensate for its weakness by gathering information through its own means, thereby preventing the other party from acting opportunistically. Meanwhile, what the "codification of an information disclosure policy" mechanism shows is that a startup firm can establish controls over the disclosure of information in order to avoid being compensated inequitably following a disclosure of its technical or otherwise sensitive information (Arrow, 1962). In addition, based on the "balanced coopetition," mechanism, a startup firm will choose opponents and collaborations that do place it at a disadvantage even if it is originally in a weak position. Both of these defense mechanisms presume the weaker position of the startup firm. In addition to the selective and strategic disclosure of information (Riepe & Veer, 2018), this study shows that startup firms that are less informed and in a weaker position respond to the threat

of sharks by employing the bilateral defense mechanisms of providing and collecting information, in addition to defense mechanisms involving the mode of collaboration.

"Defense" through a startup firm's areas of strength. Some startup firms have stated that they can win even if their ideas are leaked [misappropriated] because they are faster and more agile. Previous research, including this one, has discussed defense mechanisms based on the assumption that startup firms are in a weaker position and that misappropriation will occur if they do not take countermeasures. However, the defensive mechanism of the "agile implementation of ideas" shown in this study indicates that entrepreneurial firms have relative strength in certain aspects. And this strength contributes to the creation of a situation where even if a large firm misappropriates a technology or other sensitive asset, the return generated by the asset will not also be misappropriated (owned). The appropriability mechanism is concerned with how to prevent a situation in which imitation of a technology deprives the developer of a return generated by the commercialization of the technology. However, the mechanism identified during this study functions as a consequential defense in that it aims at value acquisition (Schumpeter, 1950; Arrow, 1962; Teece, 1986). In addition, the existence of this defense mechanism indicates that startup firms, which are in a disadvantageous and weak position in their alliances and collaborations with large firms, are in a relatively strong position in certain aspects, or that there are aspects in which startups may be believed to be weaker but are actually not. It also shows that a discussion of the defense mechanisms employed by startup firms should also include such aspects. Related to the argument that entrepreneurial speed is a defense is the argument for the agile recombination of alliance portfolios (Bengtsson & Johansson, 2014). However, the mechanism presented here is not one of reduced dependence, but of defense through speedy commercialization. If a situation exists in which a startup firm can win even if its opponents imitate it because of the speed of its hypothesis testing and commercialization, this suggests that the rich complementary assets that should be necessary to commercialize innovations are also a dysfunction. Large firms that are partners of startup firms have a wealth of complementary assets to commercialize. Because of their large number, the number of internal stakeholders increases further, and internal coordination becomes costly and time-consuming, making it difficult to make decisions quickly. In

the course of this study's interviews, it was repeatedly mentioned that the huge difference in agility between startup firms and large firms often hinders the building of relationships and advancement of business development. It has been asserted that one of the reasons for the slowness of large firms is the delay in internal coordination and decision making due to the abundance of complementary assets, which is a dysfunction of complementary assets, and that the quality of "agility due to the lack of complementary assets" possessed by startup firms can serve as a defense mechanism. Similar to the concept of lead time (Levin et al., 1987), this is an appropriability mechanism based on time differences. However, unlike lead time, which is based on chasing a given time required by the technology or product/commercialization structure from behind, this is a form of appropriability mechanism in which the first mover always wins by staying ahead of their opponent and utilizing their speed advantage.

- **Defense as dysfunction.** The dysfunction explained together with complementary assets also explains the other mechanisms addressed. The economics of information argues that the principal monitors and governs the behavior of agents by investing capital in them and holding their shares, which in itself gives the party investing the capital an incentive to align its interests with those of the party in which it has invested the capital. This indicates the presence of a dysfunction, where opportunistic behavior on the part of the investing side is suppressed and the behavior of the side that is the target of the investment is governed. In the "inverse governance of social relations," the dysfunction is to protect an entity by restricting its own freedom through actions that allow a third party to monitor its actions, thereby restricting others from taking opportunistic actions against the entity.

Based on the above discussion, the theoretical contributions of this study can be summarized in three perspectives.

The first is the conceptualization of "inverse governance" mechanisms. Different explanations for the various defense mechanisms, such as explanations of the mechanism by which dependence on the other party increases independence from the other party and becomes a defense, and the mechanism by which principals and agents may become inversed, with the recipient of capital governing the issuer

of capital, were presented, including different explanations for the same variables in different theories, which were in direct opposition to previous explanations posed by the economics of information and resource dependence theory.

Second, a comprehensive and explicit discussion of defense mechanisms able to be implemented even from positions of weakness where mobilizable tactics are not sufficient was offered. The relationships between defense mechanisms were also discussed in terms of their explanations from the perspectives of various theories such as appropriability, the economics of information, and resource dependence.

Third, the “ability to implement ideas,” a strength of startup firms, was explicitly argued to function as a defense mechanism. Additionally, the complementary assets owned by large firms, which are necessary for technology commercialization and are the reason for alliances, were suggested to function in the opposite manner. The mechanism of “defense” was discussed because it assumes that startup firms are in a weaker position in relation to established large firms, while in actuality, the strength of startup firms is their agility and ability to execute actions quickly.

REFERENCES

Ahuja, G., Lampert, C. M., & Novelli, E. (2013). The second face of appropriability: Generative appropriability and its determinants. *Academy of Management Review*, *38*(2), 248-269.

Alvarez, S. A., & Barney, J. B. (2001). How entrepreneurial firms can benefit from alliances with large partners. *Academy of Management Perspectives, 15*(1), 139-148.

Arrow, K. (1962). J., 1962, Economic Welfare and The Allocation of Resources for Invention. *The Rate and Direction of Inventive Activity, Princeton University Press and NBER*.

Bengtsson, M., & Johansson, M. (2014). Managing coopetition to create opportunities for small firms. *International small business journal, 32*(4), 401-427.

Benson, D., & Ziedonis, R. H. (2009). Corporate venture capital as a window on new technologies: Implications for the performance of corporate investors when acquiring startups. *Organization Science, 20*(2), 329-351.

Casciaro, T., & Piskorski, M. J. (2005). Power imbalance, mutual dependence, and constraint absorption: A closer look at resource dependence theory. *Administrative Science Quarterly*, *50*(2), 167-199.

Ceccagnoli, M. (2009). Appropriability, preemption, and firm performance. *Strategic Management Journal*, *30*(1), 81-98.

Chen, E. L., Katila, R., McDonald, R., & Eisenhardt, K. M. (2010). Life in the fast lane: Origins of competitive interaction in new vs. established markets. *Strategic Management Journal*, *31*(13), 1527-1547.

Christenson, C. (1997). The innovator's dilemma. *Harvard Business School Press, Cambridge, Mass.*

Cohen, W. M., Nelson, R. R., & Walsh, J. P. (2000). *Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not)* (No. w7552). National Bureau of Economic Research.

Colombo, M. G., & Shafi, K. (2016). Swimming with sharks in Europe: When are they dangerous and what can new ventures do to defend themselves?. *Strategic Management Journal, 37*(11), 2307-2322.

Costas, J., & Grey, C. (2014). Bringing secrecy into the open: Towards a theorization of the social processes of organizational secrecy. *Organization Studies*, *35*(10), 1423-1447.

Dechenaux, E., Goldfarb, B., Shane, S., & Thursby, M. (2008). Appropriability and commercialization: Evidence from MIT inventions. *Management Science*, *54*(5), 893-906.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Mill Valley, CA: Sociology Press. （後藤隆・大出春江・水野節夫訳『データ対話型理論の発見　調査からいかに理論を生み出すか』新曜社，1996）

Graebner, M. E. (2009). Caveat venditor: Trust asymmetries in acquisitions of entrepreneurial firms. *Academy of Management Journal, 52*(3), 435-472.

Graebner, M. E., & Eisenhardt, K. M. (2004). The seller's side of the story: Acquisition as courtship and governance as syndicate in entrepreneurial firms. *Administrative Science Quarterly, 49*(3), 366-403.

Graebner, M. E., Eisenhardt, K. M., & Roundy, P. T. (2010). Success and failure in technology acquisitions: Lessons for buyers and sellers. *Academy of management perspectives*, *24*(3), 73-92.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American journal of sociology*, *91*(3), 481-510.

Grigoriou, K., & Rothaermel, F. T. (2017). Organizing for knowledge generation: Internal knowledge networks and the contingent effect of external knowledge sourcing. *Strategic Management Journal, 38*(2), 395-414.

Gulati, R., & Singh, H. (1998). The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly*, 781-814.

Hallen, B. L., Katila, R., & Rosenberger, J. D. (2014). How do social defenses work? A resource-dependence lens on technology ventures, venture capital investors, and corporate relationships. *Academy of Management Journal, 57*(4), 1078-1101.

Huang, P., Ceccagnoli, M., Forman, C., & Wu, D. J. (2013). Appropriability mechanisms and the platform partnership decision: Evidence from enterprise software. *Management Science*, *59*(1), 102-121.

Katila, R., Rosenberger, J. D., & Eisenhardt, K. M. (2008). Swimming with sharks: Technology ventures, defense mechanisms and corporate relationships. *Administrative Science Quarterly, 53*(2), 295-332.

Kelle, U. (2007). " Emergence" vs." forcing" of empirical data? A crucial problem of" grounded theory" reconsidered. *Historical Social Research/Historische Sozialforschung. Supplement*, 133-156.

Kracauer, S. (1952). The challenge of qualitative content analysis. *Public opinion quarterly*, 631-642.

Kuckartz, A. M., & Kuckartz, U. (2002). *Qualitative text analysis with MAXQDA.*

Kuckartz, U. (2014). *Qualitative text analysis: A guide to methods, practice and using software.* Sage.

Kuckartz, U., & 佐藤郁哉. (2018). 『質的テキスト分析法』. 佐藤郁哉訳, 新曜社.

Laursen, K., & Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic management journal, 27*(2), 131-150.

Levin, R. C., Klevorick, A. K., Nelson, R. R., Winter, S. G., Gilbert, R., & Griliches, Z. (1987). Appropriating the returns from industrial research and development. *Brookings papers on economic activity*, *1987*(3), 783-831.

Laursen, K., & Salter, A. J. (2014). The paradox of openness: Appropriability, external search and collaboration. *Research policy*, *43*(5), 867-878.

Miozzo, M., Desyllas, P., Lee, H. F., & Miles, I. (2016). Innovation collaboration and appropriability by knowledge-intensive business services firms. *Research Policy*, *45*(7), 1337-1351.

Ozcan, P., & Eisenhardt, K. M. (2009). Origin of alliance portfolios: Entrepreneurs, network strategies, and firm performance. *Academy of management journal*, *52*(2), 246-279.

Pahnke, E. C., Katila, R., & Eisenhardt, K. M. (2015). Who takes you to the dance? How partners' institutional logics influence innovation in young firms. *Administrative Science Quarterly*, *60*(4), 596-633.

Park, H. D., & Steensma, H. K. (2012). When does corporate venture capital add value for new ventures?. *Strategic Management Journal*, *33*(1), 1-22.

Paruchuri, S., & Awate, S. (2017). Organizational knowledge networks and local search: The role of intra-organizational inventor networks. *Strategic Management Journal, 38*(3), 657-675.

Penrose, E. (1959). The Theory of the Growth of the Firm, New York: John Wiley and Sons.

Pfeffer, J., & Gerald, R. (1978). Salancik. 1978. The external control of organizations: A resource dependence perspective.

Pinkse, J., & Groot, K. (2015). Sustainable entrepreneurship and corporate political activity: Overcoming market barriers in the clean energy sector. *Entrepreneurship Theory and Practice*, *39*(3), 633-654.

Reuer, J. J., & Tong, T. W. (2010). Discovering valuable growth opportunities: An analysis of equity alliances with IPO firms. *Organization Science, 21*(1), 202-215.

Riepe, J., & Veer, T. H. (2018, July). Social defenses and selective revealing of ventures in Europe and Latin America. In *Academy of Management Proceedings* (Vol. 2018, No. 1, p. 13999). Briarcliff Manor, NY 10510: Academy of Management.

Ring, P. S., & Van de Ven, A. H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review*, *19*(1), 90-118.

Santos, F. M., & Eisenhardt, K. M. (2009). Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields. *Academy of Management Journal*, *52*(4), 643-671.

Siegel, R., Siegel, E., & MacMillan, I. C. (1988). Corporate venture capitalists: Autonomy, obstacles, and performance. *Journal of Business Venturing, 3*(3), 233-247.

Schumpeter, J. A. (1950). *Capitalism, Socialism, and Democracy 3rd Ed*. New York, Harper & Brothers.

Stinchcombe, A. L. (1965). Organizations and social structure. *Handbook of organizations*, *44*(2), 142-193.

Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge university press.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques*. Thousand Oaks, CA: Sage publications.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *The Transfer and Licensing of Know-How and Intellectual Property: Understanding the Multinational Enterprise in the Modern World*, *15*, 67-88.

Villanueva, J., Van de Ven, A. H., & Sapienza, H. J. (2012). Resource mobilization in entrepreneurial firms. *Journal of Business Venturing*, *27*(1), 19-30.

Wang, Y., & Rajagopalan, N. (2015). Alliance capabilities: review and research agenda. *Journal of management*, *41*(1), 236-260.

Winter, S. G. (2006). The logic of appropriability: From Schumpeter to Arrow to Teece. *Research Policy*, *35*(8), 1100-1106.

Wry, T., Cobb, J. A., & Aldrich, H. E. (2013). More than a metaphor: Assessing the historical legacy of resource dependence and its contemporary promise as a theory of environmental complexity. *The Academy of Management Annals*, *7*(1), 441-488.

Yang, H., Zheng, Y., & Zhao, X. (2014). Exploration or exploitation? Small firms' alliance strategies with large firms. *Strategic Management Journal*, *35*(1), 146-157.

Yin, R. K. (1994). *Case Study Research: Design and methods (2nd ed.)*. Thousand Oaks, USA: Sage Publications. (近藤公彦訳『ケーススタディの方法(第 2 版) 』千倉書房, 2011).

Yost, M., & Devlin, K. (1993). The state of corporate venturing. *Venture Capital Journal, 33,* 37-40.

Table 1: Conceptualized defense measures and specific actions of entrepreneurs

	Representative quotations
Rules for information disclosure policy	
・ Tighten disclosure content at each stage	"Of course, we have patents, and in the first place we have a clear policy of information disclosure… such as… never reveal 'this' information. (…) There are cases in which we are developing and suspect that large firms are getting our information. In such a case, we can almost eliminate such a firm by insisting to conclude an NDA. Therefore, it is a major premise to conclude an NDA basically for suspicious firms. In addition, we will not disclose as little as possible. After doing that, we collaborate a little as a taster, then continue for about half a year, and, if we can build a trusting relationship with the counterpart, we start collaboration." (CEO 10) "How much information to show before the contract, how much information should be provided as primary data after a non-disclosure agreement, and how much information should be provided at each stage of research. We spend a lot of time deciding these things. Therefore, there is information that is not given even to collaborators. (…) I use the most energy when judging information to be disclosed before signing this non-disclosure agreements" (CEO 22)
・ No disclosure, even to members	"We don't share any really important information with anyone. Even with our internal members. Only few internal members know about the core logic. The counterpart firms repeatedly ask for disclosure, but we refuse and never disclose it." (CEO 10)
・ Partner only upon acceptance of a non-disclosure policy	"We may not be bullish unless we have the ability to negotiate. (…) From the beginning, we consistently stated that we collaborate 'only with' firms that acknowledge our non-disclosure policy. We build a track record and accumulate collaborations results. … And even after that, we tell the counterpart that we don't disclose our information and get it convinced." (CEO 10)

Inverse governance through capital relationship	
• Match interests	"We basically think that it is necessary to let them have stocks and to receive investment when we work closely with the partners. (…) If there are real partnerships, we don't need to doubt the partners. The investors also suffer their own damages if they do something harmful to us. (…) We encourage initial investment when we feel an ongoing collaboration is likely." (CEO 21) "When we have to be careful about information disclosure, the time will come to judge how to collaborate with the partners more closely. We want to break through to survive. Therefore, we offer to receive initial investment when we think the partner is good to work with." (CEO 21)
• Encourage shareholders to check each other.	"It worsens the relationships if I say the same thing by myself. Shareholders agree somehow when they are convinced by other shareholders. I have to … arrange … their power balance … well … Therefore, I spend time talking to stakeholders. (...) 'This topic will appear in the next shareholders meeting, so please play such a role.' I always make such a pre-arrangement." (CEO 1)
Inverse governance through social relationships	
• Clearly indicate well-known mentors or lawyers	"Our firm's website shows the name of our lawyer (laugh) (Q: It means the appeal of 'a well-known lawyer'?) Yes. Yes." (CEO 15) "Outsiders (at the time of financing and alliances) think that our firm would be OK with XX-san. (...) Looking from the outside, many people would see our firm is 'OK' because there is Dr. YY inside. (CEO 19) "After all, there is a scene where the persuasive power changes with or without the doctor (industry authority). It works positively for investors too." (CEO 19) (Q: Do you invite prominent doctors to get your advantage in financing or alliances?) Yes. That's right. We actually have (such a doctor) right now. (CEO 19)
• Trade within a framework between universities	"A small, technology-based firm like us needs to be very vigilant. (...) For example, XX University and YY University have inter-university framework, aren't they? We make a deal under such circumstances. (CEO 18)

Eliminate information asymmetry	
• Examine the products and papers of counterparts	"Beware of the manufacturer, we examine thoroughly what kind of products they have, and what kind of papers they published (before the meeting with large firms concerning collaborations)." (CEO 21) "Decisions in large firms are not made by one person. Therefore, we interview about 10 keymen in the counterpart including head of departments. It is important to know who is in what position and what they usually think about. I also read books and materials about their history since the founding. In addition, we try to know the power balance within their firm. Large firms do not want to 'support' our startups but run their own business. It is important that we first know it therefore." (CEO 40)
• Gather information about movements in partner firms at academic conferences	"Large firms sometimes have projects similar to ours. They do acquire competitors to 'reduce their competitors.' In fact, they do not develop to launch relevant pharmaceutical products after the acquisition in such cases. We have to identify their true intention (behind their alliance proposals). (…) We need to pre-fetch information. Therefore, we participate in academic societies, and that kind of thing ... Though it doesn't come out on the surface as a topic in those academic societies (…) That firm seems to do this kind of things, this firm seemed to do that recently, things like that. Then, we obtain information. (…) The judgement at that time is not always correct. However, unfortunately, we can only judge with the available information at that time." (CEO 18)
• Do not use the standard contract template of the established firms	"(large firms) often use contract templates that state all rights of the collaboration achievements belong to the large firms (laughs). (…) We carefully watch and negotiate to shear rights or share out costs while discussing the common goals of the collaboration we are aiming for. " (Chief of Business Development 16) "In terms of contracts, there are also various conditions regarding the treatment of rights". (Q: favorable conditions for the large firm?) "Yes. Yes, it is." (CEO 15)

	"If you start a deal with a large firm, their contract states that all intellectual property belongs to the large firm. It is a so-called subcontract agreement. We can never do business with such contract." (CFO 38)
• Information sharing in entrepreneur communities	"We hear so many things, such as that startup worked with that large firm and they were told this kind of things." (CFO 5) "We ask VCs for advice as they have that kind of experiences." (CEO 1) "Well, yes, we have (the connection in the entrepreneurial community). (…) (Keep connected to obtain information?) Yes, yes." (CEO 12) "There are communities where we can share a variety of fresh stories, successful stories and failed stories to get informed and defend." (CEO 13) "We regularly exchange information with entrepreneurs. For example, 'I had this experience with this firm. Has anyone had that experience?' (...) Then we can also get another information (to confirm) from their other acquaintances. (…) Such things come out naturally in conversations with them." (CEO 11)
Balanced Coopetition	
• Negotiate with multiple partners	"It's not good to negotiate with just one counterpart. … Basically, choose a counterpart with good conditions while talking and negotiating with multiple firms … just like ... that firm will give us XX, so, how about you?" (CEO 18)
• Do not become overly competitive	"What we are conscious of when we work with a large firm is, … how far, ... we enter the "center" of management issues for large firms, … and we walk together with the large firms by solving the issues together. That is what we think when we select a counterpart and work together. (…) Because I think it will not work well if it is done competitively." (Chief of Business Development 16)
• No joint development	"Large firms say let's apply for a patent together in joint development, but, even if they and we can use the outcome freely, we do not engage in a giant sphere of business, so, after all,,, we cannot get much merit if it is a joint application. It's very good for large firms, as it becomes a patent in their business field, and they can do

	what they could not do before. Therefore, we basically do not accept "joint" R&D." (CEO 15) "When we bring our technology and do joint development together with their technology, (...) they often have the real intention that they want to do it only by themselves if they can do it. (…) Discussion with the engineers is very risky. (...) Honestly, I think that joint development with a large firms is nearly a castle in the air in the present circumstances." (CEO 21)
・ Choose a partner with higher interdependence	"It is beneficial for us to partner with someone with different technological strength. (...) [we can say] 'we do it because we are good at. So, you do that' (…) We do many collaborations in that way." (CEO 10) "We always ask (large firms) to tell us what they are really having trouble with. It's not enough to 'hope' to do. It would be very troublesome without this, definitely want to do this, but they can't do this with their own technology." (CEO 41) "Even if we challenge to set about collaborating with various large firms, nothing happens in some cases, progress to some extent and stop in other cases. (…) It does not proceed unless it is good for each other." (CEO 16) "Though in the same industry, what they do is different from us. So, we can partner with them. The technology is different. They are strong in XX, do XX in a special way. We do straightforward. XX and YY, similar but different." (CEO 7)
Agile implementation of ideas	
・ Uneven distribution of the knowledge about how to carry out an idea	"I think it doesn't matter if they steal only the idea. It doesn't matter if it could be replaced by just an idea. The really important point is why this mechanism is put in until this system or product is built up. And I don't disclose it." (CEO 10) "We don't disclose the very core or the source code itself, of course. Then, we are not afraid because it is difficult to create (products) without fairly advanced engineering and technical skills. (…) We constantly improve and change while operating the products. This kind of accumulated know-how cannot be disclosed. Therefore, we think important parts can be black boxed". (CEO 10)

	"Know-how and relevant knowledge accumulate while doing. It's more important to apply those knowledges and execute immediately in our business. (CEO 4)
・ Confidence in the agility to commercialize	"How fast you can do hypothesis testing, the power to actually move is more valuable. In the end, it would be meaningless if there was no such person. There is a lot of similar information everywhere." (CEO 4) "Well, we're startups anyway. We do whatever unless it is illegal (laugh). (...) I think it will take a year or two for a large firm to do the same." (CEO 24) "If people at large firms work with us, they will notice that they can't do it the same way as we do. Because they and we have different style. If they work with us, they will probably understand why we can do this quickly. So, we are not worried about being eaten by 'sharks." (CEO 10)