Co-Creation or Co-Opetition? A Case Study of a Deep-Tech Venture and Its Corporate Venture Investors

Tsung-Hsien Han and Huan-Wei Liang

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CO-CREATION OR CO-OPETITION? A CASE STUDY OF A DEEP-TECH VENTURE AND ITS CORPORATE VENTURE INVESTORS

TSUNG-HSIEN HAN
The Graduate Institute of Technology, Innovation & Intellectual Property Management,
National Chengchi University, Taipei, Taiwan (R.O.C.)
104364501@nccu.edu.tw

HUAN-WEI LIANG
The Graduate Institute of Technology, Innovation & Intellectual Property Management,
National Chengchi University, Taipei, Taiwan (R.O.C.)
104364503@nccu.edu.tw

ABSTRACT

There are plenty of researches focused on the value created and captured by corporate investors, however, the dynamics of value creation and value capture between investee and its corporate venture investors is yet to be well discussed in this context. To fill the research gap, the action research in this study investigates how a start-up enables the complementary assets from its corporate venture investors to enhance its core competitiveness and reduce the barriers of commercialization. The contribution of this exploratory study on theoretical perspective is to investigate the co-creation and co-opetition dynamics by developing a social physics approach. On the implications for practice, the research findings can provide a common assessment practice which shall be applicable for start-ups with radical innovation, corporate venture investors and policy makers.

Key words: corporate venture capital; co-creation; co-opetition; complementary asset; field theory

INTRODUCTION

In general, there are two primary types of venture capital, including independent venture capital (hereinafter "IVC") and corporate venture capital (hereinafter "CVC"). For entrepreneurial firms, the presence of CVC may provide a suitable channel to access their corporate parents' unique knowledge, networking and technology. The joint development of specialized and/or co-specialized complementary assets which are essential to the continued growth and success of the company is a co-creation connection. However, the relationship in CVC investments can be far more enriched particularly when the focal firm has more than one CVC investors. This is attributable to the potential conflict of interest among CVC investors either attributed to the homogeneity of complementary assets they can provide, or the conflict of corporate interests among the CVC investors.

The coexistence of competition and cooperation has been coined as a neologism named co-opetition in management literature. The dynamic interplay between co-creation and co-operation intertwined might generate tensions when the investors have the dual role of both customers and business peers. However, the interplay has yet to be systematically examined in previous studies. This paper attempts to explore insights from the perspective of complementary resources by evaluating a new entrant in the position of the material upstream of industries which is funded mainly from CVC investors. The primary objective of this paper is to take a holistic view on how co-creation (value creating process between the focal firm and its CVC investors) improves and further increases the competitiveness of the focal firm, and in the meantime, how co-opetition (the dynamics between value creation and value capture) might evolve over time in stakeholder relationships. Finally, this paper proposed a method using social physics approach to analyse the decision-making mechanisms when maximizing the best interests of the focal firm.

LITERATURE REIVEW

Co-creation and co-opetition among CVCs and entrepreneurial ventures

CVC refers to the form of investment by corporate funds of incumbent firms in independent entrepreneurial ventures (Dushnitsky and Lenox, 2005). It can be defined as "the systematic practice by established corporations of making equity investments in entrepreneurial ventures" (Drover, Busenitz, Matusik, Townsend, Anglin and Dushnitsky, 2017). Usually CVC investors focus on strategic objectives investing in long-term value, early stage and extension of their main business in entrepreneurial ventures by providing capital, complementary assets, industry knowledge, and channel to customers and innovation strategies advices for their parent firms (Drover et al., 2017). An investment alliance formed by CVC investors is one kind of inter-organizational relationships which is feasible to co-create supernormal benefits and value.

In the interplay of mulit-CVC networks, co-creation is a fundamental building block of the relationships between CVCs and the focal firm. When a start-up has more than one CVC investors, the company can build the relationships to co-create value by forming strategic alliances, joint ventures, buyer–supplier agreements, licensing, co-branding, networks, trade associations, and consortia etc. The co-creation process is explicitly when CVC's corporate parents are also one of the customers of the focal firm, or vice versa (Chemmanur, Loutskina and Tian, 2014). The core concept of value co-creation in the relationships is to drive co-exploration ("cooperative relationship to create new knowledge, tasks, functions, or activities") and co-exploitation ("cooperative relationship to execute existing knowledge, tasks, functions, or activities") for achieving the most efficient governance form in various possible ways by leveraging specific investment, complementary assets, unique resources and incentive alignment (Parmigiani and Rivera-Santos, 2011). It is "a function of interaction" (Grönroos and Voima, 2013) and "as joint activities by parties involved in direct interactions, aiming at contributing to the value that emerges for one or both (or all involved) parties" (Grönroos, 2012).

Another fundamental building block of the relationships among CVCs and their investee is co-opetition. Co-opetition represents firms involving cooperation and competition simultaneously under the value co-creation intent (Brandenburger and Nalebuff, 1996; Gnyawali, He and Madhavan, 2006). When a firm is at fledgling stage, it may accommodate and enable both value co-creation and value capture simultaneously to spur the successful virtuous circle (Niesten and Stefan, 2019), in the CVC investment relationship. However, the existing of multi-actors in the investment alliance would inevitably spark off complicated interaction, communication and relationship that may rise the opportunistic behaviours (Anand and Galetovic, 2000). If particular CVC investors occupy centrality position in the CVC network, they may profit more innovativeness and financial return (Baierl, Anokhin and Grichnik, 2016), which indicates that when creating and capturing values in co-opetition situations, the conflict of interest in the investment alliance built by CVCs and the investee is possible to escalate into tension (Parmigiani and Rivera-Santos, 2011). When CVC investors raise conflicts with IVC, they may wilfully ignore the financial goals of investees and other investors in the syndicate (Bertoni, Colombo and Grilli, 2013). However, there are still few literatures discussing inter-organizational co-opetition in CVC context, not to mention the discussinion on co-opetition in the scenario of intra-organizational relationships. It suggests that scholars shed more light on the study of co-opetitive CVC networks (Baierl et al., 2016) which aligns to the goal of this paper to fill the research gap by using a qualitative approach.

Relationship Efficient Force (REF)

As explained in the previous paragraph, the nature of co-creation is to create more value from the interaction (Grönroos, 2012; Grönroos and Voima, 2013). However, in co-opetition scenario, the relationship might not be so straightforward and often involve in certain level of tensions resulted from the conflicts of value capture. When the two structures co-exist in the same arena, there is a need to develop a comprehensive method to normalize the effectiveness of the factors related to them in a decision-making process.

To analyse the relevance, a model widely used in psychology named field theory brings new inspiration to conceptualize the complicated relationships among the players. Field theory, also known as topological psychology, is a famous theory within the organization change proposed by Kurt Lewin, one of the leading psychologists who developed the theory in the 1950s. He argued that by constructing a "life space" comprising the psychological forces influencing their behaviour is possible to understand, predict and provide the behaviour of individuals and groups (Back, 1992; Diamond, 1992). In the theory, tension also occurs from the interaction of individual's motivation and social situation/environment which is reified as a force; when more than one force interacts with each other, they will create a field. The method seems to provide a workable model as a way of examining and explaining the dynamics. In this study, we propose a framework named as Relationship Efficient Force (hereinafter "REF") to determine the factors to make a change in a decision-making process. Through REF framework, the it can help researchers to make the complicated dynamics simple for gaining insight into relationship correlate of interactive behaviour.

RESEARCH CONTEXT AND METHODS

Case study company - An Eta (η) investment alliance

The focal firm in this case study is a nanotechnology start-up (referring to as "Eta" in this study). Eta has a radical innovation on chemical formulation to provide a material which can form a high purity, ultra-thin metal film with high electrical conductivity by using a brand-new technical approach. Because the film is characterized by excellent material properties, it can radically reduce the demand and consumption of the material which generally implies that the bill of materials (BOM) can be significantly reduced. In a sense, it is taken as a dream material that can replace certain conductive materials in the market easily, including display, plating, wearable devices, as well as variety of consumer devices. However, Eta faces an uphill battle severely for two reasons: First, Eta's market position is in the upstream of the supply chain, therefore, it needs other complementary assets to commercialize the radical innovation. Second, most of Eta's competitors are world's leading chemical companies with abundant resources to compete with. Therefore, Eta needs to leverage resource from other partners, including the investors of the company.

Eta has introduced four significant CVC investors after the recent capital increase. Those CVC investors' corporate parents are well-reputed, internationally in their respective areas of specialization, including one world leading company specialized in chemical synthesis (CVC-A), two leading equipment solution providers (CVC-B and C), and one research organization (CVC-D). They jointly invested in Eta in the same investment round because they are impressed with the radical innovation developed by Eta and eager to develop strategic partnership relations with the company not only aim at maximizing their financial return but also the collaborations with their main businesses. From the perspective of strategic management, the co-creation relationships are independently built. The interactions between Eta and its CVC investors thus provide the basis for mutually advantageous conditions.

Table 1:The co-creation dyad relationships between Eta and its CVC investors' corporate parents

VC	VC Type	Industry	CVC parents' role	Benefit to CVC parents' business
A	CVC	Chemical synthesis	a. Provide raw materials b. Global networking	a. Sale of raw materials b. Sale of end products
B	CVC	Machinery & material manufacturing	a. Co-develop equipment for coating b. Scale-up manufacturing c. Global networking	a. Sale of equipment b. Material manufacturing c. Sale of end products
C	CVC	Machinery	a. Co-develop equipment for coating b. Global networking	a. Sale of equipment b. Sale of end products
D	Semi-CVC	Research organization	a. Develop new applications b. Supply-chain networking	Royalty from licensing intellectual property

The paradoxical tension escalating from value capture

Comparing to the harmonious relationship between Eta and its CVC investors, the relationships among CVCs are relatively tangled and complicated: in most cases, they work with Eta on a one-to-one basis because the projects with different CVCs consist of a variety of technologies and do not have dependencies on each other. Take for example, even though both CVC-B and CVC-C have expertise to handle and develop equipment specified for Eta, the operational use of equipment is totally different. In that sense, the cooperation among CVC investors is infrequent.

Even though all the CVC investors do not carry on the business of dealers or agents, they are easier access to Eta's potential customers because they have built extensive networks and the brand effect from their reputation in the markets. Therefore, they do not rule out the possibility to sale the conductive materials developed by Eta. It is inevitable that the shape of the competitive landscape will be subtly changed when more than one CVC investors intent to participate in the sale of Eta's end products. In order to sell Eta's products, therefore it is inevitable to generate tensions resulted from the conflicts of value capture.

The Interplay between Co-creation and Co-opetition

At this stage, Eta is in the process of building up sales channels. However, because the company is still at fledgling stage, the established sales channels sometimes cannot reach target customer effectively, for which motivates Eta to make a change to enhance the effective use of sales channels. There are two possible reasons for making the change: First, without extra bandwidth and resource, it is not an easy job to build an extensive in-house sales network and solid business foundations when a start-up is at fledgling stage. Second, for start-ups like Eta at this stage, it is less visible to the authorized agents comparing to their portfolio companies which means Eta might be regarded as a relatively unimportant customer. Therefore, it is a reasonable judgement to hand over the marketing rights to other parties who are more capable of boosting the sale of the products.

When Eta was standing at a crossroad to decide how to reach target customer more efficient, there are several alternatives in the matter, including maintain the status quo (direct sales) and strengthen the company's marketing and technical service ability, transfer the distribution right to authorised agents at zonal, regional, or global levels, or undertake to sell the products through the corporate parents of its CVCs. After long deliberation, Eta put forward some concluding thoughts concerning in the recent board meeting which tends to work with its CVC investors to explore more business opportunities. The primary consideration for making the decision is that Eta has doubts about the risk of knowledge spilling over to other competitors who have related domain knowledge and expertise on making the materials by using the same or similar chemical approach. The decision seems to have the best of both worlds: building sales networking with less financial burden and protecting technology know-how with lower risk of knowledge spill over.

After announcing the information, it has raised the awareness of CVC investors to capturing the business opportunity from selling Eta's products. Some early signs showed the possibility to escalate into tension from acquiring the opportunity when the decision-making point is approaching. It anticipates that the relationships among CVC investors are far more tangled and complicated when the dynamics evolve over time.

Data collection and analysis

This study adopted action research approach (Lewin, 1946). Action research provides an approach for scholar and practitioner engaging in the practices and researches to learn and change the activities through intervention and reflection (Eden and Huxham, 1996; van de Ven, 2007). Thus, action research is suitable method to explore (and fill) gaps (Smith and Sharicz, 2011) and collect field data to develop constructive knowledge (Goldkuhl, 2012).

The first author in this study is the representative appointed by CVC-D to participate in the investment alliance. He explicates the process, activities and changes of investment alliance, and integrates data and observation in document. The second author is responsible for analysing the data by different theoretical lens, asking questions, and keep as an outsider objectively. The two authors discuss the initial coding data and extract the insights emerging from the dynamics.

FINDINGS AND DISCUSSIONS

To gain insight into the Interplay between co-creation and co-opetition and its causes, this exploratory study makes a further in-depth investigation on the co-creation and value capture paradox from inter-organizational relationship dynamics in the next section.

Inter- and intra-organizational co-creation and value capture paradox

In the inter-organizational level relationships (the relationships among CVC investors), prima facie, the co-creation relationships seem to be the collaborations between CVCs' corporate parents and their investee. However, going beyond simply the value creation of the both sides, the process also involve the shaping of the bargaining power of the CVC investors. The argument arises from the fact that through the co-creation process, either specialized complementary assets such as specially trained scientists or engineers from the CVC corporate parents, or co-specialized complementary assets such as tailor-made manufacturing equipment which is co-developing by the focal firm and the CVC corporate parent, have to different extents invested in the related projects. Therefore, if any one or more of the CVC investors who hold projects which are involved in specialized or co-specialized assets for Eta, the investments for the co-creation process then further strengthen the bargaining power of the CVCs as a result.

The analogous situation also happened in the intra-organizational level relationships (the relationships between the focal firm and its CVC investors). Even though it comes natural to CVC investors to help Eta, it is possible to anticipate that the relationships might gradually transformed from co-creation to co-opetition. Take for example, when Eta grows to a certain stage, it might consider taking back the sales channels to maximize the benefit of the company either when Eta has built up longer business track record and is able to rebuild sales channel by itself, or the collaborations with CVC investors to access complementary assets from the strategic alliance (Teece, 2006) has come to an end temporarily, which leads to enhance Eta's negotiation capacity. Therefore, the transformation of sales channels to Eta's CVC corporate parents, for instance, might not unshakeable when Eta becomes a full-fledged company. The insight from the dynamics of Inter- and intra-organizational co-creation and value capture paradox will be discussed in the following sections.

Method for the Investigation of the paradox – A force field approach

In this case, we observed that the inter- and intra-organizational co-creation and co-opetition are highly sophisticated and dynamic relationships in the same arena. However, for the common benefit of the stakeholders, the competitions in a CVC investment alliance are not a contest to fight to the death. This would mean the relationships among the stakeholders are a balance of cooperation and competition. Moreover, the balance may change over time by the strength of the bargaining power among stakeholders. In that context, there is a need to further explore the important factors to the decision making which could cause the change of power balance.

To explain and further conceptualized the findings in this study, the following sections aim to provide an analysis of the relationships from a broader perspective and attempt to propose a new theoretical framework by using a social physics approach. In the force field analysis model, it indicates that any current state of being is the result of a combination of two forces, including driving force (the force which supports the change) and restraining force (the force which opposes the change) at work. When driving and restraining forces have maintained a balance, it is named as equilibrium in the theory. If the sum of those driving forces is larger than the sum of those restraining forces, then the equilibrium will be changed; conversely, if the sum of those driving forces is smaller than those restraining forces, then the equilibrium will maintain the status quo. Therefore, to implement the change, it requires increasing those driving forces, or decrease those restrain forces. However, a subtle difference in this study is that the equilibrium is all working hypotheses (Hilborn and Mangel, 1997), or named as "Equilibrium Hypothesis", which are provisionally accepted hypotheses proposed for making inferences. All the forces and their scores in the practices are given by the action researcher and his team in the research.

Illustration of the Relationship Efficient Force (REF) Perspective

In this study, the status quo of the focal firm's sales strategy is to sell products and services directly to customers. Following the model proposed by force field theory, before entering the REF analysis process, it needs to identify two types of forces, including driving forces and restraining forces, working to keep the equilibrium or status quo.

In the first scenario, the equilibrium hypothesis is to sell products and provide services directly to customers by the focal firm (Figure 1). The driving forces to move beyond the status quo are the forces such as the improvement of poor efficiency, the absence of resource (including capital, human resource to build an in-house team, etc.), and the lack of territorial access to new customers gave momentum; on the other hand, the forces such as the payment of high commission fee, the concern of layoffs of current sales team, or task flow change can be considered restraining forces. As a next step, the focal firm then requires rating those forces based on the importance and significance related to the equilibrium hypothesis. Take for example, the absence of resource can be problematic to start-ups when exploring new business opportunities, therefore, it received a rating of 9, implying that the force is defined as a strong force to make a change. Another vexing problem on the same side is how to improve the efficiency of the sales channels, then the big headache to the focal firm received a rating of 8 in this scenario. On the contrary, the three restraining forces on the right side of the equilibrium hypothesis received a rating of three or below, implying that all the factors are remote and unimportant to the focal firms. The overall rating of each side is based on the total number of rating. In this scenario, the total rating of the driving forces is twenty-three and the total rating of the restraining forces is six, which indicates that the equilibrium hypothesis is falsified, and the change would have been advantageous to the focal firm.

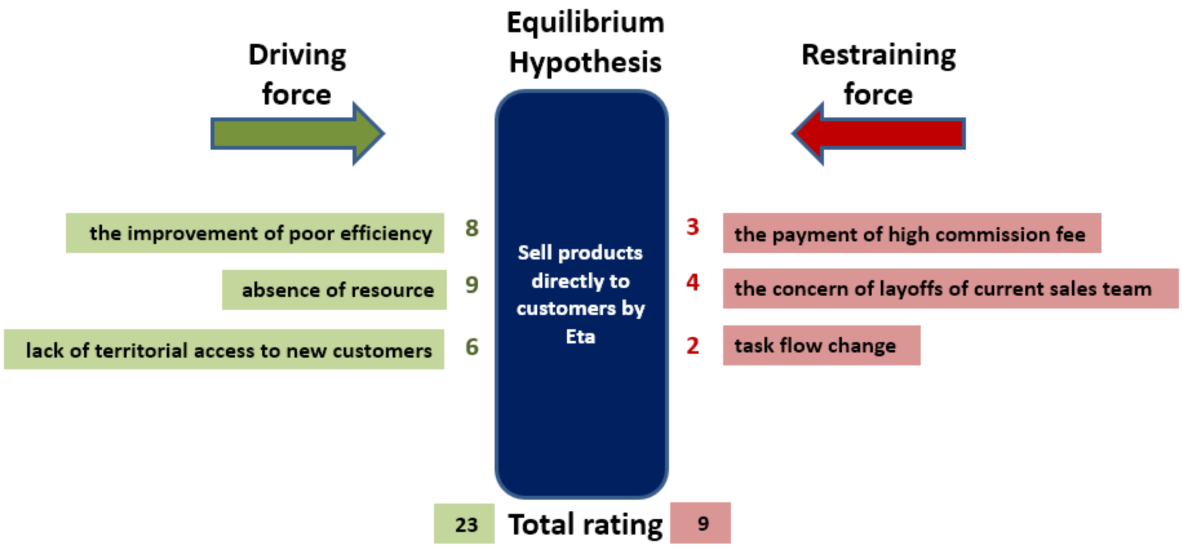

Figure 1: The force field analysis to determine the forces that are for and against change

By using the same method, in the decision-making process, the next question in the first scenario is then arises as to whom Eta should collaborate with to explore new business opportunities. Here we cite examples for explaining two different sub-scenarios to map out the countermeasures after studying their feasibility. The first sub-scenario is to make the change by transferring the distribution right to one or more than one sales agent (Figure 2a). In the scenario, there are two new-added restraining forces which might make the implementation of change much more difficult, including the fear to leak out know-how and less visible to the authorized agents. In this sub-scenario, the fear to leak out know-how received high rating because it is essential to the survival of knowledge-based start-ups which mainly protected their innovation by using know-how. Combining with another new-added factor with high rating, the total rating of the restraining forces is higher than the total rating for driving forces, which indicates the decision was taken to maintain the status quo.

The observation seems to be a reasonable judgement to the focal firm because: First, it is no doubt that the fear to leak out know-how considered here is extremely important especially to a radical innovation in the nature of a trade secret ; Second, it is a common problem that sales agents might tend to spend more resource to serve major customers instead of a start-up company with less visibility. Therefore, those two forces will help the equilibrium to maintain the status quo.

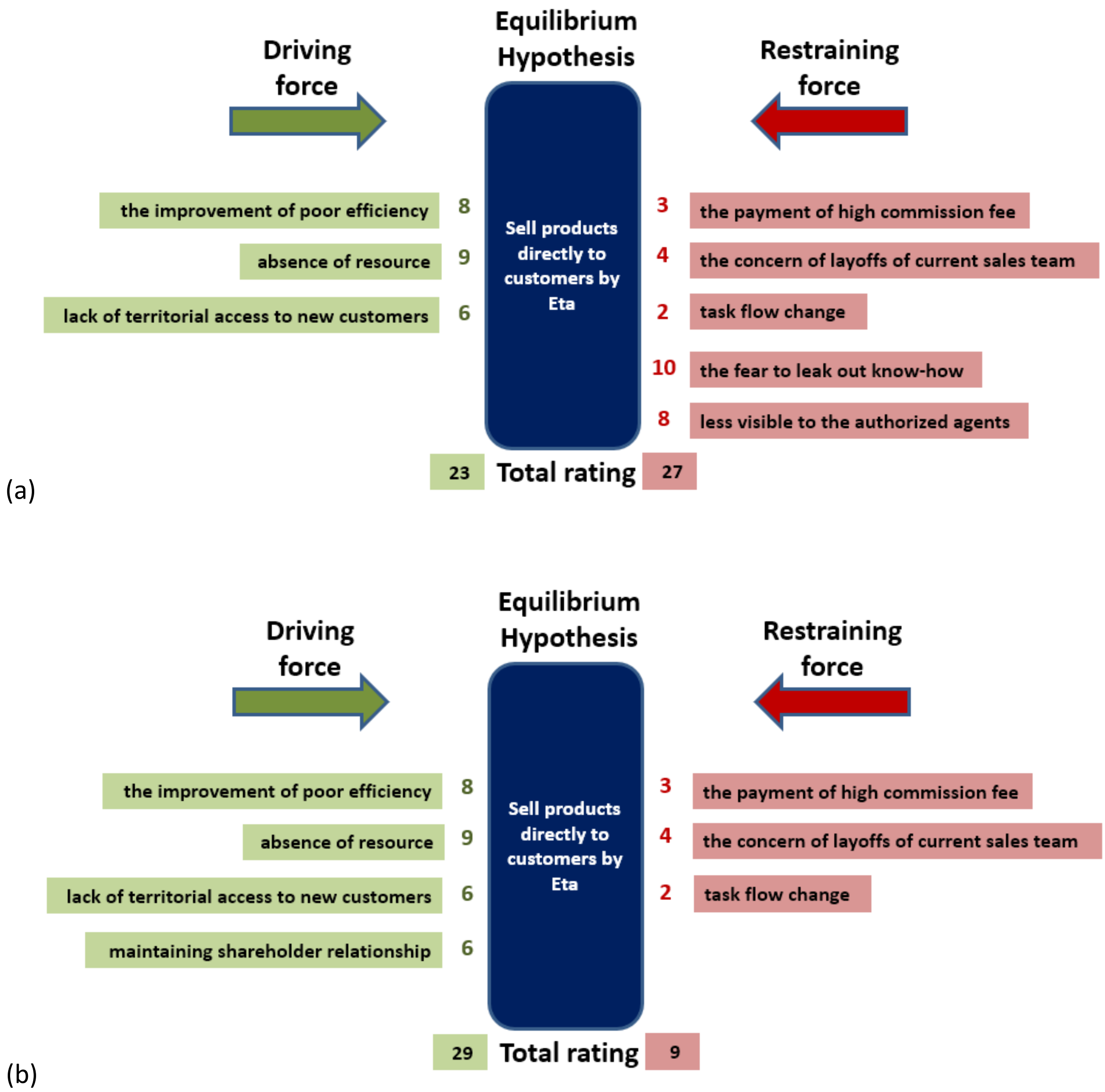

Figure 2: The force field analysis of the two sub-scenarios: (a) transferring the distribution right to external sales agents, (b) working with CVC investors

The second sub-scenario in this case is to transfer the distribution right to one or more than one CVC investors (Figure 2b). In the sub-scenario, the two restraining forces (the fear to leak out know-how and less visible to the authorized agents) are no longer there because to promote the focal firm's products through its CVC investors reflect a common interest among the stakeholders, which indicate the two restraining forces are no longer the motional factors to the CVC investors. Instead, there is one new-added factor which is to maintain shareholder relationship in the driving force side. After removing the two restraining forces and adding one driving force, the new dynamics then produces a different result which is the pro for working with CVC investors. The inference seems to suggest that to sale products through CVC investors' channels is the best scheme for the focal firm at this moment. Consequently, the following propositions are proposed:

> **Proposition 1:** Cooperating with external partners to some extent through a reliable channel such as CVC investors is a risk mitigation approach to pursue the common interests of both shareholders and the focal firm.

The second equilibrium hypothesis in this study is to sell products to customers through CVC's corporate parents (Figure 3). Following a similar procedure, the co-creation and co-opetition dynamics of inter- and intra-organizational relationships among CVC investors can also be analysing to facilitate clearer awareness of the insight of the process. In the intra-organizational relationships, someday in future, when Eta smoothly expands business to certain significant scale, the driving forces and the restraining forces might change. Take for example, the substantial improvement of the company's management features would lead to much higher efficiency, lower the feel of anxious on the lack of resource and the access to new customers, which will weaken the restraining forces so as to change the status quo. To further analysis on the driving force side, when the revenue size has been growing exponentially, this would mean that the expenditure of commission fee will increase accordingly and becomes a major issue to Eta. Furthermore, once the product design stabilizes, the main focus will shift from product innovation to process innovation (Teece, 1986), which might indicate the bargaining power of CVC investors gradually becomes weaker as time passes so that the maintenance of the relationships with the CVC investors is relatively less important. From the focal firm perspective, the combination of weaker restraining forces and stronger driving forces would lead to a rethinking of the equilibrium which will enable the company to perform more efficient. In that sense, the relationships between the focal firm and its CVCs might turn from co-creation to a certain level of competition, or coopetition, which is the combination of cooperation and competition.

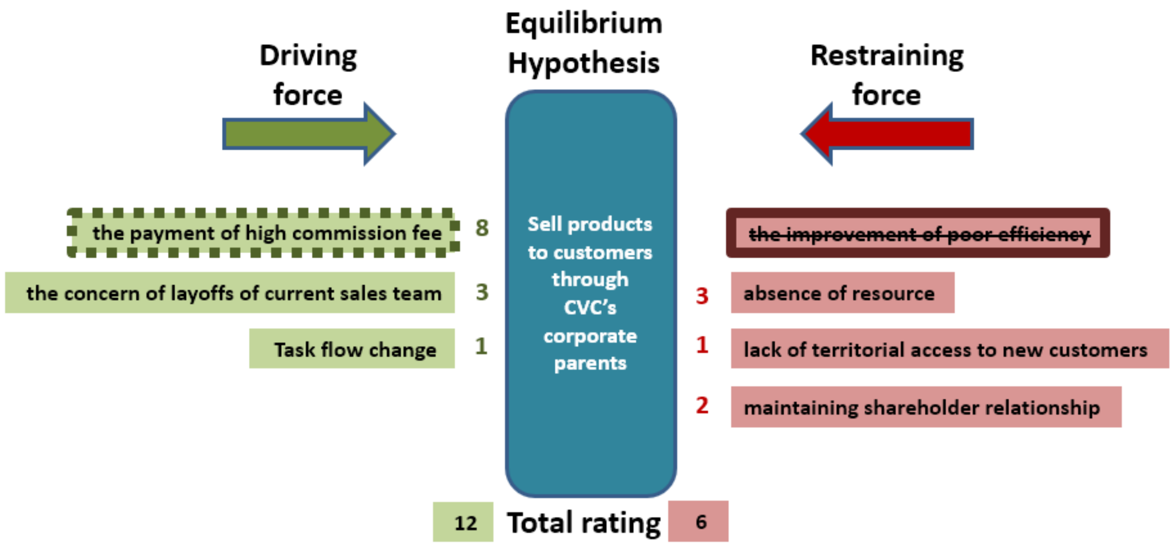

Figure 3: The intra-organizational relationships analysis on taking back the distribution right from the CVC's corporate parents

The inference in this scenario also shares a similar view about the changing role of customers to competitors in one of the widely cited paper on coopetition studies (Prahalad and Ramaswamy, 2000). In the paper, the authors pointed out that when customers become more knowledgeable and recognize, it will result in the increase of bargaining power to negotiate. A similar situation might happen in the relationship between the focal firm and its CVC investors: when a company is at fledgling stage, it tends to work with the partners who are able to provide resources to assist the growth of the company; however, when a company is at full-fledged stage, it tends to create value via activities controlled by the focal firm. Although the decision-making process may seem a trivial issue to a company's operation, the observation enlightened the exploration of the boundary between customer-centric view and company-centric view proposed by C.K. Prahalad and Venkatram Ramaswamy in 2002. In the theory, there are two views on the co-creation of valuable experiences with consumers, including the consumer-centric view and the company-centric view. In the consumer-centric view, the consumer is an integral part of the system for value creation and is able to influence value generation, which indicates the consumer can compete with companies for value extraction; there are multiple points of value exchange in the view where the consumer and the company can co-create value; in the company-centric view, the consumer is outside the domain of the value chain and has weak influence to value generation, which indicates value is created in a series of activities controlled by the enterprise before the point of purchase, and there is a single point of value exchange which is to extracting profit from customers (Prahalad and Ramaswamy, 2002).

By expanding the theory to this case, the dynamics between transferring the distribution right to CVC investors and taking back the right from the CVC investors seems to fit to the scenario proposed in the model: when the CVC investors turns the focal firm into a stronger company, their influence to value creation become decreasingly important, and the points of value exchange gradually decrease and might theoretically remain two points of value exchange, including extracting profit from purchasing the focal firm's products, and the financial return from the investment. The insights of the observation can be summarized and proposed as the following propositions:

> **Proposition 2a:** Customer-centric view and company-centric view are the two sides of the same coin from the best interest of a company. Which side of view a start-up might take shall be determine by the bargaining power of the company.
>
> **Proposition 2b:** When a company is still at fledgling stage, it would be more prudent to adopt the customer-centric view for seeking resources from outside; on the contrary; when scaling up to a certain stage, then to adopt the company-centric view might be able to maximize the best interest of the company.
>
> **Proposition 2c:** In a CVC investment case, the point of value exchange will decrease when the dynamics lean to company-centric view. In the extreme conditions, there are two points of value exchange shall remain in the co-creation relationship, which are the purchase of products and the financial return from capital investment.

The last scenario discussed in this study related to the inter-organizational relationship among CVC investors when they compete for the distribution right. Here we propose a working hypothesis for that Eta considers changing the exclusivity of the distribution right from a single CVC's corporate parent to multi- sales channels provided by more than one CVCs' corporate parents (Figure 4). In the scenario, some driving forces proposed in the previous scenario, including the improvement of poor efficiency, lack of resource, the payment of high commission fee, and the concern of layoffs of current team were removed because they are no longer significant factors in this scenario. Instead, a new driving force which is the factor that multi-contacts might complicate task flow with low score, as well as two restraining forces including single channel risk mitigation and maintaining shareholders' harmony with high rating, were new added in this scenario. The reason to give relatively higher rating to maintain a harmonious board of the director's relationship is because in most cases they are related to each other in many aspects other than the relationships in the investment alliance. Take for examples, those CVC investors might refer other investment opportunities to each other and jointly invest in other investment cases, or their corporate parents are business partners cooperated in other areas. Therefore, to maintain a harmonious board of the director's relationship is highly important and beneficial matter to the CVC investors when the inter-organizational relationships need to be considered as a whole and in most cases to act in good faith to refrain from undertaking irrational actions.

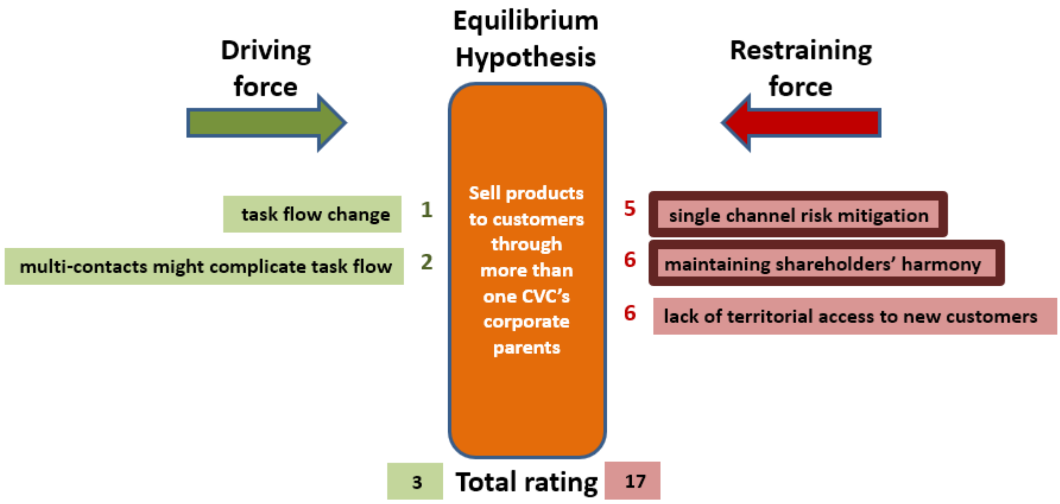

Figure 4: The inter-organizational relationships analysis on carving up the distribution right

It is worth noting that in the inter-organizational relationships on carving up the distribution right, the two new factors which get relatively high score can be explained from the perspective of efficiency of resource allocation. This is because the CVC investors are from different industries, or some part of the business are in the same field (e.g., the corporate parents of CVC-B and CVC-C in machinery industry) but developing different technologies. It makes sense that to maintain more than one sales channel made up of a variety of "channel portfolio" from geographical, industrial, or knowledge complementation perspectives might able to maximize the benefits of channel diversification. The partnerships might be able to become more indispensable to increase their respective market share based on the shared goals. The insights of the observation on the inter-organization relationship can be illustrated and proposed as the following proposition:

> **Proposition 3a:** The co-opetition among CVC investors needs to consider both infield (the interactions inside the arena) and outfield (the interactions outside the area) factors for maximizing the value of the inter-organizational relationships.

Proposition 3b: To maximize the best interest of the company and prevent the source of tension, a company requires to consider the diversification of CVC corporate parents' professional expertise and knowledge in their respective fields.

CONCLUSIONS

Even though CVC investment is playing an increasingly key role in venture capital investment society, there is a lack of relevant study on intra-organizational co-opetition between investors and their investee in a CVC investment alliance. The goal of this exploratory study is to develop a social physics approach to analyse a CVC investment alliance over a decision-making process. Through the REF model proposed in this study, it helps to gain new insights into the relationships among stakeholders of a firm in a CVC investment alliance. The results offer a portrait of how co-creation and co-opetition might affect the dynamic of stakeholders and initiatives with the focal firm. It indicates that CVC investments can be a channel to provide complementary assets which are scarce resources to start-ups at fledgling stage. However, as time pass, the dynamics, either inter- or intra-organizational relationships will change over the bargaining power of the stakeholders which directly related to the contribution of the complementary assets from the CVC investors. The propositions proposed in this study provide unique contexts to gain a deeper understanding of how a start-up maximize its best interests when the access of complementary is a key factor in the achievement of sustainable development.

Despite this study's objective nature, the method used was somewhat subjective, which meant that the method was somewhat biased by the authors. Hence, the findings of this study should not be interpreted as conclusive, but rather as an observation for gaining insights from the field data collected by the action research. Regarding future research, it requires a broader scope to dialogue with other management theories, including Transaction Cost Economics (TCE), Resource Based View (RBV), or agency theory.

REFERENCES

Anand, B.N., and Galetovic, A., (2000), Information, Nonexcludability, and Financial Market Structure. The Journal of Business, 73(3), 357–402.

Baierl, R., Anokhin, S., and Grichnik, D., (2016), Coopetition in corporate venture capital the relationship between network attributes, corporate innovativeness, and financial performance. International Journal of Technology Management, 71(1/2), 58–80.

Bertoni, F., Colombo, M., and Grilli, L., (2013), Venture Capital Investor Type and the Growth Mode of New Technology-Based Firms. Small Business Economics, 40(3), 527–552.

Chemmanur, T., Loutskina, E., Tian, X., (2014), Corporate Venture Capital, Value Creation, and Innovation. The Review of Financial Studies, 27(8), 2434-2473

Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., and Dushnitsky, G., (2017), A Review and Road Map of Entrepreneurial Equity Financing Research: Venture Capital, Corporate Venture Capital, Angel Investment, Crowdfunding, and Accelerators. Journal of Management, 43(6), 1820–1853.

Dushnitsky, G., & Lenox, M. (2005). When do incumbents learn from entrepreneurial ventures? Research Policy, 34(5), 615–639.

Eden, C., and Huxham, C. (1996), Action research for management research. British Journal of Management, 7, 75–86.

Gnyawali, D.R., He, J., and Madhavan, R., (2006), Impact of co-opetition on firm competitive behaviour: An empirical examination. Journal of Management, 32, 507–530.

Grönroos, C., (2012), Conceptualising value co-creation: A journey to the 1970s and back to the future. Journal of Marketing Management, 28(13-14), 1520–1534.

Grönroos, C., and Voima, P., (2013), Critical service logic: making sense of value creation and co-creation. Journal of the Academy of Marketing Science, 41, 133–150.

Hilborn, R., and Mangel, M., (1997), The ecological detective: confronting models with data. Princeton University Press.

Lewin, K., (1943), Defining the 'field at a given time.' Psychological Review, 50(3), 292–310.

Lewin, K., (1946), Action research and minority problems. Journal of Social Issues, 2(4), 34–46.

Niesten, E., and Stefan, I., (2019), Embracing the Paradox of Interorganizational Value Co-creation–Value Capture: A Literature Review towards Paradox Resolution. International Journal of Management Reviews, 21(2), 231–255.

Parmigiani, A., and Rivera-Santos, M. (2011), Clearing a Path Through the Forest: A Meta-Review of Interorganizational Relationships. Journal of Management, 37(4), 1108–1136.

Prahalad, C.K., and Ramaswamy, V., (2002), The Co-Creation Connection, Strategy and Business, 27 (2), 50–61.

Smith, P., and Sharicz, C. (2011), The shift needed for sustainability, The Learning Organization, 18(1), 73–86.

Teece, D.J., (1986), Profiting from Technological Innovation Implications for Integration, Collaboration, Licensing and Public Policy. Research Policy, 15, 285–305.

Teece, D.J., (2006), Reflections on "Profiting from innovation". Research policy, 35(8), 1131–1146

van de Ven, A.H., (2007), Engaged scholarship: a guide for organizational and social research. Oxford: Oxford University Press.