



The Importance and Satisfaction of Collaborative Innovation for Strategic Entrepreneurship

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•Received 26 July 2015• Accepted 27 Oct 2015•Published online 23 Jan 2016

Building on network, learning, resource-based and real options theories, collaborative innovation through the sharing of ideas, knowledge, expertise, and opportunities can enable both small and large firms to successfully engage in strategic entrepreneurship. We use the real case of a research-oriented organization and its incubator for analysis to strengthen our claim that inter-organizational network, co-learning, resource allocation and real options all have a positive impact on innovation performance for both the research-oriented organization and the start-up companies in the incubator.

Keywords: collaborative innovation (CI), strategic entrepreneurship (SE), SERVQUAL, importance-performance analysis, science education

INTRODUCTION

In recent years, many organizations have experimented with more open and collaborative innovation models and processes recognizing the value of external innovation networks and ecosystems (Chesbrough, 2003, 2006; Nambisan & Sawhney, 2007a). Such open and network-centric innovation has included collaborating with numerous partners in developing new products and services, establishing more open technology and innovation platforms, sourcing innovation and technologies from diverse types of external sources for internal development, and participating in and contributing to 'open source' projects in different industries. In some cases, this has involved creating markets in intellectual property, which was owned by firms, but not exploited by them (Arora and Fosfuri, 2003). Similar open innovation approaches have also been adopted by non-profits, government agencies, and other organizations in the public/social sector (Nambisan, 2009; Clay & Paul, 2012). Consequently the topic of strategic entrepreneurship and open innovation have been discussed in detail by scholars for various innovation applications at organization level.

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doi: 10.12973/eurasia.2015.1601a

Strategic Entrepreneurship and Open Innovation

Ireland et al. (2001) integrates the idea of opportunity seeking and advantage seeking and states that mindset, culture, leadership style, strategic management and innovation ability are important factors for strategic entrepreneurship. Strategic Entrepreneurship is to undergo innovation activities via opportunity recognition, market positioning, resource allocation and opportunity exploration under uncertainty and risk for the sake of wealth creation.

Open innovation as a concept has encouraged experimentation with new organizational arrangements and reconsideration of which types of entrepreneurship are most effective. The reasons for this include:

1) Start-up companies have proven to be a costly and inappropriate way to commercialize many innovations due to the invention's narrow scope of application, low profit potential, or lack of an appropriate business model for monetization. At the same time, the opening up of corporate innovation pipelines to ideas and technologies from outside and the associated introduction of new types of innovation intermediaries (e.g., Nambisan and Sawhney, 2007b) have made it possible for companies to entertain a wider range of external ideas and technologies and to engage in new forms and models of corporate entrepreneurship (e.g., Anthony, 2012). Note that our definition of corporate entrepreneurship includes both organizations and employees as entrepreneurs.

2) Many promising university-based technologies fail to reach the market place, due to the lack of appropriate internal and external innovation structures to facilitate their transfer and commercialization (Grimaldi et al., 2011). The adoption of open innovation practices and the recent emergence of new types of external innovation infrastructure could potentially alleviate this (Nambisan et al., 2012). At the same time, many companies claim that universities have become too rigid in forging collaborations and too aggressive in asserting their intellectual property rights (Siegel et al., 2003), what David Mowery (2001) refers to as the rise of the "patent" university. These concerns are heightened because, as Kenney and Mowery (2014) show, much university knowledge is transferred and entrepreneurship encouraged through complex bi-directional flows of knowledge. Thus, open innovation approaches question such rigid IP-related practices and indicate the critical need to re-examine the overall nature of university-industry partnerships in innovation commercialization.

3) Open innovation approaches are being adopted in the public and non-profit sectors, as a result of advancements in information technology, government austerity, and the complex nature of civic problems, thereby motivating new forms of social innovation and social entrepreneurship. One of the outcomes of open innovation has been the involvement of organizations in all three sectors—public, private, and non-

State of the literature

- Collaborative innovation can enable both small and large firms to overcome their respective challenges related to successfully engaging in strategic entrepreneurship.
- The quality and the type of collaboration will determine the possibility of the success.
- The collaborative innovation which help lessen investments and increase resources are contributing to the strategic entrepreneurship.

Contribution of this paper to the literature

- The core organization also needs the knowledge/resource input from relatively small firms to enhance its innovation or development ability.
- For start-up companies, ideas or resources from outside or wider range of applications of its innovation through collaborative innovation will make the commercialization more likely to happen
- Inter-organizational network, co-learning, resource allocation and real options all have a positive impact on innovation performance for both the core organization and the start-up company.

profit—in promoting and facilitating social entrepreneurship initiatives, particularly in emerging economies. It is also evident that to successfully engage with citizens and other actors in social entrepreneurship, organizations will need to adopt structures, strategies, and practices that are more open and collaborative (Battilana and Dorado, 2010).

According to Link and Siegel (2007), inter-organizational collaboration in the commercial arena has been growing steadily over the past two decades, fuelled by institutional changes such as (1) investments in public-private partnerships including incubators, science parks, and small business programs; (2) relaxation of antitrust enforcement to promote collaborative research; and (3) enactment of legislation designed to promote more rapid technological diffusion from universities and federal laboratories to firms (Bayh-Dole Act and Stevenson- Wydler Act, both passed in 1980). Firms that choose to pursue collaborative innovation as a strategy must be able to develop the capabilities, structures, and processes to support a collaborative approach.

LITERATURE REVIEWS

Collaborative innovation

Collaborative innovation can enable both small and large firms to overcome their respective challenges related to successfully engaging in strategic entrepreneurship. Collaborative innovation is the creation of innovations across firm (and perhaps industry) boundaries through the sharing of ideas, knowledge, expertise, and opportunities (Miles, Miles, and Snow, 2005). For small firms, pursuing innovation collaboratively allows them to preserve their creativity and flexibility while mitigating the inherent liabilities of smallness. Typically, a small firm that devises a valuable innovation runs the risk that larger firms will imitate the innovation and gain significant market share before the small firm can fully develop its idea and appropriate value by successfully taking that idea to the market. Through collaborative innovation, a small firm's innovations can be implemented on a scale that permits market entry to be as fast and effective as that of large firms.

Similarly, collaborative innovation facilitates large firms' efforts to exploit their advantage creating skills while concurrently exploring innovation-related opportunities outside their current domain. Large firms already have the resources and market power that small firms need to protect their innovations from rivals. Large firms also operate on a scale that allows them to be efficient in their operations. Large firms can learn how to 'think small' through their interactions with small firms. This does not imply having small ambitions; it suggests the value of approaching opportunity seeking with the open-minded optimism traditionally possessed by start-ups and young ventures. Such a mind-set is difficult to maintain over time, because growth is commonly accompanied by the emergence of bureaucratic procedures, complex structures, and rigid cultures. This suggests that collaborative innovation can fuel the strategic renewal that large firms often find elusive (Floyd and Lane, 2000).

Collaborative innovation's contribution to Strategic Entrepreneurship

Pursuing both market advantages and opportunities may be necessary for survival or long-term profit in today's global economic situation. Large firms tend to be skilled at establishing competitive advantages, but their emphasis on operational effectiveness often undermines their ability to continuously explore additional opportunities. Small firms' opportunity-seeking skills may be strong, but their limited knowledge stocks and lack of market power inhibit their ability to enact the

competitive advantages necessary to appropriate value from opportunities. As a consequence, smaller firms may wish to form some type of collaborative relationship with one or more larger firms in order to gain access to their partner's capabilities and resources as a way of exploiting an innovation it developed. Alternatively, large firms may wish to organize communities that include small firms so that cross-market product and service applications can be more easily identified and developed. For these reasons, the collaborative innovation which enhance the strategic entrepreneurship may be considered as one of the effective ways for big firms to maintain continuous competitiveness and for small firms to obtain more resources for their growth. The growing inter-organizational collaboration is one of proves of such trends (Ketchen, Ireland and Snow, 2007).

Perspectives of how collaborative innovation contributes to strategic entrepreneurship in different theories

Network Theory

This theory put emphasis on the relationships a firm has with other firms, and on how those relationships influence a firm's behaviour and outcomes (Dyer, 2000). The quality and the type of collaboration will determine the possibility of the success. It is indicated that creative ideas are likely to generate when networks are connected by loose ties and where resources and assets are complementary within an environment of which organizational processes are open (Granovetter, 1973). The atmosphere of such encourage and provide diversity of thought and experiences.

The network which provides complimentary attribute will infuse energy and creativity and foster the strength in strategic entrepreneurship.

Learning Theory

This theory looks into how a firm builds its knowledge base over time and deploys its stock of knowledge to achieve success. Within the context of a collaborative network, large and small firms can develop significant synergies along different dimensions. Large firms can provide economies of scale in information processing, while small firms can provide the specialized knowledge needed to identify trends early. Large firms can draw on the recipes that are codified in their memories for time-tested solutions, while small firms' relative lack of memory and recipes helps the network approach situations with a fresh perspective. Our expectation is that to the extent that large and small firms integrate their different learning capabilities, both should improve the quality of their opportunity-seeking and advantage-seeking activities, ultimately resulting in better performances in strategic entrepreneurship (Ketchen, Ireland and Snow, 2007).

Resource-based view

The resource-based view has its perspective on certain assets and capabilities which are fundamental for the competitive advantages which are highly irreplaceable (Wernerfelt, 1984). The resources of such kind are strategic resources. Collaborative innovation may create new strategic resources with a high level of inimitability (Barney, 1991).

As long as the free flow of ideas and knowledge is kept, creativity pivotal to the strategic entrepreneurship will form during the process of collaborative innovation.

Real options theory

The real-option theory considers two key factors in management, they are, uncertainty and investment irreversibility (Thompson, 1967). Real options theory contends that when faced with uncertainty and investment irreversibility, firms are more likely to make small investments (Sharp, 1991: 71).

A large firm may address this situation by capitalizing on its resource base to make a series of small investments, both internally and externally. Small firms generally lack resources and possess little slack and may rely on their larger allies to provide such infrastructure (Ketchen, Ireland and Snow, 2007). The collaborative innovation which help lessen investments and increase resources are contributing to the strategic entrepreneurship.

REASEACH STRUCTURE

We investigate the performance of core organization and start-up companies who have adopted the collaborative innovation approach (including Network, Learning, Resource-based, Real option) for opportunity recognition, market positioning, resource allocation and opportunity exploration, as shown in Fig. 1. In our study, we examined closely the relationship between the core organization (providing the incubation services) and its APP incubator (hosting a bundle of new start-up companies). The mission of the APP incubator is to facilitate local start-up innovation by sharing the core organization's resources. The core organization on the other hand hopes to gain competitive innovation by hosting the incubator.

In order to explore innovative models of cooperation, this study will focus on service satisfaction, as an important reference for the follow-up research.

METHODOLOGY

Taking into consideration that the APP incubator has both the tangible and intangible service quality characteristics, we used the PZB model proposed by Parasuraman et al(1985). Through the construction of SERVQUAL scale, we investigated the role of the core organization and its APP incubator for innovation performance.

SERVQUAL Model

Parasuraman et al (1985) proposed the PZB model, which is a conceptual model for evaluating service quality. They conducted interviews with management staffs and clients in the banking, securities, credit card, and product maintenance industries, finding that variances and gaps existed between the perceptions of the management staffs and the services delivered to the clients. The PZB model highlights the five gaps shown in Fig. 2.

As shown in Fig. 3, GAP 1 to GAP 4 are the gaps in services rendered. GAP 5 represents the difference between expectations and actual services. There is a functional relationship among these five gaps.

Parasuraman et al. suggested that the service quality perceived by customers depends on the magnitude scale and direction of the gap between expectations and performance. They proposed using SERVQUAL measurements for evaluating service quality by reducing the original 10 service quality constructs to 5 constructs (tangibles, reliability, responsiveness, assurance, and empathy). These five constructs are used as

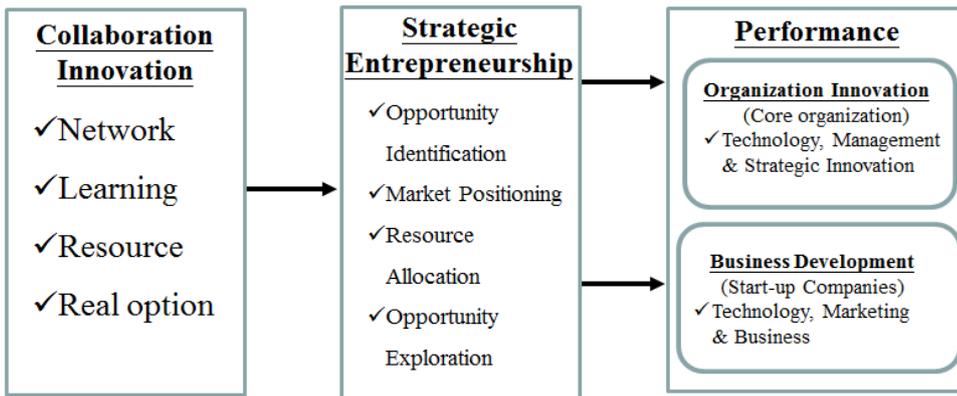


Figure 1. Research Structure

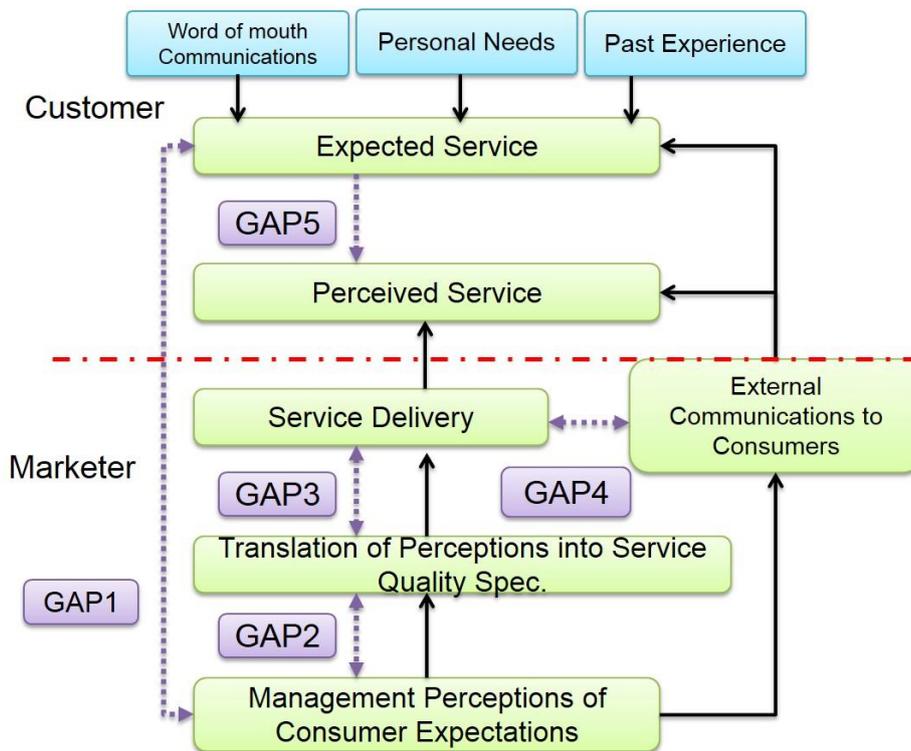


Figure 2. PZB service quality model

measurement variables for service quality, and they allow a clearer definition and measurement of service quality.

Importance-Performance Analysis

Martilla and James formulated IPA, and this simple technique has been frequently used for understanding customer satisfaction and prioritising service quality improvements. It is not only an analysis methodology but also an implicit theory of behaviour. In IPA, customer ratings of the importance and performance of several attributes are typically averaged across the attributes and are plotted against each other; the resulting importance-performance space is divided into four quadrants. The IPA method has been widely used in

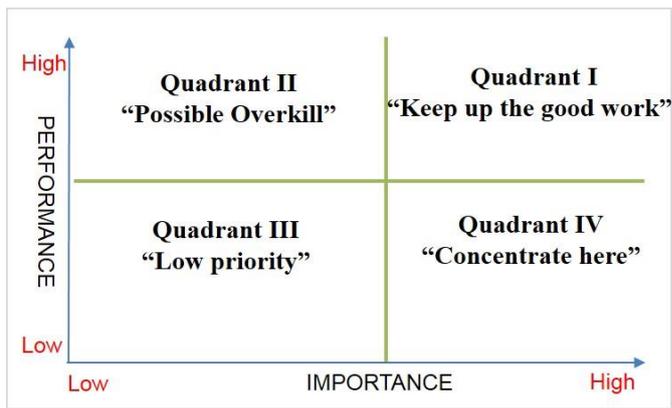


Figure 3. Significance of importance and performance

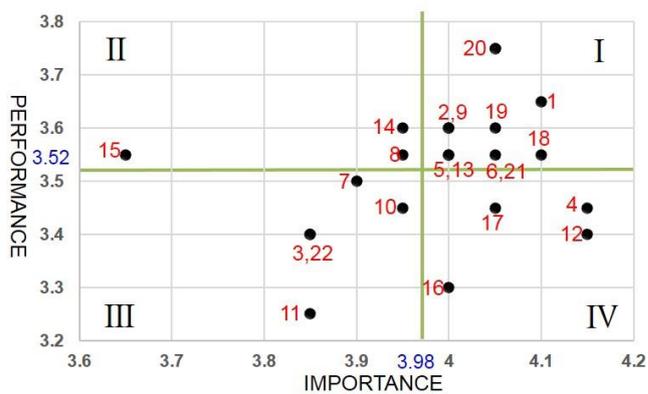


Figure 4. IPA Distribution of the Core Orgnization

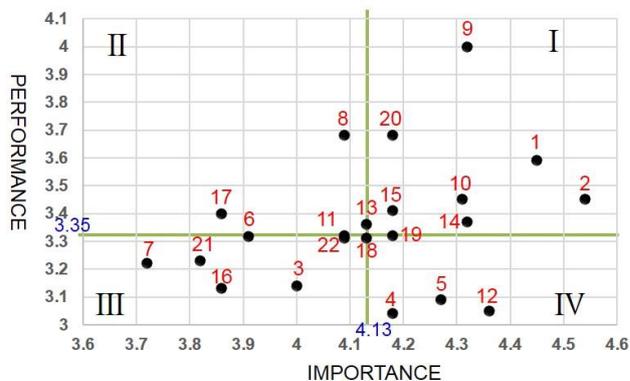


Figure 5. IPA Distribution of the Start-up Companies

several fields, including marketing, logistics, tourism, health care, and education, to improve service quality and facilitate business decision-making.

In Fig. 3, the X-axis represents the mean of the importance of the service quality dimensions, whereas the Y-axis represents the mean of the performance; the graph is divided into quadrants indicating the importance and performance of the combination of the service quality dimensions. The service items in Quadrant I indicate high importance and high performance; these items are strong and should be maintained. This quadrant is labelled as 'Keep up the good work'. Quadrant II shows low importance and high performance, which suggests insignificant strengths and the possibility that that diverting the resources elsewhere would be more beneficial. The low

importance and low performance items lead to the Quadrant the core organization being labelled as 'low priority'. Although service items with such a rating for the attributes do not pose a threat for service provider, they may be candidates for discontinuation. In quadrant IV, importance is high but performance is low, and the quadrant is labelled as 'concentrate here', indicating that the service items located this area requires urgent corrective action and should therefore be given top priority.

Integrated SERVQUAL-IPA Model

This study integrated the SERVQUAL model and IPA model and applied the integrated model to determine the service quality of APP incubator. The test subjects included 30 people from start-up companies and 20 staff members of the core organization. The questionnaire is designed according to the 5 facets of SERVQUAL, and asked the subjects to grade the service provided by the incubator in 5 levels regarding aspects in opportunity recognition, market positioning, resource allocation and opportunity exploration. The 5 facets of SERVQUAL are defined as follows:

- Tangible service: Service Item 1-3, regarding tangible resources such as e-learning, animation design, game development.
- Reliability service: Service Item 4-7, regarding consultation relating to technical, business model issues.
- Responsiveness service: Service Item 8-13, regarding matching start-up companies up with either/both government subsidies and angel funds.
- Assurance service: Service Item 14-17, regarding the distribution of useful information on market analysis and technology trends.
- Empathy service: Service Item 18-22, regarding setting up communication channels with other start-up companies and organizations outside the incubator.

DATA ANALYSIS AND INTERPRETATION

After a careful analysis of the SERVQUAL questionnaire, we have found that for the start-up companies in the incubator, the overall average service importance and satisfaction scores are 4.13 and 3.35, respectively. In Fig. 5, nine service items (1, 2, 9, 10, 13, 14, 15, 19 and 20) are located in Quadrant I, and four service items (4, 5, 12, and 18) in Quadrant IV (Appendix 1 & 2). For the core organization, the overall average service importance and satisfaction scores are 3.98 and 3.52, respectively. In Fig. 4, ten service items (1, 2, 5, 6, 9, 13, 18, 19, 20 and 21) are located in Quadrant I, and four service items (4, 5, 12, and 18) in Quadrant IV (table 1 & 2).

As service items(1, 2, 9, 19, 20) lie in Quadrant I in both Fig. 4 and 5, this suggests that the core organization and the start-up companies both see resource/knowledge sharing and learning are important keys to collaborative innovation, and the services provided by the incubator are satisfactory.

On the other hand, as service items (4, 12) lie in Quadrant IV, this suggests that the consultation regarding business plan and angel fund matching are important but the service has room for improvement (T).

Finally, service items (5, 18) lie in Quadrant I for staff members of the core organization, and in Quadrant IV for the start-up companies. This is maybe due

Service Items	<i>I</i>	<i>P</i>	Service Items	<i>I</i>	<i>P</i>
	<i>Mean</i>	<i>Mean</i>		<i>Mean</i>	<i>Mean</i>
1	4.45	3.59	12	4.36	3.05
2	4.54	3.45	13	4.13	3.36
3	4	3.14	14	4.32	3.37
4	4.18	3.04	15	4.18	3.41
5	4.27	3.09	16	3.86	3.13
6	3.91	3.318	17	3.86	3.4
7	3.72	3.22	18	4.13	3.31
8	4.09	3.68	19	4.18	3.32
9	4.32	4	20	4.18	3.68
10	4.31	3.45	21	3.82	3.23
11	4.09	3.32	22	4.09	3.31
<i>Avg(Importance)</i>		4.13	<i>Avg(Performance)</i>		3.35

Table 1. Start-up company importance and performance

Service Items	<i>I</i>	<i>P</i>	Service Items	<i>I</i>	<i>P</i>
	<i>Mean</i>	<i>Mean</i>		<i>Mean</i>	<i>Mean</i>
1	4.1	3.65	12	4.15	3.4
2	4	3.6	13	4	3.55
3	3.85	3.4	14	3.95	3.6
4	4.15	3.45	15	3.65	3.55
5	4	3.55	16	4	3.3
6	4.05	3.75	17	4.05	3.45
7	3.9	3.5	18	4.1	3.55
8	3.95	3.55	19	4.05	3.6
9	4	3.6	20	4.05	3.75
10	3.95	3.45	21	4.05	3.55
11	3.85	3.25	22	3.85	3.4
<i>Avg(Importance)</i>		3.98	<i>Avg(Performance)</i>		3.52

Table 2. The core organization importance and performance

to communication problems between the two groups so that the services provided did not meet the need of the start-up companies.

Following the data analysis, we introduce a real cases in the incubator to strengthen our claim that collaborative innovation has gain competitive advantage for both the core organization and the start-up companies.

In this case, start-up company A is focusing on developing products that make use of Kinect application and wearable technology. The core

organization has spent much effort in devising innovative applications in e-learning using state-of-art learning technology. In the form of collaborative innovation, the two have formed partnership and combined resources together to develop a new learning product.

In addition, the start-up company must invest capital and seek more opportunity to expose themselves for sustainable growth, Therefore, the core organization has the edge in setting up meetings between interested parties and the start-up company for future investment (real option). On the one hand, the start-up company has augmented the level of the technology, the channel of investment as well as the network of distribution via the collaboration. On the other hand, the capacity of e-learning applications devised by the core organization have been used in more diverse areas and disciplines and will in turn boost organizational innovative performance in terms of technology and strategy.

Hence based on the research and analysis in this study, it is clear that collaborative innovation s mutually beneficial to both the core organization and the start-up companies. Specifically, inter-organizational network, co-learning, resource allocation and real options all have a positive impact on innovation performance for both the core organization and the start-up company.

DISCUSSION

While big firms take strategic entrepreneurship as an approach to seek opportunities, start-up companies make effort to commercialize their technology or concepts. To reach business success and open innovation, both big firms and start-up companies need to be more open to collaborative (Battilana and Dorado, 2010), and the growing inter-organizational collaboration proves trend (Link and Siegel 2007). In order to look into the relationship between strategic entrepreneurship (SI) and open innovation, this study collects the replies from test subjects and provides the discussion of collaborative innovation from the following perspectives:

1) For the core organization: The data analysis indicates that both core organization and start-up companies recognize the importance of resource/knowledge sharing and learning. The analysis reveals that the core organization also needs the knowledge/resource input from relatively small firms to enhance its innovation or development ability.

2) For start-up companies: For start-up companies, ideas or resources from outside or wider range of applications of its innovation through collaborative innovation will make the commercialization more likely to happen (e.g., Nambisan and Sawhney, 2007b). The research in this study has the similar conclusion based on the data analysis which indicates that start-up companies regard introduction of angel funds and consulting services of business model important.

3) For the future development of the core organization and start-up companies: To ensure the sustainable growth, start-up companies need opportunities of on-going exposure, and the core organization can assist in arranging meetings between interested parties so as to help start-up companies secure future resources (real option). The growth of start-up

companies will contribute more innovative ideas or concepts to the core organization and boost its innovation performance to ensure its sustainable development.

Hence, based on the research and analysis in this study, it is clear that collaborative innovation s mutually beneficial to both the core organization and the start-up companies. Specifically, inter-organizational network, co-learning, resource allocation and real options all have a positive impact on innovation performance for both the core organization and the start-up company.

CONCLUSION AND FUTURE WORK

Our research investigates the impact on organization performance while undergoing strategic entrepreneurship via collaborative innovation. We analysed the real case of the core organization and its incubator using the SERVQUAL and IPA model, and the result points in the direction that collaborative innovation—through the sharing of ideas, knowledge, expertise, and opportunities—can enable both core organization and start-up companies to successfully engage in strategic entrepreneurship.

In the future, we will investigate the impact of collaborative innovation further by taking into consideration the degree of inter-organization involvement in meeting the basic needs, technology management and strategy/policy making for the sake of gaining competitive advantage for both core organization and the start-up companies.

REFERENCES

- Anthony, S. D. (2012). The new corporate garage. *Harvard Business Review*, 90(9), 44-53.
- Arora, A., & Fosfuri, A. (2003). Licensing the market for technology. *Journal of Economic Behavior & Organization*, 52(2), 277-295.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, 17(1), 99-120.
- Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53(6), 1419-1440.
- Cheng, J. H., Lai, C. Y., Chen, H. P., & Ou, C. L. (2010, July). The service quality analysis of public transportation system using PZB model—Dynamic bus information system. In *Computers and Industrial Engineering (CIE), 2010 40th International Conference on* (pp. 1-5). IEEE. Chesbrough, H.W. 2003.
- Chesbrough, H. W. (2006). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.
- Clay, A., & Paul, R. (2012). Open Innovation: A Muse for Scaling, *Stanford Social Innovation Review*, 17-18.
- Lijphart, A., & Aitkin, D. (1994). *Electoral systems and party systems: A study of twenty-seven democracies*, Oxford University Press.
- Floyd, S. W., & Lane, P. J. (2000). Strategizing throughout the organization: Managing role conflict in strategic renewal. *Academy of management review*, 25(1), 154-177.
- Granovetter, M. S. (1973). The strength of weak ties. *American journal of sociology*, 1360-1380.

- Grimaldi, R., Kenney, M., Siegel, D. S., & Wright, M. (2011). 30 years after Bayh–Dole: Reassessing academic entrepreneurship. *Research Policy*, 40(8), 1045-1057.
- Ireland, R. D., Hitt, M. A., Camp, S. M., & Sexton, D. L. (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. *The Academy of Management Executive*, 15(1), 49-63.
- Kenney, M. & Mowery, D. (2014). *Public Universities and Regional Development: Insights from the University of California System*. Palo Alto, CA, Stanford University Press.
- Ketchen, D. J., Ireland, R. D., & Snow, C. C. (2007). Strategic entrepreneurship, collaborative innovation, and wealth creation. *Strategic Entrepreneurship Journal*, 1(3-4), 371-385.
- Link, A.N. & Siegel, D.S. (2007). *Innovation, Entrepreneurship, and Technological Change*. Oxford University Press: Oxford, U.K.
- Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *The journal of marketing*, 41(1) 77-79.
- Miles RE, Miles, G, & Snow, CC. (2005). *Collaborative Entrepreneurship: How Communities of Networked Firms Use Continuous Innovation to Create Economic Wealth*. Stanford University Press: Stanford, CA.
- Mowery, D. (2002). The changing role of universities in the 21st century US R&D system. *AAAS Science and Technology Policy Yearbook*, 253-71.
- Nambisan, S. (2009). Platforms for collaboration. *Stanford Social Innovation Review*, 7(3), 44-49.
- Nambisan, S. & Sawhney, M. (2007a). *The Global Brain: Your Roadmap for Innovating Faster and Smarter in a Networked World*. Wharton School Publishing, PA.
- Nambisan, S., & Sawhney, M. (2007). A buyer's guide to the innovation bazaar. *Harvard Business Review*, 85(6), 109.
- Nambisan, S., Bacon, J., & Throckmorton, J. (2012). The role of the innovation capitalist in open innovation: A case study and key lessons learned. *Research-Technology Management*, 55(3), 49-57.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *the Journal of Marketing*, 41-50.
- Sharp, D. J. (1991). Uncovering the hidden value in high-risk investments. *MIT Sloan Management Review*, 32(4), 69–74.
- Siegel, D. S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. *Research policy*, 32(1), 27-48.
- Thompson JD. (1967). *Organizations in Action: Social Science Bases of Administrative Theory*. McGraw-Hill: New York.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, 5(2), 171-180.



APPENDIX 1. START-UP COMPANY SERVQUAL QUESTIONNAIRE

Service Items	Questionnaire	I	P
		1~5	1~5
<i>Tangible service</i>			
1	We are provided with sufficient office supplies (i.e. computers, copy machines, phone & etc.), and it benefit resource allocation of the company.		
2	We are provided with well-arranged common space (i.e. meeting rooms, demo rooms, online network & etc.), and it benefit resource allocation of the company.		
3	We are provided with shared testing tools/equipment, and it benefit resource allocation of the company.		
<i>Reliability service</i>			
4	We are provided with consulting services of operation or business planning for the company to seek opportunities		
5	We are provided with the consulting services of IP for the company to seek opportunities		
6	The incubator pays attention to the company's needs and provides assistance for the company to explore and identify opportunities.		
7	The incubator proactively tracks the problems and status of the company, which benefits the resource allocation.		
<i>Responsiveness service</i>			
8	The incubator responds promptly to the needs, which benefits the company to identify opportunities.		
9	The incubator's staff members are very willing to serve our needs, which benefits the company to identify opportunities.		
10	The incubator assists in applying governmental grants, which benefits the company to allocate resources		
11	The incubator assists in previewing the business plan, and it helps us improve the company's business performances		
12	The incubator introduces venture capital to enhance the company's ability in market exploration.		
13	The incubator supports the research and development of new products for the company to enhance technical performances		
<i>Assurance service</i>			
14	The incubator provides the latest information of the market, industry and technology to assist the company's market positioning.		
15	The incubator provides professional consulting services for the company to seek opportunities.		
16	The incubator assists in business strategies and specific action plans, which benefits the company's market positioning.		
17	The incubator has sufficient professional knowledge to assist the company in market positioning.		
<i>Empathy service</i>			
18	The incubator provides connections outside of the company, which benefits the company to identify opportunities		
19	The incubator provides the information and the major points of the applications in the governmental grants, which speed up the company's market positioning		
20	The incubator provides network opportunities with other companies, which helps identify opportunities		
21	The incubator holds activities and exhibitions on a regular basis for the company to present products/services, which helps the company improve marketing performances.		
22	The incubator has diversified lessons on a regular basis for the company to understand the market trends and needs, which helps the company to plan and allocate resources.		

APPENDIX 2: THE CORE ORGANIZATION SERVICE QUESTIONNAIRE

Service Items	Questionnaire	I	P
		1~5	1~5
<i>Tangible service</i>			
1	We provide the start-up companies with sufficient office supplies (i.e. computers, copy machines, phone & etc.), and it helps the resources used efficiently in the core organization.		
2	We provide the start-up companies with well-arranged common space (i.e. meeting rooms, demo rooms, online network & etc.), and it helps the resources used efficiently in the core organization.		
3	We provide the start-up companies with shared testing tools/equipment, and it helps the resources used efficiently in the core organization.		
<i>Reliability service</i>			
4	Providing the consulting services of operation and business plans for the start-up companies, benefits the core organization to explore potential innovation opportunities.		
5	Providing the consulting services of IP helps the core organization in exploring potential innovation opportunities.		
6	Paying attention to the needs of start-up companies and providing assistance help the core organization explore and identify new opportunities.		
7	Training the core organization staff members to track problems and status of the start-up companies helps the core organization to perform better in innovation management.		
<i>Responsiveness service</i>			
8	Responding promptly to the needs of start-up companies helps the core organization explore and identify innovation opportunities.		
9	Enthusiasm in providing assistance helps the core organization to identify new opportunities		
10	Providing the information of the governmental grants helps the core organization in allocating resources efficiently.		
11	Previewing the business plans of the start-up companies helps the core organization in reflecting its own business operation and market positioning.		
12	Introducing venture capital helps the core organization and the start-up companies to collaborate in exploring and developing opportunities.		
13	Collaborating with start-companies for new product development increases the core organization's ability in technical performances.		
<i>Assurance service</i>			
14	Providing the information of industry, market research and technology helps the core organization in market positioning.		
15	Introducing professional consulting services helps the core organization in exploring opportunities.		
16	Assisting in business plans and specific action plans helps the core organization in market positioning.		
17	Equipping with sufficient professional knowledge assists the core organization in market positioning.		
<i>Empathy service</i>			
18	Facilitating the connections between the start-up companies and other companies helps the core organization in identifying innovation opportunities.		
19	Gathering the information of the governmental grants and application flows helps the core organization in readjusting its market positioning.		
20	Creating interactions between the start-up companies and other companies helps the core organization in innovation and opportunity identification.		
21	Holding activities and exhibitions for start-up companies to present services/products helps the core organization in using resources efficiently.		
22	Providing diversified consulting services helps the core organization in allocating resources efficiently.		