Cluster Alliance – The Alliance Influenced Factors in Taiwan's Hi-tech Industry

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Abstract
With the saturation of cluster development, corporate strategy aims to seek co-workers so as to remain cluster competitiveness in the global economics. Taiwan's industrial clusters are facing the challenge from multinational enterprises (MNEs). To compete with MNEs, firms that gathered among regional science park in Taiwan took strategic development such as joint ventures and alliances to extend cluster's vitality and renew cluster life cycle.

This study aims to discuss the alliance influential factors among the cluster's network. The research generalizes cluster alliance critical influential factors which applied to Taiwan's hi-tech industrial clusters, and investigate how heterogeneous industrial factors affect the strategic decision in alliance partners' selection. Hi-tech industrial clusters rely on technology capabilities, market forces, and industrial differentiation. Considering these cluster incentives, corporate capability and mutual relationship construct the possibility of cluster alliance.

This study adopts the regression analysis to verify that firms in cluster would take technology and market factor into consideration when different cluster seeking for alliance; the industry factor affects as a moderator when technology and market factor affects cluster alliance tendency. This research finds out that Industry factors would induce the cooperation possibility, showing that linkage with the value chain and constructions of cluster network are the essential elements in corporate strategy. And this study explores that industrial heterogeneity would weaken the market effect to cluster alliance tendency. Without past experience, more risks need to be considered in cross-industry alliance.

Chapter 1 Introduction

1.1 Overview and Motivation

Numerous innovative creations stimulate the pace of technology development. The competition makes it possible more human to explore advanced and improved inventions to generate more opportunities of gaining profit. In Taiwan, the geographical environment narrows the resources and therefore mostly the companies in Taiwan are small and median enterprises (SME). To compete with multinational enterprises, firms in Taiwan took strategic development such as joint ventures and alliances. Besides, the densely populated environment makes firms to get closer with their supply chain partners.

Cluster is defined as groups with interconnected companies to share their resources and technologies, clusters can strengthen the industrial division among the upstream to the downstream of the supply chain (Porter, 2007). Gradually the proximity enterprises turn out to gather as the clusters to integrate value creations. There are over seventy industry clusters around Taiwan. The growth of cluster development accelerates the innovation and competitiveness throughout the global economics. The booming IT industry in Taiwan also cut a striking figure in the international. However, this kind of development strategy now has been widely used in many other countries. Although Taiwan's cluster development still remains 1st in the world. Cluster development in Taiwan need to create the differences in order to extend the cluster vitality (Gnyawali, 2013). This research intends to construct an alliance structure to build a linkage within clusters. The enterprises can extend their business through formal network relationships in nationalization (Fernhaber, 2013). Cluster networks can lead to the formation of exchange relationships, which have been suggested to be a vital component to new venture internationalization as they can provide both resources and legitimacy (Oviatt and McDougall, 1994). Also, mature development clusters can exchange different integrated resources. Such collaboration can help extend the cluster vitality and some of them may find different possibilities in their business.

Taiwan's hi-tech industry has been moving forward to this kind of network collaborations. With the exploitation of cluster alliance factors construction, enterprise can have comprehensive arrangement in exploring business and compete with MNEs. There are plenty of factors while considering choosing alliance partners, many studies mentioned about individual selection about their partners, but few of them considered about organizational integration. The coordination between firms may involve strategic thinking. With the view of integration consideration, the decision can be more compressively.

Research Objective

Hi-tech industry effects heavily from knowledge-based resources. The product/service life cycle usually last for short period. Research has found that most of firms exchange leverage cluster-based resource to reduce research and development from itself. This study aims to discover the influential factors when cluster seek partners from other clusters. In technology-based clusters, knowledge diffusion and absorption promote technology improvement. Knowledge flows between alliance partners would provoke firms to find new inventions. Economic consideration from market side also affect heavily from the integration within the clusters.

The research investigates the incentives from technology and market factors, different alliance partners provide resources differently. Homogeneous industrial clusters can merge capacities and heterogeneous industrial clusters compound their technology to improve existing development. Which type of alliance partners that can bring out more incentives plays the main role in decision-making? Research has found that different kind of integration shows the difference in development. Whether the cross-industry alliance would provide more advantages than common alliances is the main issue to discover. Taiwan's hi-tech industry represents a well example of cluster development. Through this research firms among the clusters would have more effectively suggestions in decision-making. The objectives of this study are as follows:

- Generalizing cluster alliance critical influential factors which applies to Taiwan's hi-tech industrial clusters.
- Investigating how heterogeneous industrial factors effects the strategic decision in alliance partners' selection.

Chapter 2 Literature Review

2.1 Industrial Cluster

Industrial cluster theory, originated from economies of agglomeration, indicates that firms or value-chain-based linkage of the industry slowly gather together in a particular area to seek production advantages through this kind of regional agglomeration. In this cluster individuals could gain their vertical and horizontal dependency such as specific suppliers, service providers, company's mutual dependence and companies of associated industries (Porter, 1998). The resources and network synergy brings out cluster's vitality—the extent to which a cluster is imbued with new knowledge resources over time—, and suggest that cluster vitality is very critical for sustained flow of cluster benefits (Gnyawali, 2013).

Clusters have been described as groups of interconnected businesses that form a significant economic unit (Morfesis, 1994). One of the most inclusive definitions of a cluster may be the one provided by National Governor Association (2002) where they define cluster as a geographically bounded concentration of similar, related or complimentary businesses, with active channels for business transactions, communications and dialogue that share specialized infrastructure, labor markets and services, and are faced with common opportunities and threats. Swann and Prevezer (1996) define clusters as groups of firms within one industry based in one geographical area. Clusters indeed create the geographically integrated effect, in many places people use this kind of development strategy to build up business in diversity.

Industries absorb these benefits to breakthrough personal advantages. Therefore, firms with similar demands gradually attract each other and become different types of industrial clusters. The industrial cluster can strengthen overall bargaining power and build up collaboration network. SMEs use cluster development to expand their competitiveness in order to compete with MNEs. Besides, it's more convenience to internationalize through informal (geographically proximate firms) and formal (alliance partners) network relationship (Fernhaber and Li, 2013). Firms in cluster tend to exchange knowledge and technology. They both share knowledge to explore niche business in the same market. The state of cluster development index in Taiwan still remains 1st in WEF's (World Economic Forum) survey, which means that Taiwan is also a role model in conducting industrial cluster research.

Dahmen (1952) firstly defined the element of successful industrial cluster. Not only the internal linkage efficiency but also the self-mobility through forward and backward production chain in industrial complexes should be sustained in a cluster development. The firms build their linkage efficiency through work integration. And the professional division of labor from upstream to downstream strengthened the whole cluster to form a circulation among this cluster. They exchange knowledge through informal social networks and thus stimulate the formation of business clusters in rural areas that can improve the performance of firms. When the mutual relation gradually developed, the knowledge can be strongly enhanced.

These so-called consequences are the cluster effect. The cluster effect brings out successful business in originally inconspicuous area and therefore attracts researchers to investigate the phenomenon. In Taiwan, industrial clusters represent their competitiveness for the past decades. However, these days many countries build up integrated clusters as their economic unit and threaten Taiwan's international business. With the growth of cluster development, Taiwan once created its innovative capability, but there's still a long-term development to industrial clusters.

2.1.1 Cluster Phenomenon

An industry cluster is a small geographic area (usually the size of a metropolitan area) that hosts a significant number of a given industry's competitors, suppliers, and/or distributors (Porter, 1998). Zaheer and Manrakhan (2001) describe four main reasons for a company to locate in a cluster: 1. resource-seeking, 2. market-seeking, 3. efficiency seeking, and 4. strategic asset-seeking. Firms get together to implement each other, including raw materials to human resources. Such combinations of integration enhance firms' capacity and thus linked firms together to form a cluster. Tacit knowledge about markets and manufacturing techniques that can be acquired through regular contact with managers within the cluster determines the strategic assets to this specific cluster (Saxenian, 1994).

However, cluster also has its life cycle, though this organization could facilitate the collaboration between firms and enlarge capacity by the efficiency of integration. Pouder and St John (1996) defined three phases through which clusters pass: 1. Origination and emergence of the cluster. 2. Convergence of the cluster firms. 3. Firm reorientation and decline in the performance of the cluster. During the rise of a cluster, companies inside the cluster grow much faster than those outside of the cluster. However, during the decline of a cluster, these firms also shrink and go out of

business at a faster rate than the rest of the industry. Klepper (1997) also distinguishes three different stages of an industry life cycle: embryonic, growing and mature. In this model, there is an embryonic stage with small output, a subsequent growing stage, and a mature stage with a decline in the number of companies and employees. But neither the age, nor the quantitative development of companies and employees sufficiently describes the development of an industry. Not all of the clusters can continually retain its vitality. As cluster development mature, dynamics such as innovation and creativity decreases. Therefore, the ongoing revolution in cluster development is essential to maintain cluster vitality. To better understand the nature of cluster evolution, which has nurtured economic growth, scholars have attempted to unpack contributors to cluster evolution from the perspective of the environmental uncertainty and resource abundance effects. The facts that these factors determine cluster to link together so as to renew cluster vitality.

The growth of Taiwan Hi-tech clusters faces the convergence of cluster firms. To improve and survive from decline of development rely heavily on innovative process. Firms in cluster sought to build a continuous value creation and knowledge sharing network. The industrial cluster can conquer internal rigid and inertia because of continuous involvement of new entrants. When cluster gradually saturated, it must turn out to meet external stimulations. Collaboration within clusters made firms easily to get used to different resource integrations. Especially to highly competitive market, the adaption to dynamic changes by integrated alliance help increasing the possibility to success.

2.1.2 Hi-tech Industrial Cluster

There are many industrial clusters in Taiwan. Most of them gathered as Science parks to build innovate and creative inventions for commercialization. Science parks are widely seen as an effective tool to promote industry cluster, to realize larger and more visible returns on the R&D investment of a nation, and to bring about national/regional economic development. These industrial clusters share knowledge rapidly with individuals within the cluster organization. They divide works and remain professional competency so as to focus on main-tech development. In addition to informal collaboration, they also take formal collaborations to reinforce mutual trust when knowledge sharing. By combining some of the incentive structures of markets with the monitoring capabilities and administrative controls associated with hierarchy (internal organization), alliances can provide a superior means to gain access to technological and other complex capabilities. Alliance runs the gamut from fairly simple unilateral contracts, such as licensing, through more complex contractually based arrangements, such as technology sharing and joint development agreements (Mowery, 1996). And firms can easily obtain the complementary resources by signing contracts.

2.2 Influential Factors in Hi-tech Cluster Alliance

There are many ways to enhance the possibility of alliance, and there are many studies mentioned about the influential factors for strategic alliance. However, in these days, to cooperate with members in nearby area is not enough for the globalization. The alliance should consider more than geographical factors since the network have linked each part of country and even continent to continent. Therefore,

to realize the critical factors that could help firms, or even the clusters to cooperate with each other should be more useful for firms to learn how to explore their careers. Expanding firm capacities varies from internal and external resources. For internal expanding, firms seek low-cost and R&D activities; in the other hand, firms outsource part of work. Some firms also take strategic alliance as one of way to outsourcing.

2.2.1 Technology

Industrial and economic clusters have emerged as a special form of spatial organization in economics theory regarding organizations efficiency based on their geographic locations, networks and relations. However, technology clusters are different from the classic economic cluster. For hi-tech industries there are some important factors that could stimulate the firm's performance.

Clusters are the main factors for increasing jobs, income, and global export goods. According to Sanchez and Omar (2012)'s study, there are five factors that can lead to cluster improvement: Strong innovative base with supporting R&D activities, using technology to improve productivity, advisory board for companies in industry clusters, competitive pricing, and market expansion nationally and globally. Such factors can also be taken into alliance consideration. Clusters strive for competitiveness and resource integration, which significantly impact firm performance. By knowledge spillover and technology transfer, firms among different clusters can obtain codified knowledge from the past integration in the cluster. Therefore the reliabilities of knowledge transfer can easily be estimated. Many studies indicate that technology is the prior influential factor when firms need to find collaboration. Also, the strength of integrated capability of technology and innovation lead to feasibility of collaboration development. Besides, the spread of knowledge and learning capability are necessities in maintaining cluster vitality. When clusters need to expand its capacity and ally with other clusters, it is necessary that cluster should gain more learning capabilities and faster transmission in technical knowledge.

2.2.2 Market

The spatial clusters make it more easily for firms to reduce the coordination costs. Also, the collaboration benefits the exchange of technology information, which promotes the new product development and research of improvement. By competitions the firms among clusters construct the advantages in industrial competitions. The range of industrial clusters gets bigger than a single industry, so they can grasp the importance of cross-vendor and industry connections, complementarity, technology spillover effects, skills, resources, marketing and customer needs, these links are competition, productivity and new business formation and direction of innovation and technical depth of the basic elements.

The advantages that help industrial clusters reduce costs, amplify the market share and strengthen the competitive advantage, even with the pioneer enterprises to enhance the overall reputation increase the possibility of an alliance. The study of industrial cluster in the literature talked about the production, demand and other factors, issues related industries, as well as value chain architecture considerations, Child et al. (2005) also mentioned in the industrial cluster network architecture, the members of the cooperative will reduce transaction costs; the cluster alliance also

provides a form of network resources, markets, technology and access to information (Gulati et al., 2000).

2.2.3 Industry

The empirical picture that emerges from this analysis is that alliances are used when there is a disparity between a firm's existing operations and the firm's new activity. Clusters and networks remain fuzzy concepts when we consider their own interrelated relationships and their relationships with the factors and variables of the whole economy, such as institutional arrangements, trading efficiency, level of specialization and agglomeration, as well as their dynamic evolution (Li et al., 2010).
The linkage of value creation through network collaborations matches by both formal (strategic alliance) and informal (cluster) coordination of the partnership. Furthermore, the development of cross-industry alliance can also improve the overall network effect.

The opportunities in alliance are fraught with uncertainty. Business goals, strategies and organizational methods depending different industry show a wide range of differences. If the decision among these situations can cooperate well, it then therefore creates more business opportunities. Researcher says that the social network used to emphasize the accumulation and relationship. In these days we seek the concept of the linkage within value chain and cluster integration, which we often called cluster value. Through competitive advantages and the organization strategy integrates the development of the entire value chain. The cluster can gather more partners form global clusters.

Chapter 3 Methodology

3.1 Research Framework and Hypotheses

The following are the definitions of cluster alliance influential factors and sub-factors (see Table 3.1 & Table 3.2). Based on these factors, the questionnaire would be designed to verify the research assumptions.

Table 3.1 Definitions of cluster alliance influential factors

Influential factors	Definitions	Sub-factors
Technology	In hi-tech industry, technology represents the essence of the creation and the capability. The strength, creativity, and the diffusion of the technology could enroll more attraction of the feasibility of alliance.	Value of Technology
		Knowledge Diffusion
		Capacity of Innovation
Market	In every industry, market resource is the key element when firms need to gain more profits. Besides, market share and firms reputation also needs to be considered when expanding. Thus market should be the incentives when hi-tech clusters' alliance has to be built.	Cost Reduction
		Market Share Expansion
		Reputation Creation
Industry	Alliance could make industrial integration or cross-industry collaboration. Both of them would create more positive synergies and industry expanding, especially in hi-tech industry. Different combinations could blur more creative productions.	Clusters' Network
		Linkage within Value Chains

Table 3.2 Sub-factor Definitions of cluster alliance influential factors

Sub-factors	Definitions	Indicators	Researchers
Value of Technology	Show integrated capacity when firms ally to each other.	● Numbers of certification patent ● Numbers of patent cited.	1. Catalin, 2012 2. Gomes-Casseres, 2006
Capacity of Innovation	Determine the strength of innovative creation	● R&D expenditures ● R&D personnel	1. Kodama, 1992
Knowledge Diffusion	Facilitate the knowledge flow and information exchange. Technical knowledge interworking in different firms.	● Co-citation numbers ● Degrees of departmental communication	1. Chan et al., 1997 2. Connie and Breitzman, 2009
Cost Reduction	Inter-firm relationship Transfer technology and cooperate in technological development	● Labor cost reduction ● Transaction costs	1. Sergio Janczak, 2008 2. Sia and Bruton, 2005
Market Share Expansion	A ratio of multiple outputs to multiple inputs	● Firms productivity	1. Farrell, 1957 2. Oum et al.,2004
Reputation Creation	Investor Recognition Hypothesis	● Number of stockholders	1. Ron Kaniel, Dong Li, Laura Starks, 2003
Clusters' Network	Network linkage density among the cluster	● Cluster density	1. Dyer and Singh, 1998, Lavie, 2007; Stuart, 2000
Linkage within Value Chains	Taiwanese firms rely heavily on the power of upstream and downstream companies to conduct their business if they are unfamiliar with the domain field.	● Number of companies which conduct business along the value chain.	1. Chuang, Chia and Wong, 2013

From Hypothesis 1~3 this study suggests that technology, market, and industry factor would have a direct effect on alliance tendency. The influential factors would positively affect manager's decision when considering strategic alliance. And Hypothesis 4 suggests that industry factor would be the moderator when technology factor affects alliance tendency. Researchers have different view on linkage within the value chain. Lai et al. (2005) argued that innovative activity comes from direct contact with a variety of sources.

However, many of integrated clusters eventually diminished after the network construction. Industrial clusters that accumulate high levels of innovative success need to assemble different information in their existing field so that it could facilitate the next round of innovation. The cross-industry concept of business integration also provokes enterprises to seek partners from different fields. But the willingness of

business combination from two different fields still not as good as they expected. Some of successful R&D alliances appear no significant in their operational fit (Gassmann et al., 2010). Many alliances in Taiwan have been found that some of enterprises are lack of technology or market advantages. However, the contractual relationship still can be built in such collaboration.

This study aims to provide the credible evidence to show that alliance partnership focus on inter-firm relationship more than firms' individual capabilities. The social relation between partners may trigger larger enterprise to lead small companies, or cross-industry cooperation. Hypothesis 4 suggests that the industry factor affects as a moderator when technology factor influence cluster alliance tendency. Companies need to choose their partners from the same supply chain or different field would adjust the effect of market factor affects the alliance tendency. The incentives from the technology view may be weakened by the linkage of VC and completeness of network construction. Also, the network relationships can regulate the effect on market consideration. Hypothesis 5 is set to test for the moderate effect of industry factor. It suggests that the industry factor affects as a moderator when market factor influence cluster alliance tendency.

3.3 Research Method

At first, this research would use reliability test to examine the designed questionnaire. And the study would use regression analysis to test for the assumptions. The regression analysis would be divided into two stages: the first stage is to verify the direct effect to the alliance tendency, and the second stage is to test whether industry factor would affect as a moderator.

The research intends to use senior managements in the Hi-tech industry clusters as the research sample. This research sent 130 questionnaires to workers in science parks (Hsin-chu science Park, Central Taiwan Science Park, Tainan Science Park and Kaohsiung Science Park) and their co-workers nearby the regions. And the response rate is 78.5% (102/130).

Chapter 4 Results Analysis

4.1 Reliability and validity test

To ensure that the survey design has a high degree of reliability, the study employed reliability analysis to evaluate the reliability of the questionnaire. Nunnally (1978) proposed Cronbach's α coefficient as a measure of reliability; α coefficient greater than 0.7 is high reliability while less than 0.35 is low reliability. From Table 4.1, it can be seen that the composite reliability values are larger than 0.7, showing that this study has high reliability. Originally the Cronbach's α for industry factor is lower than 0.6, after subtracting the two sub-factors (c1 and c5), the result turns out to be reliable (Cronbach's $\alpha = 0.782 > 0.7$).

This research also uses factor analysis to reduce the dimensions in order to conduct the regression analysis. Principal components analysis with Varimax Rotation which produced the dimension of differentiation was used in order to confirm whether or not the scale construct validity. According to Kaiser's (1974) research , to define if the

subscales were suitable for factor analysis, KMO (Kaiser-Meyer Olkin) statistical tests was used. And the results for factor analysis fitness are meritorious (KMO > 0.8) for doing the survey.

Table 4.1 Reliability and validity test

Variable	KMO	Cronbach's α	N of Items
Technology	.87	.844	7
Market	.857	.741	7
Industry	.843	.782	4
Alliance Tendency	.836	.858	6

4.2 Regression analysis

The research uses regression analysis to test the hypotheses. According to Table 4.2, the correlation analysis shows the correlation between the three factors. The results show moderate correlated to the interaction are all significant. This implies that industry factors may have interference effect to technology and market factors.

Table 4.2 Correlation analysis

		Technology	Market	Industry
Technology	Pearson Correlation	1	.511**	.397**
	Sig. (two-tailed)		.000	.000
	N	102	102	102
Market	Pearson Correlation	.511**	1	.550**
	Sig. (two-tailed)	.000		.000
	N	102	102	102
Industry	Pearson Correlation	.397**	.550**	1
	Sig. (two-tailed)	.000	.000	
	N	102	102	102

**. Correlation is significant at the 0.01 level (two-tailed).

Table 4.3 shows the results of regression analyses. In first three equations, the simple linear regression test for single factor is significant (p-value of Technology factor is 0.007; p-value of Market factor is less than 0.001; and p-value of industry factor is less than 0.001 as well). However, taking three factors into the regression model, only industry factor shows significant (p-value<0.001). The p-value of technology factor is 0.843; p-value of market factor is 0.385.This indicates that technology and market might not really directly affect the alliance tendency. The fifth equation, taking interaction into regression model, shows that both industry factor and interaction term are significant (p<.05). According to the analysis, this shows that the industry factor has indirect effect on technology and market factors.

Table 4.3 Regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	1.082E-16	.096		.000	1.000
	Technology	.264	.096	**.264**	2.742	**.007*** **
	R square	.07				
	Adjust R Square	.061				
2.	Constant)	3.973E-17	.092		.000	1.000
	Market	.377	.093	**.377**	4.071	**.000*** **
	R square	.142				
	Adjust R Square	.134				
3.	(Constant)	-5.743E-17	.083		.000	1.000
	Industry	.555	.083	**.555**	6.675	**.000*** **
	R square	.308				
	Adjust R Square	.301				
4.	(Constant)	-4.699E-17	.083		.000	1.000
	Technology	.020	.098	.020	.198	.843
	Market	.095	.108	.095	.873	.385
	Industry	.495	.101	**.495**	4.887	**.000*** **
	R square	.316				
	Adjust R Square	.295				
5.	(Constant)	.067	.091		.736	.463
	Technology	.003	.098	.003	.031	.976
	Market	.156	.108	.156	1.442	.153
	Industry	.516	.099	**.516**	5.206	**.000*** **
	Technology*Industry	.214	.089	**.282**	2.406	**.018** **
	Market*Industry	-.278	.109	**-.304**	-2.550	**.012** **
	R square	.364				
	Adjust R Square	.331				

Table 4.4 Research supported results

Hypothesis	Supported or not
H1: Firms in cluster would take Technology factor into consideration when different cluster seeking for alliance.	Not Supported
H2: Firms in cluster would take Market factor into consideration when different cluster seeking for alliance.	Not Supported
H3: Firms in cluster would take Industry factor into consideration when different cluster seeking for alliance.	Supported
H4: Industry factor affects as a moderator when Technology factor influence cluster alliance tendency.	Supported
H5: Industry factor affects as a moderator when Market factor influence cluster alliance tendency.	Supported

From Table 4.4, the result shows that Hypothesis1 and Hypothesis 2 are not supported, which means that Technology and market are not significant for the direct effect on alliance tendency. Apart from this, Hypotheses 3 to5 are all supported, which means that Industry factor has both the direct and indirect effect on alliance tendency. According to Table 4.10, Industry factor has a positively direct effect on alliance tendency (β= 0.516). In addition, the interaction between technology and industry factor has a positive effect on the alliance tendency (β= 0.282), while the interaction between market and industry factor has a negative effect on the alliance tendency (β= -0.304).

To further explore how Industry factor affects the alliance tendency, the study then use sub-factors of Industry factor to test for the influence.

Table 4.5 Regression analysis for sub-factors of Industry factor

Questionnaire	p-value	β
C2: The past alliance partners belong to the same value-chain system as our company.	0.087	0.155
C3: The past alliance partners also compete with our company in the same market.	**0.002*** **	0.289
C4: The development of internal specialization relative increased after the alliance.	**0.025** **	0.205
C6: The company's future development tends to search for cross-industry alliance.	**0.033** **	0.194

According to Table 4.5, the regression analysis shows that C2 is not significant (p-value=0.087). C3 positively affects the alliance tendency (p-value =0.002; β= 0.289). It shows that the enterprises tend to collaborate with their market competitors. C4 also positively affects the alliance (p-value =0.025; β= 0.205), which means that firms are likely to take strategic alliance to improve internal specialization. As long as they execute the professional division of labor, they can concentrate on their core-technology. In this way, they can achieve a great synergy. C6 has a positive effect on alliance tendency as well (p-value =0.033; β= 0.194). It implies that firms expect to approach the cross-industry alliance. Although there's a long road to achieve, they still have the interest to attempt this kind of collaboration.

Chapter 5 Conclusions and Recommendation

5.1 Conclusions

Currently firms' cooperating strategies for alliance are being widely discussed in literature. Ahuja (2000) indicates that technical, commercial, and social capital form the firms' propensity to alliance; and its resources and external environment also determine whether managers would make their decision (Park et al., 2002). However, mature cluster development creates stabilized knowledge exchange and common orders. The incentives decrease as long as the cluster integration has become fully developed. The conclusions are summarized as follows:

1. The study finds that technology factor doesn't have a significant effect in cluster's alliance. This result is conflict to some studies. Though hi-tech clusters rely on technology capability and degrees of innovation ability, few of them would take their core-technology as the bargaining chip in cooperation. Firms in the clusters divide their work into many parts of processes and workers to eliminate the technology infringement. But it's still risky to put themselves to a highly transparency in technology. Without mutually trust relationship in a long-term period, the clusters' network might collapse. Furthermore, different degrees of cluster development have various degrees in technology dependency (Menzel and Fornahl, 2009). In the growth stage, firm's alternative concepts compete with each other. The technological field is quite heterogeneous and there is a large amount of uncertainty concerning the future direction of the trajectory. Therefore technology plays an important role in the growth of cluster. Different technology collide with each other can create various results and this is exactly the differentiator for clusters to exceed those individuals. And at the mature stage of cluster development, it's hard to differentiate the integrated independent technical capacity among the clusters. The enterprises look up for the synergy effect instead of single terms of ability. Thus the technology factor is not strong enough for being the crucial factor. Lack of other accompanied effects, technology shows no direct influent on partners choosing in cluster alliance. In mature clusters, the value of technology and capacity of innovation is unquestionable. What they needs more is the linkage within other knowledge diffusion system. Knowledge network among different regions would be crucial for firm's survival in global market sectors. This network resource not only depends on their existing knowledge, but also their linkage with value chains. Intensive exchange among clusters renews the vitality of cluster's life cycle.

2. Also, market factor in this study doesn't show significant effect on alliance choosing. Though cluster development can reduce the cost and expand resource acquisition, this effect in Taiwan's cluster doesn't seem to attract the enterprise much. As Li et al. (2013) mentioned in their study that although they benefit from agglomeration economies over time, firms located in geographical clusters become habituated to dealing with local partners leading to lock-in effects. Such clusters may also enter into a cycle of "entropic deterioration" that eventually degrades the knowledge resources available in the cluster. The priority for those enterprises is to maintain cluster heterogeneity. The so-called Cost-reduction strategy has no longer been able to sustain the competitive advantage. Besides, SMEs share their orders in order to get the capacity they originally were unable to load. The collaboration must have some inequitable effect. On realizing the result, the incentives to minor companies then decrease the market effect. And in the end the effect gradually become blurred in the alliance.

3. Industry factor in this research affect directly to alliance tendency. Network relationships also engender respect, trust, truthfulness, and friendliness, and help build social capital, an important resource that entrepreneurs capitalize on (Ahlstrom and Bruton 2006; De Carolis, Litzky, and Eddleston 2009; De Carolis and Saparito 2006; Hanlon and Saunders 2007; Hite 2005; Liao and Welsch 2005; Yiu and Lau 2008; Zhang et al. 2008). The intensely linkage within the value chain and adequate capacity of innovation help firms strive for international competition.

4. As Hansen (1999) observed that the transfer of tacit knowledge was more effective in networks with strong ties whereas the transfer of explicit knowledge occurred more often in weakly connected networks. Firms in great network of cluster collaboration could have more ability to diffuse their knowledge. Therefore industry factor can indirectly influence technology to have a positive effect on alliance tendency. Increasingly patenting strategy provides further competitiveness for cluster unit to prevent infringement from other rivalries.

5. Furthermore, this study also finds that there's a a negative interaction between industry and market factor in alliance choosing. The greater market expanding it possesses, the more heterogeneous cooperation it would attempt to stretch out. In order to gain more territory, large clusters would seek more possibilities to differentiate their qualities.

However, if the market expansion is not well enough in their existing field, they would rather choose co-workers along the supply chain than taking the risk to search for cross-industry alliances.

6. This study discovers that enterprises tend to collaborate with their market competitors. The geographic proximity of firms in the cluster could enhance direct observation of competitors (Burt, 1987; Pascal and McCall, 1980; Rogers, 1995). Firm may try to mimic others and inadvertently generate innovation (March, 1994).

This study takes Taiwan's Hi-tech industrial clusters as the example of mature stage of cluster development to observe how clusters could renew their cluster vitality. Continuously evolution in cluster development can lead clusters sustain their competitive advantages and keep exploring new technology. It is believed that cluster network relationships will become the future trend of internationalization.

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