Do Inter-firm Cooperation and Social Networks Change Over Time in Regional Clusters?

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Abstract

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Main findings of this study show that in some dimensions, such as cooperation in market research & intelligence, cooperation in joint product development and attracting new customers, the more mature cluster tends to have more inter-firm cooperation. However in other dimensions, such as joint distribution activities and social networking, competition prevail inter-firm cooperation.

We expect this topic to be important for policy makers and practitioners who can have influence on the development and growth of regional clusters.

Key words:
Inter-firm cooperation
Industrial clusters
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Longitudinal study

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1. Introduction

The focus of this study is the change over time of inter-firm cooperation and social networks within regional clusters. It is well known that there is not a unique definition for cluster. A century after Marshal's (1920) theory of industrial districts, which yield externalities of collaboration and informal and knowledge spillovers, Porter (1998) defined a cluster as a geographically proximate group of interconnected companies and associated institutions in a particular field linked by commonalities and complementarities. Porter (1990) argued that leading export companies in the USA economy do not work in isolation. Consequently, 'clusters' can be defined as a set of industries related horizontally and vertically having different kind of interactions ending with greater levels of productivity due to these interactions. Moreover, later on, this idea led to his model of a ´competitive diamond´, involving the interaction of firms' strategy and rivalry, demand conditions, input and related industries. After the first approach of Porter´s cluster definition, there have been many other attempts to explain this concept. For example, Enright (1996, p.191) in his contribution 'Regional Clusters and Economic Development', states "A regional cluster is an individual cluster in which members firms are in *close proximity* to each other". More recently, ´clusters´ has been defined as "local or regional *dimension of networks*" (van Den Berg, Braun and van Winden 2001, p. 187).

This study is focused on a regional cluster, which may be considered relatively new. Following Enright (1991), Swann and Prevezer (1996) and Porter (1998) we define a regional cluster based on the geographical proximity of firms, related to same industry, to the extent they are linked by commonalities and complementarities. While extensive previous research has dealt with clusters and industrial districts (Steiner and Ploder 2008), only limited previous research explored differences in same clusters over time. Schutjens and Stam (2003) called for more detailed research on variations in business networks, its explanations and in particular the dynamics in business networks over time. Therefore, the purpose of our study is to compare different dimensions of inter-firm cooperation and social networks in a single regional cluster over a long enough period of time. The research questions focus on how regional clusters change in terms of inter-firm cooperation and if social networks in these clusters increase over time. Thereafter our study aims to contribute to the literature with exploration how clusters may change over time. The high value of micro-level, longitudinal analyses in assessing clusters as well as the advantage of this kind of studies has been explained by Arnould and Mohr (2005). The main advantage of a longitudinal study to explore our research questions comes out in the stronger claims for a causal relationship between the initial attributes and the subsequent status of the same enterprises over time (Gatewood, Shaver and Gartner 1995; Delmar and Shane 2003).

Following this introduction, the next section of this paper addresses theory development. Then, the methodology and the industry analysis are presented, followed by the main results. Conclusions, managerial implications and directions for further research are then suggested.

2. Theory development and Hypotheses

2.1 Geographical proximity and inter-firm cooperation

During the last few years, various studies in dissimilar industries have concluded that the geographical implication of clusters has an effect on the development of local wealth. This includes not only attracting foreign investors, but also generating global networking and helping in the export and internationalisation process of companies as part of 'regional clusters' (Felsenstein and Taylor, 2001; Rosenberg, 2002). Morgan and Hunt (1994) suggested that to be an effective competitor in the global economy requires more cooperation and networking between firms, which will lead to establish or maintain a marketing competitive advantage. The benefits from cooperative strategies among firms have also been a key research topic within the networks literature and more specifically in the Industrial Marketing and Purchasing Group (IMP) (cf. Hakansson *et. al.,* 2006).

Industrial relationships may lead to better forms of interactions among firms and then to cooperation, which is defined as "complementary actions taken by firms in inter-dependent relationships to achieve mutual outcomes over time" (Anderson and Narus, 1990, p. 42). This requires not only a proactive attitude towards cooperation and commitment (Morgan and Hunt, 1994), but also the construction of social capital among the participant of a cooperative network.

A century ago Weber (1909) stated that due to agglomeration industry which is brought together at certain points is expected to enjoy cost reductions. During the last few years a new and growing interest in localized networks and regional innovation systems has emerged, deriving support and competitive advantage through highly localised inter-firm relationships. This issue is illustrated by Brown and McNaughton (2001) who argued that the establishment of early firms at a particular location is as much a matter of historical accident as anything else. The subsequent attraction of more firms depends on the economies of scale and positive externalities, including the regional science policy that this territorial agglomeration may offer (Perry and May, 2007). However, these issues may be different if we study natural resources-based industries, where the location of those natural resources in specific areas is the main reason why companies co-locate. This is what Gulati (2007, p.15) calls as ´positional embeddedness´, as this kind of regional networks might be limited by location-bound resources and regional lock-in may occur leading to the decline of an entire network.

Inter-firm interaction in localised clusters cannot be seen in isolation. Research has focused on concepts acknowledged by Porter (1998) as being 'social glue'. Some authors, like Maskell (2001) suggest that the social process of learning and innovation in inter-firm co-operation works best when partners involved are sufficiently physically close to allow frequent interaction and effective exchange of information. The social process that is embedded in regional communities that share a common knowledge base and culture may be the best facilitator for inter-firm collaboration (McKelvey et al, 2002). Close proximity at regional level facilitates frequent face-to-face interaction in both formal and informal settings. This process creates a common language or code of communication, sometimes called tacit knowledge, through repeated interaction over time. This, in turn, leads to the creation of regional institutions that help reinforce the right environments for inter-firm interaction (Salazar and Holbrook, 2007)

Since the network of firms changes over time, and especially young firms are subject to those changes (Schutjens and Stam, 2003; Hakansson, et al, 2006), it is possible to hypothesize that the externalities endowed by the cluster firms are expected to enhance cooperation over time in order to save cost and to improve their competitive advantage. In particular, it is expected that externalities related with cost reductions will increase over time since they enhance competitiveness in international markets as a result of economies of scales. Therefore, the corresponding hypothesis is postulated as follows:

Hypothesis 1: Inter-firm cooperation in clusters yielding externalities of cost reductions and competitive advantage of firms is expected to increase over time.

2.2 Social networks and inter-firm cooperation

Social networks are key elements in relationships, at both organisational and personal levels, in embedded local firms (Johannisson, 1995; Ahuja, 2000). Networks can also become the basis of a rich information exchange that enables firms to learn about new alliance and market opportunities with reliable partners (Ahuja, 2000). The literature identifies three broad types of networks (Johanninsson, 1995; Mackinnon *et al.*, 2004). *Exchange networks*, involve commercial relationships with customers and suppliers; *communication networks*, involve individuals who provide a firm with contacts and knowledge to inform business activities

(for example, with industry bodies); and social *networks*, including formal and informal relations, friends and other connections which provide support to owner-managers, and which have a broader scope of development, social embedded norms and expectations.

Our study focus on social networks, as they are key elements in relationships, at both organizational and personal levels, in embedded local firms. Formal and informal social networks require interaction. This interactional context in social networks includes issues of trust and commitment.

Coutler and Coutler (2003) asserted that *trust* may be seen as a complex construct that includes integrity, honesty and confidence that one party places in another. Trust also involves issues of credibility among parties and implies an active participation in the 'soft social elements' of inter-firm co-operation. Consequently, trust is an important influence on interpersonal and inter-group behaviour as well as a critical element of competitive success in firms. On the other hand, Coote *et al.* (2003) defined *relationship commitment* as a long-term exchange partner's desire to maintain a valued relationship. Commitment can be seen as an important element for developing and maintaining a successful relational exchange among firms, enhancing efficiency and effectiveness of marketing relationships. Furthermore, it predicts willingness to cooperate. Following Morgan and Hunt (1994) and Coote *et al*. (2003), we consider relationship commitment in marketing activities as: partners and potential partners, trying to maintain and enhance a value relationship for the development of a better inter-firm cooperation at local and/or international levels.

According to the previous literature, and since the establishment and enhancement of relationships are time dependent, the corresponding hypothesis is proposed as follows:

Hypothesis 2: clusters enhance social networking overtime and thereafter inter-firm cooperation.

2.3 Cooperation as competitive advantage for firms in clusters

It is clear that there is an agreement in the literature that clusters and networking provide general benefits to firms, especially in the value chain inputs as well as in the general aspects of the production process (MacKinnon *et al.,* 2004). However geographically clustered firms must cooperate while they also compete (Mesquita, 2007). Thereafter, institutional aspects, formal organisations, such as trade associations and the presence or absence of social capital, may play a critical role in creating the right environment and then influencing the climate for cooperation in regional clusters (Holbrook and Wolfe, 2005).

To what extent competition may prevail over cooperation? Malmberg and Power (2005) found some evidence, although limited, that competition may increase the creation of knowledge in clusters and sometimes there is indeed intense local rivalry. Hence they suggest not to expect firms in clusters to display high levels of local collaborative interaction, and they advocate to drop the underlying assumption that "the more localized interaction, the better". Following Steiner and Ploder (2008) the extent of cooperation and participation in various activities of different quality and function within networks are based on strategic reasons. They found that knowledge exchange was not ubiquitous since the diffusion of knowledge is highly selective and strongly dependent on the position of the firms within their cluster. Keeping away from the extreme, Chetty and Agndal (2008) found that firms maintained balance between ´competition` and ´cooperation` despite their initial reluctance to collaborate, though too much collaboration and too little competition may lead to self-destruction. Accordingly, the following hypothesis is postulated:

Hypothesis 3: Cooperation which may jeopardise firms' competitive advantage will decrease while cluster getting more mature.

3. Methodology

Following Birkinshaw and Hood (2000) we focused our cohort on a leading-edge cluster which has a strong competitive advantage in the global market. Porter (1990) attributed a leading-edge cluster in terms of the extent of international sales: where the world clusters exports is more than double the average export share of the country. The salmon farming cluster in Chile complies by far with this criterion, since in 2008 its exports represent by 32% of the world production while the country share of the world export counts for only 0.3%. This cluster is considered to be nascent, where the term nascent refers to cluster starting to grow and develop,

following Martin and Sunley (2003) who classified clusters into nascent clusters, new clusters, established clusters, and declining clusters.

The presented research question and the hypotheses, which are of international context, are placed in the southern regions of Chile in order to control for cultural, regional, and country economics environmental effects. On the other hand, focusing on a quasi-homogeneous macro region namely southern Chile eliminates the study of regional specificity.

Although there are few publications related to natural resources-based clusters in the Latin-American context and to public policies for inter-firm cooperation and associations (e.g. see Maggi, Montero and Parra, 2000; Felzensztein and Gimmon, 2008), they mostly do not consider explicitly the marketing externalities or social networking aspects in a longitudinal study. Nevertheless, the Chilean cluster context has traditionally been based on a 'bottom-up' approach. This means that the cluster strategy has been led by the local companies with minimal or no governmental intervention. This model of cluster strategy differs to other international cases with a more 'top-down' approach, as the case of the Scottish industry clusters, which is led by the Scottish Executive, the developmental agency for Scotland. However only few significant differences were found (Felzensztein and Gimmon, 2007) between clusters from the salmon farming industry in Chile and Scotland, suggesting the international context of clusters in Chile.

3.1. Industry Analysis

The cohort of the present study is based on the salmon industry in southern Chile. This industry sector, ranking among the most important ones inside the economic activity in the country, generating a high percentage of job positions outside the metropolitan areas and exporting to foreign markets with high levels of international competitiveness, is studied in this research.

The accelerated development of the Chilean aquaculture, at national and international levels, has supported population in southern areas to get economical stability by producing the most interesting number of job positions (55,000 approx.). Presently, there are about 80 companies, 70% of which are located in *Los Lagos Region.* This number of firms has declined by about 30% since 2003 due to global trends of mergers and acquisitions and more recently for the ISA virus which currently affects the Chilean industry. The industry continues being export oriented, selling more than 90% of the production in foreign countries, being the main export markets the United States (38%), Japan (32%), the European Union (14%) among others (Salmonchile, 2008).

The salmon farming industry has been defined as a strategic *"cluster"* for the current economic development and competitive strategy of the Chilean government (Eyzaguirre, 2008). A Trade Association for this industry sector was founded in 1986 and the participating firms considered themselves to be a cluster since the year 1999. This industry sector possesses the following characteristics: they have a specific territorial concentration in *Los Lagos Region*, according to the political-administrative division, concentrating approximately 87% of salmon production in this region. Moreover, external economies and all strategic links of value chain are found in the territory. Other characteristics are the importance of associative and public support, such as those coming from CORFO – the governmental agency for economic development. Finally, continue technological innovation and learning possessed by this industry as well as imported from the experience and learning from Norway are key for the industry. The main competitive advantages in salmon *cluster* can be defined as follows: stable and transparent legal framework and public support, managerial initiative having intra and entrepreneurial capabilities, technological learning and human capital, among others. Furthermore, the industry has been evolving from a commodity into a differentiated product, characterized by new elaboration degrees and high quality standards, thus reaching better prices and new consumers located in competitive international markets.

Apart from the above facts, the salmon farming industry was chosen for this study for diverse reasons. Firstly the obvious inter-connections in value chain activities which enable business-to-business activities, combined with its geographical specific location, suggest that this industry constitutes an industrial cluster. Secondly, the salmon farming industry is a fast growing industry (Hites et al., 2004) where Chile is the second largest producers and exporter of farmed salmon in the world. A balance mix of foreign and indigenous firms made this industry an interesting case study for exploring behaviour of industry clusters over time, where limited literature exists.

3.2 Data collection

A mail survey methodology was used to examine the effect of co-location on externalities. The questionnaires recipients were either general managers or marketing managers of their firms since they can oversee and assess the conditions in which they function (Kahn and McDonough 1997). The mail survey was sent during 2003 to the total population of 115 companies involved in the main value chain activities of the Chilean salmon-farming industry all located in the same region namely Region de los Lagos. After three months of follow-up process an effective 20% response rate (23 firms) was achieved in this first stage. The second stage was conducted four years later in the year 2007 when we tried to contact the same cohort of firms of which 16 responded effectively, representing 14% response rate in this stage. The lower response rate is due to mergers and acquisitions. Another reason may be the too many applications for data collection which these firms encounter in Chile. After the second stage of data collection by questionnaires, we conducted personal interviews during 2008 with seven managing directors of this cluster (of which five where part of the sampled firms) in order to validate the results of this study. It should be noted that while referring to the same cohort of a salmon-farming cluster firstly in 2003 and secondly in 2007, sampling and data collection were conducted independently.

3.3 Measurement

Where not many scales of measurement related to inter-firm cooperation in marketing have been previously reported in published academic journals, the operationalization of constructs employed by Brown and Bell (2001) were used and adapted. The questionnaire was translated from English into Spanish aiming at the full understanding of the Chilean managers. The questionnaire was pre-tested by a group of 10 worldwide academic experts and 8 Managing Directors to assess clarity of instructions, style of the questionnaire, length and scale items. Finally, on the basis of their comments, modifications were made.

4. Analysis and results

A description of the principal characteristics of the entire sample of 39 responding firms consisting the two sub-samples is provided in Table 1. Tests were conducted in order to evaluate the similarities of the samples. Pearson's Chi-squared test revealed that the samples were not significantly different (i.e. $p>0.05$) for the main sample characteristics, except for the variable "percentage of annual sales from local market" which shows a significant increase over time in the number of export-based firms.

Insert Table 1 about here

In order to select the appropriate procedure to test the differences between the old and new sampled firm, normality tests were conducted to determine if the values obtained from the firms' responses were normally distributed. The results of these tests (Kolmogorov-Smirnov and Shapiro-Wilk) revealed that most of the 18 variables considered were not normally distributed for both groups. Therefore, the Mann-Whitney U non-parametric test for means comparisons was selected as the most appropriate way to compare the means between the previous mentioned groups. This test has been reported as considerably more efficient and robust than t-test when sample distributions are far from normal (Conover, 1998). As of testing for the sample size, since the Mann-Whitney U non-parametric test does not provide values of the statistical power (which is the ability of a test to detect an effect, given that the effect actually exists) as an approximation a single sided t-test was applied for this purpose. Results for all the variables which were found to be significantly different between the two groups showed (at $p=0.05$) power larger than 75%.

Results of the Mann-Whitney U non-parametric test for means comparisons are shown in Table 2, and revealed significant differences between the two groups in regard to several of the studied variables. This Table provides statistical analysis of all the previous mentioned variables along with notations of the significant differences between data collected in the salmon farming cluster in the year 2003, and four years later in the year 2007.

Insert Table 2 about here

In the dimension of *general positive externalities provided by geographical co-location* (1), two out of fourteen different opportunities were found to significantly change over the four years period: “Access to a skilled labour pool” was increased while “Selling intermediate goods to other firms” was decreased. All other opportunities like “Providing access to new technology”, “Greater local market demand”, “Enhanced reputation or credibility of your firm and products”, “Greater innovation and new product development” - were not found to change significantly.

In the dimension of the specific *marketing externalities provided by geographical co-location* (2), we found significant changes only in “Joint distribution strategies” with other firms and with the Trade Association. All other opportunities in this dimension such as “Joint trade fairs participation”, “Joint market information research”, “Joint branding (co-branding)” and “Joint new product development”, were not found to change over time.

In the dimension of the *importance of inter-firm cooperation in marketing* (3), as perceived by the respondents, we found three of the five factors to have significant differences over time: “Our firm wish to co-operate more actively with other firms in joint marketing activities”, “Inter-firm co-operation in marketing is important for the development of our business”, “Inter-firm co-operation in marketing is important for the development of our industry sector”. No change was found in the other three factors referring to the importance of co-location.

In the dimension related to the *marketing activities in which firms want to get involved* (4), we found three of the eleven activities to change significantly, which were all increased. These are “Local / regional advertising”, “Inventory holding”, “Market research / intelligence”. The other eight activities such as: “International advertising and promotion”, “New product development” and “Internet strategy”, were not found to be rated differently over time.

In the dimension of *resources allocation* (5), only one of the nine inter-firm cooperation activities was found to increase significantly (to a large extent from the mean of 3.20 to 4.57), which is “joint product development”. The ratings for all the other activities were not found to change, including: “Joint distribution activities”, “Joint promotion strategy” and “Co-branding”.

Also the dimension of the *reasons for having inter-firm cooperation in marketing* (6) showed significant increase (from 4.09 to the maximum rate of 5.0) in one factor, named “Attract new customers”. The other five reasons, such as “Increase sales in the short and long term” and “Retain existing customers“, remained without significant changes.

Dimension 7 refers to both *formal and informal social networks with managers* in other firms and with the Trade Association. No significant change was found over time in relation to the Trade Association, but three channels of communication with the firms were found to decrease significantly: “contact mainly at an informal and social level”, “contact mainly at formal and informal levels on a one to one basis” and “contact at both a formal and informal levels”. It should be noted that the channel of communication “contact mainly at an informal and social level”, changed downward substantially from 3.73 to 1.55 at the significant level of $p<0,001$. The more formal channels of communication did not present a significant change.

The dimension which deals with *sources of marketing advice* (8) was not found to show any significant differences over the period of time analyzed in this study. The sources of marketing advice included “friends”, “family members”, “local Chamber of Commerce” and “managing directors from other companies”, among others.

5. Discussion

Findings of this study show that the more mature the cluster is the more well-qualified workers will be available. However, the specific type of cooperation of selling intermediate goods to other firms as one of the benefits of geographical co-location has decreased over time. It can be probably explained that firms fear strong competition at the cluster level and due to their vertical integration they do not need intermediate sales. Strong competition can also explain why firms which are co-located in a cluster tend to less cooperate in distribution strategies with other firms and with the Trade Association. An additional reason may be that more

mature clustered firms need less to join forces and are ready to go by themselves rather than to be helped by other firms or by the Trade Association. The decreased importance of inter-firm cooperation in marketing as perceived by the respondents can also be explained by rivalry while firms are more competitive and try to outperform other firms in the same cluster.

According to the above finding, we can clearly say that competition is stronger over time than cooperation in this cluster. These results support hypothesis 3 that cooperation which may jeopardise firms' competitive advantage will decrease while clustered firms getting more mature.

Hypothesis 1 which expects inter-firm cooperation in clusters yielding externalities of cost reductions to increase over time is supported. The variables related to marketing activities such as advertising; inventory management and market research were all found to increase over time. That means that firms would like to have more local and national advertising to improve the perception from the local community of their industry activities (e.g. public relations), while most customers are overseas. Firms apparently perceive that cooperation in inventory management (e.g. sharing a warehouse) may reduce costs while not involved with customers, hence no effect of their competitive advantage. Joint market research in foreign markets, is perceived as a direct benefit of cooperation for reducing costs of these studies. Also the increase in variable joint product development, which is related to the dimension of resource allocation, provides support to hypothesis 1. We suggest considering the increase in the variable attraction of new customers, which is related to reasons for having inter-firm cooperation in marketing, also supports this hypothesis since the externality of cooperation in this activity may save costs.

Interestingly, hypothesis 2 proposing that clusters enhance social networking overtime and thereafter inter-firm cooperation is not supported. The results show that three channels of communication between the firms were found to decrease significantly which are (1) discussions at informal levels, (2) person to person discussion and (3) general formal and informal communication at the social level. This phenomenon can be explain since discussion with other companies are perceived to be dangerous for disclosure of information and may cause losing competitive advantage, as rivalry is strong and there are low levels of trust in the Chilean and the Latin-American context as stated by Huemer *et al* (2009) study.

6. Conclusions and managerial implications

Following the results of this study two of the three suggested hypotheses are supported:

Hypothesis 1: inter-firm cooperation in clusters yielding externalities of cost reductions is increased over time; is supported

Hypothesis 2: clusters enhance social networking overtime and thereafter inter-firm cooperation; is not supported.

Hypothesis 3: Cooperation which may jeopardise firms' competitive advantage will decrease while cluster getting more mature; is supported.

In order to validate the findings of this study, discussions were conducted occasionally in the year 2008 on a person to person basis with seven general managers of the salmon farming industry who mostly validated the previous results. They indicated the trend of stronger competition in recent years, moreover in the year 2008 due to the ISA virus, which dramatically reduced marginal profits for all the firms participating in the cluster. The benefits of inter-firm cooperation in certain areas of marketing are perceived to be lower in light of the risk of losing competitive advantage. Thereafter, we can conclude that under this situation, firms are acting in a more individualistic in areas where they may lose competitive advantage, while cooperating in areas where their competitive advantage is not at risk, aiming order to reduce costs.

Based on the extensive clusters literature and the results related to hypothesis 1, it is expected that firms will cooperate aiming to achieve better economies of scale, as for example reducing costs of production or reducing logistic costs. The more mature the cluster is the more extent of this cooperation will be generated to the participant firms in the cluster. This phenomenon is not exclusive for well mature clusters, but also for the more traditional agglomeration economies which pursue reduction of costs as described in the literature since

Weber (1909), However following hypothesis 3, whenever cooperation is perceived to risk the competitive advantage firms will be reluctant to be involved in inter-firm cooperation (Mesquita 2007; Chetty and Agndal 2008). Moreover, it should be noted that the institutional aspects, formal organisations, such as business associations and the presence or absence of social capital, may play a critical role in creating the right environment and then influencing the climate for cooperation in regional clusters. Then, the right mix and balance of competition and collaboration is not just a matter of firms' involvement and willingness to cooperate, but also a matter of the whole environment surrounded the specific cluster. Firms in more established clusters are more aware of the inter-firm rivalry; thereafter lower levels of cooperation would be expected.

The unexpected finding which did not support hypothesis 2 is related to the development of formal and informal social networks. According to the literature we would expect to increase over time, however, this study showed decreased extent of formal and informal social networks. This can be explained as the salmon farming industry in Chile, though the cluster got older, it still have the characteristics of an inexperienced-nascent cluster. Moreover, the high intensity of competition for achieving a better international market share and the problems that this industry sector is facing in terms of the ISA virus and environmental concerns has apparently made the firms in the cluster to be more individualistic, while adopting a more competitive business behavior, without the development of social ties with other firms. This reflects the cultural identity of the Chilean businessmen, who show mistrust and aversion to failure risks if cooperation does not guarantee the expected benefits.

We do not believe that under the current market circumstances these practices are the best strategy for the salmon farming cluster in Chile. On the contrary, we would recommend at this time to enhance social glue between managers in the firms as well as between the firms and the Trade Association, ideally under the support of strong public policies of enhancing inter-firm cooperation and strategic alliances among clustered firms.

An additional managerial lesson for emerging countries, such as Chile, is the urgent necessity for the Trade Association to conduct more social informal interaction between the associated firms. This will enhance the possibility of further inter-firm cooperation among actors in the industry. This suggestion is also applicable for public policies aiming for more local and international competitiveness of firm competing in emerging economies.

The managerial implications of this study may help individual companies, participating industries and regional policy bodies. Specially, managers may have benefits of new knowledge about the best opportunities and specific areas for inter-firm cooperation. Public policy and regional development bodies may benefit of this research for achieving better regional clusters strategies, as well as specific incentives for companies participating in this regional industry. Cooperation may be fostered in the context where a new national and regional cluster strategy in Chile as well in some Latin-American countries is being currently implemented.

While most recent studies on industrial clusters have dealt with product development, this study contributes to the research of business-to-business marketing where issues related to clusters, and moreover longitudinal studies, have been under-researched. Also the international focus coming from Chile, while specifically dealing with a leading edge cluster of a resource-based industry, contributes with evidence from the under-explored Latin-American context to the study of business-to-business interaction.

In this study the cohort was limited to one nascent cluster located in a specific region of southern Chile. Also this study was limited to a specific period of time in which the industry encounters changes and challenges such as the ISA virus, environmental concerns and turndown of the global economy. It should be noted that this is a limitation of a longitudinal studies where certain data may not always be controlled or even available to the researchers.

In order to substantiate and generalize the conclusions larger database should be utilized and more regions need to be studied. Also additional industries such as the mining industry, located in northern Chile, or the fresh products and wine industries, located in central Chile, can be compared to the salmon farming industry discussed in this study in order to explore industry and regional specificity in the Chilean context. Finally, further research is needed in other cohorts located in different countries and conducted at different periods of time to enhance validity and reliable comparisons.

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Table 1. Samples Composition

Sample Characteristic	Old Salmon - 2003	New Salmon - 2007

*Percentage of annual sales from local market**	*Valid Cases = 20*		*Valid Cases = 15*	
0% to 50%	9	(45,0%)[a]	12	(80,0%)
51% to 100%	11	(55,0%)	3	(20,0%)
Main source of capital in the company ownership	*Valid Cases = 23*		*Valid Cases = 16*	
Chilean Capital	18	(78,3%)	9	(56,2%)
Mixed Chilean and Foreign Capital	5	(21,7%)	7	(43,8%)
Subsidiary of a multinational company	*Valid Cases = 23*		*Valid Cases = 16*	
Yes	3	(13,0%)	6	(37,5%)
No	20	(87,0%)	10	(62,5%)
Age of the company	*Valid Cases = 23*		*Valid Cases = 16*	
Less than 10years	9	(39,1%)	7	(43,8%)
More than 10 years	14	(60,9%)	9	(56,2%)
Number of full-time employees:	*Valid Cases = 23*		*Valid Cases = 16*	
Less than 50 employees	12	(52,2%)	4	(25,0%)
51 - 250 employees	6	(26,1%)	8	(50,0%)
More than 250 employees	5	(21,7%)	4	(25,0%)

a. Percentage based on total valid cases for each variable
* Pearson's Chi-squared = 4.375; p<0.05

Table 2. Mann-Whitney U Test Results

Variable	Group	Valid Cases	Mean	SD	Mean Diff. (NS-OS)	Mann-Whitney U	Z	
Dimension 1: How useful is being located in a specific region of your country (regional cluster) for providing the following opportunities to your firm/organisation:								
Access to a skilled labour pool	Old Salmon	23	3,13	1,06	0,62	122,5	-1,883	*
	New Salmon	16	3,75	1,13				
Selling intermediate goods to other firms	Old Salmon	23	3,57	1,16	-0,70	117,0	-1,718	*
	New Salmon	15	2,87	1,25				
Buying intermediate goods from other firms	Old Salmon	23	3,48	1,24	-0,35	146,5	-1,108	
	New Salmon	16	3,13	1,26				
Providing access to new technology	Old Salmon	23	3,09	1,35	-0,21	157,0	-0,801	
	New Salmon	16	2,88	1,15				
Providing access to better specialised suppliers	Old Salmon	23	3,22	1,41	0,47	156,0	-0,828	
	New Salmon	16	3,69	1,14				
Greater local market demand	Old Salmon	23	2,65	1,50	0,41	155,5	-0,835	
	New Salmon	16	3,06	1,57				
Greater international market demand	Old Salmon	23	2,39	1,34	-0,20	165,5	-0,553	
	New Salmon	16	2,19	1,38				
New customers find your firm	Old Salmon	23	3,04	1,55	-0,31	152,5	-0,612	
	New	15	2,73	1,53				

	Salmon						
Enhanced reputation or credibility of your	Old						
firm and products	Salmon	23	3,13	1,29	0,18	161,0	-0,679
	New						
	Salmon	16	3,31	1,54			
Finding new customers in new markets	Old						
	Salmon	23	2,87	1,39	-0,12	172,5	-0,338
	New						
	Salmon	16	2,75	1,44			
Greater market and marketing information /	Old						
knowledge	Salmon	23	3,04	1,52	0,14	173,5	-0,308
	New						
	Salmon	16	3,19	1,56			
Greater innnovation and new product	Old						
development	Salmon	23	3,39	1,16	-0,52	130,0	-1,316
	New						
	Salmon	15	2,87	1,30			
Inter-cluster referrals to your firm	Old						
	Salmon	23	3,04	1,11	0,21	164,0	-0,591
	New						
	Salmon	16	3,25	1,34			
Inter-cluster referrals from you to other firms	Old						
	Salmon	22	2,86	1,04	0,20	159,0	-0,527
	New						
	Salmon	16	3,06	1,24			
Dimension 2: How useful is being located in a specific region of your country (regional cluster) for facilitating the following opportunities for co-operation in marketing:							
Joint trade fair participation	Old						
	Salmon	22	2,82	1,33	0,24	155,5	-0,624
	New						
	Salmon	16	3,06	1,88			
Joint marketing delegations	Old						
	Salmon	22	2,95	1,36	-0,70	124,5	-1,574
	New						
	Salmon	16	2,25	1,48			
Joint trade missions to new markets	Old						
	Salmon	22	2,82	1,50	-0,51	144,0	-0,986
	New						
	Salmon	16	2,31	1,58			
Joint market information research	Old						
	Salmon	21	3,05	1,36	-0,11	163,5	-0,142
	New						
	Salmon	16	2,94	1,69			
Joint branding (co-branding)	Old						
	Salmon	21	2,38	1,47	-0,57	132,0	-1,198
	New						
	Salmon	16	1,81	1,17			
Joint sales to local markets	Old						
	Salmon	21	2,29	1,35	-0,29	143,5	-0,813
	New						
	Salmon	16	2,00	1,41			
Joint sales to foreign markets	Old						
	Salmon	21	2,19	1,29	0,00	161,5	-0,213
	New						
	Salmon	16	2,19	1,47			
Joint distribution strategies	Old						
	Salmon	21	2,67	1,28	-0,73	112,5	-1,789 *
	New						
	Salmon	16	1,94	1,34			
Joint new product development	Old						
	Salmon	21	2,76	1,45	-0,76	119,5	-1,584

	New Salmon	16	2,00	1,51				
Dimension 3: Based on your experience or expectations, to what extent do you agree with the following statements?:								
Firm wish to co-operate more actively in joint marketing activities	Old Salmon	21	3,19	1,25	-0,82	109,0	-1,868	*
	New Salmon	16	2,38	1,36				
Co-location is important for inter-firm cooperation in marketing	Old Salmon	22	3,00	1,35	-0,31	156,5	-0,595	
	New Salmon	16	2,69	1,35				
Inter-firm cooperation in marketing is important for the development of the business	Old Salmon	21	3,57	1,21	-0,88	109,5	-1,863	*
	New Salmon	16	2,69	1,35				
Inter-firm cooperation in marketing is important for the industry sector	Old Salmon	21	3,86	1,24	-0,92	111,5	-1,831	*
	New Salmon	16	2,94	1,61				
Co-location is not importnat for cooperation in marketing because of the use of ICT	Old Salmon	21	3,48	1,40	-0,35	147,0	-0,663	
	New Salmon	16	3,13	1,54				
Dimension 4: If your firm develops any inter-firm co-operation in marketing, overall how would you rate this co-operation in terms of each of the following activities?								
Local / regional advertising	Old Salmon	8	1,88	1,64	1,96	10,0	-1,957	*
	New Salmon	6	3,83	1,60				
International advertising and promotion	Old Salmon	8	2,50	1,69	1,17	13,0	-1,461	
	New Salmon	6	3,67	1,37				
New product development	Old Salmon	8	2,38	1,77	1,13	14,0	-1,323	
	New Salmon	6	3,50	1,22				
Pricing strategy	Old Salmon	8	2,75	1,39	-0,08	23,0	-0,136	
	New Salmon	6	2,67	1,51				
Sharing of distribution chanels	Old Salmon	8	2,25	1,39	0,75	14,5	-1,272	
	New Salmon	6	3,00	1,10				
Promotional discunts	Old Salmon	8	2,13	1,36	0,04	24,0	0,000	
	New Salmon	6	2,17	1,33				
Customer services	Old Salmon	8	2,50	1,41	1,33	12,5	-1,518	
	New Salmon	6	3,83	1,60				
Invertory holding	Old Salmon	8	1,50	0,76	2,17	7,5	-2,239	*
	New Salmon	6	3,67	1,75				
Sales training	Old Salmon	8	2,00	1,41	1,33	15,0	-1,227	

	New Salmon	6	3,33	1,97				
Market research / intelligence	Old Salmon	9	3,33	1,32	1,17	12,5	-1,789	*
	New Salmon	6	4,50	0,84				
Internet strategy	Old Salmon	9	2,44	1,42	0,72	20,5	-0,787	
	New Salmon	6	3,17	1,83				
Dimension 5: If your firm develops or expects to engage in inter-firm collaboration in marketing, the resources (people, time, money, etc.) for the development of these joint marketing activities are invested (or would expected to be invested) in:								
Joint product development	Old Salmon	10	3,20	1,48	1,37	14,5	-2,094	*
	New Salmon	7	4,57	0,79				
Joint price strategy and planning	Old Salmon	9	3,11	1,54	-0,25	28,5	-0,325	
	New Salmon	7	2,86	1,68				
Joint distribution activities	Old Salmon	9	2,89	1,17	0,83	19,5	-1,323	
	New Salmon	7	3,71	1,50				
Joint promotion strategy	Old Salmon	10	4,30	0,82	0,27	28,0	-0,773	
	New Salmon	7	4,57	0,79				
Co-branding	Old Salmon	9	2,11	0,93	1,03	20,0	-1,251	
	New Salmon	7	3,14	1,77				
Joint database technology and internet to improve communication with customers	Old Salmon	10	3,20	1,48	0,37	30,0	-0,502	
	New Salmon	7	3,57	1,40				
Establishing and building joint personal relationships with individuals customers	Old Salmon	9	3,22	1,56	0,78	21,0	-1,155	
	New Salmon	7	4,00	1,53				
Developing of firm's network relationships with markets(s) or wider marketing systems	Old Salmon	9	3,89	1,36	-0,32	26,5	-0,552	
	New Salmon	7	3,57	1,40				
A combination of all the previous	Old Salmon	8	3,13	1,13	0,48	14,5	-0,836	
	New Salmon	5	3,60	1,67				
Dimension 6: If your firm develops or expects to engage in inter-firm collaboration in marketing, the joint marketing activities with other firms/ organisations are principally intended to (or would be expected to) be:								
Atract new customers	Old Salmon	11	4,09	1,04	0,91	17,5	-2,274	*
	New Salmon	7	5,00	0,00				
Increase sales in the short term	Old Salmon	11	3,45	1,04	0,40	28,5	-0,935	

	New Salmon	7	3,86	1,68				
Increase sales in the long term	Old Salmon	11	4,55	0,69	0,17	34,5	-0,438	
	New Salmon	7	4,71	0,49				
Retain existing customers	Old Salmon	11	4,27	0,65	0,30	29,0	-0,968	
	New Salmon	7	4,57	0,53				
Develop cooperative relationships with customers, suppliers and buyers	Old Salmon	11	4,55	0,69	0,03	36,5	-0,218	
	New Salmon	7	4,57	0,79				
Cordinate activities between the firm, customers, and other parties in the wider marketing system	Old Salmon	11	4,45	0,82	0,12	38,0	-0,052	
	New Salmon	7	4,57	0,53				
Dimension 7: When people from your organisation (e.g. Managing Directors, Marketing Managers) meet (or if they expect to meet) with people from other firms to discuss about inter-firm co-operation in marketing, it is (or they will expect it to be):								
Mainly at a formal, business level	Old Salmon	16	3,19	1,38	-0,37	75,0	-0,656	
	New Salmon	11	2,82	1,54				
Mainly at a formal level, yet personalised via the use of technologies	Old Salmon	15	2,93	1,10	0,16	70,0	-0,679	
	New Salmon	11	3,09	1,22				
Mainly at an informal, social level	Old Salmon	15	3,73	1,16	-2,19	17,0	-3,520	***
	New Salmon	11	1,55	1,04				
Mainly at a formal and informal levels on a one to one basis	Old Salmon	15	4,13	0,64	-1,13	42,0	-2,266	*
	New Salmon	11	3,00	1,41				
At both a formal, business and informal, social level (but not in a one-to-one basis)	Old Salmon	16	3,06	1,39	-0,96	49,5	-1,656	
	New Salmon	10	2,10	1,29				
Dimension 8: How important would you consider the following sources of marketing advice if you want to develop interfirm collaboration in marketing?								
Friends	Old Salmon	18	2,94	1,30	-0,41	111,0	-0,892	
	New Salmon	15	2,53	1,36				
Family members	Old Salmon	18	2,44	0,98	0,16	124,0	-0,411	
	New Salmon	15	2,60	1,30				
Local Chanber of Commerce	Old Salmon	19	2,53	1,22	-0,39	117,5	-0,906	
	New Salmon	15	2,13	1,19				
Trade Association	Old Salmon	20	3,60	1,14	-0,60	104,0	-1,627	
	New	15	3,00	1,25				

Local Enterprise	Salmon Old						
	Salmon New	19	2,95	1,27	0,25	125,0	-0,630
	Salmon	15	3,20	1,32			
Social Groups	Old Salmon	18	1,67	0,84	0,40	115,5	-0,762
	New Salmon	15	2,07	1,22			
Other MDs (possible partners)	Old Salmon	20	4,05	1,00	-0,58	105,5	-1,563
	New Salmon	15	3,47	1,25			
People or employees from the firm	Old Salmon	18	3,56	1,10	-0,22	129,0	-0,226
	New Salmon	15	3,33	1,40			

* p<0.05, ** p<0.01, *** p<0.001 (one tailed)