

Regional Cooperative and Competitive Forces Driving Industry Cluster Development and Renewal in the Swedish Periphery

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Abstract

This research paper assembles regional industry clusters cooperative and competitive relations into a conceptual framework and reports upon an empirical study that captured initial developments of a regional biorefinery industry cluster in a peripheral region of Sweden. Key findings from the research illustrate how forces of *intra-regional cooperation* and *inter-regional competition* drove the new biorefinery industry clusters development, which in turn aided the peripheral region's renewal. For the development and renewal of regional industry, the role of not-for-profit collaborative organisations is evident. As a result, this single case-study provides new implications for research and practice in specific relation to regional renewal and industry cluster development within peripheral regions.

Keywords: regional renewal, industry cluster, peripheral, inter-regional, competition, intra-regional, cooperation, Sweden, local industry development, biorefinery

1.0 Introduction

In recent decades, regional industry clusters have become important for local development planning, practice and research efforts (Mills, Reynolds, & Reamer, 2008). Regional industry clusters are generally known as groups of interconnected businesses and organisations in a specific region that, through cooperative and competitive relations involving a localised business, support infrastructure and shared vision, and glean productive synergies for themselves and their particular local industry (Cooke & Huggins, 2003; Enright, 2003; Porter, 2000; Wolfe & Gertler, 2004). A growing interest in clusters as a concept and instrument for influencing regional renewal has developed within policymakers of industrial and post-industrial nations. As such, many local planners and community developers have been striving to improve their regions by developing new and rejuvenating old regional industry clusters (Karlson, 2008). This is exemplified in Sweden, the OECD and European Union where local, national and international authorities have recognised regional clusters as important for renewal, industrial modernisation and wealth creation (see European Commission, 2008a; Ketels, Lindqvist, & Sölvell, 2008; Maguire & Davies, 2007).

Extant research on regional renewal and industry cluster development has focused on successful – often high-tech – clusters located in flourishing regions (e.g. Roberts & Enright, 2004; Saxenian, 1994; Waluszewski, 2004). Prior research indicates that intense competition between local organisations is critical for local development. The interrelatedness and critical mass of clustered organisations is argued to encourage mutual monitoring, collaboration and observation (Ketels &

Memedovic, 2008; Porter, 2008); and as one cluster actor acts entrepreneurially, others are compelled to follow, striving to do better. Thus, regional industry clusters are known to entail public and private organisations embracing various competitive and cooperative activities that create entrepreneurial, and sometimes-unexpected local developments (Johannisson, 1987; Newlands, 2003; Waxell & Malmberg, 2007).

Although the aforementioned research offers valuable contribution to our knowledge of local community and regional industry developments, it only provides insights into competitive and cooperative relations of successful and well-developed phenomena, occurring in central and flourishing regions. As such, the emergence and development of new industries has been neglected (Forbes & Kirsch, 2010); and empirical examples of renewal and regional industry clustering in peripheral locations are few. Some notable exceptions are Camagni (1995); Hall & Donald (2009); Kaufmann & Tödtling (2000); Nuur & Laestadius (2007, 2010); Rees (2005); Virkkala (2007) and von Friedrichs (2003); and these scholars argue that knowledge of industry clusters in peripheral regions, and their competitive and cooperative dynamics, is limited.

Research suggests though, that peripheral regions often lag in terms of local business development, investment and support organisations conducive to an entrepreneurial local business environment (European Commission, 2008b; Rosenfeld, 2002; Tsipouri, 2005). The geographical remoteness from large markets, combined often with low levels of human capital, limited local competition in product markets and narrow regional market opportunities generally deters development in peripheral regions (North & Smallbone, 2000). Private sector activities, in these often-rural areas, are generally sparse, and are dominated by small businesses in traditional industries.

Developmental services, and necessary support structures for facilitating fruitful and productive networking, up-skilling and technological transfers tend to be lacking in peripheral regions (Malecki, 2003; Tödtling & Trippel, 2005). Consequently, specialised collaborative services more often than not fail to exist within remote locations. This makes cooperation between local businesses, universities and public R&D centres weak (Doloreux, 2003). It is therefore construed that in peripheral regions, industry clusters' competitive and cooperative relations may occur differently.

To this background the purpose of this research paper is threefold: first, to outline the conceptual nature of regional industry clusters' cooperative and competitive relations; second, to further understand cooperative and competitive forces driving a new industry cluster in a peripheral region; and third, to acknowledge the implications of this study for future regional renewal planning, practice and research. As a result, this research suggests that intra-regional cooperation and inter-regional competition is central for new regional industry clusters to emerge, and that regional industry clusters are able to play a key role in a peripheral regions renewal.

2.0 Conceptual Framework

In this section, prior research regarding regional industry clusters cooperative and competitive relations are assembled into a joint conceptual framework. It should be noticed that research (i.e. Hendry, Brown, & Defillippi, 2000; Newlands, 2003)

indicates local industry clusters' competitive and cooperative relations to encompass both economic and social processes associated to organisational interdependences.

2.1 Intra-regional Cooperation

According to Porter (1990, 2008), You and Wilkinson (1994), and Oliver (2004), regional industry clusters involve an assortment of local firms and organisations *cooperating* around common business activities, and using key organisational competencies to complement each other. This develops processes of locally orientated cooperation where the regionally clustered actors exchange various business services, resources, knowledge, skills and personnel. Regional industry clusters are, thus, characterised by high levels of intra-regional cooperation in which complementary activities and reciprocal exchanges of local business, information, skills and knowledge become standard practice (Karlson, 2008).

Ottati (1994) argues that intra-regional cooperation is dependent on adherence to local industry conventions and organisations meeting regional business behavioural requirements. Thus, reciprocal conventions play an important role by making intra-regional cooperation achievable (Ottati, 1994, 2002). Newlands (2003) notes that most key developments and significant events for regional clusters occur when reciprocal intra-regional cooperation transpires between all organisations and people engaged in a cluster. The research from Ottati (1994, 2002) and Newlands (2003) is useful to help explain that local conventions in a region enable clustered actors to operate (very productively) under informal agreements, and even to predict the quality of services, information, knowledge and goods that they exchange. The prospect of regular interactions within a cluster stimulates intra-regional cooperative behaviour to higher than normal levels, namely through local activities like pooling resources and sharing risks. In addition, Maskell and Malberg (1999) argue that clustered organisations will reduce costs by developing complementary functions, and new types of regional organisations that help gain economies of scale and scope within a local business environment. Hence, intra-regional cooperation is considered a critical development force within regional industry clusters.

It should be noticed, however, that abuse of intra-regional cooperative conventions could create tensions and even withdrawal, which in the close-knit socioeconomic environment of a regional industry cluster can be damaging. Andersson, Serger, Sörvik, and Hannson (2004), and Ottati (1994, 2002) indicate that these intra-regional cooperative forces depend on socialisation processes and social control in which the role played by formal institutions in supporting, policing and spreading intra-regional cooperation is central. As Porter and Emmons (2003) teach, these 'institutions for collaboration' (hereafter IFC's) are intermediary and are regionally based organisations that sustain cooperative interest amongst the local actors. IFC's can take various forms such as chambers of commerce, industry associations, professional associations, technology transfer organisations, quality centres, think tanks and 'community development organisations' (Bessant, 2005; Porter et al., 2003).

In dynamic regional industry cluster settings, Ketels, Lindqvist and Sölvell (2008) note that a 'cluster organization' (CO) will often act as the IFC. An IFC and CO main roles tend to facilitate constructive intra-regional cooperation, which can vary from engaging local organisations in collective projects and business activities, to

representation of the groups' new and/or established organisations, and general promotion of the cluster (Bessant, 2005; Porter et al., 2003).

Although intra-regional cooperation creates fruitful results for local industry development, Lagendijk (2002) reminds us that too much on intra-regional activity can create a 'regional gaze' that fails to look beyond the boundaries of the cluster. In the long term, this can be harmful for local business and industry developments. Visser and Boschma (2004) advise that an overreliance on local collaboration could, over time, restrict development by creating negative cognitive and organisational lock-in, highlighting subsequently a weakness of strong local ties (see Morgan & Nauwelaers, 2003, p. 8). This leads regionally clustered actors to offset intra-regional relations and explore other cooperative activities – for example, *inter*-regional cooperation.

2.2 Inter-regional Cooperation

Regional industry clusters exhibit flows and exchanges of services, resources, knowledge, skills, and personnel with other industry clusters, firms and institutions located outside their specific regional business environment (Enright, 2003), and are therefore considered to cooperate inter-regionally. Research has noted that valuable new skills, business initiatives and innovations will be created in numerous regions, and in other regional clusters. As a result Malecki (2004) and Newlands (2003) argue that successful industry clusters are outward looking and engaged in many non-local and inter-regional cooperative activities.

Oinas and Malecki (2002) argue that inter-regional cooperation is vital for the renewal of regional business environments because it facilitates new ideas and industry techniques that would not be developed locally. Moreover, Bathelt, Malmberg and Maskell (2004) note that inter-regional cooperation is dependant on well-organised cooperative relations, connecting the cluster to other regional business environments. Bathelt et al. (2004) suggest this to be beneficial for a cluster's development, namely because individual firms (as members of a cluster) can benefit from establishing competence and developmental relations with actors outside their specific region.

In a study of an emerging high-technology and knowledge-based Canadian cluster, Rees (2005) explains how non-local collaborations are an important sources of competitiveness, which means that even world-class industry clusters cannot be permanently self-sufficient in terms of avant-garde skills, business or entrepreneurship. Hence it is suggested that clusters of local organisations that build collaborative links with other clusters, in other regions, gain much competitive advantage (Semlinger, 2008).

Bathelt and Taylor (2002) indicate that advantages from an industry cluster's inter-regional cooperative activities derive from the integration of organisations located in multiple business environments. Inter-regional cooperative activities can feed local interpretations and usage of knowledge, skills and competencies that helped the development of successful businesses and industries in other regions. In turn, this often provides regional clusters with fresh resources, specialised skills and new possibilities to benchmark from one another.

Although inter-regional cooperation can support regional industry cluster development, when it becomes too dominant inter-regional cooperation has potential to threaten a cluster's long-term existence. When regionally clustered

actors are too focused on inter-regional cooperation, such activities can takeover the local business environment, and regional actors can become less willing to engage in local efforts and local information flows. It is noted that a regional industry cluster, whose core actors constantly travel outside the region (in order to build and maintain inter-regional cooperation) could run risks of becoming static at the local level, and out of touch with their own regional business environment. Thus, Asheim and Cooke (1999, p. 156) argue that inter-regional cooperation should not replace localised collaborations, but aim instead to create strategic advantages over inter-regional competitors.

2.3 Intra-regional Competition

Although intra- and inter-regional cooperation is noted to progress industry cluster developments, research and practice indicates that competitive relations are equally important. The underlying drivers of such dynamics are local events, actions or interactions giving rise to a constant search for some kind of absolute or comparative advantage (Malecki, 2004; Porter 2008).

Andersson et al. (2004), Ottati (1994), and Porter (1990, 2008) each note that local *competitive* relations prompt rivalry and increased motivation among a cluster's core actors. They note that as one organisation acts entrepreneurially, others in the cluster are compelled to follow, and in many cases strive to do better. Thus, intra-regional competition is considered as a core stimulant for regional industry development (see also Enright, 2003; Ketels & Memedovic, 2008; Porter, 2003). Intra-regional competitive relations involve numerous local businesses and industry organisations competing, consciously monitoring and observing each other, facilitating conventional comparative relations to transpire such as cost and price comparisons.

Important competitor-based knowledge and market information can be transmitted within a regional industry cluster via a variety of formal and informal intra-regional competitive relations. The most important of these is frequent monitoring and observation (Porter, 2003), and the advancements and entrepreneurial developments that intra-regional competitive relations create will vary. Andersson et al. (2004) argue that market characteristics of a cluster will determine whether local business actors attempt to gain an advantage by reducing costs or prices, raising quality, acquiring new customers, or entering new markets. Hence, the intra-regional competitive actions and decisions of clustered organisations help raise the bar for all actors. Thus, prior research indicates intense intra-regional competition should be the dominant force of an industry cluster.

On the other hand, intra-regional competition could also be destructive and create high entry or advancement barriers for newcomers. Ottati (1994) suggest that intra-regional competition can give certain local actors unhealthy privileges, which reduce long-term collective developments and hinder community advancements. Subsequently, too much (or overly dominant) intra-regional competition discourages a cluster's new entrants instead of fostering their development. Regardless of the importance of local rivalry and intra-regional competition, these relations are as much a part of the regional renewal picture as inter-regional competition and rivalries with other regional clusters.

2.4 Inter-regional Competition

Scholars (i.e. Cortright, 2006; Porter, 1990) argue that industry clusters compete with each other because, quite plainly, they are able to go out of business. An industry cluster's *inter*-regional competitive activities encompass the collective group of organisations competing with other businesses, industry clusters, organisations and institutions located outside their specific region.

Inter-regional competitive relations assume various forms. Fagerberg (1988) notes that conventional comparative dynamics such as cost and price comparisons, which usually transpire between businesses, become less important between industry clusters and they are replaced by technological competitiveness and the ability to compete on delivery. Further to this, Ffowcs-Williams (1997, 2004) indicate one of the simplest and most common forms of inter-regional competition for clusters is promotion and marketing. However on closer inspection, much inter-regional competition within and between clusters involves more than marketing or attempting to sell core products and services. It involves enhancement and improvement of the cluster's core attributes that attract investment and skilled labour to the location and make the regional business setting 'sticky' (see Markusen, 1998).

Malecki (2004) suggests that intra-regional competition will entail direct head-to-head contests for particular projects or events, and in other circumstances to encompass more indirect and subtle relations like attaining media attention. Subsequently local industry clusters' inter-regional competitive relations are often attributed to non-price competition where regional clusters compete in measurable areas, such as human capital and infrastructure and in other, less measurable ways, such as social capital, collective cooperation, collective learning and untraded interdependencies (Malecki, 2004).

It should be noted that inter-regional competitive relations tend not to involve as regular or intense events or interactions as on the intra-regional level. According to Porter (2008), this is because intra-regional competition is enhanced through local interrelatedness and geographic proximities. Often regional clusters are located on opposite sides of the world to the other clusters with which they are competing; thus, intense competitive relations tend not to transpire. Nevertheless, the underlying competitive principles (i.e. events, actions or interactions that give rise to a constant search for some kind of absolute or comparative, advantage) still exist inter-regionally. A cluster's competitive relations with other regional, national and foreign entities encourage its core actors to react to improvements and developments introduced through external competitors. This develops the process of inter-regional competition within the regional cluster, and plays a significant role in stimulating them to develop, improve and outperform other regional business environments.

This theoretical overview has created a joint framework that illustrates regional industry clusters' cooperative and competitive relations and indicates that they transpire both intra and inter-regionally. Whereas in most cases formal and informal inter-organisational strategies let competing entities within the region manage partially convergent interests by cooperative advantage (Porter et al., 2003), in some cases, formal IFC's and Cluster Organisations help to accommodate regional competitive and cooperative forces. There are, however, few published empirical studies available in this area. Hence, at present, little is known about competitive and cooperative forces related to emerging regional industry clusters in peripheral regions.

3.0 Research Site

This research was conducted in a peripheral Swedish region (Örnsköldsvik) that spreads out around a small coastal city with 55,387 inhabitants (SCB, 2009). The Örnsköldsvik region is located in one of Sweden's least enterprising counties (see Kreicbergs, 2010) and has a population density of 8.5 inhabitants per square kilometre. In 2008, there were 2,744 economically active businesses operating in Örnsköldsvik. The largest and most dominant businesses in the region were within forestry, pulp-and-paper and engineering sectors (SCB, 2008). Twenty seven percent of Örnsköldsvik residents work in manufacturing compared to the national Swedish average of 18%. A military vehicle production sector, small local tourism and professional service divisions exist alongside a budding biorefinery sector. Figure 1 shows the Örnsköldsvik regions location in Sweden, Scandinavia and north Europe; Figure 2 illustrates the regions borders and locality in more detail.

Figure 1. Location of the Research Site

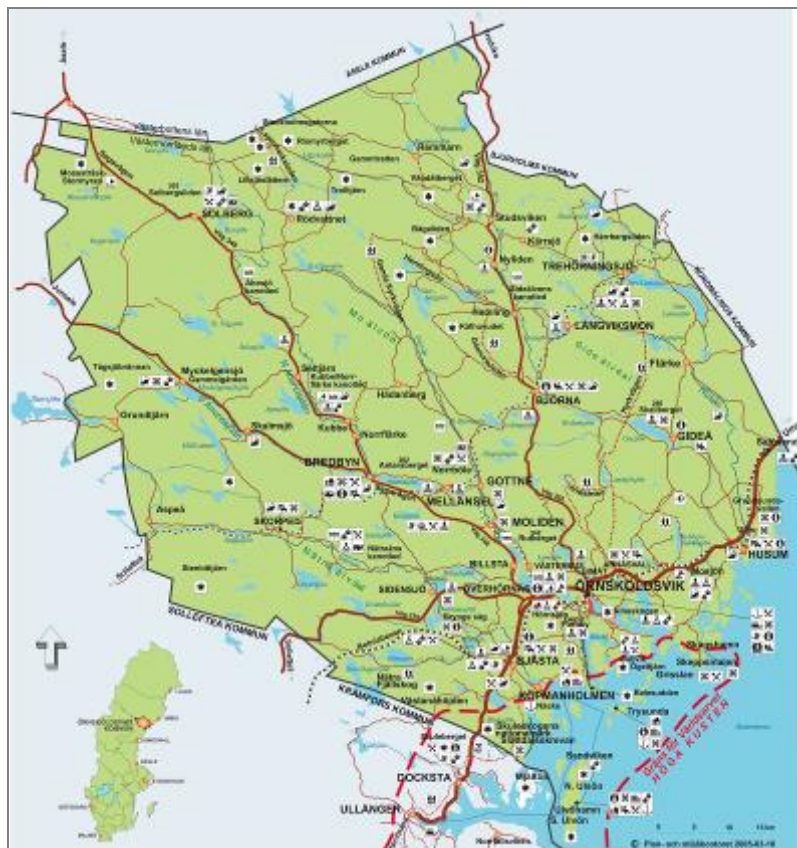


Nuur and Laestadius (2007, p. 47) point out that many peripheral regions in Sweden fall victim to *Bruksanda* - the spirit of expecting everything from a single village factory. This is analogous to *Bruksmentalitet* – strong conformism, low interest in education, weak entrepreneurial spirit and sharp boundaries between social groups – that gripped many rural communities in Sweden during the first half of the 19th century, and stems also from reliance on a sole (often manufacturing) firm or ‘branch plant’ (Phelps, 1993). Exhibiting decidedly similar characteristics in Örnsköldsvik, the research sites’ industrial traditions, *bruksmentalitet* and socioeconomic developments trace back to the first local sawmills being established, and pulp production becoming dominant in northern Sweden during the early 1900s.

A key development phase for the Örnsköldsvik region occurred during WWII, when importing chemical products into Sweden was difficult. To take care of Sweden's chemical resource needs – mainly chlorine and ethanol – a local Örnsköldsvik conglomerate (MoDo), with strong ties to Sweden's wood-based industries, took the lead by developing research and production facilities that would create chemicals from the abundant local forestry supply. Gaining strong commitment from local employees and suppliers, as well as becoming active in local church and sporting associations (mainly ice hockey), MoDo became a regional locomotive; It built the foundations for the Örnsköldsvik business, industrial and societal landscapes (Croon, 2005; Peterson, 2009).

However in the late 1980s Sweden's wood-based industries faced economic difficulties, which for most of the nation's rural areas, especially those north of Stockholm, permeated into socioeconomic challenges (Lehtinen, Donner-Amnell, & Sæther, 2004; Waldenström & Westholm, 2009). As a result, the Örnsköldsvik industrial and societal locomotive debased during the 1990s. And many local businesses closed, downsized or relocated to more central regions in Sweden. This resulted in a loss of around 5000 jobs in the Örnsköldsvik region (Engman, 1996). During this time, it was not uncommon to hear local residents describe their remote regional community as *Dövik* – meaning 'Dead Bay'.

Figure 2. The Örnsköldsvik Region, Sweden



Source. Örnsköldsvik municipality 2010

Aware of regional decline and a potential dormant status, local media as well as business leaders, entrepreneurs, and politicians, reported the need for new businesses, new industries, and a general need for renewal in Örnsköldsvik. Among various ideas to meet the new needs, a novel biorefinery industry and cluster initiative, based on an almost defunct industrial site, emanated between local entrepreneurs. The entrepreneurs' plans were to initiate new collective business and to gather older businesses closer together in order to develop innovative and more versatile industrial facilities and processing systems that integrated biomass conversion equipment and processes, to refine raw forest material into modern products. Once developed, a strategy was to have the products sold domestically, and/or exported internationally, from the region's deep-water port.

The Örnsköldsvik regional biorefinery industry and cluster initiative required resources and infrastructural support that traditional forestry and pulp-and-paper industry in the region used. This resource presage combined with prospects of new jobs and a promising regional industry meant that activities around the newly forming cluster were often reported in local press and national media. Moreover, high profile business ideas from the eminent industry cluster (e.g. ethanol from wood as a fuel for transport) were debated at length at national Swedish and European Union levels, and included within Örnsköldsvik municipality's regional development scheme - Världsklass 2015¹.

The emerging biorefinery industry and clustering activities were well noticed within the remote regional community. This provided opportunities for obtaining quality empirical data and information on under-researched processes of regional industry renewal and cluster development. With the aim of providing a rich description of the regional industry clusters development and regions renewal processes, the research was carried out as an in-depth qualitative case study (Neergaard & Ulhøi, 2007; Siggelkow, 2007) based in the peripheral Örnsköldsvik region.

4.0 Research Approach

Empirical data used in this research paper generates from multiple sources: semi-structured interviews; workshop symposia; internet; media archives and databases. Initially, a one-day symposium workshop was conducted with eight representatives of the emerging regional industry and cluster. The purpose of this symposium was to make observations, take field notes and allow the author to gain an initial understanding of the region's local business setting, along with its historical and current industrial developments. Then, over a 6 month period, semi-structured interviews were conducted with regional and industrial developers, local forestry procurement managers, business developers, industry cluster planners, pulp-and-paper production managers, bio-waste and chemical-processing site managers, an

¹ The Örnsköldsvik regional municipality created 'Världsklass 2015' as a local development scheme and long-term project encompassing five strategic 'regional excellence' areas. Each area aimed for the region to be 'world-class' by the year 2015. The biorefinery industry initiatives fell into the municipality's 'Beyond oil – industry development in a sustainable society' area. Other strategic excellence areas were: 'Worth seeing' – aiming to develop local tourism; 'Finally at home' – aiming to develop the quality of life and attractive accommodations; 'Skills for the new world' – aiming to develop skill provision and higher education; and 'More City' – aiming to develop local attractions, establishments and venues.

ethanol production technician, research and development technicians, trade officials, and public servants in local, regional, and national authorities.

The semi-structured interviews ($n=19$) were conducted face-to-face and lasted between one and three hours. Inspired by Perry (2007) a themed interview guide was used to assist during the interviews. Informants, whose time working in the region ranged from 3 to 44 years were able to outline, through their own words and expressions, key events, activities, relations and incidents relating to the regional biorefinery industry and cluster. Observational notes were made and follow-up questions employed. The semi-structured approach (Eriksson & Kovalainen, 2008) afforded openness from the informants. Each interview was digitally audio-recorded and transcribed verbatim within 24 hours of being conducted; the transcribed interviews totalled 322 single-spaced pages.

To provide detail and deeper understanding of the studied phenomenon documentary material was gathered before, during and after the interviews. When collecting this qualitative data, information was sought in regards to local industry activities, events and relations pertaining to the regional biorefinery and industry clusters developments. Information published during the period 1999-2008 was requisite, as this was when the initial workshop and interview data identified the prominent competitive and cooperative activities and relations to occur.

Documents in local/national media archives and databases, on local business and governmental websites, and from various key informants were gathered. In total, this data encompassed over 150 documents: biochemical industry newsletters, biorefinery planning documents, EU project pre-studies, and forestry company annual reports, meeting minutes from regional development project meetings, municipality planning documents, newspaper articles and press releases. Observations were also made while participating in two local development forums.

From a single case-study approach (Siggelkow, 2007) the gathered data was analysed with particular focus on inter and intra-regional cooperative and competitive activities, events and relations. Inspired by Gioia and Chittipeddi (1991) the interview narratives were coded into first-order categories, in which patterns and similarities between them were explored. Seeking detail, the patterns were compared to those within documentary materials, refined accordingly and placed into second-order themes. The second-order themes represented more aggregated explanations of various regional cooperative and competitive forces. Within each second-order theme, key findings emerged that described prominent intra-and inter-regional processes occurring during the studied regional industry's developments and renewal.

5.0 Empirical Findings

In this section, prominent cooperative and competitive forces found driving the regional biorefinery industry cluster's development are explained. The findings highlight how the nature of such forces differed depending on whether they occurred intra or inter-regionally.

5.1 Intra and Inter-regional Cooperative Forces

Intra-regional cooperative relations flourished during the biorefinery industry cluster's emergence, whilst on the other hand inter-regional cooperation lay rather idle. Within these regional cooperative relations were forces that encompassed:

- Creating collective opportunity
- Advancing new business and research flows
- Building legitimacy and authenticity

Creating collective opportunity

Concerns over local industry stagnation (and decline) spurred the conception of new regional industry development discussions. The new ideas focused on creating collective opportunities. A small group of entrepreneurs began to discuss and develop new regional industry concepts and business ideas. A main concept was an innovative regional industry and cluster. Related projects (and action plans) concerned creating new businesses and organisations in the local community, and encouraging already existing businesses to cooperate. The core idea was to develop pioneering industrial facilities, and processing systems that could integrate biomass conversion equipment and processes, to refine raw biomass – mainly forest material – into new value-added products (i.e. textiles, fuels, food additives, pharmaceutical aids, energy and heat, soil enhancers, paints and solvents). Simultaneously, the entrepreneurs worked together to create a novel not-for-profit organisation (hereafter IFC), to be owned by a local interest group that represented their interests in realising new regional business and industrial opportunities². A local industry development manager noted,

“The forming of the biorefinery collaborative was a state mark and as a concept made it possible for companies to use them as a resource for new business and research”.

Consequently, new firms began to work side-by-side and create opportunities for other local businesses to share resources, office buildings, human resources, research equipment, and laboratories with older companies. Much of this work was also done for local R&D firms to create new products, services, and industrial processing techniques. Cooperative websites and professional marketing materials were developed. A new business incubator was also created and situated nearby to assist budding entrepreneurs and related start-ups.

The not-for-profit IFC organised and conducted research-based and development projects with local firms that were interested in accessing new biorefinery industry opportunities. For the firms and entrepreneurs involved, these new projects reduced human resource and administrative overheads and created opportunities for them to free-up resources and explore new business areas. The IFC prioritised and promoted new and potential business opportunities in ways that not just one business or organisation in the cluster was able to advance and capitalise upon. The opportunities were prompted so that all members were able to benefit; these

² The formal organisation - *Processum Biorefinery Initiative AB* - was setup with an independent Board of Directors with persons from key regional industries and businesses that showed an interest in developing new process industry activities in Ömsköldsvik. Local organisations and businesses were then invited, or applied, to become A, B or C-level members of the organisation. The type of membership determined the amount of funds contributed to the collective organization (eg. A-level members would contribute most funds and C-level members the least). With a not-for-profit focus, earnings generated by *Processum Biorefinery Initiative AB* would *not* be distributed directly to members or shareholders, but instead, profits would be reinvested to promote and support new biorefinery business activities in the region.

activities increased the opportunities for progressing the cluster. Whilst explaining how this was done, an IFC board member noted,

“They [the participating companies] had a lot of ideas and we would prioritise them so we could get the groups vision into what should be prioritised”.

Alongside the creation of a not-for-profit IFC, the collective group of business and organisations that began realising the biorefinery industry, developed new partner channels within the region. A process-technology manager mentioned,

“With help from the Processum group we were approaching the pulp-mills and locating the good local partners”

Other informants noted how these collective relations benefited the new industry and cluster’s development. It compelled people and firms interested, but not actually engaged in the initiatives, to try harder and to contribute towards developing new local business concepts instead of just observing. As such, key actors in the biorefinery initiatives organised and developed research activities between local companies, and created new business opportunities by sharing physical facilities and setting-up joint business administrative systems. These activities also created new employment opportunities related specifically towards the new biorefinery cluster initiative. New employees were observed administering and expediting new research, industry development and business projects for local companies that lacked resources to do them alone. The new expansions were essential to effectively and efficiently facilitate the local cooperations and to create new regional industry development opportunities. In 2005, two years after initial conception, the IFC had three professional employees. And by 2007, the IFC’s highly skilled human resources had increased to eight. Thus, skilled, trained and competent human resources, which the clustered organisations had direct access to and assistance from, were augmented within the remote region.

Advancing new business and research flows

Central outcomes of the new collective opportunities were locally based business, and research projects. The IFC become responsible for the projects, subsequently offering and promoting their benefits to all the members of the IFC. However, complete and fair allocation of the project resources did not occur. Instead of awarding each organisation involved in the cluster initiative the same share, the IFC worked towards the businesses, entrepreneurs and organisations showing that the most interest would advance the flow of new business and research within the small community.

Important in the selection of new intra-regional collaborative projects (as well as decisions concerning on what to use newly gathered resources) was that at least two or more local companies needed to be involved. Many local cooperative relations at this time were often the result of decisions made within the IFC. This was observed to advance new business developments and encourage local companies interested in the initiative, but inactive, to submit development projects to the IFC. Consequently, the flow of tangible business, research, and development projects advanced. For example, a local research firm had conducted investigations that needed to be put into industrial trials, and in order to build a pilot plant on a semi-dormant industrial site they made joint investments with local power and energy firms. Thus after just two years of building collaborative business and

research projects the emerging industry cluster's central collaborative organisation was responsible for seven new business creations and had gathered 14 local companies into the regional biorefinery initiatives (Kågström, 2006).

Eight senior scientists and two professors were incorporated into the cluster by the non-profit IFC, subsequently advancing flows of research within the region. These experts began working directly alongside businesses to actualise biorefinery industry R&D. This provided new direct interactions between the cluster's core firms and a nearby university, and it played a key role in driving the flow of research and development projects based on wood and chemical processing, process engineering, and process controls. It also offered businesses engaged in the new biorefinery industry projects a chance to meet with university professors to discuss current and future problems and projects. In some of the meetings, new ideas turned into tangible action, proposals for new business were stimulated and potential patents developed.

Results and information from the locally generated research projects were often distributed to, within and between the regionally clustered firms, IFC, and regional government. These intra-regional activities opened new commercial and research flows for local firms. After new patents were developed from joint projects between the non-profit IFC and member businesses, a new processing plant was designed and implemented where innovative green chemicals (methanol and ammonium sulphate for fertiliser) from renewable local forest resources would be produced. Consequently, new biomass processing technologies were developed within that helped several local processing mills reduce nitrogen oxide emissions. Research connections to universities located in the nearby Umeå region, as well as metropolitan regions of Stockholm and Gothenburg were also developed.

Building authenticity and legitimacy

Although new research and business flows were being advanced, many of the initiatives lacked authenticity and legitimacy. Hence, lead entrepreneurs began to interact with the region's politicians and establish more support and funding. Furthermore, key organisations within the emerging industry cluster lobbied local government bodies towards supporting the emerging biorefinery industry projects³. These newly attained funds were used mainly to develop local biorefinery related research towards commercialisation, and these made the new industry cluster initiatives more authentic. Furthermore, some firms begin extra efforts towards meeting and working with local city councillors. These intra-regional activities resulted in favourable decisions being made for the emerging biorefinery initiatives. This helped develop the industry cluster's legitimacy within the region. Exemplifying this were decisions to build new (and upgrade old roads) that heavy industry transport could use whilst transporting raw materials and manufactured products to and from industrial sites, and decisions to provide free car-parking facilities for local residents with ethanol-fuelled automobiles⁴.

³ For example, during the 2006 financial year approx 25% of the emerging industry cluster's IFC funds were attained from off local political organisations. Key individuals developing the biorefinery initiatives convinced the county administrative board to support the emerging biorefinery industry with over one-million Swedish kronor (SEK) and encouraged a local council to give 900,000 SEK (circa 92,600 EUR).

⁴ Ethanol developed from biomass and used as fuel was one of the initial high profile regional industry projects stemming from emerging the biorefinery cluster in the Ömsköldsvik region.

Additionally, entrepreneurs representing the collective group interacted with local government authorities in order to develop campaigns that would benefit the emerging regional cluster, and integrate the new industrial ideas into the local community. The core-clustered businesses began collaborating with local primary, middle and tertiary education providers and setup projects through the IFC so that local high school students would take fieldtrips (four per year) to see-and-learn about the newly developing biorefinery industry and clustered firms. New chemistry based and industrial processing science programmes were developed, for example, a '*Green Chemicals without Oil*' course. Simultaneously more local businesses decided to contribute to the new industry initiatives. This was done through greater personnel commitments and active input at each formal cluster meeting. In addition, the local biorefinery collaborative activities gained positive media recognition and received financial backing from a prominent research trust (i.e. Kempestiftelsen) and the neighbouring region's university (i.e. Umeå University).

Complementing this prominent intra-regional cooperation and legitimacy building, core firms in the initiative worked alongside the IFC to develop a traineeship program. Funded and facilitated by the not-for-profit IFC, over a 12-month period the program recruited and introduced six local university graduates, and future employees, into the initiative. These fresh human resources worked on joint projects aimed at developing new biorefinery industry products, processes and systems within and between four local firms. This resulted in further positive media attention, and appeared to aid the emerging industry cluster's legitimacy within Örnsköldsvik and other regions in north Sweden.

Core firms and organisations working to develop the cluster had initiated and become engaged in different cooperative relations at the European Union (EU) level. Public education schemes and awareness ventures based on using ethanol as a fuel for transport joined similar initiatives, on a national scale, for lobbying activities in the EU. Public Swedish and EU funding was eventually received and proved the biorefinery initiatives' worthiness. Having activities being part of national, and EU, funded initiatives appeared to raise societal awareness, and assisted, while lobbying agencies in the US, to support the cluster's advancements in gaining finance.

These inter-regional cooperative activities were found to build legitimacy and authenticity for the initiatives within the Örnsköldsvik region and the European arena. After gaining EU support for a particular bio-fuel project, an executive active in promoting the region noted that having an EU logo or stamp placed on marketing and promotional material (brochures, websites and presentations slides etc) was well-received by external parties. Subsequently initiatives around the industry cluster become more authentic.

Some inter-regional relations with large firms and subsidiaries of traditional Swedish – or in some cases international – organisations were found to debase some of the cluster's initial activities. Local employees who were passionate about their community's recent biorefinery advancements, yet whose managers' head offices were located in other regions of Sweden and Europe, had, in some instances, their work related activities questioned heavily. Certain work relating to the industry cluster's developments halted when employees tried to seek authentication and extra support from bases abroad. Thus, some inter-regional cooperative efforts were not actualisable. Despite certain debasing activities, inter-

regional cooperation was rich and found aiding the emerging cluster towards becoming legitimate and authentic.

5.2 Intra and Inter-regional Competitive Forces

During the industry cluster's emergence, inter-regional competitive relations were found to flourish whilst the intra-regional forces were debased. Within these regional competitive relations were forces that encompassed:

- Outperforming other regions
- Protecting core concepts
- Monitoring external parties

Outperforming other regions

As local projects and ideas for developing a regional biorefinery industry were commencing, lead entrepreneurs and managers entered the collectively orientated initiatives into a Swedish regional development competition⁵. Subsequently the setting found itself in head-to-head battles with many other regional business settings in Sweden for long-term support, development training and financial resources. Key informants explained how the regional biorefinery industry cluster had to outperform other innovative Swedish cluster settings in strategic concepts such as implementation of development plans, organisational/regional learning, and regional business system effects. Thus the newly forming cluster became engaged in competitive relations with a handful of other emerging regional industries throughout Sweden, which compelled business and organisations in the emerging Örnsköldsvik industry to actualise collective developments vis-à-vis other regions.

Committing and being exposed to new, and non-local, competitive relations meant the core businesses and IFC needed to develop reports, initiate and attend meetings, discuss and promote the initiatives to national evaluation panels as well as to an international panel of cluster experts. Development and realisations of these tasks were continuously carried out. These kept local organisations, in the peripheral region's newly conceived cluster, active and engaged in collective projects. Key informants mentioned their awareness of grasping opportunities to attain support for the region and actualise collective development vis-à-vis other regions. These prominent relations helped keep the emerging local industry cluster's development projects moving steadily forward. This allowed core businesses and IFC to assess (and reassess) the emerging cluster's development and realise projects that would improve areas that were found to be lacking. Accordingly, self-assessments of the collective and strategic vision, genuine growth potential, central development infrastructure, R&D skills and strong collective business concept were also realised.

⁵ The competition (Vinnväxt) was organised by Vinnova - the Swedish Governmental Agency for Innovation Systems. The Vinnväxt aim was for research, business and society in various regions of Sweden to mobilise and focus on a collective strategic development idea. The main goals were economic growth, and for the region to become internationally competitive within its area of strength. From the 200 circa applications, there have been 12 regional industry settings in Sweden that have won Vinnväxt. Including the regional 'Biorefinery of the Future' from Örnsköldsvik, other winning regional industry settings have included life sciences, energy/environment, textiles, steel, food, health and IT.

Protecting core concepts

Predominant intra-regional competitive relations centred on protecting core local development concepts. The newly clustered organisations were concerned about their own survival and development. Nonetheless they were often more troubled about the survival and development of their local cooperative partners. Concerns for ‘the local collective’ were dominant, and personnel within the clustered organisations were observed being exceedingly concerned about creating activities that would (or could potentially) put unusual pressure on locally clustered counterparts. IFC executives mentioned that many firms were worried about competing with local companies, putting entrepreneurs out business and people they knew out of jobs. Fear of regional industry stagnations and decline were noted to debase many intra-regional competitive relations for the sake of protecting core concepts and the collective group’s future survival.

Nevertheless, some core organisations competed with large traditional firms in the region. Businesses engaged in the cluster that handled, processed, and refined raw forest materials competed with local pulp-and-paper production systems for locally sourced and unprocessed working materials. It was found that during this time some traditional and established local forestry firms made it difficult for organisations in the emerging cluster to access raw material, thus putting certain regional biorefinery cluster projects at risk. In some instances, these relations even reduced the new industry cluster and region’s opportunities for development and renewal. As a result, the newly clustered organisations re-assessed their initial development plans to protect themselves and their core concepts and began tailoring projects more towards established firms that had responded rigidly to the initial efforts. New and alternative raw material suppliers were also found in other parts of the world (e.g. South America).

Actors within the emerging industry cluster competed for national R&D projects, funding, media attention and public relations with a similar regional biorefinery initiative in Piteå, Sweden. Lead entrepreneurs and managers in the Örnsköldsvik setting appeared to consider the Piteå initiative as less developed in terms of actual business development projects and industry cluster activities. Nevertheless, they knew it had, and was developing, high quality R&D – stemming from Swedish universities – that related to innovative refining processes. The Piteå initiative was also receiving R&D resources from the EU and exposure from the US government.

It was apparent the IFC and core actors from the emerging Örnsköldsvik biorefinery cluster were aware that their local industry initiatives lacked certain knowledge and features (or at least access to them) and proposed joint projects with Piteå. Nonetheless, in order to protect their own concepts from debasing, prominent inter-regional competitive relations transpired through high profile public-opinion products and development concepts as a tool with which to compete. Some high profile products and projects relating to the emerging Örnsköldsvik industry cluster involved research and industrial development of ethanol from forest resources; whilst the Piteå setting centred on research and industrial development of other wood processing by-products, mainly black-liquor⁶. Through public relations efforts promoting and defending high-public-

⁶ Spent cooking liquor, deriving mainly from lignin degradation, can achieve a higher added value if gasified or used as chemicals (see Elegir, Bussini, Antonsson, Lindström, Zoia, 2007; Stenius, 2000).

profile ethanol projects that would sway local and national public opinion, the emerging Örnköldsvik cluster protected various core concepts.

Monitoring external parties

Core organisations within the emerging industry cluster were found to monitor and keep track of similar regional biorefinery industry locations in three locations in Europe (Borregaard, Norway; Attisholz, Switzerland; Lenzing, Austria) and in one in Japan (Gotsu). Managers within the IFC identified these external locations as main ‘international competitor regions’ within international forestry based biorefining. Specific employees would monitor the internationally located regions that had been identified as main competitors within forestry based biorefinery. Comparisons of products being developed as well as potential collaborations, actual outputs and processing operations were made on a regular basis. Such information was relayed between core organisations and through the regional IFC.

Thus, actors involved in developing the regional biorefinery initiatives were able to distinguish how their new regional cluster and local industry operations differed, and could be improved in comparison to other regions. Observations where improvements could be implemented were also made available to the IFC’s members. Operational maps of industrial process flows from the identified international competitor regions were sourced and analysed. When gaps and differences were noticed in such flows and in ways of organising, new projects emanated within the Örnköldsvik cluster setting that would create newer, or rather similar flows. Key informants mentioned it was common to hear how activities within the identified regions were not as advanced as those within their own region.

Actively gathering knowledge and information was influential in the industry cluster’s emergence. It provided the core business and the IFC with direct information regarding activities in regions outside Sweden. This put external pressure onto core business and research projects, and compelled local firms to keep developing their projects. Additionally, information about competitor regions within Sweden was also gathered. The most influential competitive activities were the development and implementation of action plans and strategies for the regional setting that stemmed from monitoring, and being monitored by, external parties. This let the emerging industry cluster’s core companies learn, and observe, what other clusters in similar peripheral regions of Sweden were doing, and more importantly how they were doing it.

Consequently, 25 locally operating business and organisations became engaged and active in the new regional biorefinery industry and cluster. Hence, for the remote and once struggling business environment, the period, during which its new industry cluster’s core businesses and research concepts were conceived and then materialised, was noted as the strongest growth period for the Örnköldsvik region in decades (Larsson, 2008). In late 2009, the regional biorefinery industry and cluster initiative was awarded 17.4 million Euros in EU structural funds, to continue the local biorefinery developments (Werkström, 2009). Furthermore, after evaluation from national and international cluster review panels the cluster was offered 10 years of funding and support – approximately 11 million Swedish kronor (SEK) per year – from the Swedish government’s VINNVÄXT regional development program. Accordingly, key cooperative and competitive forces found driving the studied regional industry and clusters development are summarised overleaf in Table 1.

Table 1. Summary of key regional cooperative and competitive forces driving the regional industry clusters development

	Intra-regional	Inter-regional
	Cooperative	
Creating collective opportunity	Developing not-for-profit ifc's, sharing resources and unused facilities, creating collective partner channels, making new shared employment positions, developing joint marketing efforts, gathering new collective resources	[COLLECTIVE OPPORTUNITY CREATION DID NOT OCCUR INTER-REGIONALLY]
Advancing new business and research flows	Building regional research projects, commercial idea sharing, strategic resource allocation, connecting to local university, specialised human resource recruitment	Building national and international research profiles, expanding pre-existing European business networks
Building authenticity & legitimacy	Lobbying local government, building new high school and tertiary educational programs, engaging in public education schemes, seeking local media attention.	Seeking attachment to EU initiatives, national government recognition, home office approval
	Competitive	
Outperforming other regions	[OUTPERFORMING OTHER REGIONS DID NOT OCCUR INTRA-REGIONALLY]	Engaging in national development programmes, developing vis-à-vis regional industry concepts
Protecting core concepts	Contesting local resources with traditional firms, avoiding rivalry and conflict with local collaborative partners	Promoting high profile public opinion products.
Monitoring external parties	[MONITORING OF EXTERNAL PARTIES DID NOT OCCUR INTRA-REGIONALLY]	Carrying out national & international competitor analysis, making national and international cluster comparisons

6.0 Implications for Research and Practice

This research paper has shown that regional industry clusters' cooperative and competitive relations occur both *inter* and *intra* regionally. Through an empirical illustration of an emerging regional biorefinery industry and cluster, the research

has discovered how prominent *intra-regional cooperative* forces combined with key *inter-regional competitive* forces drove developments in a peripheral region. Such forces were found to be facilitated through a regionally orientated not-for-profit ‘institution for collaboration’ in a bottom-up process. Accordingly, this research offers a useful framework for exploring cooperative and competitive dynamics within regional business environments, and provides various implications for future research and practice.

The intra-regional *competitive* forces discovered during this investigation were found to be meagre and did not drive much of the industry cluster’s emergence. It appeared that competition at an intra-regional level was not perceived by the cluster’s core actors as positive for their development. Concerns of putting local firms out of business, which could then lead to local industry stagnations or decline, toned down competitive rivalry between the regionally clustered companies. On the other hand, direct head-to-head contests with other regional industry settings for particular research and development efforts was found to drive many development projects forward. Moreover attaining positive local and national media attention were key inter-regional competitive forces in the cluster’s early developments, especially in comparison to other regions in Sweden.

These findings (in combination with a general lack of head-to-head competition inside the regional setting) contrast with the general notion that the driving forces of regional clusters are synergies and rivalries between local competitors (i.e. Enright, 2003; Mills et al., 2008; Porter, 1990, 2008; Poudel & St. John, 1996). Although intra-regional competition has been suggested to drive industry cluster development, this empirical case study from the Swedish periphery has not exemplified such a premise. Nonetheless, the findings concur with Malecki (2004) who emphasises that contemporary regional business environments need to compete inter-regionally for more than just financial investments.

Through the creation, and innovative use of the not-for-profit IFC, the regionally clustered business and organisations operated with an intra-regional network. Through the IFC’s non-profit status, local businesses in the remote community were easily able to cooperate and contribute financial support to develop the collective activities. If the central development organisation was a profit orientated business, then questions would likely to have been raised by the intra-regionally cooperating parties and local government, regarding who was gaining from such an organisation. Moreover, the IFC’s not-for-profit focus also made it easy for neighbouring universities and government agencies to support the cluster, and advance important research flows that were beneficial for renewal.

Even though the IFC’s efforts in developing the cluster were found to spur intra-regional *cooperation*, they simultaneously debased intra-regional competition. This appears to be due to the IFC’s creation of strong and shared local interests and protection of the benefits for and between the regionally clustered organisations. This drove the new regional industry forward in a smooth and secure manner, indicating a powerful collectively oriented approach toward new industry development and regional renewal (see also Arbuthnott, Ericksson, & Wincent, 2010).

Subsequently, in order to renew local business and industry the new industry cluster materialised through private actors’ (mostly SME’s) intra-regional cooperative initiatives and projects. Although governed by local industry, the predominant intra-regional cooperative relations were organised through the IFC’s

formalised business networks and local business forums. This fuelled further intra-regional cooperation and led to significant developments. Hence, the regional cluster's emergence and region's renewal efforts were locally developed. These findings concur with Sölvell, Lindqvist and Ketels (2003) who note that one of the most important factors for regional industry cluster success is the willingness of local businesses to participate in the efforts, indicating that participation is more assured when regional industry clusters emerge from the bottom-up.

In relation to there being a facilitative (and instrumental) actor driving the renewal and developments, this study shows that such tasks can be attributed towards not-for-profit collective organisations run by local firms. In this case, such an organisation allowed for participating local industry, government and university parties to cooperate regularly and make collective financial, time and human resource investments. Additionally the local collaborative members were able to receive benefits in such a way that not just one business or organisation within the cluster benefited and capitalised; instead all were able to. Through the IFC's non-profit status, local government and public universities were able to support the industry cluster's development without putting intra-regional cooperative investments, support and efforts into question or jeopardising their use in the same way they would if profit orientated businesses and public organisations were at the helm.

Noting that prominent regional competitive and cooperative forces were often facilitated and driven by local non-profit 'institution for collaboration' provides lessons for developers and regional planners looking to stimulate new industry clusters and renewal. The case indicates that local businesses should be encouraged by regional agencies to create not-for-profit collaborative organisations capable of taking care of intra and inter-regional collective orientated funding, research and business developments. The importance of local industry-lead organisations driving and operating a regional cluster is therefore emphasised. This supports the work of Sölvell et al. (2003) who argue that bottom-up driven clusters are more successful than top-down operated ones⁷. Moreover, it reveals the implications of not-for-profit '*community development corporations*' (e.g. Bessant, 2005) in aiding the renewal of peripheral regions.

It should be noticed that whilst highlighting the importance of bottom-up efforts for regional industry cluster development, this research does not imply that regional government (nor support agencies) should step away from cluster development and renewal responsibilities. It merely indicates that public agencies should instead take responsibility to educate local business communities in how to develop bottom-up industry clusters and how to promote the advantages of having proactive (and industry-led) collaborative organisations in peripheral regions. Thus, public agencies should aim to facilitate, but not drive new and emerging clusters' competitive and cooperative relations. This means that, within regional business environments, it is important that government confine itself to the education, awareness and encouragement of bottom-up institutions for collaboration. Incentives, through the form of local financial support structures, are suggested to be provided for new industry clusters to develop; although as previously mentioned public agencies should refrain from running the IFC. Such

⁷ See Fromhold-Eisebith & Eisebith (2005) for a further explanation and discussion into 'bottom-up' and 'top-down' regional clustering.

tasks can instead be given and setup for local industry and entrepreneurs to drive their own inter-regional competitive and intra-regional cooperative relations.

In terms of its empirical evidence and analysis of an emerging regional industry's competitive and cooperative relations, this research supports the recent call made by Forbes and Kirsch (2010) for more detailed industry emergence investigations. Moreover, it provides implications for regional planners and local industry developers working with development issues in peripheral regions. The key findings indicate that it was fruitful for the emergence of the peripheral region's industrial cluster when grassroots industry organisations and local businesses took care of, and drove, the new industry's *intra*-regional cooperations. Hence, the emerging regional industry and cluster's dominant cooperative forces are found to be *intra-regional*.

Consequently, this research suggests that inter-regional competition *and* intra-regional cooperation are important for new regional industry clusters to emerge and aid in the renewal of a peripheral region. When regional planners and industry developers emphasise intra-regional, rather than inter-regional cooperation, Rees (2005) noted that it might put local developments at risk. This suggests that too much intra-regional cooperation during regional industry cluster development may reduce local businesses capabilities to learn and develop from, and work together with, firms in more established regions, subsequently increasing a region's peripherality. However, in the peripheral region that this investigation at rests upon, such debasing forces, as noted by Rees (2005), were not so apparent.

Although contrasting, these differences can be explained by the *type* and *form* of industry and regional cluster that are in focus. For example, Rees (2005) shows in regions where very high-technology clusters are trying to emerge that inter-regional cooperation should be driving developments. Yet where production based and/or regional clusters that are more industrial are emerging, then intra-regional cooperation should be the *initial* driving force in local cluster development, as this was the case in Örnköldsvik. This indicates that the type and form of local businesses and industry (i.e. 'knowledge-based' or 'production-based') is critical for regional planners and industry developers to consider before considering new clustering and renewal initiatives in peripheral regions.

Warning of the negative long-term effects from overly dominant *intra*-regional cooperation (i.e. 'regional gaze' and 'lock-in'), both Lagendijk (2002) and Visser et al. (2004) suggest that *inter*-regional competitive and cooperative relations may become vital deterrents of 'lock-in' as well as important long-term development drivers. Therefore, once a regional industry cluster has emerged in a peripheral region, and before further projects and plans are made or implemented, local decision makers and firms should consider creating more *inter*-regional cooperative activities, and ensure *intra*-regional cooperation does not remain dominant for the long-term.

7.0 Concluding Remarks

This research paper provides new knowledge and insights into regional industry clusters' competitive and cooperative relations. It also explains how, within a peripheral region of Sweden, a new regional industry cluster was able to develop, mainly through bottom-up *intra*-regional cooperative and *inter*-regional

competitive forces. Facilitated through a formal non-profit collaborative organisation, the key regional cooperative forces entailed *collective opportunity creation, advancement of new business and research, and building legitimacy and authenticity*. Simultaneously prominent intra and inter-regional competitive forces entailed *out performing other regions, protecting core concepts, and monitoring of external parties*. This provides lessons for improving peripheral and rural regional business environments and aids progression of development research.

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