

# Cluster analysis: Mapping the Nelson seafood industry

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# Cluster analysis: Mapping the Nelson seafood industry

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*Industry clusters are a complex web of knowledge, relationships and resources. As a basis for understanding the potential value within the cluster, this research uses Porter's framework to build a multi-sector map of the Nelson seafood industry.*

As the world has become increasingly globalised, it is a paradox that competitive advantage lies increasingly at the local level. For instance, in 1995, Denmark had 60% of the wind turbine market, and Singapore 40% of global hard disk manufacture. Locations such as Silicon Valley and Hollywood too are renowned for their respective focus on high tech and entertainment industries. This clustering of specialised activities within a local region—knowledge, relationships, raw materials, complementaries and specialised services—enables networks of related firms to improve their productivity and innovation for global competition. This is founded on specialisation characteristics of the local region that supports strong levels of cooperation among the competing firms. This agglomeration of local industry is known as industrial clustering, a concept

popularised in the management literature by Michael Porter,<sup>1</sup> with intellectual antecedents from Marshall.<sup>2</sup> This paper describes the attributes of the cluster typology within a New Zealand context.

In New Zealand, one such agglomerated region is the seafood industry located in the Nelson-Marlborough-Tasman region (referenced in this paper as the Nelson region). This industry is New Zealand's fourth largest agricultural export earner, behind dairy, meat and forestry. In the 1980's, the value of this industry to the New Zealand economy was \$500 million; by 2002 it had reached \$1.7 billion, with \$1.51 billion of this being exported to 84 countries, specifically to Australia

(\$199million), Japan (\$257million), Hong Kong and China (\$265million), and the United States (\$315million).<sup>3</sup> The Seafood industry is comprised of two sectors: fishing and aquaculture. Fishing includes deep-water, mid-water



Jim Speers, Ngarauंगा (part of series), 2005, digital print. Artigiano Gallery & Elam School of Fine Arts

and inshore activities, and is recognised as a hunting practice. Conversely, aquaculture is a farming activity (gathering), and involves the seeding, growing and harvesting of a variety of seafood which include mussels, salmon and paua. While each sector's resource requirements are discrete, they share significant complementary synergies at the support and infrastructural levels. Currently, however, the industry is struggling with adverse media attention, as claims of foreign exchange rate pressures, high fuel prices, low catch rates, and low commodity prices have collectively contributed to an unexpected economic downturn in the industry.<sup>4</sup>

This paper examines the profile of this seafood production region: Nelson. Located at the top of the South Island, the region has ready access to the rich fishing grounds on both East and West coasts. The seafood industry in this region contributes 38% of total regional income and 30% of total regional employment, and represents 25% of the seafood industry's contribution to national GDP.<sup>5</sup> Nelson is the largest fishing port in Australasia, supporting more than 100 fishing vessels that vary in size and needs from small local inshore boats to large factory trawlers. The deepwater fishing fleets of four of New Zealand's largest fishing companies are based in Port Nelson: Amaltal, Sealord Group, Sanfords and Talley's (also a joint venture partner with Amaltal). Smaller fleets of inshore boats are also found in other ports in Tasman and Golden Bay. These firms engage in both the fishing and aquaculture sectors. Significant related industry resides within this location to support the seafood industry. The marine engineering industry plays a vital support role, with its building, repair and maintenance of the fishing fleet. Other related industry complementors include, for example, equipment suppliers to support both the aquaculture and fishing sectors, and consumer goods and distribution networks.

Also of significance are the specialized social infrastructure organisations which assist the core firms to embed skills and innovation. These include: a tertiary organisation, the Nelson-Marlborough Institute of Technology (which includes a fishing school), Crown Research Institutes of Crop and Food and the National Institute of Water and Atmospheric Research, and a private research Institute for Fisheries, the Cawthron Institute. Because of the importance of this industry to the region, a national Seafood Centre of Excellence is being established in Nelson, with the support of government. At the hard infrastructure level, the Ports (Nelson, Picton and Tasman) form a significant part of the cluster, not only from a distribution perspective, but also as a Port provider for both the fishing, aquaculture and marine sectors.

This region, then, consists of a geographic concentration of interconnected organisations that compete and cooperate as an interdependent system. This integration of both upstream

and downstream value chain activities conforms to what is described as a regional industrial cluster. Clusters are characterised by threads of commonality, which in this case is seafood; while at the same time, independent organisations engage in specialised production that both compete and cooperate with each other. The purpose of this paper, then, is to examine the supply-side enterprise profile of this cluster through profiling the individual attributes that constitute the cluster as a regional productive industrial system.

### Clusters and location

In the management literature, like economics, attention to geography or location has been minimal. Globalisation has created a tendency to regard location as of diminishing importance.<sup>6</sup> However, more attention<sup>7</sup> needs to be given to the importance of location as a variable affecting the global competitiveness of firms for two reasons. First, with the gradual dispersion of created assets, the structure and content of the location portfolio becomes more critical to firms who seek to acquire new assets and simultaneously more efficiently deploy their home based assets. Second, the role of government becomes more critical as they need to understand the growing importance of knowledge-related infrastructure and with it the idea of sub-national spatial units as a nexus of untraded interdependencies. Government's role is to promote the dynamic comparative advantage of their resource capabilities and to work in partnership with firms to improve or replace markets in the cases of those markets where endemic market failure is most widespread.<sup>8</sup>

The most influential promoter of the spatial agglomeration concept in the management literature is Porter.<sup>9</sup> Using the intellectual antecedents of industrial districts as a foundation,<sup>10</sup> Porter developed a "cluster theory" model while seeking to understand corporate strategy issues at a regional level. The theory posits that by grouping firms together, cluster analysis can reveal specialisations of production chains in the local region. Thus, the key premise underlying cluster theory is that through the exchange of specialised information, increased productivity, innovation and new business formation may be achieved within the regional context. Rosenfeld defines a cluster as "a loose, geographically bounded agglomeration of similar firms that together are able to achieve synergy. Firms "self-select" into clusters based on their mutual interdependencies in order to increase economic activity and facilitate business transactions."<sup>11</sup> Thus, the cluster concept can be a valuable tool for understanding and leveraging the direct and indirect inter-firm linkages, with the repeated interactions assisting in the transfer of information that contributes to on-going innovation and problem-solving.

Nevertheless, there are criticisms of this "theory". While Porter describes clusters as the "new economics of

competition”<sup>12</sup> Martin is strongly critical of this descriptor arguing that “what the new geographical economists are saying is not new, and it is most certainly not geography”.<sup>13</sup> He claims that the current economic emphasis of increasing returns and spatial agglomeration has been done (and discarded) by geographers who were busy analysing industrial location back in the 1960’s and 1970’s.<sup>14</sup> Martin opines that this “new economic geography” is long on mathematical modelling and short on empirical application.<sup>15</sup> Martin ascribes this deficiency to the abstract, oversimplified and idealised nature of the models themselves. Similarly, Martin and Sunley argue that cluster theory in the Porter-sense is not a theory as such.<sup>16</sup> Rather, they claim, it is an attempt by an economist to model the complexity of the region into a competitive framework for policy application. Indeed, they claim that the current propositioning of Porter’s cluster theory is in fact low on specifics and high on generalisations, making it useless for really understanding the rich dynamics and interplays that occur within regional contexts. This critique is also reiterated by Martin who notes that these regional convergence models examine only one aspect of convergence. Thus, there have been few attempts to unravel the qualitative side of knowledge flows, technology spillovers and migration levels. Limited attention is paid to the forces that influence the geographical distribution of industry and economic activity (such as local infrastructure, local institutions, state spending and intervention, regulatory arrangements and foreign investment and disinvestment). In this sense the limitations of the studies are that the architecture of policy to stimulate and encourage the development of economic agglomeration is missing.

If the “institutional thickness” which is the geographers idea of studying “real people in real places” is the ideal, then the neo-Marshallian focus on the industrial districts of the “Third Italy” should have a prominent place in the management literature.<sup>17</sup> The contribution from this area is that the detailed empirical work on specific regions such as Emilio-Romagna in Northern Italy emphasises the embeddedness of the social, institutional and cultural foundations of local industrial growth. These foundations are built on the networks of trust, co-operation, competition and governance that characterise such areas. Recognising the importance of location and the individual initiatives of entrepreneurs helps explain the shifting dynamics of clusters.<sup>18</sup>

Thus, in this paper, we present a brief overview of the profile of such a regional agglomeration based on empirical evidence. Notwithstanding the criticisms of Porter’s cluster theory, we use its elements as a framework for unravelling the industrial district. We do not posit and utilise it as a “theory”, rather we use the word clustering as the informal social interactions that occur as a consequence of being geographically proximate.

## Cluster elements

Porter identifies four key elements—core firms, supporting firms, social infrastructure and hard infrastructure—that interact within related industry groups through complementary and competitively linked value chain activities in the local region. At the centre is the core set of highly specialised and complementary firms. They form the critical core of the cluster group, and display distinctive characteristics that are unique to the local region. Specialisation by these firms creates an interdependence where partnerships are required in order to build a comprehensive production system. The second layer, supporting firms, involves related industry specialists and these firms have close links with the core cluster. They may include functional activities, such as banks, accountants, lawyers, designers, supplier firms, or secondary activities that add value to the core firms. The key test of whether a firm is a related and supporting industry to the core firm is to ask if the core firm would be viable if the related and supporting industries were not there. The third layer of a cluster is the social (or soft) infrastructure. Organisations within this layer involve public and private partnerships: local government, educational institutions, professional bodies and industry associations. Their main function is to facilitate the coordination of the core and supporting firms, which would remain fragmented without this structure. Finally, the hard infrastructure includes the facilities that assist with energy requirements, transportation and communication both within the network and managing its external linkages. The physical infrastructure is essential if inputs and outputs are to get to and from markets, both national and international, which is why the upgrading or development of an effectively functioning infrastructure is critical to the cluster.

This spatial concentration and multi-sector integration is claimed to improve regional performance in a variety of ways. Gordon and McCann note that innovation and productivity within a cluster occurs through agglomeration, industrial complexity, and social mechanisms.<sup>19</sup> The agglomeration benefit is realised at a resource level, as interconnected suppliers are able to achieve production economies of scale through the sharing of resources which can improve individual firm productivity.<sup>20</sup> Firm and inter-firm capabilities are built, shared and leveraged for increased efficiency. Further, firms have a wider selection of employees (from competitors and training institutes) and suppliers, promoting both cost efficiencies and knowledge creation. Industrial complexity is developed through the integration of complementary activities, both within the industry and across sectors. By adding diversity, partners’ strengths can compensate for others’ weaknesses, which enables a more comprehensive range of activity.<sup>21</sup> Further, the multi-sector partnerships have the ability to develop strategically-focused innovations that go beyond product and process innovation

because of the knowledge diversity. Co-entrepreneurship occurs more readily with indirect competitors<sup>22</sup>, and the specialised knowledge of local infrastructural institutions greatly assist this. The third factor, social mechanisms also assists knowledge development within spatial proximity through the flow of employees from one firm to another: they assist in the transfer of better practices from firm to firm, tighter and more immediate flow of market and competitive intelligence, and location assists in face to face contacts for formal and informal meetings to occur. Each of these elements facilitates the formation of social capital, which plays a significant role in innovation processes.<sup>23</sup>

This paper constitutes the first part of research in understanding cluster performance. Indeed, as each industry structure is different, these structural attributes are a necessary prerequisite before more innovation- and performance-related dynamics can be examined.

### Method

Data collection for this research included sending a postal survey to 512 organisations known to be related to the seafood industry within the Nelson-Marlborough region in December 2003. While not exclusive, with many organisations belonging to more than one, the databases used and the number of participants contacted were:

- a) The New Zealand Seafood Industry Council - 156 firms.
- b) FishServe (Fishing Firms) – 197 fishing firms
- c) Seafood Cluster database – 159 related and supporting industry firms.

This paper includes data specifically related to Enterprise Profile (specialised production activities, industry-relatedness, size of firms and employment figures) in order to give insights into the overall structure and diversity of production that exists in the cluster. These results were a part of a larger scale project undertaken by New Zealand Trade and Enterprise. The focus on the cluster profile characteristics is to present a snapshot of the components within the cluster. In total, 71 usable questionnaires were analysed, representing a working response rate of 14%, which is consistent with other survey sampling response rates found in the management literature.<sup>24</sup>

Analysis of this data occurred through a codification process; with the comparative results of each question illustrated through graphs. The following data presents an overview of the cluster characteristics, and while not claiming to be representative, they do give an indication of the nature of enterprise in this cluster.

### Cluster profile

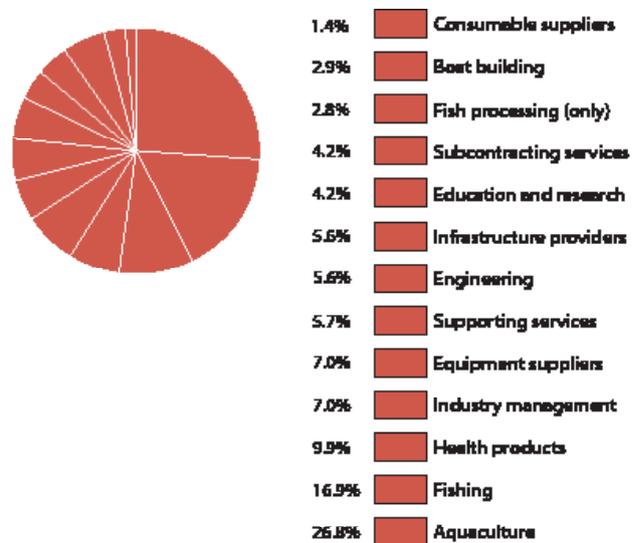
The survey focused on characteristics of enterprise within the cluster: a) production activities, b) years of operation, c) ownership structure, d) employment details, and e) revenues.

The following section describes the results of this survey.

### Production activities

The 71 survey respondents were divided into 13 categories depending on the sector they participated in. Almost 44% (33 organisations) operated in the two core seafood sectors: aquaculture and fishing. Only 10% of these organisations were also engaged in fish processing, and 3% of all respondents performed solely as fish processors. Within the aquaculture category, 73% of organisations were mussel farming companies, and the remaining 26% farmed salmon, koura, paua, and other types of seafood. The health products category (seven organisations, almost 10% of respondents) consisted of firms producing four types of goods: oils, marinade and pre-treatment products, health supplements, and smoked seafood. The industry management sector consisted of two industry collectives and three quota management groups representing 7% of the total respondents. The same percentage of companies qualified as equipment suppliers. The supporting services sector consisted of 6% of organisations (four companies – legal, insurance, consultancy etc.), similar to two other sectors: engineering and infrastructure providers. Education and research, as well as the subcontracting services category were both represented by 4% of respondents, 3 companies each. Finally, the boat building sector consisted of 3% of organisations (two firms), and the smallest category – consumable suppliers accounted for 1% of the respondents and was represented by one packaging company. Figure 1 illustrates the percentage of organisations in each category.

Figure 1: Percentage of companies in each category

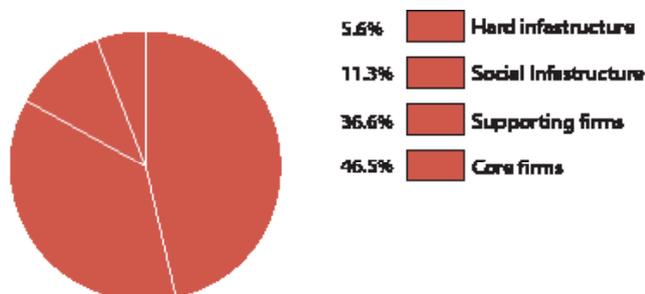


### Cluster elements

The above categories are readily grouped into the cluster

elements described by Porter:<sup>25</sup> core firms, supporting firms, social infrastructure and hard infrastructure, illustrated in Figure 2.

Figure 2: Seafood cluster elements



The cluster core consisted of similar or related seafood businesses. The core firms consisted of fishing, aquaculture and processors. The research sample of this cluster element was represented by 33 organisations comprising 47% of all respondents.

The specialist firms supporting these core sector fishing and aquaculture businesses included: health products, subcontracting services (diving, construction and maintenance), supporting services (consultancy, legal, insurance, survey and inspection), consumable supplying (packaging), equipment supplying, distribution networks, and the marine engineering sector with its building, repair and maintenance of the fishing fleet. This cluster element of 26 organisations represented 37% of all respondents, and this data highlighted the diversity of supporting industries that both complement and assist the production of upstream value within the seafood industry.

The social infrastructure comprised eight companies representing 11% of all respondents. These included education and research institutions, as well as industry management organisations (industry collective groups and quota management companies). The activities noted in this section included education, research and development, and industry management, with their primary purpose to increase the skill base and innovative capacity in the industry. The hard infrastructure (supporting the physical infrastructure) was the smallest element of seafood cluster in terms of the number of organisations represented. This layer consisted 6% of the respondents (four companies), with their operations focussing on shipping, cold storage, and port facilities.

This data illustrates the multi-sector activity that occurs in the production system. Significantly, the core firms comprise almost half of the organisations in the cluster, and together with supporting firms, these two elements make up 83%. This data reinforces the importance of specialised production and entrepreneurial activity.

### Years of operation

Only five of the organisations have been in operation for

less than two years; i.e. the start up phase of a new firm. Table 1 illustrates that 61% of the organisations have been operating for more than 10 years, 14% for 5 to 10 years, and the remaining 25% for less than 5 years. With only 5 firms classified as entrepreneurial start-ups, this suggests limited opportunities for growth in the current competitive conditions. It also indicates a longer term consequence of New Zealand's quota management system (QMS). The right to fish is allocated to fishers via a quota system. This perpetuity allocation can be freely bought, sold or leased. This process institutionalises the incumbent quota holders, creating high barriers to entry for new firms.

Table 1: Years of operation

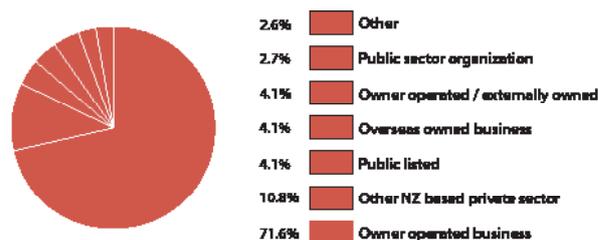
Years of operation	Number of orgs	% of orgs	Core firms	Supporting firms	Infra-structure
< 2 years	5	7%	10%	8%	0%
2 to 5 years	13	18%	18%	23%	0%
5 to 10 years	10	14%	12%	15%	25%
> 10 years	13	61%	60%	54%	75%

Translating this into the cluster elements, the majority of organisations in each cluster element have been operating for over 10 years. Again, this reinforces the stability of operations, with few entrepreneurial start-ups in each cluster layer. This suggests that the tight competitive conditions do not attract new entrants, and existing firms, with their length of years in operation, are those that have demonstrated enduring capability.

### Ownership structure

Most of the organisations (87%) stated that they operated in the New Zealand-based private sector. As illustrated in Figure 3, the biggest group within this sector consisted of owner operated companies (72% of all respondents, 53 companies), whereas publicly listed companies accounted for only 4% (8 companies). Overseas owned businesses as well as a mix of owner operated and externally owned companies represented 4% of respondents each (3 companies each). Finally less than 3% of organisations (2 firms) belonged to the public sector.

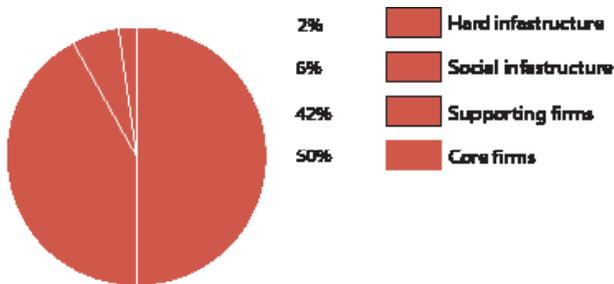
Figure 3: Ownership structure



More than 90% of the organisations belonged to New Zealand-based private sector in three cluster elements: core firms, supporting firms and hard infrastructure. Within the first two segments, owner operated businesses played the most important role, averaging 80% of all respondents. This reaffirms the dominance of owner-operated firms in the New Zealand economy.

Figure 4 demonstrates that the core and supporting firms had the biggest proportions of owner operated companies within all cluster elements, which is consistent with overall business patterns in New Zealand.<sup>26</sup>

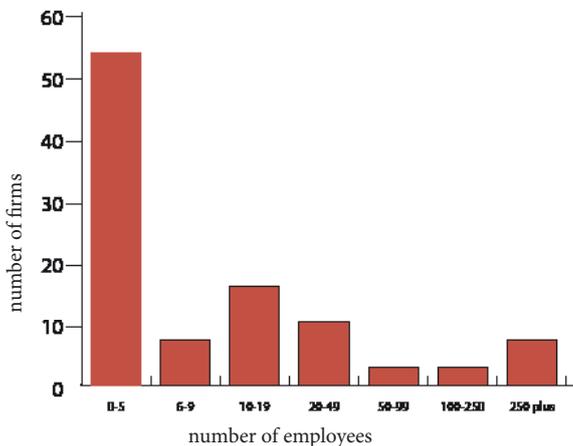
Figure 4: Owner operated businesses



### Employment details

Most respondents, almost 54% or 37 firms, were small size organisations with five or less full-time employees. The great majority, 87%, employed less than 50 people (60 companies), only 6% (4 firms) had between 50 and 250 employees, and 7% (5 respondents) were large companies, by New Zealand standards, with over 250 employees. The employment details are provided in Figure 5 below.

Figure 5: Number of employees



Organisations in two cluster elements followed the similar trend: most of them employed 0 – 5 people (20 core firms and 14 supporting firms). The difference occurred in big size firms; over 16% of core firms and none of the supporting firms had more than 100 employees. Three quarters of core firms, the same proportion of social infrastructure companies, and

85% of supporting firms, employed less than 20 people. A different tendency was shown by companies in the hard infrastructure element: three out of four employed between 20 and 100 people. This data demonstrates the differentiated nature of entrepreneurial activity for niched production, as opposed to the larger scale public institutions.

### Total sales revenue

Approximately half of the organisations had less than NZ\$1 million of total annual turnover for the last financial year, and almost 80% reported the total sales revenue of less than \$5 million. Only 6 organisations had revenues of more than NZ\$16million. Table 2 shows the respondents’ total sales revenue for the last year.

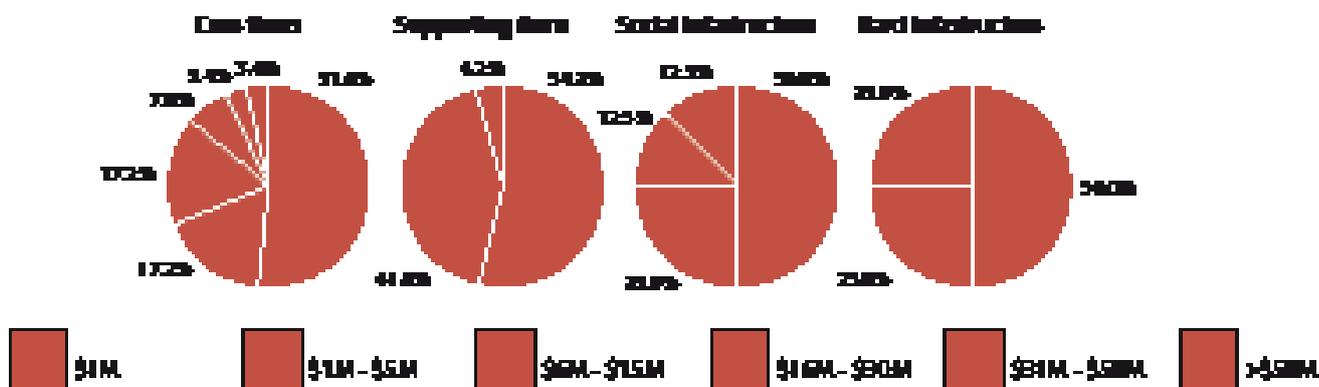
Table 2: Total sales revenue (NZD)

Total sales revenue	Number of organisations	Percentage of organisations
< \$1M	30	46%
\$1M - \$5M	21	32%
\$6M - \$15M	8	13%
\$16M - \$30M	2	3%
\$31M - \$50M	2	3%
> \$50M	2	3%

The total sales revenue of organisations in each of the cluster segments are presented in Figure 6. In two elements (core firms and social infrastructure) the sales revenues were less than NZ\$1 million for at least 50% of companies. Supporting firms showed the tendency to have low sales revenues as well (over 41% had less than NZ\$1 million and more than 54% between NZ\$1 and NZ\$5 million). By contrast, half of the hard infrastructure companies declared sales revenues of between NZ\$6 and NZ\$15 million.

In summary, the dominant profile of an organisation participating in this survey of the Nelson-Marlborough seafood cluster is of a small New Zealand owner-operated firm. It is more than 10 years old, has less than 50 employees, and has a total sales revenue of less than \$1 million. This data is consistent with other statistics characterising the New Zealand operating environment.<sup>27</sup> The high average age of firms was surprising, particularly for the core firms. This lack of attraction of new business formation could indicate the maturity of this industry. Further, strong external pressures from the global markets may be causing tighter competition internally, with a less favourable environment for new business development. A final indicator is the entrenchment caused by the QMS, creating effective barriers to entry for new firms.

Figure 6: Total sales revenue percentage in cluster elements (NZD)



### Mapping the cluster

The enterprise profile of this survey illustrates the diversity of the firms that are required to construct a cohesive regional production system. A comprehensive component of the cluster model is the mapping process, which provides a visual representation of the interaction between relevant organisations. The purpose of a visual map is to identify which organisations participate in any given cluster - the types of organisations, the supporting institutions, industry associations, government agencies, and other specialized firms. It also provides a better understanding of the embedded nature of a local production system in larger economic structures. A map shows the sequence of the value system, i.e., the main production steps along the chain as well as the key inputs. This map is depicted in Figure 7.

The Nelson seafood cluster, then, includes not only firms that catch (hunt), farm (gather), and process seafood, but also their suppliers (e.g., fish feed, nets, boat repairs), the social infrastructure that supports industry needs (e.g., universities, training providers, research and development institutes) and the hard infrastructure of shipping and airports, and telecommunications. This mapping procedure demonstrates the considerable diversity of complementors within the cluster. Recalling that 44% of the survey participants were core firms in the fishing and aquaculture sectors, the remaining 56% covers a wide cross section of public and private institutions. Together, this diversity forms a value chain of activity that begins with research and development, goes through manufacturing and production and ends with marketing and distribution. The cluster mapping process enables local regions to strengthen their depth by filling value chain gaps through new firm and capability development. Further, innovation too, can occur through tightening the connections between the components for co-entrepreneurial development.

Synergistically, this depth of activity forms an industrial system. While the two sectors (fishing and aquaculture) share common infrastructural support, their core activities remain primarily distinct as they require differing production processes. Indeed, many in the aquaculture sector note that

they are more aligned with farming activities than they are with deep-sea fishing. Thus, Figure 7 identifies the synergies between the clustered elements of the regional system while also acknowledging their independence. The commonalities include knowledge creation and production processes, while the diversity remains in core production.

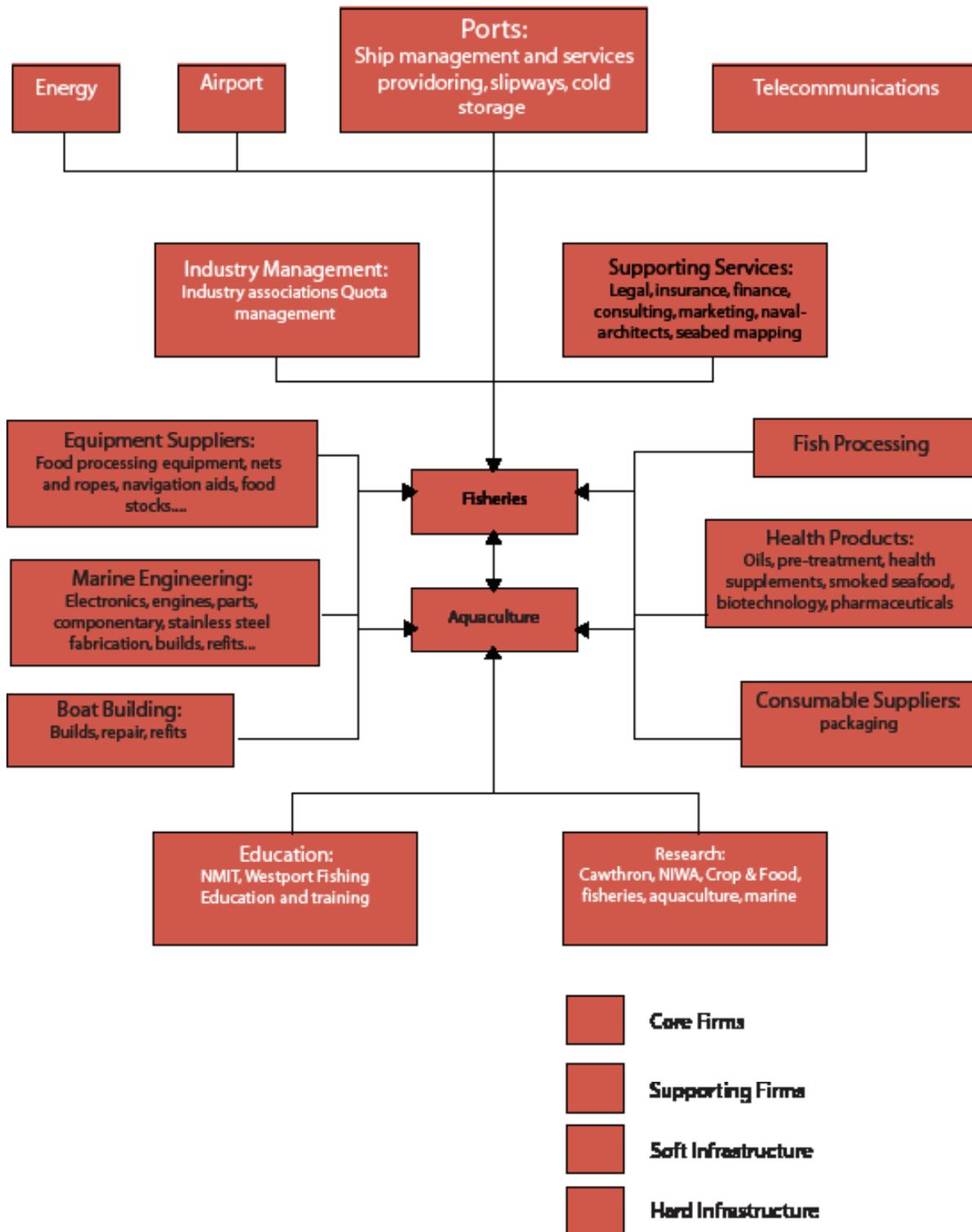
### Conclusion

In conclusion, this is an initial stocktake of the cluster, as it establishes the dimensions and characteristics that occur within this local production system. Its purpose is to identify the relevant players at an individual level, while also recording the aggregated characteristics of the production system. This process identifies in detail three factors that characterise regional productivity. First, is the physical concentration of businesses that stem from the specific natural resources, unique local assets, and skilled labour that reside in the geographical location. Indeed, as stated earlier, this context is rich in seafood and provides the region with a natural comparative advantage. Second, the specialised core activity or common thread that businesses gather around is the two sectors of fishing and aquaculture. Each requires a discrete set of production skills that make them independent production activities (one a hunting activity, the other a farming or gathering activity); yet the support and infrastructure activities provide synergies that have the potential to move forward in the value chain through innovation and added value, both through process and operational improvement and the development of new products. In this sense there is the potential for the regional district to become a coordinated network involving forward and backward integration through relational links; a characteristic of Italian firms in the textile district of Como in Northern Italy. Through the clustering of these activities, new opportunities exist in the creation of synergies and sustainable practices within the cluster. From the absence of new business formation in this cluster, it would appear that there is potential growth through developing linkages between these organisations for further innovation. Finally, this process has enabled the identification of the players that

structure this cluster context. It is through this process that the linkages and interactions can be examined. This profiling and mapping process establishes a framework for further research that seeks to unlock the dynamic processes of

knowledge creation and innovation that occur between the interconnected organisations, particularly as business, research and government intersect in order to develop stronger understandings of value within the cluster system.

Figure 7: The Nelson Seafood Cluster Map



## References

1. Porter, M. (1998a). *On Competition*. Boston: Harvard Business School Press.; Porter, M.E. (1998b). Clusters and the new economics of competition. *Harvard Business Review*, 76(6), 77.; Porter, M. (1996). Competitive advantage, agglomeration economies and regional policy. *International Regional Science Review*, 19, 1-2.; Porter, M.E. (1994).; The role of location in competition. *Journal of the Economics of Business*, 1(1), 35-39.; Porter, M.E. (1990). *The competitive advantage of nations*. New York: Free Press.
2. Marshall, A. (1920). *Industry and trade: a study of industrial technique and business organisation, and of their influences on the conditions of various classes and nations*. London: Macmillan.
3. (2003). *Big Fish: Industry Profile*. The New Zealand Seafood Industry Council Ltd.
4. (2004). *Fishing Slump hits Port*. New Zealand Herald, 10 August 2004.
5. McDermott Fairgray Group Limited. (2000). *The New Zealand Seafood Industry Council: Economic Impact Assessment for New Zealand Regions*. Auckland: McDermott Fairgray.
6. Porter, M.E. (1998a). See endnote 1.
7. Dunning, J. (1998). Location and the multinational enterprise: A neglected factor? *Journal of International Business Studies*, 29(1), 45-66.
8. Dunning, J. (1998). See endnote 8.
9. Porter, M.E. (1990). See endnote 1.
10. Marshall, A. (1920). See endnote 2.
11. Rosenfeld, S. (1995). *Industrial Strength Strategies: Regional Business Clusters and Public Policy*. Washington, DC: Aspen Institute.
12. Porter, M. (1998a). See endnote 1.
13. Martin, R. (1999). The new 'geographical turn' in economics: Some critical reflections. *Cambridge Journal of Economics*, 23(1), 65.
14. Arthur, W.B. (1996). Increasing returns and the new world of business. *Harvard Business Review*, 74(4), 100.; Arthur, W.B. (1994). *Increasing Returns and Path Dependence in the Economy*. Ann Arbor: University of Michigan Press.; Krugman, P. (1995). *Development, geography, and economic theory*. Cambridge, Mass: MIT Press.; Krugman, P. (1994). *Complex landscapes in economic geography*. *The American Economic Review*, 84(2), 412.; Krugman, P. (1993). On the relationship between trade theory and location theory. *Review of International Economics*, 1, 110-122; Krugman, P. (1991). *Geography and trade*. Leuven, Belgium: Leuven University Press.; Venables, A.J. (1996a). Equilibrium locations of vertically linked industries. *International Economic Review*, 37(2), 341.; Venables, A. (1996b). Localisation of industry and trade performance. *Oxford Economic Policy Review*, 3, 52-60.
15. Martin, R. (1999). Critical survey: The new "geographical turn" in economics: Some critical reflections. *Cambridge Journal of Economics*, 23(67).
16. Martin, R. and Sunley, P. (2003). Deconstructing clusters: chaotic concept or policy panacea? *Journal of Economic Geography*, 3(1), 5.
17. Antonelli, C. (1994). Technology districts, localised spillovers and productivity growth: the Italian evidence on technological externalities in core regions. *International Review of Applied Economics*, 18(30); Antonelli, C. (1990). Induced adoption and externalities in the regional diffusion of information technology. *Regional Studies*, 24(1), 31-40.; Beccatini, G. (1990). *The Marshallian Industrial District as a socio-economic notion*. Geneva: International Districts and Inter-firm Cooperation in Italy, International Institute for Labour Studies.; Garolofoli, G. (1991). Local networks, innovation and policy in Italian industrial districts. In Bergman, E., G., M., and F., T. (Eds.), *Regions Reconsidered*. London: Mansell.; Lazoni, M. and Lorenzoni, G. (1999). The firms that feed industrial districts: A return to the Italian source. *Industrial and Corporate Change*. *Industrial and Corporate Change*, 8(2), 235-266.
18. Akoorie, M.E. (2000). Organisational clusters in resource-based industries: Empirical evidence from New Zealand. *Trans.* In McNaughton, R. and Green, M. (Eds.), *Networks and Proximity*. London: Ashgate Publishing.
19. Gordon, I. and McCann, P. (2000). Industrial clusters: complexes, agglomeration and/or social networks? *Urban Studies*, 37(3), 513-532.
20. Scott, A. (1992). The role of large producers in industrial districts: a case of high technology systems houses in Southern California. *Regional Studies*, 26(3), 265-275.
21. Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 42, 35-67.
22. Pavlovich, K. and Corner, P. (2005). Knowledge creation through co-entrepreneurship, *Forthcoming*. *International Journal of Knowledge Management Studies*.
23. Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organisational advantage. *Academy of Management Review*, 23, 242-266.; Yli-Renkon, H., Autio, E., and Sapienza, H. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22, 587-613.
24. Yli-Renkon, H., Autio, E., and Sapienza, H. (2001). See endnote 23.
25. Porter, M.E. (1990). See endnote 1.
26. Dept of Statistics. (2004). *New Zealand Department of Statistics*. Wellington: Hot off the Press.
27. Dept of Statistics. (2004). See endnote 26.