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Networks as Drivers for Innovation – Experiences from Food Networks in Canada and New Zealand,

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ABSTRACT

A common feature among networks is the focus on innovation but the approach to driving innovation and to supporting companies' innovation work differs widely between networks. Some networks strive to be THE forum of an industry, and these networks generally focus on promoting innovations that are market-ready. Networks with a defined objective of promoting research-driven innovation must have different network organisations from the forum-oriented networks. Research shows that networks promoting research-driven innovation also lead to patent applications and should have activities towards commercialisation support. This paper compares four networks from Canada and New Zealand in order to identify examples of how networks with different structures and objectives can support innovation in agri-food companies. The paper is an empirical contribution to the research area of networks and innovation.

Keywords: Agri-food sector; networks; innovation; research-driven; hands-on

1 Introduction

Most Canadian agriculture and agri-food industries. In 2009, Canada was the fourth-largest exporter in the world with exports valued at 35.2 billion CAD (Agriculture – AgriFood Canada, 2011).

Concerning New Zealand, food accounts for 54% of exports valued at 17 billion USD, and food industry provides 20% of employment. Auckland is the centre for food processing, 25% of the country's population live here, and Auckland is also the country's international hub for logistics. The national annual spending on research for food and agriculture exceeds half a million USD. Research is driven by four major and internationally recognized universities across the country (Coriolis, 2011).

The food industry in both countries is highly fragmented with the majority of enterprises small or medium sized entities. In Canada, SMEs accounted for 80% of food sector enterprises and produced less than 20% of the sector's turnover (Agriculture- Agri Food Canada, 2011). Comparing Canada and New Zealand, other similar features are quite small populations relative to the countries' sizes, strong agricultural traditions, export-oriented agri-food industries, and rather few food companies with strong positions in the global agri-food market.

Both Canada and New Zealand have for many years been exporting commodities such as grain from the Canadian plains and milk powder from New Zealand. The latter is the world's largest exporter of milk powder (Coriolis, 2011). Commodities are traded in the world market at world market prices, and generate only limited additional value to economic growth and employment. However, when processed food and value-added agricultural products account for significant shares of exports you find a stronger economic robustness and more diversified market strategies.

Today, only 17% of the Canadian production of processed food is exported (Agriculture – AgriFood Canada, 2011). Both the Canadian and New Zealand governments have decided to emphasise the development of the countries' agri-food sectors towards production of more value-added products. The New Zealand government introduced the New Zealand Food Innovation scheme; a strategy focusing on more research-driven innovation. A core issue in the strategy was to link universities, companies, and local enterprise promoting agencies in order to support and drive innovation (Coriolis, 2011). In Auckland the result was the Auckland Food Cluster, which will be discussed in this paper.

Networks are regarded as a way to promote innovation in the food sector and governments may provide funding for such innovation networks. This is the case for the Advance Food and Materials Network (AFM Net) in Canada and the Auckland Food Cluster (AFC) in New Zealand. Both are the largest government funded food sector networks in the respective countries. Private entrepreneurs can also establish networks with the aim of promoting collaboration and innovation. This is the case for the Banff Pork Seminar (BPS) in Canada and for New Zealand Institute of Food Science and Technology (NZIFST). These two networks have for many years been financially independent of public money and both networks have developed into the most recognised forums for the Canadian pork industry and New Zealand food industry professionals, respectively.

This paper will compare and contrast these four networks with the aim of identifying advantages and consequences of networks in the light of promoting innovation. It is evident, that case study analysis is confined to a small sample and cannot provide results that are statistically significant. However, they offer deep insights which support understanding and allow to drawing conclusions that may reach beyond the specific cases that were analysed. They can provide the basis for extended surveys with statistical relevance.

The paper introduces into the subject with a discussion of the approach followed in the analysis and data collection (chapter 2). The case study analysis is discussed in chapter 3. It provides an overview on the selected cases with their characteristics and elaborates in more detail on specific initiatives in support of innovation. A critical discussion of results and especially the comparative advantages of networks in light of promoting innovation are the focus of the remaining chapter and conclusion.

2 Methodology

2.1 Overview

The four networks selected for the analysis could be separated into two groups based on their similarities within organisation and strategies. The comparison will focus on two core features of innovation networks:

1. Providing a forum.

2. Support from learning to innovation.

Feature 'providing a forum' has been chosen as a key issue for the analysis, as the overall concept of a network is to establish and promote contacts between members. Feature 'from learning to innovation' is relevant in the sense that for innovation networks, learning is considered the antecedent of innovation. For networks this implies that the network should stimulate members' learning (through a range of different activities) and the development of ideas and collaborative projects, all in the light of promoting innovation.

The background for this paper is research carried out within the Netgrow project (see acknowledgements). The case studies of the selected networks are part of a broader study that involves networks from all over Europe and beyond. The networks have been selected according to a number of selection criteria as follows:

- The network should be established within the agri-food sector.
- The network could target the value chain either horizontally or vertically.
- Innovation should be an important theme within the network.
- The selection of networks should include local/regional and national networks.
- The selection of networks should include young (i.e. less than 2 years of age) and more established networks.
- The selection of networks should include a mix of different financing schemes representing public, private and public-private funded networks.

All networks were analysed in a similar way involving the specification of a general profile and considering a number of network parameters as follows:

- Network inception (how was the network started including funding scheme and network objective).
- Network evolution (how has the network developed since its inception).
- Network membership (how many and which categories of organisations are members, and is it a formal or informal membership).
- Network configuration and network ties (how close are the ties between members, are the ties of an informal or formal nature).
- Network activity (which activities and services are offered by the network).
- Network management and governance (how is the network's management structure and governance procedures).
- Network performance (how does the network perform according to members and network management opinions).

2.2 Collection of data

The data were obtained through a survey based on a questionnaire developed as a semi-structured interview guide. Ten respondents from each network were interviewed face-to-face. Respondents encompassed the network coordinator, network member companies (both large companies and SMEs), other members (research institutions, public bodies, funding agencies, other), and if possible also representatives from the network board. Interviews with the coordinators included all aspects listed above, whereas interviews with members (companies and researchers) focused on membership, network configuration and the network's benefit to members. Interviews with public bodies and funding agencies were mainly about network inception, evolution, activities and governance. All interviews were conducted in early 2011.

The interviews were transcribed and captured in case study reports for each individual network. Besides data retrieved through the interviews, additional data were collected from networks' websites, reports and network specific documentation such as internal material on governance procedures.

3 Analysis and discussion

3.1 Overview

The characteristics of the selected networks are summarized in table 1. The table demonstrates vast differences between the networks. To arrive at conclusions about how networks can support innovation, an analysis is performed based on a comparative approach building on the profiles of the networks and their initiatives towards innovation. The comparison relates the group involving networks providing as a functionality a forum for industry professionals (such as Banff Pork Seminar and NZIFST) with the group involving networks focussing on learning towards innovation (AFM Net and Auckland Food Cluster) (table 2). The comparison matches the key functionalities of the networks with network's primary objective.

Table 1.
Characteristics of selected agri-food networks in Canada and New Zealand

	Banff Pork Seminar (BPS)	**Advanced Food and Materials Network (AFM Net) (group 2)**	**Auckland Food & Drink Cluster (AFC) (group 1)**	**New Zealand Institute of Food Science and Technology (NZIFST) (group 1)**
Established	1970's	2003	2005	1960's
Funding	95% private	Mainly public	Mainly public	100% Private
Scope/objective	To be THE FORUM for the Canadian pork industry	To drive interdisciplinary research within bio-materials and healthy food	To establish a local food cluster, focus on innovation, investments and market development	To be THE FORUM for food sector professionals in NZ
No. of members	700	240	150	1200
Personal membership or organisational membership	Personal	Mainly organisational	Mainly organisational	Personal
Members	Farmers, suppliers, processors, financial institutions, organisations, research inst., public bodies	Research institutions, SMEs, large companies, organisations, public bodies in Canada and abroad	Companies, trading organisations, government, research inst.	Food industry professionals: food scientists, engineers, marketing, government and students
Geographic scope	Canada, but with global outlook	Canada, but with global outlook	Auckland (New Zealand)	New Zealand
Activities	Annual conference with exhibition of new technology, innovation award, young scientist award	Annual conference, seminars, innovation projects, access to project funding, post-doc program, supports commercialisation	Annual conference, seminars, business trips, collaborative projects, Export promotion, investment and innovation support	Annual conference, local seminars, innovation awards
Active innovation support *	No	Yes	Yes	No
Other comments	Hands-on approach to innovation	Research-driven innovation from idea to commercialisation	Approach to innovation and business development determined by the companies approaching the cluster secretariat. Hands-on	Hands-on approach to new knowledge relevant for food sector professionals

* *Active innovation support* refers to activities and services provided by the network for supporting members' innovation and commercialisation activities. Examples are advice on IPR and funding schemes, practical support through a commercialisation process including developing a business plan, attracting investors and other activities, too.

Table 2.
Comparative analysis of agri-food sector networks

Key functionality	**Key objective of network**	
	To be THE Forum of the industry is a key objective of the network	Innovation is a key objective of the network
Providing a Forum	Delegates come to the network because "everybody else is here" or "this is THE network for this industry". "We (the industry professionals) meet all our professional connections here". "This forum provides exactly the knowledge we need for our business".	The network functions as a "gateway to the industry". The network provides a forum for industry and research to meet. The network supports the building of linkages between members and to the "outside" communities.
From learning to innovation	Hands-on approach to learning. Very industry-relevant new information. Awards used to promote innovations.	Mainly research-driven approach. Project proposals and funding. Interdisciplinary research projects. Long-term projects. Patent applications and commercialisation

Group 1: Providing a forum

It is quite clear, that the Banff Pork Seminar (BPS) and NZIFST have found ways of building a forum that attracts a large group of industry professionals. The participants in the Banff seminar use an annual conference to host additional company meetings as "everybody else in the industry is here". This quote was brought forward several times among participants at the seminar underlining the importance of the seminar to the industry. At the BPS you find many participants who have come to this annual event for more than 10 years, and they still express that they gain new, relevant knowledge and contacts from participating. It was pointed out that the information provided at the conference was very "*hands-on*" and could be used directly on farms and in other businesses, and that the knowledge flow also provided inspiration to "*think out of the box*". The seminar touches upon very industry relevant aspects. It also provides new thinking; as, e.g., the use of social media to communicate about pig production with society.

For the organising committee of the BPS one of the biggest challenges is to find speakers and topics that will provide new hands-on knowledge for the pork industry and animate forward thinking; i.e. providing inspiration and knowledge for the delegates to pick up and exploit.

The NZIFST is a network with personal members only, i.e. excluding corporate or institutional members. The network is known throughout the country as THE food sector network. The members of the NZIFST are industry professionals from all sectors of the food processing industry. Members stay in the network for many years – even after changing jobs. The knowledge provided in the network is hands-on information applicable in a food company. Examples could be controlling allergens or new regulations for the food industry.

Group 2: From learning to innovation

Generally, learning is regarded as the antecedent of innovation, and successful transfer and uptake of knowledge is a necessary prerequisite for innovating. This is what innovation is about: to catch an idea, develop it into a solution, and finally implement the solution into a framework that leads to an increased performance of the organisation or company. It is based on the understanding that the implementation of an innovation is the key to success.

The AFM Net is the network in Canada for food and bio-materials research and established by the Government of Ontario in 2003. By 2011, the network counted 240 members, whereof the majority were Canadian food companies, research facilities and government bodies. But there are a number of foreign members as well: Food manufacturing companies from USA and elsewhere, foreign research facilities and other bodies. Interviews with American members of the AFM Net revealed that they regarded the network as a very important gateway to the Canadian food sector.

It should be noted in this context that quite similar statements could be brought forward for the BPS network of group one, as this network is THE forum for the Canadian pig industry, and many foreign delegates participate in the network's annual conference. This proves that a network can be an important

gateway to a country or an industry – irrespective of its organisational structure.

The Auckland-based Food Cluster (AFC) has a very "*hands-on*" approach to members and their need for contacts and support for innovation. The AFC mostly works bilaterally with its members on matters requested by the company. The AFC aims to build a reputation as THE contact point for enterprises in the Auckland food industry, and the cluster is also supported by the local Enterprise Development Agency. The cluster secretariat is the turning point and creates the dynamics of the food cluster. Through activities such as conferences, seminars and export promotion events the cluster builds linkages between the local food companies, researchers and government bodies.

3.2 Specific initiatives of networks

Networks can provide a range of different activities and services that target innovation, learning and inspiration, but it is the individual member that has to pick up new information, learn from it, and turn it into an innovation. The analysis of the networks revealed a range of features that are generally applied in networks to promote collaboration, learning and innovation. These features are discussed below.

Innovation Awards

In the BPS and NZIFST networks one finds innovation awards – despite the fact that none of these networks has a formal objective of supporting innovation. So, what the networks actually do by presenting Innovation Awards is that they inspire the delegates to work on their own innovations, and in this coherence, the networks provide a frame for developing the idea and meeting potential collaborators. The BPS has introduced two awards for innovations: One is given to the best young scientist (Ph.D. level) and the other is for an innovation that has an immediate commercial potential in the pork industry. The young scientists present their findings in poster sessions, and all delegates can discuss the projects with the scientists. This promotes learning as well as inspiration for future research themes. This is the foundation for applied R&D work that can later turn out as an innovation. The other innovation award at BPS is the Innovation Award given to a new technology, idea or product that has proven to be of immediate commercial success or serves needs within the pig industry. Examples of winners of the Innovation Award 2011 are: new syringes for vaccination and a new watering system for the pig transportation trucks.

The NZIFST presents two awards at the Annual Conference: One is for Excellence in Innovation, and the other is for Eco-Efficiency Innovation. The Innovation Award is awarded for a significant new development in a product, process, ingredient, packaging or equipment that has been commercialized within the last 12 months. The Eco-Efficiency Award is for achieving environment resource efficiencies along with waste reduction.

Collaborative projects

For many networks targeting innovation, it is an important activity to promote interdisciplinary research and collaboration. This is particularly the case for the AFM Net. A continuous support of interdisciplinary research and collaboration between industry and academia is important if the goal is innovation. In the Canadian research environment, the idea of collaboration with institutes in other disciplines was quite new just 10 years ago. Furthermore, research tended to focus on topics that were of relevance to the university rather than the needs of industry. The AFM-Net's efforts has changed these patterns, so there is a much stronger interdisciplinary research collaboration today, and industry and academia have learned to cooperate to mutual benefit. Interviews with members of the AFM Net have revealed that also SMEs can benefit from the network's approach to interdisciplinary research (table 1).

The network supports the SMEs with project proposals, finding contacts in the research environment, and offers a wide network of large companies, government bodies and institutions for collaboration. Table 3 proves that SMEs have a very hands-on approach to joining a network targeting innovation. It seems as if the primary reasons for joining are to expand the business; to gain access to funding; and to gain more contacts.

The Auckland Food Cluster (AFC) occasionally provides funds for collaborative projects. Examples are the projects Food & Beverage Sector Organic Waste Survey 2009 and Post-Consumer Food Waste Pilot Collection and Evaluation Report (2010). Both projects were conducted for a group of companies, organizations and local authorities. The projects have pointed to an issue of concern to the full value chain, and this can induce further collaboration, learning and networking among the participants. Other collaborative projects initiated by the AFC are joint export promoting events.

Table 3.
SMEs' arguments for joining the AFM-Net

We are a start-up company based on a technology developed in collaboration with the University of Guelph and financial support from AFM-Net to our projects.
We are a technology based company and we joined AFM-Net to expand our R&D capabilities and gain access to highly qualified staff (in research facilities).
Our company collaborates with universities and R&D groups of multinational companies, and we joined AFM-Net to expand our business network and gain access to government research funds.

Seminars and Annual Conferences

All investigated networks offer an Annual Conference where all members can meet and learn more about hot topics and latest research results within their specific fields of work. Most networks also offer seminars throughout the year (on a national and/or local basis). The seminars cater to the needs of the members. Key themes for such seminars frequently relate to changes in industry, regulations, new technologies or market opportunities.

4 Advantages and consequences of the networks in the light of promoting innovation

Networks that strive to be THE forum for an industry or group of professionals cater to the needs of the individual. In such networks it is the individual member that is responsible for gaining sufficient information at network events and for turning this new information into innovations or improved personal skills. For enterprises, the advantages of joining such networks as Banff Pork Seminar and NZIFST are clearly their reputation in the respective industries. The reputation and long history of the networks are a "guarantee of quality" and relevance to the industry. Members of the networks may regard it as a challenge to benefit from the information provided at network events and "not just enjoy the events".

The analysis of networks has shown that networks like the BPS and the NZIFST are today very much regarded as part of the industry and still hold potential for further development. Both networks do not have an official strategy of supporting innovation – only promoting innovations taking place in member enterprises. By having this approach to innovation, networks are functioning more like a "support organisation" to innovative members who can gain recognition and promotion.

Networks with a defined strategy of supporting innovation in member organisations through projects and commercialisation support (such as AFC and AFM Net) are attractive to potential members with interest in innovation. Through the network's (e.g. AFM Net) services and activities the members are actively supported in, e.g., gaining more funding or better contacts to business, government and research. One of the issues under discussion is their beneficial role for large companies on one side and SMEs on the other side. For the AFM Net is would be fair to conclude that the network's services and activities are offered to members of all sizes, and that both large companies and SMEs have benefitted from being a member of this network.

In Auckland, most companies in the food industry are SMEs, and the work of the AFC with regard to innovation is driven by companies' requests. The AFC offers support in finding funds for innovation, writing applications, and finding business and research contacts. By offering such business focused services, the cluster secretariat is developing into THE contact point for food sector developments in the Auckland region. For companies, the benefits of collaborating with the cluster are obvious: the cluster secretariat can offer the tools and assistance that companies need in order to move on with innovation projects and business development in general. This is especially of relevance for SMEs.

The innovations being promoted at the BPS are very much business driven and commercially viable innovations. In the case of the AFM Net innovations are to a much higher degree research-driven, and there are several examples of interdisciplinary research projects involving industry partners that have resulted in patents. The comparison shows that the BPS promotes innovations that are market-ready, whereas AFM Net more likely promotes collaboration at an earlier stage of the innovation process. It should also be mentioned that the AFM Net offers support for the commercialisation process including patent application, identifying investors, and elaboration of business plans.

The differences in the networks' involvement in the innovation process are also related to the networks' organisation. The AFM Net has a secretariat operating year round and staffed with a business development manager, scientific manager and other personnel. The Advisory Board at the AFM Net is responsible for supporting the development of research proposals that match the need of industry and are at the forefront of industry and research trends. Members of the Advisory Board include professionals such as Professors in food science, Product Development Managers or Innovation Managers from large food companies. At the BPS there is no formal secretariat as the network is established around an annual conference. The BPS is governed by a Committee, and the Committee's main tasks are to plan next year's event and ensure the sustainability and development of the organisation. Members of the Committee encompass scientists, industry representatives and services (e.g. veterinarians). Together, members of the Committee represent the pork industry and this ensures the connection to and understanding of the pork industry's needs and demands.

5 Concluding remarks

This paper has discussed examples of how networks can promote and support innovation in the agri-food sector. Key issues in the discussion were linked to network activities, membership and network strategy, and how these features impacted the network's success with regards to innovation.

It is evident from the above mentioned activities in BPS and NZIFST that both networks strive to meet the needs of their members; the industry professionals. Both networks are very good at creating forums that on one hand attract delegates, and on the other hand provide the speakers and topics which delegates are interested in hearing about. Both BPS and NZIFST provide an annual opportunity for the delegates to meet, and NZIFST also provides more local seminars during the year. The key issue is the network's ability to provide a forum that attracts delegates and meets the delegates' interests and need for new and relevant information.

The organisation and management structure of the network is very important to consider if the aim is to drive innovation. Research for this paper has proven that if a network is to be at the forefront of research-driven innovation it requires adequate competences both at the network secretariat and at the Advisory Board. On the other hand, a network with a much smaller organisation and slimmer management structure can also promote innovation but in a different way as demonstrated by the BPS network.

It is recommended that further research is conducted about other features in order to gain an even better understanding of how networks can support innovation. Examples of such features are the network's self-sustainability (financially as well as regarding other parameters), the network's ability to develop itself in line with members' and society's changing interests, and the ability of network staff in supporting commercialisation of innovative developments.

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