NETGROW

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Executive Summary

This working paper has compared a group of eight non-EU food sector networks in order to identify, on one hand, how learning in companies occurs, and on the other hand, success factors that are relevant for fostering and driving company learning. The comparative analysis covers networks in Brazil, Canada, USA, Vietnam and New Zealand. Together the networks represent different regions of the world, different industries, and different types of networks.

The analysis suggests that networks with a hands-on strategy have a stronger company involvement than networks with a scientific strategy. The hands-on strategy relates to the activities and services provided by the network, hence also to learning. In networks with an objective of creating a forum for business meetings, activities fostering interactions along the value chain, or activities or services that target practical aspects of business development and innovation, companies are actively taking part in the network including network governance.

Some networks are designed and funded by government bodies. The analysis shows that these networks are mostly vivid only during the funding period. Other networks have developed with a bottom-up approach based on a core group of individuals and their mutual interest in a theme or collaboration. From the cases analysis, it appears that networks with a bottom-up approach have strong commitment from industry. Moreover, it appears that these networks have managed to develop in line with changes in industry, and have become practically independent financially.

Learning is the process of obtaining new knowledge and implementing it into one's organization. Learning may be unstructured as well as structured, and learning may be theoretical or practical. Certainly, learning may be combinations of the above-mentioned. Learning in networks is the result of interactions between at least two persons. Traditional tools for fostering learning in networks are conferences, workshops, and collaborative actions (projects or events). Other tools are innovation supports, particularly during the early stages of a commercialization. This implies that networks focusing on commercialization use innovation as inspiration to drive learning in companies.

As networks have different objectives, organizations and members there must be some tools that are unique to the particular network and to driving learning in that network. This is proven by the fact that the networks offer learning within different themes depending on the objective and practices of the network. The analysis identifies a range of such unique tools and underlines that the unique tools may have to be adapted in case they will be applied in other networks.

It is concluded that among the core success factors for driving company learning in food sector networks are a strong company involvement in the network including and governance, and that the network offers activities and services with applicability and relevance for business development.

1. Introduction

1.1 Context and purpose of the paper

This report is prepared as Working Paper Deliverable D.2.3 in the Netgrow project. The purpose of the report is to identify how SME learning in non-European networks occurs, and which success factors are important for company learning. Deliverable D.2.3. has been prepared in coherence with Deliverable D.2.1 of the Netgrow project – the latter as an analysis of 26 food sector networks across 9 EU countries.

Findings and recommendations from Deliverable D.2.3. are anticipated to be useful for establishing and developing food sector networks in Europe that can foster and drive even stronger learning and innovation – particularly in SMEs – than is seen today. The paper is prepared by IFAU in collaboration with UGENT, LAS and UBO. IFAU has prepared the case studies from Canada and New Zealand, UGENT has prepared a case study from Vietnam, LAS the one from USA, and UBO has supplied a case study from Brazil.

Several examples of learning in food networks in the EU are proved in this project (refer to D.2.1 and D.2.2). Learning occurs in informal as well as formal networks, and learning occurs in different types of networks (refer to D.5.1 on success factors). Furthermore, learning in networks is a broad concept ranging from "simple" new knowledge to implementation of research into commercialized values. The latter is regarded as the ultimate form of learning. There is as such a general understanding and acceptation of the idea that networks can foster and drive learning in network participants. The expression "to foster learning" means to create learning or the antecedents for learning to happen. "To drive learning" means to support the learning process. Hence, learning is a dynamic process involving at least two individuals and in most cases also tools for creating and driving the learning process.

All chapters of this report have been elaborated with the view to how companies' learning in networks occurs. Following this, issues which are related to networks' performance and performance measurement or commercialization of innovations are not included in this analysis.

1.2 Methodological approach

1.2.1 Introduction to the networks

The report is prepared as a comparative analysis of eight non-European networks, figure 1. Comparison will be made between four designed networks, two social networks, one value chain, and one producer-driven network. In the analysis all these structures and organizations will be regarded as "networks" and analyzed as networks. Profiles of the networks are given in Chapter two.

New Zealand:
Auckland Food and Drink Cluster (AFC)
New Zealand Institute for Food Science and Technology (NZIFST)

Canada:
Banff Pork Seminar (BPS) (Banff, Alberta)
Advanced Food and Materials Network (AFM) (Toronto, Ontario)
AgWest Bio Inc. (AgWest) (Saskatoon, Saskatchewan)

Vietnam, Thua Thien Hué province:
Rice Value Chain (RVC)

Brazil, Minas Gerais:
Pole of Excellence (Polo do Leite) – Dairy Products (POL)

USA, Missouri:
Pasture-based Dairy farming Missouri (PDM)

Figure 1: The networks in the analysis and their abbreviations

1.2.2 How the analysis was conducted

The networks for the report were selected based on a list of structural network attributes in order to assure a broad variation of network alternatives. The list of structural attributes was the following:

- Network age (<2 years vs. >2 years)
- Source of funding (public, private or partnership)
- Geographic scope (regional, domestic or international)
- Targeting the value chain (vertical or horizontal)
- Focus on innovation (product, process, organization or market)
- Network driver (industry, research, focal company, public body, producer groups or other)

Besides, the networks included in this analysis were chosen for their countries' importance in the international food industry and food trade.. The chosen networks cover four regions of the World: Far East, Oceania, North and South America, networks in developing and developed countries. A further reason for choosing these networks was to exploit already existing contacts and knowledge within the Netgrow consortium. There are no direct connections between the networks.

In order to retrieve information for this analysis interviews with network coordinators, board members, and network participants (large companies and SMEs, research bodies, public bodies and other) have been carried out. The overall aim of the interviews has been to obtain an understanding of how these non-EU networks operate, their organization and development, and how they contribute to companies' learning. It was anticipated that some 5-10 interviews should be conducted within each network but the number of interviews varies between networks. This is mainly because of practical issues such as the availability of respondents, travel arrangements and similar factors. Interviews have been based on the questionnaires which were also used for the analysis of the EU

networks (refer to D.2.1). Most interviews have been conducted face to face, but some have been conducted by telephones. In some cases, the questionnaires have been forwarded by email and returned filled-in. Personnel at the locations have assisted with translation, setting up meetings or otherwise assisted the Netgrow team during the interview phase.

The interviews have been conducted in the period from December 2010 to May 2011 to avoid effects linked to potential changes in economic environments.

Interviews were conducted on the basis of semi-structured interview guides, which had also been used for the Deliverable D.2.1 about the EU food sector networks. The interview guides were elaborated to target each group of respondents (network coordinator, research facility, company and public body) individually, thus allowing retrieving general information about the network and more specific issues related to the particular group of respondents. Furthermore, the interview guides were elaborated in such a way that they would assure comparability between the networks across countries, sectors and network typologies, as well as allowing the interviewer some flexibility to obtain network specific information. The headlines in the interview guides were as in figure 2:

Headline	Included under this headline
Network inception	Network origin, objective, vision, funding and strategy
Network evolution	Network development
Network membership	Group of members, evolution in member groups, number of members
Network configuration and ties	Relationships within the network, density, formal or informal relationships
Network activities	Activities and services provided by the network
Network organization, management / governance	Network structure and typology, management, tasks, governance, company involvement in governance
Network performance	The performance of the network at network level

Figure 2: Headlines in the interview guides

This analysis is based on the results from the interviews about network inception, evolution, members, activities and governance. Hence, issues related to network performance are not included in the report. Other data sources are industry and network reports, articles and websites as given in the List of References. It has been a priority to identify literature and data that could provide information about SME learning. In many cases this has not been possible, as most sources only discuss “company learning”. Therefore, most information about SME learning is retrieved from the interviews. It is thus anticipated in this analysis that findings about “company learning” may apply to companies of all sizes including SMEs.

1.2.3 Structure of the paper

In the following section, aspects of learning will be discussed to form a basis for the comparison of the non-EU networks, and in Chapter two the networks are profiled. Chapter three outlines the networks’ inception and strategies including a discussion of the implications for company involvement in the networks. All networks need tools to attract and involve members including companies and tools for creating and driving learning. This is analyzed in Chapter four. Chapter five outlines governance structures emphasizing how companies can be involved in network governance. Conclusions and recommendations are given in Chapter six. It should be kept in mind

that the following chapters will be elaborated from this point of view of emphasizing how networks contribute to learning in companies.

1.3 About learning in networks

Basically, learning is the process of transferring information from one individual to another. Networks can contribute to learning by creating an environment that fosters learning and / or an environment for driving learning. Learning can be unstructured such as talks between delegates at a conference or observations at an exhibition. Neither the process nor the goal of unstructured learning is defined, and learning occurs indirectly. On the other hand, learning can also be structured where learning occurs during or as a result of a defined and motivated process. Furthermore, the structured learning has a goal such as the message from a presentation at a conference or the outcome of collaborative actions. Hence the structured learning refers to the process in which "to learn more" is a goal itself and the learning process is a result of deliberate actions. With this background it is obvious that learning is a complicated process including at least two individuals, and ranging from the informal talks to the implementation of new knowledge to create innovation and commercialization – the ultimate form of learning. In figure 3 the concept of the increasing learning intensity is illustrated.

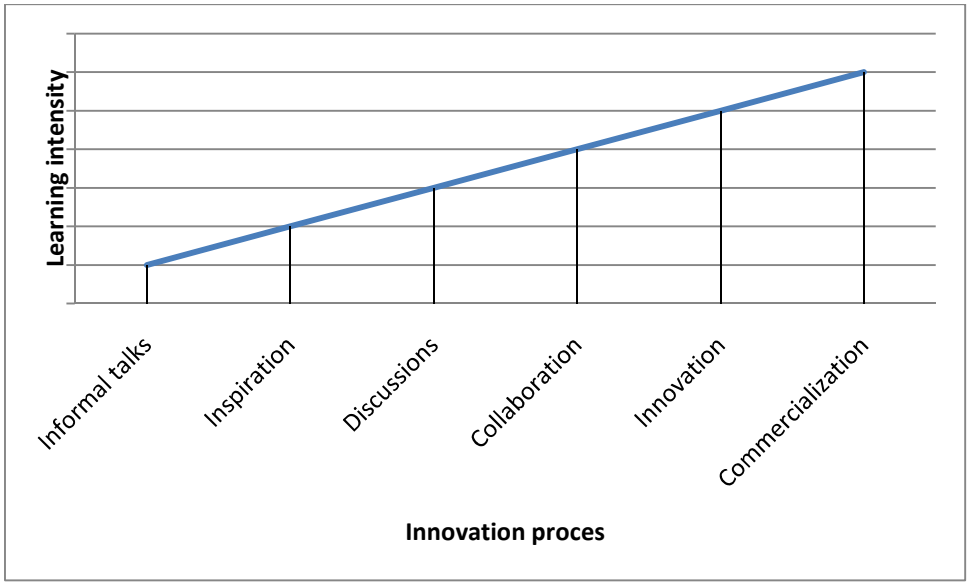

Figure 3: Learning: The concept of the increasing learning intensity (Source: Own compilation)

As discussed above, learning in networks includes a wide range of mechanisms for knowledge transfer. This paper will concentrate on learning at early stages (inspiration and new knowledge) to a more intense learning (mainly from collaborative actions).

Aspects about how networks contribute to transferring learning into innovation and commercialization will not be included in this paper. This is because commercialization involves other disciplines and skills than are connected with company learning from network activities. Examples of such skills and disciplines are experience in working with seed and venture funding

mechanisms, skills within IPR and technology transfer, and within setting up a business and elaboration of business plans.

Learning may be theoretical (obtaining knowledge from workshops, conferences, informal talks etc.) or practical such as testing of products and technologies, or participation in training sessions. In both situations, an instructor is needed to shape and drive the process of learning. The network is therefore regarded as the framework for the learning process, and the instructor as the intermediate for transferring the knowledge. The instructor makes use of the opportunities and events given by the network such as conferences, projects, workshops, social events etc. It is then up to the individual to receive, understand and implement the new knowledge into one's own organization.

2. Overview of the international case studies

The networks in the analysis are presented in figure 4. The networks all target different aspects of innovation, business development and learning.

Network	Country	Network typology	Network focus
Auckland Food and Drink Cluster	New Zealand	Designed network	Food production, training and innovation, and to develop a food cluster
New Zealand Institute for Food Science and Technology	New Zealand	Social network	Professional development of industry people
Banff Pork Seminar	Canada	Social network	The pork value chain, innovation and growth
Advanced Food and Materials Network	Canada	Designed network	Driving innovation in healthy food and bio materials by interdisciplinary research and commercialization
AgWest Bio Inc.	Canada	Designed network	Driving the bio based and life science industries through innovation and commercialization
Rice Value Chain	Vietnam	Value chain	Improved rice production and profitability
Polo do Leite	Brazil	Designed network	Innovation in dairy production
Pasture-based Dairy Production	USA	Producer driven network	Innovation in production methods and management

Figure 4: Overview of the networks

Designed networks are such structures, where the network's objective, organization and funding have been determined by bodies outside the network. Typically, such bodies are government agencies. Funding is mostly limited to a defined period. Members generally stay in the network as long as the services and activities are relevant for the particular member hence membership is connected with the network rather than the persons (other members) in the network.

The social network is a network where a group of people meet to discuss a topic of mutual interest. The network may have developed around platform of mutual interest and executed through an annual event, a value chain or an industry. Funding, objective, activities, and organization are matters the network deals with itself. Social networks are characterized by the added value of "Everybody else is here". This implies that membership is closely related to personal relationships in the network and the value of the personal relationships. Members generally stay in social networks for many years.

A producer-driven network is a network organization where producers are the core participants hence the network develops around the producers and their needs. The value chain network is closely related to the producer driven network, as the core driver in the value chain is a group of producers (from primary, secondary or both industries).

Specifically for the value chain is to mention that innovation and learning must be regarded with the perspective of the chain and the benefits from learning has an impact on the chain. On the contrary, the theme of innovation and learning in designed networks is more often coherent with a specific group of members within the network (such as a group of companies working together on a project). This implies that other members of the network seek learning within other themes and activities, and this may be a challenge for the designed network. Hence, the designed network may have a uniform overall strategy but is challenged by a broad group of members, where as the value chain and producer driven networks have the advantages of serving the interests of a core group with mutual interests.

A summary for each of the case investigated can be found in the following sections.

2.1 Auckland Food & Drink Cluster, New Zealand

The purpose of the network is to support and develop the food business in the Auckland region by providing assistance within business development, contacts (to funding agencies, investors, research facilities etc.), and activities to promote the food business locally, collaboration, and in overseas markets. Hence, AFC's services are developed to support business and enterprises in the region, and as such, the services are very often a matter between the AFC and the company. In short, the AFC secretariat responds to industry needs, and operates as a neutral and non-commercial organization. The intention is that the AFC develops into a strong platform for the food business of the Auckland region to market, research, develop or showcase the companies and products locally and in overseas markets. The AFC secretariat collaborates with a leadership group. Members of this group include directors of local companies, representatives of local authorities and research facilities, and the sector manager of the food activities of the AFC. The AFC is started in 2005.

Members of the food cluster counts 150 entities including large food companies, small niche manufacturers, producers of food ingredients, researchers, retailers, media and supporting industries. There are no members from farming. Membership benefits include contacts, addressing of common issues, promotion, capacity building, and business support. Membership is open to any key component in the food and beverage value chain. Members are offered to join projects conducted for groups, and joint export events.

The cluster secretariat is the key player and the driver of contacts and activities within the cluster. Key issues for the food cluster lie within business development services: search for skilled labour, investors, contacts, project funding, and support to find a way through the regulatory framework, including support with obtaining permissions from authorities. Interviews with companies reveal that their experience with the cluster is generally within business development, and with a strong focus on the need of the particular company. All respondents claim to be very satisfied with the hands-on approach of the cluster secretariat to the needs of the company, and the AFC's understanding of business development including the innovation process.

Interviews with companies reveal that most product development work has been done in-house and not in collaboration with other companies or research facilities in the cluster. Hence, interviews point to the fact that the cluster secretariat's main role in the innovation process is to be a facilitator.

The network has research facilities as members, too. Interview with a large research institution reveals that this institution has critical mass on its own, but remains positive towards local, national and international networks. The institution states that the AFC is an important local opportunity for networking, and that the institution is open for collaboration suggestions.

The AFC secretariat hosts workshops targeting capacity building in industry. Themes for such workshops could be "Getting it right for supermarkets", "Lifting the game – product assessment" and "Tasting for quality assurance". Such workshops give the participants practical hands-on knowledge that immediately can be used for product or business development. The workshops are important as an element for learning in companies and for networking within the cluster.

The AFC is a very business oriented network structure. Members of the cluster (respondents from interviews) all claim satisfaction with the services provided by the AFC secretariat. At present, the AFC is highly oriented towards collaboration on a company-to-secretariat-basis, but projects and

activities for groups of companies are also offered by the AFC. Innovation is facilitated by the AFC secretariat through e.g. fundraising and identification of contacts targeting the particular company's needs, and by the joint activities. Hence, innovation in the cluster / network is a result of interactions between the company and the AFC secretariat and from interactions between participants in the joint activities in the network.

http://www.em.org.nz/index.php/industry_sectors/food_beverage

2.2 NZIFST, Auckland, New Zealand

The network NZIFST (New Zealand Institute for Food Science and Technology) was started around 1960 by the department of food science at Massey University in Palmerston North, New Zealand. The department started to form a society of food scientists and food industry professionals. The objective was dissemination of new knowledge and science about processing issues targeting food industry professionals. Since then, the network has developed into a social network covering the whole country. The NZIFST is the longest established network in the New Zealand food sector.

The network is an independent, self-financing association or society. The network covers the whole country through the seven local branches. Today, the network counts around 1,200 members who are all professionals within the food sector. Members include engineers, people working with food technology (processing equipment, ingredients, and refrigeration), academics, food scientists, a few food marketing managers, representatives from government agencies, and around 100 students. There are no corporate or institutional members neither are there members from the primary industries, trade or retail.

The network is recognized as THE network in the New Zealand food industry. The members claim, that it is essential to be a member of this network "because everybody else are members". A very important benefit is the personal network to other food industry professionals. Members generally stay in the network for many years, and a major reason for leaving the network is a change to a non-food career or going overseas. Furthermore, it is claimed that members stay in the network for many years as the network is the forum for developing professional relationships in the food industry.

The network offers branch meetings, workshops, an Annual Conference, a Professional Development Program (PDP), a trade magazine, and electronic newsletters. The branch meetings are scheduled after working hours and usually last a few hours. The objective is to bring local network members together in order to provide knowledge and to promote personal relationships. The branch meetings are designed to promote transfer of knowledge on a local level, whereas the PDP and Annual Conference promote learning across the country.

The Annual Conference has been hosted for nearly 40 years in ever changing locations across the country. This way the network strengthens the ties between the seven branches. In 2010 the annual conference attracted 450 delegates including delegates from Australia and other foreign countries. A key issue for the Annual Conference is to bring in high-quality speakers to attract a large number of New Zealand and foreign delegates from industry, science and other food sector professionals. This creates a dynamic forum for exchange of information. At the annual conference 4 awards are presented, and 2 are very relevant for innovation: The Food Industry award for excellence in Innovation, and The Ecolab award for excellence in Eco-efficiency of Innovation.

Development of members' professional skills is a core issue within the network, and therefore the network has introduced the Professional Development Program (PDP) in 2005. The program consists of approx. 10 different workshops per year targeting specific topics of interest to food industry professionals (one topic per workshop). Examples of topics are allergens, packaging, regulatory issues or engineering. Key note speakers are recruited locally and from other countries. Around 10-30 practitioners participate in a workshop, and they pay an attendance fee.

The network's mission is to provide knowledge to improve members' professional skills and to provide an interface. The network's contribution to innovation and learning lies within trust building between members and the transfer of knowledge. An overall strategy for the network is that it should grow based on its own merits and own funding. This implies that network growth is based on the demand for its activities and services, and a sound interest and commitment from the members. An initiative that supports the future existence of the NZIFST is to develop training courses for food industry professionals from New Zealand as well as other countries.

www.nzifst.org.nz

2.3 Banff Pork Seminar, Banff, Canada

Banff Pork Seminar originated at the University of Alberta, Canada in 1971. Researchers took the initiative. The objective in the early days was to disseminate research findings to pig farmers under the concept of "train the farmer". This means that the presentations provided hands-on information that could be applied directly on the farms. Approx. 40 farmers attended the first seminar. The University of Edmonton contributed with secretarial assistance and covered some of the basic costs related to the seminar, and the early seminars were hosted at the University.

The seminar has developed much since then, but has kept true to the core concept: To provide hands-on and innovative information to participants in the pork value chain to support growth and development of the industry. Today, the seminar is the largest and leading of its kind in the Canadian pork industry with participants (delegates) from all Canada and from all parts of the value chain: from farm to consumer including affiliated industries and services, and research facilities and government. Delegates also come from other countries like USA and Mexico.

Originally, most delegates were pig farmers but this has changed today, as more delegates now represent industry including local SMEs and multinational companies. Farmers only account for 30% of the delegates. The shift in the network focus from transferring research findings to farmers to providing information about industry-relevant issues has attracted an increasing number of delegates from industry. The shift is also visible from the changes in the keynote speakers: from university researchers to industry representatives from Canada and abroad. In 2011 the seminar attracted more than 650 delegates.

A core value of the seminar which is hosted every January in Banff is that "everybody in the industry is here". Hence, companies use the Banff event as an opportunity to meet with business partners, collaborators, host own company seminars, and to meet other in the Canadian pork industry. This is highly appreciated by all categories of delegates, and many have participated in Banff for many years. This underlines the importance and value of the seminar to the industry.

The Banff Pork Seminar is coordinated by a network coordinator taking care of the practical issues connected with the organization of the seminar. The strategic planning and financial issues are the responsibilities of the Steering Committee in which companies, research facilities and other bodies participate.

The network targets take-home messages and inspiration that can be applied in the pork value chain. This is achieved by offering plenary sessions with keynote speakers, break-out session focusing on more specific themes (such as production or market oriented themes), a poster session for young scientists to display their results, an innovation award and an award for an outstanding young scientist, and an exhibition of technologies and services. Together, these activities and social activities create a vibrant and inspiring forum driving personal relationships, business development, learning, and innovation. Examples of innovations are the development of new cooling systems to pig transportation vehicles and a new syringe. The companies with the innovations are invited to present at the seminar and this opportunity provides many benefits to the companies such as exposure to the press, contacts to potential investors or business partners, and a wide network for further development of the companies.

In order to continuously stay at the forefront of industry's demands for information the seminar hands out questionnaires to the delegates asking about the most interesting themes for next year's seminar. The network also makes use of keynote speakers from other countries, industry experts, and an ongoing adjustment of the themes presented at the seminar. An example of an adjustment from 2011 is a keynote presentation about how the use the social media to create a positive image of the pork industry. It should be mentioned that this presentation was highly appreciated by the delegates at is contributed with a new perspective on innovation and growth in the pork industry.

The network has developed with a bottom-up strategy and has now maintained its core values for 40 years. This is particularly because the network has remained dynamic, and has accomplished to meet the changes in the industry by adapting to new groups of delegates, new themes and new requirements from the volatile international business environment of the pork value chain. The network is independent and self-sustainable as it relies on its own funding structure where industry sponsorships and attendance fees provide the majority of the budget.

www.banffpork.ca

2.4 Advanced Food and Materials Network, Guelph, Canada

The Advanced Food and Materials Network (AFM Net) was initiated in 2003 with an initial goal of developing a pre-eminent role for Canada in advanced foods and bio-materials research. The goals were: To build a research network across Canada; to drive multi- and interdisciplinary research within bio materials and healthy food focusing on pre-competitive research; and to drive innovations to commercialization. AFM Net established an infrastructure to develop commercially viable, socially acceptable value-added products and processes for the benefit of all Canadians. The AFM Net is Canada's largest network for food and bio-materials research. The network has a staff of seven and is hosted at the University of Guelph, Ontario.

Initial funding of 39 million CAD for the network was received from the Ontario Government for the period 2003-2010. As of 2011 the network has adapted to a changes in the funding structure and works towards financial self-sustainability. A basic principle in the new funding structure was a shift from financing early-stage innovations to financing later-stage innovation projects that were close to commercialization. Other impacts of the changed funding structure were a change in memberships towards having more companies as members, and a shift towards two levels of membership: the basic level includes the service of screening for contacts, and the advanced level targets project funding. Funded projects are reviewed by a committee on which venture capitalists, provincial government, and members of the AFM network's management are involved. The network had 236 members by 2011, figure 5.

	Industry	Academia	Government	Other	Total
2004	17	29	11	8	65
2010	69	69	25	51	214
2011	78	72	26	60	236

Figure 5: Members of the AFM Net

AFM Net provides workshops, an annual scientific conference, calls for projects, and services related to commercialization. The network's core research themes are food and nutrition, consumer science, traceability, authenticity, food safety, functional food, nutrigenomics, nano-science, and bio-based materials for food and non-food purposes.

Interviews with companies reveal that they have gained much from participating in the network's projects, including improvements in skills within collaborating with universities and graduate students. The AFM Net has initiated a special program targeting the integration of graduate students and post graduates into research projects and collaboration with industry. This program is called the Highly Qualified Personnel program. Since 2003 more than 600 have participated in the HQP.

AFM Net collaborates with other food research facilities across Canada and has established a wide network to other food research networks around the world (including France, Japan, China and New Zealand).

The network's focus on commercialization has resulted in several spin-outs from universities and start-ups. Examples of such start-ups are within novel biomaterials made from starch and for non-food applications; a company developing and marketing alternatives to traditional shortenings; and a company operating within biomaterials based on collagen. An example of a spin-out from the University of Toronto is a company developing and producing testing kits for the nutrigenomic profile in humans. Interviews also reveal examples of collaborative projects involving large

companies and universities. Such projects have targeted innovations with have been developed in line with industries' requirements. Examples of such projects are development of new ingredients and healthy convenience products. Companies claim that an important reason for joining the network is that it functions as a gateway to the Canadian food industry and research environment. This way the network is very convenient for Canadian as well as foreign companies and institutions.

The network will continuously work to develop collaboration between industry and research by maintaining a visionary approach to bio-materials and food innovations. It is also anticipated that the network's international relationships will be developed further in the future.

www.afmnet.ca

2.5 AgWest Bio Inc., Saskatchewan, Canada

AgWest Bio Inc. is organized as a non-for-profit corporation located in Saskatoon, Saskatchewan (Canada). The network's objective is to drive the bio-economy into an important contributor to the province's economy by growing companies, promoting relations, and building bridges between industry, research and government.

The staff counts seven people. The network is managed by a CEO and a vice president and governed by a Board. The network has a strong focus on innovation, entrepreneurs, business development, and commercialization. AgWest Bio Inc. is funded by government (the main funding source), membership fees, grants for projects, and funding obtained from conferences, events and contracted analysis. The funding agreement is renewed every three years, and the funding agreement for 2010-2013 has been approved by government.

The network was formed in 1989 with the objective of developing this bio economy by the initiative of the provincial government. In the early days the network particularly focused on GMO1 (crops and technologies), vaccines and microbial products. Later, in 2002, AgWestBio merged with two other networks in the province: Saskatchewan Nutraceutical Network and Bio-products Saskatchewan. The merger led to a broader focus of the AgWest Bio network to include topics such as bioproducts and biofuls, molecular diagnostics, processing technologies, functional genomics technologies, food processing, and technological progresses in GMO.

AgWest Bio has around 80 members: 40% are SMEs, 15% are larger companies and multinational companies, 25% are government institutions, research facilities and universities, and 20% are trade associations and producer organizations.

The network's focus of creating a forum for the bio economy implies that the activities and services are very oriented towards the needs of entrepreneurial companies, collaborative projects, and commercialization. Hence the activities offered in the network include conferences, workshops, collaborative projects, business mentorship program, assistance in the commercialization phase, and many other activities and services within this field including a Commercialization Fund providing seed capital.

Learning in the network occurs during events such as the company showcases, workshops, the Annual Conference, and from information about other conferences and events in Canada and abroad. The network focuses on the acceleration of commercialization through knowledge transfer and increasing management capacity of start-ups and early stage companies. In 2009-2010, AgWest Bio hosted 11 investment and commercialization seminars in collaboration with the Entrepreneurial Foundation of Saskatchewan providing hands-on information to more than 60 participating early-stage companies.

An example of an innovation resulting from the network is the approval of GMO canola seeds in 1995. The network helped to get the seeds approved. Today, GMO canola has a turnover of 14 billion CAD, so in short: the network was the facilitator of the GMO canola industry. The Food Processing Centre in Saskatchewan is a facility where companies and researchers can come and test their products and technologies by using the facilities' processing equipment. The Food Processing Centre is a partner of AgWest Bio. The Center facilitates technology transfer to SMEs, and the

[1] GMO: Genetically modified organisms.

Centre has also participated in the development of innovative and value added ingredients made of pulses.

The overall vision of the network is to be the driver of the bio economy of Saskatchewan. This should be achieved by growing companies and by functioning as a catalyst for partnerships by providing business oriented services and seed money. Another objective is to make Saskatchewan THE preferred location for doing business in the bio economy. The latter objective is targeted by providing incubator facilities, events, and by attracting foreign companies and research units to locate in the area.

www.agwest.sk.ca

2.6 Rice Value Chain, Thua Thien Hue province, Vietnam

The objective of this case was to investigate the learning dynamic present in the rice value chain in Hue province (Vietnam) and the parameters influencing it. The focus was especially on learning that contributes to increase rice quality. As rice quality was recognized by the actors of the value chain to essentially depend on the rice variety and the production process, learning in regard with rice quality concerned these two elements.

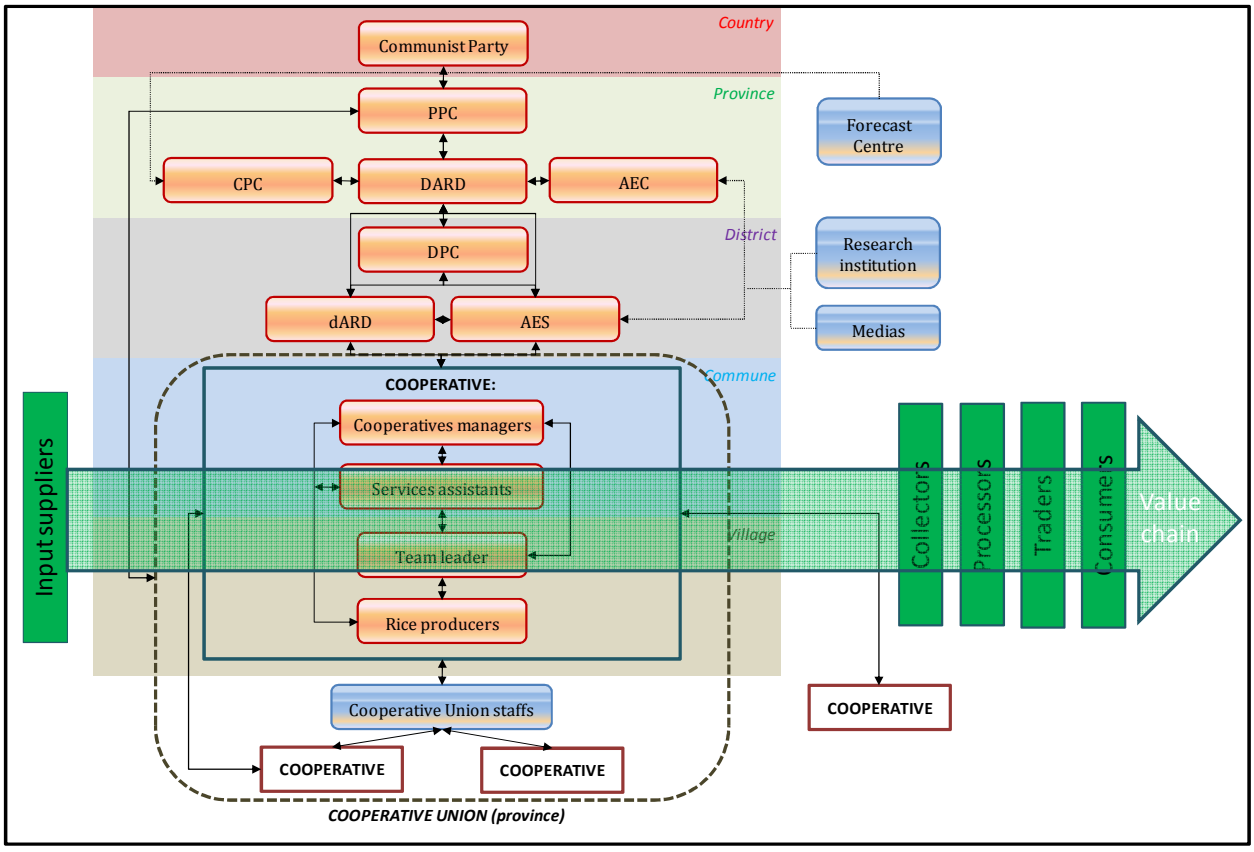

Figure A: Rice value chain and rice producers' support organizations in Hué province (Source: Own compilation)

Figure A illustrates the rice value chain as well as the extended horizontal network which developed around rice producers in Hué province. The rice value chain usually includes: suppliers of inputs such as seeds, pesticides and fertilizers, rice producers who are all small-scale farmers (i.e. fields of less than 1ha), collectors and processors (which can sometimes be one entity), traders (including retailers and wholesalers) and consumers which are never outside of the province. It should be mentioned that rice producers are most of the time members of a rice producer cooperative. In this case, the services offered by input providers, collectors and processors might actually be offered to farmers by the cooperative. The horizontal network mostly includes: public organizations and this at different governmental levels i.e. provincial and district, and rice producer cooperatives which are private organizations owned and managed by their members. More information about the different entities involved in the horizontal network can be found in table A. It should be mentioned that none of the public organizations involved in the horizontal networks are actually specific to rice except some of the research institutes.

Table A: Actors involved in the horizontal networks developed around rice producers in Hué province, Vietnam (Source: Own compilation)

Actor		**Specificities**
Abrev.	**Name**	
PPC	Provincial People Committee	Provincial governmental organization which bridges the national governmental bodies (Communist Party) and assures that the decisions concerning agriculture taken at the national level are implemented by the DARD at the provincial level
DARD	Department of Agriculture and Rural Development	Provincial governmental organization which has for duties to: *1.* To manage all activities related to agriculture *2.* To monitor the provincial organizations related to agriculture and their activities *3.* To transfer new technological methods to the farmer community *4.* To participate in the decision making process at the provincial level
CPC	Crop Protection Centre	Provincial governmental organization which has for duties to: *1.* To survey and predict any disease outbreaks *2.* To inform farmers about any disease outbreak –To control diseases brought in Vietnam from abroad *3.* To control the quality of pesticides at the producing company level
AEC	Agricultural Extension Service Centre	Provincial governmental organization which has for duties to: *1.* Providing trainings to farmers *2.* Providing crop production process related information to cooperatives and farmers *3.* Developing/testing new varieties
DPC	District People Committee	District governmental organization
dARD	Division of Agriculture and Rural Development	District governmental organization which has for duties to: *1.* To implement at the district level the crop production plan established by the DARD *2.* To support cooperatives in writing their annual business plan *3.* To participate in the decision making process at the district level In Hué province, there are 9 dARDs (one for each district).
AES	Agricultural Extension Service Stations	District governmental organization which has for duties to: *1.* To provide trainings to farmers *2.* To transfer scientific and technological knowledge to farmers As for the dARDs, there are in Hué province 9 AES (one for each district).
Cooperative	Rice producer cooperative	Private organizations owned and managed by their members. The majority originate from the collectivized agricultural production system established in the Hué province in 1976 and abolshed in 1989. They have for current goal to assure sufficient incomes for their members through two main strategies i.e. improving the learning standarts of the members and offering them services such as land preparation, transportation and collecting and harvesting services. Hué province counts 257 cooperatives among which 159 are for rice producers exclusively.
/	Cooperation Union	Provincial non-profit organization which has for objectives to: *1.* To represent and protect the rights of its members *2.* To advice and offer support services to cooperatives *3.* To participate in the decision making process at the provincial and country levels *4.* To establish international relations on behalf of its members

From the data collected, the horizontal network appears to be the locus where learning in regard with quality takes typically place. New knowledge is often generated at the provincial level by the Department of Agriculture and Rural Development (DARD) and the Agricultural Extension Service Centre (AEC) (e.g. development of new varieties) and is transferred to the rice producers via a well-oiled route of communication which includes the public organizations at the district level and the

rice producer cooperatives. The rice producer cooperatives are actually the link between the public organizations and each rice producer in the province. As such, it is primordial that they function properly in order that their members can benefit from them. Factors which are recognized to influence cooperative performance relate essentially to management capacity and cooperative's network. It should be mentioned that the communication path between public organizations and rice producers is not unidirectional. Rice producers can also communicate information to the top via this communication path; a mechanism which can e.g. fasten the process of treating pests, thus contributing to enhancing rice quality.

2.7 Polo do Leite, Minas Gerais, Brazil

The network Polo do Leite (Pole of Excellence Milk & Products) in the state of Minas Gerais, Brazil, was analyzed through a number of interviews involving the coordinator, various research institutions, the supporting public body and the major enterprise group active within the network. The network is part of an innovation plan currently carried out in the state under the auspices of the State Secretariat for Science, Technology and Higher Education (SECTES) where networks are established and supported in various sectors to promote innovation. The major drive is the better integration of industry and research, and the promotion of SME engagement in the sector. There are currently about 350 such networks in operation in Minas Gerais at various stages of development with about 10.000 actors involved.

The Polo do Leite involves the research institutions active in the state (University of Vicosa and Embrapa, the federal research organization of Brazil) and a.o. a major dairy group (HD Patrimonial Ltd) which is not only engaged in milk processing but also in farm milk production and the support of farmers linked to them.

The creation of the network has been a success as it involves all the partners considered to be necessary for supporting innovation in the sector. As the network is still in an early stage of development partners are not yet very critical but see most deficiencies as being part of the development process that will be overcome in due time. There was no criticism with regard to the network innovation program as such, networking being seen as something important or even, as has been stated, unavoidable looking at the complexity of challenges the sector is facing. The success of the network regarding innovation support is not yet apparent. While the network management is by large seen as fulfilling the expectations, the outcome in terms of innovation is still open.

In the actual stage, the relationships between partners are primarily based on formal contracts of cooperation. This is a bureaucratic approach but was not criticized within the project as it supports confidentiality and the development of trust among partners. It could be imagined that in the course of development the organization of relationships can become more flexible and better adjusted to innovation processes which require open exchange of ideas and an open flow of information. Differences in information access have been mentioned as one of the deficiencies the network has to cope with.

The network approach is a long term initiative. It is easy to see, that the immediate benefits are not with business but with research which gains better access to industry and gets engaged in training and research initiatives from the beginning. Business benefits need time to develop as they depend on project outcomes and the transfer of project outcomes into business environments. While this has been clearly seen by the interview partner from business it is a barrier in the transfer of network financing from public support to private engagement. The initiating government bodies have a different view and relate success to program implementation (number of networks or actors) and less to network performance in terms of innovation. From their point of view, financial responsibility should be transferred to the business community. This is a clear conflict in network development which has become apparent in the analysis and might jeopardize the sustainability of the approach.

http://excelencialeite.simi.org.br

2.8 Pasture-based dairy farming, Missouri, USA

The case covers the analysis of Missouri's pasture-based dairy farming (PDM), which has emerged in the last decade as a profitable alternative to traditional confined, corn-based dairy farming. The industry is led by recent immigrants from New Zealand, who arrived in the mid-2000s and have formed a dense network involving dairy farmers, laborers, input providers, and University of Missouri Extension Services. It is the unique meeting of different people in year's mid-2000 that have created the conditions for a complete innovation process (managerial, technical, and marketing) in a State where the traditional confined dairy production was declining.

The producer-driven network combines formal and informal aspects, with local, regional, national (USA) as well as international (New Zealand) dimensions. The product is mainly milk (and dairy products), with a scope around dairy producers, inputs suppliers and food processors (cooperatives). The network started more than 5 years ago. The network is a business-oriented innovation network. From an innovation point of view, the main topic is learning about 2 dimensions:

- New production method: a grazing system for dairy cows and seasonal dairying, which requires expertise in technical aspects (forage production), as well as in managerial aspects. The innovation at stake here is the so called 'management-intensive grazing' (hereafter MIG).
- New organizational and governance arrangements within the system, especially at the production level. The MIG requires new types of labor systems and arrangements that are specific to pasture-based systems, mainly share milking. (Refer to the website for more details about sharemilking and the business concept).

The main participants in the pasture-based dairy farming in Missouri (PDM) are the following:

- The network is mainly organized around the DFA (Dairy Farmers Association) which is the merger of 4 US dairy cooperatives and covers approximately 35% of milk supply in the USA, and Frontera, a New Zealand cooperative. These two organizations have launched the idea of a totally new system of milk production, but they do not have a real working role in the development in the network and the networking activities apart from this first connection.
- Research organization: Missouri University Extension Services (MU SW Dairy Center). The MU SW dairy center is a central component in this network because their researchers started to work on grass-based dairy production as an alternative of confined corn-based systems in the early nineties. The objective at that time was to find a way to keep milk production in Missouri that has not the ideal soil and climate conditions for intensive systems. At the same time South West of Missouri State was a potentially interesting zone for grazing (climate, hilly landscape etc.). A few individuals, extension officers and researchers, became specialists and leaders in the promotion of pasture-based milk production.
- Private companies and dairy farmers: Four companies from New Zealand (linked to the Frontera cooperative) have entered the US – Missouri domain. They have weak ties with other US groups and are forming the focal point-node with 80 employees and 8000 cows, with dense ties to a New Zealand partner with the same number of employees and cattle. The case is especially focused on Grasslands Consultants LLC, a company which has developed a complete share-milking system, as the sharemilking system is another important innovation to support the dairy grazing systems.

The main component of network learning in PDM case is the strong involvement of the University of Missouri, through its extension service. Indeed, the raise of pasture-based dairy farms using new rotational grazing techniques has been launched in order to improve declining profit margins and to reduce barriers to entry and growth. Three examples of network learning and innovation in the network are: the sharemilking website, the Missouri Dairy Grazing Conference, and the Amerikiwi exchange program.

Considering the global and complex innovation processes that have lead to the renewal of pasture-based dairy farming in Missouri, four individual/organizational elements can be identified as key elements of success: the existence of a specialized research center; a new type of labor contract; newcomers from New Zealand with a strong motivation to develop business (and profit); and interpersonal trust relationships between key people of the system.

http://agebb.missouri.edu/dairy/grazing/sharemilking/index.htm

http://agebb.missouri.edu/commag/news/archives/v18n4/news12.htm

3. Network inception and strategy

3.1 Inception of the network

3.1.1 Top-down approach

The networks in this analysis represent two structural approaches in their inception: The Top-Down approach and the Bottom-Up approach. The top-down approach refers to a network where its inception that has been decided at a managerial level above network governance. Such a managerial level could be within government bodies, organizations or other non-network related bodies. Networks with a top-down approach are typically designed organizations, where government bodies or agencies have provided the funding and outline the overall goal for the network. Furthermore, the network's funding is limited to a defined period hence the network's future after the funding period ends is in most cases uncertain. The network's growth and development is connected with the overall network goal and the funding provided by the body approving the network's inception. Examples of networks with a top-down approach are AFC in New Zealand, Rice value chain network in Vietnam, AFM Net in Canada, and the Polo do Leite in Brazil.

Interviews with companies in the AFC reveal their satisfaction with the cluster and the cluster's activities. The main argument for this is that the cluster targets the companies' need and demands by offering business focused services and activities (refer to 3.2.). On the other hand, the Polo do Leite is also working towards a strategy of achieving growth by connecting industry and research. The case study reveals that this vision of connecting companies to the Polo has not been achieved yet. The most important reasons are the age of the Polo (established in 2007); network collaboration is a young and developing culture, and most important; the network's core participants are research bodies and similar organizations – not companies. Interviews show that companies are connected with the network through projects driven by the research bodies. In order to insure a stronger commitment from industry, a network organization must take industry's needs, demands and ways of working into consideration at a very early stage: At the inception of the network.

The AFM Net in Canada is also established under a top-down approach. The idea to this network came basically from the University of Guelph. A core group of researchers approached Ontario Government and funding was provided for a seven year period starting in 2003. The goal of the AFM Net was outlined as a "network of excellence by being at the forefront of healthy food and bio-based materials". Funding was used for establishing a secretariat, conferences, workshops and calls for proposals. The latter is considered a very important element for driving collaboration between industry and research, and interdisciplinary research. Interviews with SMEs outline the following arguments for joining the AFM network, figure 6.

The horizontal network developed around rice producers in the RVC case was also established via a top-down approach. The goal of this network is to enhance the knowledge base and competencies of the rice producers in order to increase their income and therefore alleviate rural poverty. Nevertheless, such a hierarchical network and the rules it brings might actually have the opposite effect, especially when it concerns rice varieties. From interviews with cooperative staffs, it appears that only the rice varieties developed by the Agriculture Extension Service Centre (AEC) at the provincial level are subsidized by the government. As such, and because there is a general tendency among rice producers to only plant the varieties developed by AEC to get the subsidies, the network

does not reward the rice producers who tries to develop their own varieties independently. In other words, the network increases the dependency of rice producers towards public organizations in regard with innovation (i.e. development of new varieties).

The above-mentioned examples prove, that a network may be established by a top-down approach and have success in getting SMEs involved in the network. The core issues to succeed with this matter are to provide opportunities and tools that meet the needs of industry – despite the size of the company. Such tools are discussed in Chapter four.

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

Figure 6: Respondents' (SMEs) answers to the objective of joining the AFM network

3.1.2 Bottom-up approach

A network that has originated from a bottom-up approach has developed in an organic way. This means that the network has been started by a (small) group of partners with a mutual interest in a specific theme or collaborative issue. Over time, the network may develop in size and complexity, but growth will be driven by the network members and their involvement and interests. The bottom-up networks seem to be more financially independent than the top-down networks. Examples of networks with a bottom-up approach are Banff Pork Seminar in Canada, Pasture-based dairy production in Missouri, and New Zealand Institute for Food Science and Technology.

The Banff Pork Seminar is after 40 years still operating as an independent self-financing organization with a goal of providing the knowledge and inspiration which business entities in the pork value chain demand. Interviews with SMEs in Banff point to the fact that the companies have joined the seminar for many years in a row, they come for "more than the conference" hence the adjacent activities are just as important, and the companies all expressed that they go home with new and applicable knowledge, inspiration and contacts

One of the biggest challenges for the BPS is to keep on developing the seminar without changing the basic concept and at the same time provide an event for socializing and business meetings. Interviews reveal that all respondents are very satisfied with the Banff event, the conference and the social activities. Only complaints are that more free time would be valued by the companies. This should be seen in connection with how the companies (large and SMEs) use the Banff seminar: they go there for the conference and for hosting own business meetings. Hence, the seminar has developed into the business entities' seminar. If the Banff seminar can provide the frame for attracting companies and other to come to Banff, and organize the event to allow more meeting time for the delegates, the seminar would be even more in line with company demands.

The pasture-based dairy farming system in Missouri was initiated by a group of New Zealanders arriving in the USA with the intention of establishing a profitable dairy farming business back in 2005. The farmers wanted to establish a cluster around this new way of pasture-based dairy farming. This network started as a business oriented network with a strong focus on innovative production methods. The network has evolved in close relationship with researchers at the University of Missouri and the University's Extension Service. Today, the network has developed to encompass several large dairy companies (Dairy Farmers Association and the New Zealand dairy company Fonterra), several smaller dairy companies, the University of Missouri with the scientists and Extension Service unit, dairy farmers, and the Dairy Growth Council. The latter is a group of individuals interested in growing a viable dairy industry in Missouri. The case study from Missouri outlines a development pattern for a bottom-up network which has originated from a mutual interest in pasture-based dairy farming.

3.2 Network strategy and membership

A network is dependent on its members, participants or delegates – whatever expression may be used. As long as members benefit from the network including the services, knowledge, contacts and other benefits provided, the network is in demand. This is stressed as it is an essential starting point for any network structure and any group of members (researchers, industry professionals, companies, other or combinations of these groups).

A hands-on strategy refers to the focus of the network. With a hands-on strategy the network provides activities, services and knowledge that is readily applicable in business entities (primary producers and companies). Examples of hands-on activities and knowledge are workshops about how to avoid contamination with allergens or conferences about how to get listed by retailers. On the other hand, a network with a scientific strategy has a much stronger focus on science, academic collaboration, dissemination of scientific findings etc. Hence, the scientific strategy requires much more efforts from an SME in order to exploit the benefits from this kind of network compared to the network with a hands-on strategy, figure 7.

Figure 7 shows that in networks with a hands-on strategy, SMEs account for a relatively larger share of the members than in the networks with a scientific approach. Certainly, SMEs can be participants / members of scientific networks. This is the case in the AFM Net in Canada. The core issue of the AFM Net is to be at the forefront of the health food and bio-based materials by linking research and industry. Interviews with members of the AFM Net point to the fact that small companies gained from the network's conferences, the dialogues with the network secretariat and management, and from participating in projects. Activities of the AFM are discussed in more details in Chapter four. The AFM net offers many different activities and opportunities for small companies, so basically it is up to each member to decide how much and in what way to get involved in this network.

Network	Largest member group	Network strategy	Are SMEs members	SMEs account for x% of members	Network inception
AFM	Companies	Scientific (mainly) & hands-on	Yes	Less than 10%	Top-down

BPS	Primary producers	Hands-on	Yes	Primary producers and SMEs together more than 50%	Bottom-up
AgWest Bio	Companies	Scientific & hands-on	Yes	SME = 40%	Top-down
NZIFST	Industry professionals	Scientific & hands-on	Personal membership	Personal membership	Bottom-up
AFC	Companies	Hands-on	Yes	More than 50%	Top-down
POL	Research	Scientific (mainly, esp. extension) & hands-on	Yes	Primary producers = SMEs	Top-down
RVC	Farmers	Hands-on	Yes (farmers)	Majority	Top-down
PDM	Farmers	Scientific & hands-on	Yes (farmers)	Majority	Bottom-up

Figure 7: Networks and SMEs

Since its establishment in the early 1970's, the network Banff Pork Seminar has developed into the largest pork seminar in Canada. Initially, the network targeted pig farmers in Alberta province with the aim of disseminating research findings to them with a hands-on approach. The intention was to give farmers inspiration and practical take-home messages that easily could be implemented on the farms. The network has developed to include delegates from the entire pork value chain today, and SMEs are important players in this network, figure 8. The company involvement includes not only local companies from province Alberta, but from all Canada and some from other countries. Both multinational and local SMEs participate in the seminar, and this creates a very dynamic forum for exchange of information, building relationships, and discussing practical solutions. BPS has "stayed true" to the network's original focus: Hands-on knowledge and inspiration for the pork value chain, but has at the same time accomplished to develop the network in line with the changes in the group of delegates and their demands.

	Early 1970s	**Early 1990s**	**Late 1990s**	**Today and future**
Topics	Research findings relevant for pig farming	Research findings relevant for pig farming	As in early 1990s but also topics of interest to the full value chain / industry	Research findings for pig farming, issues concerning the entire industry and non-pork related issues
Members	Pig farmers in Alberta province	Mainly pig farmers in Alberta province and some industry people, few researchers	Pig farmers across Canada, industry and affiliated industries and services, researchers	Pig farmers across Canada, industry and affiliated industries and services, mainly Canadian but also foreign companies and researchers
Speakers	Researchers	Researchers	Researchers and practitioners, Industry people	Industry people Government Researchers

				Practitioners

Figure 8: Development of the Banff Pork Seminar

The Auckland Food Cluster aims at providing services and knowledge that can be used by companies, research and educational institutions, and government bodies to develop the local food industry into a national hub for production and international trade with food. The central player in the Auckland Food Cluster is the secretariat staffed with highly skilled employees with much experience in working with business support, financing, foreign investments, and establishing collaboration between companies and institutions. Small and medium sized companies account for the majority of the food processing operations in the Auckland area and are as such the core group in the Cluster.

Interviews with SMEs in Auckland point to the fact that the companies gain much by participating in the Cluster. Companies mention the cluster's assistance with i.e. seeking funding options for innovation or for foreign investments, and the hosting of collective export promotion events. This exemplifies how the cluster targets its activities according to the needs of the members (particularly industry) to meet the overall vision of the area: To become the New Zealand hub for food production and trade. Such a vision cannot be realized unless it is supported by industry's active participation, and the Cluster works dedicated towards this goal.

In Brazil, the state of Minas Gerais has a policy of establishing Poles of Excellence in such sectors or industries where there are competitive advantages. One of such is the dairy sector for which the Polo do Leite (Pole of Excellence in Dairy Products) has been established. The aim is to drive collaboration between research bodies, extension and industry to work towards improving technologies and products. The network's core bodies are the research facilities and other public bodies, hence companies' connections to this network is mainly based on projects. The case study points to the fact that there is a focal company that has gained from participating in projects through the Polo de Leite. No information about SMEs in the network or SME participation in activities has been available apart from indirect participation of primary producers linked to dairy companies.

4. Network tools for fostering and driving learning

4.1 Tools in the networks

In order to foster and drive learning, networks must be equipped with a set of tools supporting this goal. Activities and services offered by the network are considered as such tools. The analysis of the non-European networks point to the fact, that the most common activity across networks and countries are workshops, figure 9. The tools are discussed in the following sections.

Network	Annual Conference	Workshops and training	Learning and innovation support	Projects and collaborative actions	Unique tools
AFM	X	X	X	X	HQP program
BPS	X		X		Poster session, exhibition, social events
AgWest	X	X	X	X	Company showcases Business mentorship program
NZIFST	X	X			Professional Development Program
AFC		X	X	X	Collective market promotion FINZ
POL		X		X	
RVC	X	X	X		Well-oiled route of communication
PDM	X	X	X	X	

Figure 9: Activities in networks

4.2 Workshops, training and conferences

The workshops of NZIFST are hosted by the local branches and cover industry-related issues. Another activity of NZIFST is the Professional Development Program consisting of approx. 10 different workshops targeting specific topics of interest to industry professionals. Such topics could be allergens, packaging or regulations. A workshop takes one day and the instructors are local and foreign keynote speakers. It is revealed in interviews, that the workshops of the Professional Development Program are highly appreciated by members of the network and are regarded as very strong and relevant tools for learning.

In the Vietnam case study, the workshops are organized as training sessions with the aim of increasing rice producers' knowledge about the production process, and thus increasing the profits they generate from their activity. In Polo do Leite training sessions and courses target the knowledge transfer involving SMEs (farmers). A hands-on approach in workshops is also found in the Auckland Food Cluster where a workshop theme has been "How to get listed by retailers". This proves that workshops and training sessions are important for those networks with a strong focus on industry or company participation.

Workshops, conferences and training are important factors for building a common identity of a network. The case study from Missouri points to the fact that such tools have been necessary to

create an atmosphere of community within the network in order to reduce potential conflicts and misunderstandings between the network players. This is due to cultural differences between American and New Zealand people, the different players in the network (Extension service, University, dairy cooperatives, farmers, banks), and general misunderstandings in e.g. management style, investor expectations and other issues. The Annual Conference in 2011 had presentations from companies, researchers and dairy producers with the latest findings related to pasture based dairy production. The conference also included visits to farms, and this way embraced both the scientific and hands-on approach2.

The Banff Pork Seminar offers delegates the possibility of hosting own meetings in connection with the seminar. Many companies make use of the option to host internal company meetings, product presentation seminar and similar. The companies argue that "When they go to Banff everybody else is there" – implying the convenience of meeting up with business partners, customers, suppliers, new contacts etc. In the light of the vast distances in Canada, this meeting option is a highly favored part of the Banff Seminar. Furthermore, the opportunity to meet up with companies or bodies from other parts of the pork value chain is a key driver for learning in this network. This is due to the fact that much learning occurs in interfaces between disciplines or industries.
The core activity at the Banff Pork Seminar is the Conference with the plenary and break-out sessions. The plenary session focuses on issues of general importance to the pork value chain and feature key-note speakers from Canada and abroad. The break-out sessions offer presentations within feeding, breeding, housing, health and many other themes related to pork production including marketing, food safety, veterinary issues, transportation and much more. Hence, there are many opportunities for the delegates to find the most relevant break-out sessions. In 2010, the seminar had more than 650 delegates including farmers, extension, research, industry, affiliated industries and other. Interviews with delegates reveal that very important features of the Banff Seminar for creating knowledge and learning are, that delegates represent the full pork value chain and the speakers are at the forefront of new knowledge and trends shaping the industry.

Most of the networks studied for this analysis provide an Annual Conference accessible for mainly members or network participants. Interviews with companies participating in the AFM Net's Annual Conference reveal that major gains include new knowledge, open space for discussions, the options for meeting, and take-home messages applicable in companies.

The New Zealand network NZIFST hosts an Annual Conference where to international keynote speakers are invited. The conference in 2010 attracted 450 delegates including delegates from Australia and other countries. The theme for the 2011 conference is "Science to Reality". Interviews reveal that the conference attracts industry professionals from all New Zealand, researchers and other food industry people, thus creating a dynamic forum for exchange of information. This way the conference offered structured learning through the presentations as well as unstructured learning from the informal talks that will always take place at such an event.

The AFM Net hosts workshops with the purpose of sharing the network's knowledge with the outside research community and policy making agencies to influence change. Examples of such workshops are "Leaders' Summit on Food for a Healthy and Prosperous Future" or "Workshop on Expanded Voluntary Addition of Vitamins and Mineral Nutrients to Foods". The latter was hosted in collaboration with the Health Canada Food Directorate3. Another way of driving (structured and

[2] http://agebb.missouri.edu/dairy/grazing/conference/index.htm
[3] AFM, 2010

unstructured) learning through workshops is to give presentations at conferences and workshops. In 2009, AFM Net was responsible for over 200 presentations targeting researchers and industry.
The Commercialization Luncheon series hosted by AgWest Bio was launched in 2009 to help entrepreneurs with the many questions they may have about the route to commercialization. Bringing research to commercialization takes a great deal of planning. Some common questions that need to be asked in this connection are “how do I protect my IPR” or “Are there gabs in my business plan”. Such questions are typical for entrepreneurial companies, and at the Luncheon Series these matters are discussed with the companies including the questions they should be asking to obtain more success in the commercialization phase.

4.3 Innovation as inspiration for company learning

Networks that support innovation through different actions have a purpose for driving learning. This implies that in networks where innovation is promoted, the network participants are provided with inspiration and active support that may contribute to innovation and business development in some companies and in other companies to learning. Active support refers to assistance in the commercialization phase of an innovation and will not be discussed further in this paper (refer to Chapter one). Reviewing the case studies shows several tools that networks use for promoting innovation, figure 10.

Banff Pork Seminar and NZIFST: Innovation awards
Auckland Food Cluster: Fundraising and business support, and the FINZ
Pasture-based dairy: Farm tours, collaboration with extension service

Figure 10: Tools for promoting innovation

The innovation award from the Banff Pork Seminar is given to an innovation that contributes to growth in the pork industry. In 2011, the two award winners presented a new cooling system for pig transportation vehicles and a new syringe for rapid vaccination. The advantages of winning the innovation award at the Banff event is the big exposure to the press and the networking opportunities. This way the Banff Pork Seminar promotes innovation and this is an inspiration to the many delegates, hence the awards drive learning in the network. A similar pattern is found within the NZIFST. At this network’s annual conference two awards are presented: The Food Industry Award for Excellence in Innovation and the Ecolab Award for excellence in eco-efficiency of innovation. The Innovation Award is rewarded for a significant new development in a product, process, packaging, ingredient or equipment that has been commercialized within the last 12 months. The Eco-Efficiency Award is for achieving environment resource efficiencies along with waste reductions.

Supporting companies in practical matters related to innovation and business development are core competences of the Auckland Food Cluster. The staff is experienced within fundraising, obtaining permissions from authorities, attracting foreign investors or helping with other matters within business development and innovation. The case study highlights that companies appreciate the hands-on approach of the innovation support, and this itself is an inspiration for companies and a driver for learning. This way the companies are motivated to start innovating: new products, new processes or new markets. The new food innovation network FINZ (refer to 4.5) will strongly support companies in their innovation process, and this will also contribute to driving learning in the FINZ network and the Auckland Food Cluster.

4.4 Projects and collaborative actions

The AFM Net strives to bring different research disciplines to work together and to drive collaboration between research and industry through projects and calls. An interview with a department at the Toronto University revealed that this department had learned to collaborate with researchers in from other disciplines. This was because the department participated in a project funded by AFM Net. In later stages of the project, this collaboration has led to the creation of a spin-out from the university. An interview with a member company from the AFM Net highlights that a collaborative project involving a food company, a university and the public health authority can be the outcome of a good idea and a discussion with the network management. The network has provided funding for the collaborative project that should lead to a new healthy convenience product.

The Brazilian network Polo do Leite is involved in technology transfer through the validation of pilot scale projects and the following dissemination of results. These actions as well as training courses about i.e. good manufacturing practices and adaptation of new production standards target SMEs including farmers. Projects in this network are driven by the public bodies and the research facilities, but designed in accordance with the business plan for the network. Companies are connected to the network through these actions and have as such not a direct influence on the learning and innovation activities taking place in the network.

The Auckland Food Cluster secretariat has been the driving force behind several collaborative actions in the cluster. Such actions encompass projects involving industry, local public bodies, organizations, and research facilities. The project “Post-Consumer Food Waste Pilot Collection and Evaluation” from 2010 is an example of a collaborative action that forms the basis for further collaboration, networking and learning within the cluster.

4.5 Unique tools for learning

Some of the networks in the analysis have implemented tools which are unique to the network. The range of unique tools will be discussed below. It is the idea with this section to show that learning in networks for both large companies and SMEs can happen as a result of other network tools than the “traditional conferences and workshops”. The examples provided will show learning as a result of interactions between people, learning with special attention to personal skills, and practical learning.

AFM Net has developed a program called the Highly Qualified Personnel (HQP) program. The objective of this is to bring graduate students, post docs, universities and companies together to 1) establish contacts between companies and researchers, and 2) train the researchers in networking skills and the understanding of companies’ demand for research. The main tools of the HQP program are conferences and events. Several interviews reveal that the HQP program is very much appreciated by the respondents (particularly the large companies and universities), as this program has contributed to new research projects and establishing contacts between industry and research. For the graduate students the program provides a link to industry and a training opportunity to prepare the students to later stages in their careers. Hence, the HQP contributes to learning within several themes including improvements of personal skills.

In Saskatchewan, the network AgWest Bio Inc. runs Company Showcases. The idea is to let a (young) company present its product or technology to an invited forum. This way the company has an opportunity to approach the market, investors or partners for collaboration. Typically, 40 people (members and non-members) come to such showcases. After the company's presentation there is room for question and debate, and a reception. The network secretariat hosts the showcase (there are eight to ten events per year), and the secretariat will also forward the invitations. It is revealed that there are 400 people on the list to receive invitations.

Another tool applied by AgWest is the Business Mentorship Prorgam. AgWest Bio offers entrepreneurs to become protégés of mentors (stakeholders) in the bio- and life science industry of Saskatchewan. This way, AgWest Bio provides support for a young company's commercialization process and helps it develop the skills necessary for setting-up and running a business.

The basic element of the Banff Pork Seminar is the Conference (as discussed in sss above). In addition there are more opportunities for learning: There is an exhibition opportunity where suppliers of new technology or services can present their companies. It is very popular among the delegates to visit this exhibition as it provides knowledge and inspiration about the latest technologies and this is something that farmers and companies are very interested in. Certainly, the exhibition is the basis for starting many talks and discussion, so exhibition is a tool for learning. Another option at the Banff seminar is the Poster Session where PhDs can display their research results. The posters are studied by other researchers as well as delegates from the primary production and industry. Some of the research projects have been completed in collaboration between industry and universities or between pig research facilities and farms.

Collective export promoting events are regarded as a unique tool for learning in the Auckland Food Cluster. In 2010, the Cluster organized an event targeting the Australian market. The participating companies (mainly SMEs) loaded the container together and the cluster secretariat took care of the practical arrangements. Interviews reveal that participating companies viewed the event as a welcomed opportunity to learn about and test a new market, reduce the risk of entering into a new market, and to learn from the other participating companies. The Cluster plans for a new event targeting Hawaii.

In New Zealand, a new food innovation network is under development. The network with the name Food Innovation New Zealand (FINZ) will include four sites around the country. The objective of the network is to be the driver for growth in the New Zealand food industry targeting an increased production and development of value added products for export, and for a stronger collaboration between industry and research. The network is funded partly by Government, partly by local administrations, and the remaining money will be derived from companies' fees for using the new facilities. Each of the four non-competing sites is planned to have a specific focus such as wet food processing, dry food processing and pre-commercial testing. An example of a site is the one to be built close to Massey University in Palmerston North. The university has strong competences within food research, and the new site will provide opportunities for collaborative projects involving industry and university.

The first site of the FINZ is under construction in Auckland and will operational after summer 2011. This site is planned as a pre-commercial testing plant equipped with several types of modern food and drink processing equipment and state-of-the-art hygiene procedures. The idea of the Auckland site is that local companies (large and SMEs) can come and use the production equipment

for testing a near-market ready product. Another option for this site is to function as a training facility for food industry professionals from New Zealand or foreign countries. The FINZ site in Auckland will thus be an asset for all actors of the food value chain including SMEs that will now have access to near market testing facilities.

As mentioned in 2.6, rice producer cooperatives aim at securing the best income to their members by improving their learning standards and by offering a range of production oriented services. Today, the cooperatives are the central players in the rice value chain, and in this position the cooperatives are responsible for the flow of information upstream and downstream in the chain. The cooperative provides the farmers with technical information about how to improve rice production. Such information is received from the local division of Agriculture and Rural Development (dARD) and Agricultural Extension Service Station (AES) whom might have received themselves the information from public organizations at the provincial level. The cooperative communicates this information to the cooperative team leaders (one leader in each village), who further channel this information to the rice farmers. The example from Vietnam shows that learning may be a process of several steps including more actors of the value chain, particularly for channeling information. In order to secure learning, i.e. that information is received at the correct level of the value chain the route of communication has to be established. Hence to identify and establish the route of communication may be regarded as a unique tool for learning.

5. Network governance and company involvement

Network governance includes the direct decision making procedures at the managerial level of the network, i.e. decision making of the management and the Board. Other structures such as an Advisory Committee may also influence the decision making bodies of the network and as such hold some power. Mostly, companies are involved in network governance by participating in the network Board or in the advisory structures. This chapter will not discuss network management, governance or funding in details but focus on how companies are involved in the governance procedures.

The case studies of the non-EU networks have shown a range of similarities and several differences when it comes to network management and governance. In some networks such as BPS, AFM, AgWest Bio, PDM and RVC members (business entities) are actively participating in the governance procedures while in other networks such as Polo in Brazil, the business entities barely participate in governance. The case studies reveal that companies can participate in governance in several ways and this will be outlined in the following paragraphs. In the BPS case, a Steering Committee has been established, figure 11.

The Banff Pork Seminar is governed by a Steering Committee. The network coordinator is the driving force of the network and executes the organization of the seminar.

The Committee is responsible for planning the seminar and managing financial issues. The Committee counts 15 persons: University of Alberta, Alberta Agriculture and Alberta Pork Producers each have 2 permanent positions on the Committee. The other nine positions are recruited from across all sectors of the industry, each with a term of three years.

Figure 11: The Steering Committee and its tasks – Banff Pork Seminar

The organization of the AFM Net includes a Scientific Advisory Committee with the tasks of advising the network management about the most relevant themes for future project calls and conferences. The people at the Scientific Advisory Committee are from Universities (Doctors in human nutrition, physiology, bioscience and similar fields) or Industry (positions like managing director, scientific director, product development director etc.). This combination of people with different skills, backgrounds and positions secures that the activities of the AFM Net is in line with the needs and demands from industry and research, and future market and industry trends in the food and bioscience sectors.

Companies are on the Board of AgWest Bio Inc. This way, companies work together with the other members of the Board representing research facilities, education, Government, and an entrepreneurial foundation. The AgWest Bio network is dedicated to growing the bio economy of Saskatchewan. The strength of the Board of the network lies within the broad representation of

industry, government and research. The Entrepreneurial Foundation4 is also represented on the Board, and this point to the fact that the network is very dedicated to business development.

The pasture based production system (in comparison to the traditional American confined corn-based production system) involves a steep learning curve. This again requires important information exchanges between the Extension Service from the Missouri University, and the dairy producers. In order to secure the flow of information and reduce potential conflicts, the network in Missouri has established a Dairy Advisory Board[5].

In the case of RVC in Hué province in Vietnam, the rice producer cooperatives are managed by some of their members who are elected every 5 years. Such a governance system assures that the cooperative and the services it offers targets the needs of its members. However, it appears from the case that such a system might lead to the failure of the cooperative when the management staffs do not have the appropriate capabilities to run the network and its activities. This aspect is worth keeping in mind as rice producer cooperatives are key actors in the rice value chain as they constitute the link between the public organizations sources of new knowledge and rice producers as explained in 2.6.

The opposite situation than the Vietnamese one is showed in the case study from Brazil. In the Brazilian network, companies are not directly involved in network management. Companies claim that the benefit of the Polo do Leite is very limited to industry, mainly because of the network's low direct relevance for companies. The underlying conflict in the Brazilian network about future funding structures may widen this gap between industry and other network members further. The Government of Minas Gerais (which has provided initial funding for the Polo do Letie in 2007) has announced a strategy for industry to take over part of the network funding in 2010. Industry argues against this, as the network has only limited benefit to industry. Hence, the future of this network is not clear.

The case studies prove a stronger involvement of industry in those networks where business entities participate in the network governance. Overall, the main objective of company involvement in governance is to shape the network's development in close connection with the needs and demands from industry.

This seems to be coherent with the strategies of the networks as discussed in section 3.2: The stronger focus the network has on industry the more industry is involved in the decision making procedures.

[4] The Foundation provides business develoment services and seed capital. www.agwest.sk.ca
[5] http://agebb.missouri.edu/commag/news/archives/v18n4/news12.htm

6. Conclusions

6.1 Discussion – how to foster and drive network learning in SMEs

This working paper has compared a group of eight non-EU food sector networks in order to identify how learning in companies occurs, and which success factors which are connected to fostering and driving company learning.

The network is the framework for learning, i.e. the network sets the frame for the events, the composition of members / delegates / participants, and the organizational and managerial issues. There is a clear difference between the network as a framework and the network's role in the process of learning. The network determines a framework encompassing the staff, activities, funding, network organization and communication, and other managerial aspects. Learning, on the other hand, is a process that evolves between people that are i.e. collaborating in a project, meeting at a conference or speaking together during lunch. As such, the network does not have an active role in the learning process but merely sets the frame for learning to occur. Hence the better framework conditions the network can provide, the better basis there is for the learning process to occur within the network.

The network strategy (hands-on approach vs. the scientific approach) seems to have a large influence on company learning. The investigation of case studies prove that in networks with a clear hands-on approach the involvement of companies (large and SMEs) is stronger than in the networks with a scientific approach. Company involvement in networks does not seem to be related to geography, industry or network typology but is more likely connected with relevance to business. The case studies show that companies will evaluate benefits and costs related their participation in the network. This means, networks that provide more benefits than costs (costs do not only refer to economic costs) have more appeal to companies than networks where the benefits are less visible to the business entity. So, the networks that offer business oriented knowledge and inspiration, solutions to practical problems, assistance in business development and other company or farm relevant services are regarded as more attractive to business entities than networks with a focus on science.

Reviewing the case studies across industries and countries reveals that network development in terms of longevity and industry involvement is closely related to the network's ability to grow and develop in line with changes in the composition of members / delegates, and in members' demands for themes, services and activities. The social networks such as Banff and NZIFST have both lasted around 40 years and are still developing. The coordinators of both underline the importance of taking changing demands into account and drive the network as a dynamic organization.

More specifically, the Banff Pork Seminar creates many opportunities for people to meet and provides inspiration and new knowledge to the delegates. The seminar is regarded as a very strong forum for transferring knowledge between the speakers and delegates, but certainly also between the delegates themselves. Therefore Banff Pork Seminar must be regarded as a very good example of a vivid long-lasting network that fosters and drives network learning. The strength of the Banff Pork Seminar lies within the bottom-up approach: it is the business entities' seminar with a strong focus on the knowledge and inspiration demanded by these actors of the value chain. The younger networks such as Polo do Leite or Auckland Food Cluster have only got few years of experience, and still have to make their own experiences and strategies for how to develop themselves.

Following the completion and implementation of the Food Innovation New Zealand (FINZ) network in the coming years, management of the connected local food networks like the Auckland Food Cluster will be challenged. This is due to the fact that the cluster management will face a shifting balance between local companies' requests for services to involvement in a national food innovation network. This new role requires that management can cope with a role as an intermediate or facilitator between industry and the new innovation facility in Auckland. On the other hand, cluster management has established a wide network to local companies and is today in a position where the FINZ hub can be turned into a benefit for the food processing companies in Auckland, thus stimulating learning and innovation.

The AgWest Bio has changed its profile from an industry oriented network into an organization working to drive the bio economy of Saskatchewan. This has been done in line with renewed funding hence the future strategy of this network is dedicated to business development, entrepreneurs in the bio-science industry, and commercialization. The changes in the AgWest Bio prove that a government funded top-down network can be dynamic and develop in line with companies' requirements as well as strategies on government level for the bio industry in Saskatchewan.

The "traditional" network tools for learning are conferences, projects, workshops and similar events. The networks included in this analysis make use of the traditional tools (some in an adapted way), but the point is that the tools foster new knowledge and provide the incentives for people to interact. This is the basis for learning. Reviewing the non-EU networks outlines a general trend: Companies seek knowledge, news and inspiration, and collaboration that are applicable to running and/or developing business. Hence, two parameters are essential for companies to learn in networks:

- Learning theme should be relevant and applicable to running or developing business
- Learning takes at least two people to interact, thus the activities (tools) in the network must attract companies to participate and to get involved

Companies' learning in networks may result from core activities of the network (such as collaborative actions, presentations or workshops), or from adjacent activities such as the informal talks or exhibitions. Both routes to learning may exist in the same network, and the one does not exclude the other.

The comparison of the non-EU networks is based on aggregated case studies that do not reveal many (statistical) details about companies and their behavior and preferences in the networks. Therefore only indicative trends can be withdrawn about the companies in the networks. However, there seems to be a general preference among companies to participate in the activities that are most applicable to the businesses. This means that companies including SMEs get involved in collaborative actions when these suit the objectives of the companies, or the companies participate in workshops and other activities offering knowledge or contacts that are relevant for business. It is clear that company involvement is connected with the network's objective, activities and group of members to a much higher degree than to network size or typology.

Collaborative actions such as projects are commonly used in the non-EU networks. In most of the networks offering collaborative actions, these actions are driven by research or public bodies (networks like AFM, Polo do Leite and Auckland Food Cluster). The AFM network has developed a framework which supports projects where industry and research collaborate for mutual benefit. The projects may be initiated by companies or be joint applications to the network's calls for proposals. The collaborative actions in Auckland Food Cluster are driven by the secretariat of the cluster but they target the needs of industry. In the third example (the Brazilian network) the collaborative actions are clearly driven by public bodies and research facilities. The Brazilian actions are in principal designed to meet the need of industry, but companies are poorly involved in the collaborative projects. Hence, for a network to succeed with collaborative actions that involve companies, it is crucial that the actions meet the companies' needs and demands for collaboration, there is mutual benefit for the cooperating partners, and the companies are involved in the project or actions at an early stage.

Some of the networks provide tools that are regarded as unique to the network in question. The unique tools are developed to fit into the specific network's objective, member base and range of activities. As such the unique tool cannot be directly applied in other networks but can only function as inspiration. The investigation of the unique tools in this analysis points to the fact that these tools target companies' needs and requests for business oriented services. Furthermore, some of the tools are developed to support collaborative actions across business fields and between industry and research. It is therefore very important for food sector networks to secure that such tools are in place so the network can work towards an objective of company involvement, drive learning and innovation.

Learning may be "as simple as" a new understanding of collaboration, for example that researchers see the benefits of multidisciplinary collaboration, or that industry eyes the value of working together with research. Both examples demand that the network structures are capable of building the contacts "on each side" and can function as intermediate during the collaboration process.

A network is not a static structure, but must be regarded as a dynamic organization. In order to maintain the network's dynamics and development it is necessary to keep pace with changes in industry and the world. Case studies prove that networks with a dynamic approach, like Banff Pork Seminar or NZIFST, last for many years. One way to secure that a network remains dynamic is by involving the ever changing industry. This could be done by involving companies in Scientific Advisory Committees, Steering Committees or as Board members. The Banff case study reveals that a long lasting industry commitment through the Committee and industry sponsorships has maintained the network financially independent, vivid and dynamic.

6.2 Success factors for company involvement and learning

The comparison of eight different non-EU food sector networks has identified a range of success factors that are essential for companies' involvement in networks and for driving company learning. It is the intention that the list of success factors can provide inspiration to funding agencies, policy makers, and other bodies that want to establish networks. The success factors may have to be adapted to the specific network, country or industry.

Success factors for company involvement and for network learning:

- Create or motivate the contact and interface between persons

- Find a theme that provides mutual benefits to the collaborators (a theme of a workshop, conference or project, or other activities)
- Company involvement in networks and network activities is closely related to the applicability to business, so a hands-on approach drives companies' involvement
- Create and apply tools specially made for meeting the network's objective and particularly taking companies' needs and interests into account
- Get companies involved at an early stage of collaborative actions
- Involve companies in network governance such as Scientific Advisory Committees or on the Board
- The network is the framework for learning, but not the driver of learning

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