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Network Learning and Innovation in SME Formal Networks^{*}

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ABSTRACT

The driver for this paper is the need to better understand the potential for learning and innovation that networks can provide especially for small and medium sized enterprises (SMEs) which comprise by far the majority of enterprises in the food sector. With the challenges the food sector is facing in the near future, learning and innovation or more focused, as it is being discussed in the paper, 'learning for innovation' are not just opportunities but pre-conditions for the sustainability of the sector. Network initiatives that could provide appropriate support involve social interaction and knowledge exchange, learning, competence development, and coordination (organization) and management of implementation. The analysis identifies case studies in any of these orientations which serve different stages of the innovation process: invention and implementation. The variety of network case studies cover networks linked to a focus group for training, research, or consulting, networks dealing with focused market oriented product or process development, promotional networks, and networks for open exchange and social networking.

Keywords: Network learning; network innovation; formal networks

^{*} The article builds on case studies which have been published elsewhere (Schiefer and Deiters, 2011) and which have been performed by numerous people from different countries and institutions. The authors of case studies are listed in appendix 2.

1 Introduction

With the challenges the food sector is facing in the near future (Fritz and Schiefer, 2008), learning and innovation have been discussed not just as opportunities but as pre-conditions for the sustainability of the sector. Innovation support and especially support towards small and medium sized enterprises (SME) has therefore been identified as core requirement for assuring the sustainability and competitiveness of the food sector as stated e.g. in the mission formulated by the European Commission for its innovation strategy as *'...with an ageing population and strong competitive pressures from globalization, Europe's future economic growth and jobs will increasingly have to come from innovation in products, services and business models. This is why innovation has been placed at the heart of the Europe 2020 strategy for growth and jobs...'* (European Commission - Innovation Union, 2011). A similar line is followed in strategic research agendas developed for the food sector (Fritz and Schiefer, 2008).

The statement makes it clear that the need for innovation covers a broad spectrum of developments, not just in products and processes but also in services, organization, and management. Innovation, however, is not easy to identify. Discoveries or inventions without any uptake by industry and without impact on the competitive advantage or the sustainability of the sector cannot be classified as innovation. In his overview publication on 'Networks of Innovation', Tuomi (2002) even goes as far as stating *'...if new knowledge has no impact on anyone's way of doing things – in other words, if it doesn't make any difference – it is not knowledge. Only when the way things are done change, an innovation emerges...'* (Tuomi, 2002, page 10). Consequently, innovation involves both, a) discoveries or inventions and b) their successful implementation in industry.

It is obvious that the creation of an infrastructure that supports discoveries is different from an infrastructure that manages implementation. On a very basic level, we can state that inventions require creativity and ideas which could gain from learning and knowledge exchange whereas implementation requires agreements, coordinated actions, and organizational and managerial support.

The classical view on innovation is a linear one. Citing Schumpeter (1975) and others, Tuomi (2002) refers to the classical view as one building on a sequence of phases involving the creation of ideas, invention, research and development, application and diffusion. However, referring to observations in practice he argues, that in contrast to the classical view *'...innovation emerges in a complex iterative process where communication, learning and social interaction play important roles...'* (Tuomi, 2002, p. 8). Furthermore, referring to Cohen and Levinthal (1989, 1990) he continues to argue that *'... adoption of new innovation requires learning and development of competences...'* Tuomi (2002, p. 8).

Taking these arguments together one can see that communication, social interaction, learning and the development of competences are key factors in innovation development. This supports the view on networking as a suitable tool for innovation support. In addition, with the close dependencies of enterprises in the food sector in successfully dealing with food safety and food quality as well as with social and environmental concerns, interactions between actors in the food supply chain or network are a baseline requirement for any successful initiatives towards innovation.

In summary, networking is supporting the first phase in innovation (realizing discoveries and inventions) and a pre-condition for realizing the second phase dealing with implementation and diffusion. Networking is especially relevant for SMEs where individual companies do not have the internal infrastructure that supports sufficient interaction and knowledge exchange is deemed necessary for successful innovation support. Providing support for SMEs in learning and innovation initiatives is therefore closely related to providing support in realizing networking activity and especially a networking activity that is best suited for supporting learning and innovation initiatives.

This is the challenge addressed in this paper. Knowing principles on innovation support is different from making innovation support a reality. Different scenarios, capabilities, legal and political environments, sector competition etc. might have an influence on the suitability of different networking schemes for innovation support. Providing networking support requires a better understanding of the potential for innovation and learning, networks can provide especially for small and medium sized enterprises (SMEs) which comprise by far the majority of enterprises in the food sector (CIAA, 2007).

It is the objective of this study to identify network characteristics that are most suitable for promoting innovation and learning in SMEs. It is based on work carried out within the European project *'NetGrow' (Enhancing the innovativeness of food SMEs through the management of strategic network behavior and network learning performance)* which involved an extensive documentation of European networks building a.o. on face-to-face interviews with network stakeholders of whatever kind. The analysis was approached through the identification and selection of network case studies involving 28 networks from 9 different countries, most of them dealing with food in a variety of domains.

Network analysis is a complex issue as network developments are based on many internal and external factors some of which might be difficult to identify and specify. This analysis aims at providing a first overview on the initiatives. The case studies do not provide statistical information with sector relevance but are meant to uncover issues that might be of relevance and would even be worthwhile to study further. This involves issues that might have come up in interviews of one single case study but might turn out in further studies to be of wider relevance.

The paper discusses the case studies along the following line. An overview on the pressures the food sector is in provides the basis for the further discussion (chapter 2). It is with this background that groups from outside the business environment including those from public institutions have started to engage in network activities with the business sector. The following chapters introduce into the research methodology (chapter 3) and provide an overview on the case study networks that were covered (chapter 4). The paper concludes with some first observations on relationships and potentially suitable indicators for network performance.

2 Pressures and facilitators for innovation in SME environments

Challenges the food sector is faced with are enormous and ask for new ways of especially supporting SMEs with their limited resources in meeting those challenges. This is of relevance for the sector as a whole as SMEs are representing the vast majority of enterprises active in the sector. The European Technology Platform 'Food for Life' (ETP F4L), a European meeting point of research and industry, has discussed the challenges in formulating needs for research and development (CIAA, 2007). Keywords that focus our view on specific issues of concern are well-known to policy and industry alike. They involve a.o. climate change, loss of land, urbanization, changes in diets, limits in water supply, population growth, diminishing fossil energy, etc. The concern is not just any one of these issues but the simultaneous occurrence that causes the tremendous challenge the sector has to deal with.

The challenges have been captured with a focus on 2050 in the slogan '*...two times more with two times less...*', i.e., producing more food with a.o., less land, less waste, less energy, less water, less negative impact on the environment (WUR, 2011). It is obvious that such a vision cannot be reached by following present production and distribution schemes. The list of keywords should make it clear that innovations are needed in sourcing, production, distribution, and sales involving the whole spectrum of food sector activities dealing with technological, organizational and managerial aspects.

The challenges listed above are not challenges as such. They become challenges because of responsibilities placed by society on the food sector. Food is a basic human need which cannot be left to decisions by industry alone. This is where the responsibility of policy comes in, and the justification for policy engagement in facilitating initiatives towards improvements in innovation support. They include specifically the support of networks that could facilitate the emergence of innovations in the food sector for SMEs.

There might be other issues policy might be interested in, such as the creation of jobs or revenue, as has been cited in numerous case studies. However, these would be objectives any other industry could deal with. Taking rules of comparative advantage into consideration, innovations in the food sector (and consequently any analysis of network performance) would need to follow a priority scale where the food specific global responsibilities are the primary focus. This relates ultimately to the case study analysis of this paper.

Assuming, as supported by studies and literature, that networks might be suitable for innovation support, the case studies would need, in principle, to look for differences in scenarios (including the cultural, political, economic, and legal environment), in network focus, in network organization (members, regulations, etc.), in network management (activities, etc.), and their relationship with network performance. For this analysis one needed to know approximately what to look for. Based on earlier discussions, innovation support could build on supporting the creation of inventions (*focus issue 1*) or supporting its utilization and implementation (*focus issue 2*). Network initiatives that could provide appropriate support involve as principal alternatives

- a) *social interaction and knowledge exchange* (related to 'focus issue 1'),
- b) *learning and competence development* (related to 'focus issues 1 and 2'), and
- c) *coordination* (organization) and *management* of implementation (related to 'focus issue 2').

It is very obvious that networks building on social interaction or learning do not require an integration of actual business relationships. This is different for 'focus issue 2' where agreements between business

partners need to be considered. From a theoretical point of view, the move from 'focus issue-1-support' to 'focus issue-2-support' involves a major step in commitment as well as in organizational and managerial engagement. The needs for coordination and the management of implementation reach beyond enterprise border and need to assure an integrated

a) *product flow* passing through sourcing, production, packaging, distribution, sales, and consumption and an

b) *information flow* serving enterprise management and communication with consumers and stakeholders.

While coordination in product flows is established procedure, coordination in information flows is less developed and might need network support in learning and knowledge exchange reaching beyond basic coordination activities.

It could be expected that the drive of policy to engage in network activities for innovation support is more directed towards 'focus issue-1-support', as enterprises' own interest and, in turn, their willingness to engage on own account should increase when entering the implementation phase. This would also be in line with objectives that see the justification for policy support primarily in the pre-competitive phase. However, limitations in resources available to SMEs might require public support during the implementation phase as well to make an innovation to become real. This is a potential line of conflict in policy support for network development.

3 Methodology

3.1 Network identification

The study builds on in-depth case studies in 9 different countries in Europe. Within each of the countries, about 3 networks were selected for the study. The selection was based on an initial specification of structural indicators, and an identification of networks that could assure a broad variation in network alternatives. The broad variation of the networks in focus is outlined in the overview table attached as appendix. The initial indicators include age, source of finance, spatial orientation (local/global), positioning in value chain, focus of innovation, network driver, and scope (see table 1).

The table provides an impression on the network variety included in the study. Each network was analyzed through about 10 face-to-face interviews with different network members from different backgrounds, a number that should assure stable results and the consideration of the network diversity. The interviews were carried out simultaneously within a few months to avoid effects from changing economic environments.

Table 1
Summary of network characteristics

Country		DK			SE			FR			IT			NL			IR			BE					DE			HU			Summary
Network		I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	IV	V	I	II	III	I	II	III	
Age	old (>2y)	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	25
	new (<2y)		1													1										1					4
Finance	public		1	1	1		1	1	1	1				1	1																9
	private	1														1								1			1				8
Orientation	local (dom.)										1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
	global (int.)	1	1	1	1	1	1	1	1	1				1																	27
Target	horizontal	1	1	1	1	1	1			1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	5
	vertical							1	X		1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	22
Focus Innov.	product	1	1	1	1	1	1			1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
	process	1	1			1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
	organiz.							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
Driver	market	1	1		1	1				1							1	1	1						1	1					9
	industry	1				1					1						1			1	1	1	1	1	1	1	1	1	1	1	11
	research			1			1					1					1			1					1	1			1	1	9
Formal	focal comp.																			1											3
	public body, group		1	1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
	smes							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
Scope	formal	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	27
	informal																														9
Scope	food	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
	other																														8

The collection allows some first analysis of priorities in network analysis. Most networks were already some years in existence. This is due to the fact that the evolvement of networks requires some time for reaching a network status with some organizational routines. However, a few newcomers allow insight in difficulties in the uptake process. Furthermore, many networks are quite mixed in their characteristics, e.g. they might have a vertical but also a horizontal focus or combine formal and informal elements. They

were with some exceptions pre-dominantly domestic in reach. This fits SME network support as networks need to build on trust and personal interaction that is at least in initial phases best served through networks with members within easy reach. It is striking that there are almost no networks that are solely based on private funding. The majority is either based on public-private partnerships or on public funding only. SMEs are usually not in a position to provide appropriate support for initiating networks and the necessary organizational and managerial requirements.

3.2 Interview base: guide and analysis

The interviews were carried out on the basis of semi-structured interview guides that assured a basic comparison between different interviews, but allowed the interviewers enough flexibility to adjust to the different scenarios of the case studies.

Based on the analysis of the network's general profile, the interview guide did focus on a network's inception, evolution, membership, configuration, internal ties, activity, governance, management, and performance. However, interviewers were free to add other issues that might come up during the interviews. While this would not contribute to a comparative analysis of networks, it could identify issues that could gain relevance for further analysis. To account for the diversity of the networks, the interview guide had been adjusted to the main categories of respondents involving network coordinator, enterprises, research organizations, and public bodies supporting or having supported the network.

It is evident from the approach, that in the case study analysis, interviewers needed to have some expertise and were required to combine 'technocratic' information collected by following directly the interview guide with 'perceptions' they receive through the interview activity. The results are therefore not objective in a statistical (accountable) sense but objective through the eyes of the interviewing expert who is required to translate responses and impressions into a 'picture of reality'. A specific issue concerns the role of personalities. It is well documented in literature and referred to in some of the case studies that personalities might play a decisive role in the performance of enterprises or groups. This is a sensitive issue in an interview environment and in a documentation that is not totally confidential. However, it is also clear that personalities alone cannot offset deficiencies in the network approach in the long run. An evaluation is therefore not part of this documentation.

The documentation of the case studies is supposed to provide first indications of relationships between issues that might allow the formulation of a hypothesis which could be dealt with quantitatively in further research. There is no statistical relevance involved. However, the indications can be used as a basis for further studies that may support or reject the indications on a more substantial and statistically acceptable data basis.

A specific issue concerns network developments over time. This could involve changes in membership, in governance, in performance, in finance, in focus, etc. The identification of causes of changes could provide hints on deficiencies and potentially attractive opportunities to overcome them. This relates to a life cycle view and allowed the identification of opportunities to prolong the life cycle of networks.

4 Overview on cases studies

4.1 Focus activities: overview

The initial grouping of networks is according to countries and structural indicators (table 1). For their support towards innovation, they could be categorized according to their focus activities discussed in chapter 2 and their relationship with innovation generation:

1. Creating an *atmosphere for innovation* through **socialization** activities.
2. Developing an *innovation ability* through training activities that support **learning**.
3. Promoting the *identification of innovation opportunities* through activities that support **knowledge exchange**.
4. Pushing towards *innovation implementation* through activities that facilitate **coordination** and management of joint business activities.

The ordering represents in principle an increase in dedication and commitment but also a decrease in an atmosphere that supports intuition. So for best serving an innovation process in total it is not an either/or situation but a situation best served by including all four of them. However, the ordering represents as

well a development path starting with a socialization period that allows the creation of ideas and the development of trust, followed by a period of learning and trusted knowledge exchange until a dedicated business oriented innovation phase can emerge. Several case studies have emphasized the need for trust and the problem of knowledge exchange in networks that could not build on a preceding trust development phase.

4.2 Focus activities and network clusters

This principal view is to some extent mirrored in networks which reach across several of these activities. As a consequence, a suitable clustering of networks that best fit network characteristics based on their activities is subject to be challenged from any counts. However, it could support in approaching further analysis. In the following and based on the analysis, we propose a clustering of networks as follows (table 2):

1. Networks with main focus on training, knowledge generation and exchange involving training programs, consulting services, and research cooperation.
2. Networks with main focus on knowledge exchange and joint business activities with focused market oriented product or process development involving cooperation on defined product or process innovation.
3. Networks with main focus on joint business activities of business groups with common promotional interests or more specific the protection of origin.
4. Networks with main focus on social networking and knowledge exchange which could build on general socialization of groups with common interest or on focused promotion of interaction for cooperation and project initiation.

Table 2
Networks and their linkage with activities

Network activity clusters	Main focus	Networks
Networks with main focus on training and knowledge generation and exchange (through research or consulting)	Participation in training program (with alumni scheme)	Reseau-Club ICHEC-PME (BE) Plato Ireland (IR)
	Consulting and development	Innovatech (BE), Fruit Sector Network (IT) Green Tech Park (SE)
	Research cooperation	VLAT (BE), Oresund Food (SE/DK) Cluster B (NL)
Networks with main focus on knowledge exchange and joint business activities	Cooperation on defined product Innovation	Food for Health (IR), MOSZI (HU) Pharmagora (HU), Fish Innovation (HU)
	Cooperation on defined process Innovation	3D Network (FR), Agency of Innovation (FR) GlobalG.A.P. (DE), Maschinenringe (DE)
Networks with main focus on joint business activities (promotional activities)	Promotion of business group	Cais (IR), Cluster A (NL), Cluster C (NL) BioBourgogne (FR)
	Promotion/protection of regional Products	Parmigiano Reggiano Cheese (IT) Prosciutto di Parma (IT)
Networks with main focus on social networking and knowledge exchange	Open community network	Food Club (DK), Spis Nord (DK) Cluster Food NRW (DE)
	Promoting interaction for cooperation and project initiation	Skane Food Innovation Network (SE) Wagralim (BE), Flanders Food (BE)

The first group is one that usually developed out of, and continuous to build on, a dedicated interest of a focal member (enterprise or institution) providing services which keeps the network going. It is not primarily dedicated to exchange among participants but builds primarily on links between the focal member and participants, e.g. through training courses offered by the focal member. In summary, networks in this group tend to be long lasting and stable as a network scheme but may be short lived for individual participants who are no longer in need of being linked to the focal group.

The second group is one that builds on a strong common business interest of all participants dealing with the promotion and implementation of certain well-defined innovations. Interests beyond implementation stage are not in focus. In summary, networks in this group tend to be short lived (short life cycle) but stable.

The third group is one that builds on interests of participants in the promotion of a 'common good'. As long as the common good is of interest and the promotion has its value, the networks tend to continue. In summary, networks in this group tend to be long lasting and stable.

The fourth group is one that builds on knowledge exchange, social networking, ad hoc projects and similar group activities. This might be an ongoing initiative. However, as the group is less focused, its stability depends on engagements and motivation. In summary, networks in this group tend to be long lasting but with limited stability.

4.3 Impact of network support in socialization, training and knowledge exchange

Participating in networks with socialization activities requires very limited dedication but provides, in turn, opportunities for exchange and the development of relationships ('networking') that may well provide benefits much beyond costs. As socialization is an ongoing process, such networks do not follow a classical life cycle approach with a natural ending phase.

Training initiatives acquaint participants with state of the art in issues of interest. This is a service towards learning which, if asked for, could involve a positive cost benefit ratio depending on the price asked for the services. A training initiative could build on a specified training program or on a program with continuously changing subjects of interest. Several case studies deal with the first alternative (specified training program) and the development of a network of alumni of past course participants (e.g. 'Reseau-Club', FR). Such networks are not directly oriented towards innovation but build on an atmosphere of 'togetherness' which could, if appropriately managed move towards networks for knowledge exchange. The question of stability or success of such networks is not a fitting one as these networks do not involve a focus but build on participation in a training program. Success could be judged with regard to the transfer of such networks into one of socialization, knowledge exchange or business activity. A network, building on providing a teaching program with continuously changing subjects of interest, provides a learning platform. In a sector with newly emerging challenges and changing business environments such network could remain attractive indefinitely if training services remain attractive and priced below perceived benefits.

Networks for knowledge exchange with or among enterprise representatives may differ in focus depending on participation and interest. The interest may, in principle, deal with sector related issues and especially product or market interest or with issues independent of any specific product or market. It is evident that networks with sector focus are of higher interest to stakeholders, as knowledge exchange may capture the whole spectrum of domains of interest. However, it requires a substantial level of trust and confidentiality to function beyond the exchange of non-critical information items. This requirement leads to a tendency towards closed groups to retain the trust level that allows open exchange. This tendency is supported by the case studies. An alternative to networks with sector focus are networks that deal with issues of general interest that allow and employ a dedicated selection of members. Such networks may deal with general management issues and be figured around a membership group without competitive interests. This is a narrow focus which does not require similar levels of trust. In principle, such networks could remain open for new entrants. However, even in networks like this, member groups tend to close against newcomers (see example Plato, IR).

4.4 Impact of network support in business activities

Networks with a clear focus on the implementation of business related activities involve the highest level of dedication. They also tend to remain stable as long as the activities are successfully going on. The development of arrangements and the dedication of resources involve investments by participating stakeholders (research, enterprises, and public bodies) that are usually based on a clear cost-benefit evaluation by stakeholders which keeps the networks active. Such networks may deal with innovations in products, in processes, in resource use or in services. They may build on closed groups if activities are of competitive nature. Several case studies demonstrate the stability and success of such networks. Examples involve case studies 'MOSZI', 'Pharmagora', or 'Prosciutto di Parma', and others. However there are differences in the need for commitment, especially regarding innovation in products or processes. A primary differentiation involves

- a) network cooperation in the specification and marketing of products of protected origin and
- b) network cooperation in developing innovation in certain sales products.

In the first case the cooperation is defined by offering products produced according to certain specifications in a certain region. Individual enterprises might not need to cooperate in their daily operations or their procurement and sales activities. Participation in such networks is not limited to a certain period of time but may continue indefinitely as long as members perceive participation as one

where operational (day-to-day) benefits exceed costs. In the second case a group of companies usually cooperates in horizontal and/or vertical dimensions in a setting commonly referred to as a 'food chain'. Such a network cooperation creates dependencies which build on contracts and commitments. They may involve a major investment in time, funds, and commitment which usually keeps stakeholders within the network as long as benefits from investments can still be realized, e.g. usually at least for the duration of an innovation cycle. This is a classical type of networking which is commonly not seen as a network but as a business cooperation for the development and realization of competitive advantages in production and/or marketing. Typical examples are represented in case studies 'Pharmagora', 'Food for Health', and others.

Cooperation in using resources is a common phenomenon in business relationships. Enterprises might share transportation units, warehouses, marketing services etc. Such cooperation activities might involve innovation potential. However, they are usually developed as a business-to-business approach and not as a network approach with a clear focus on organizational or managerial innovation.

Beyond this type of activity, there are examples of network developments that build on innovations in management and organization and might serve as blueprint examples for network developments. Innovations in organization and management are frequently overlooked but they might have a decisive effect on a network's market performance in production and/or marketing. Examples involve networks developed for sharing physical resources as e.g. machinery resources in agriculture that do not only involve the sharing of resources but innovative organizational and managerial models for cooperation ('Maschinenringe', DE). However, the sharing of resources might not only involve physical resources but could also involve resources in planning and control as is typical in networks built on common quality schemes. An example includes the case study on 'GlobalG.A.P.', where resources in the planning, control, and marketing of the scheme are being shared by all those involved.

It is apparent that some of the business oriented networks realize an innovative approach which would not be feasible without a network. So the network is not just supporting innovation but it is the necessary base for the innovation which could not take place without its organization. This contributes to the stability of networks as long as the innovation reaps benefits.

5 Lessons learned

5.1 Inception and failure of networks

The inception of networks is scarcely just a matter of having a good idea to support each other. One of the few examples that seem to follow this simple approach is the 'Food Club' network in Denmark which serves as a meeting point for socialization of high level professionals. Most other networks evolved out of real or perceived pressures as discussed in chapter 2 that asked for action. The pressures helped to overcome the investment barriers involved in creating a network. Some examples represented in the network case studies:

1. New developments in technology: case 'Maschinenringe' (DE).

With the increased mechanization in farming, small farm structures could not utilize the benefit and saw their existence challenged. The joint utilization of machinery through innovative well organized exchange mechanisms in the network eliminated the threat.

2. Problems in staffing: case 'Cluster A' (NL).

As the food industry's processes in sourcing, production, and distribution increase in complexity, the requirements on staff competence increase as well. As some of the food industry is traditionally located in rural areas, finding qualified personnel might become a problem and initiate a network for promotion of industry through communicating its innovative base.

3. Deficiencies in consumer trust: case 'GlobalG.A.P.' (DE and global).

In the aftermath of the BSE crises, various agri-food groups developed initiatives towards the provision of guarantees on food safety and food quality. One of the innovative initiatives originated from retail and focused on 'Good Agricultural Practice' in the fruits and vegetables sector where the time to markets is short.

4. Market protection: cases 'Prosciutto di Parma' (IT) and 'Parmigiano Reggiano Cheese' (IT).

Markets principally protected by PDO agreement are not protected from competition. They need constant development, marketing, and control to remain competitive in production and to avoid fraud.

5. Sluggish economy: cases 'Cluster Food NRW' (DE) and 'Cluster B' (NL).

In regions with a deficiency in economic dynamics, government may develop initiatives towards supporting new dynamics in industry through, a.o. innovation support. Such networks focus usually on linking research up with industry for promoting research projects with relevance for industry, competitiveness and, in turn, growth.

6. Risk in developing new markets: cases 'Food for Health' (IR) and 'Pharmagora Cluster' (HU).

In the food sector, the introduction of new and innovative products may involve many risks evolving from product characteristics (e.g. new information on hazards etc.). Networks are a way of sharing risk, blame and success.

7. Emerging competition: case 'BioBourgogne' (FR).

Industry groups with certain characteristics as, e.g. the production of products with a dedicated identity (bio-products etc.) might need to cooperate against emerging competition which could build on related but maybe easier to implement characteristics realizing, in consequence, a competitive advantage.

8. Access to new technology: case 'VLAZ' (BE).

Requirements of food safety and quality control might put pressure especially on SMEs to cooperate in control technology either within the group or with groups outside the industry as e.g. research. Similar requirements might evolve in product development activities.

9. New challenges from markets: case '3D Network' (FR).

There is increasing pressure from markets to follow certain procedures in organization and/or management of processes or enterprises. It may even extend on requirements formulated for supplier companies. Examples involve requirements on quality, sustainability or corporate social responsibility. To follow such developments, SMEs might need support and cooperation with supporting institutions. The case deals with the integration of the concept of corporate social responsibility into business operations.

It is striking that a majority of case study networks involving SMEs were financially supported by public bodies. There are exceptions. They involve primarily networks that were initiated for direct business success, or provide services especially in training activities or in lobbying that provided a benefit for each individual activity which facilitates the collection of fees.

Otherwise and whatever pressures are behind, networks and especially those dedicated for supporting innovation and knowledge exchange seem to depend on public support at least during the initial phase. This statement follows the following arguments. Large companies are less dependent on network activities for innovation support. They can easily link up with research and commit internal resources for development activities. This is different with SMEs. They need network support for communication among themselves as well as with research and their institutional environment. However, they usually do not have the resources for the initiation and management of suitable networks and depend on support in network creation and management, at least during initial phases where costs for enterprises might still exceed benefits. This is where public institutions come in which have interest in promoting development and competitiveness of the sector as well as in rural development and the improvement of the labor market. Some case studies have explicitly mentioned these aspects as public bodies' objectives for their engagement.

Network failures are in many instances closely linked with financial issues. There might be a conflict between dynamics in the development of benefits e.g. through research initiatives and dynamics in the provision of public funds. This is an issue in several of the networks and, in some, challenges their continuation. However, there might be other causes for failures. There might be deficiencies in focus, organization, and management, unsatisfactory net benefits, or disagreements regarding objectives or activities. Examples of emerging discussions in this direction could be related to case studies 'Oresund Food' (DK) and 'Food Cluster NRW' (DE).

5.2 Dynamics in cost-benefit views

As the creation of networks is a resource consuming effort, network approaches are, in principle, long term initiatives. However, differences in network attractiveness over time for different stakeholders from research, business or public institutions may create critical conflicts in emerging networks which, if not overcome may jeopardize their long term sustainability. It is easy to see, that in emerging networks where innovations are still dependent on research activity 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.

This is the basis for initial public support of network development which is more common than an exception. However, it is also a barrier in the transfer of network financing from public support to private engagement. The initiating government bodies might have a different view and relate success to structural indicators of network development and less to network performance in terms of innovation. From their point of view, financial responsibility should be transferred to the business community as soon as possible. This is a clear conflict in network development which has become apparent in the analysis of networks and might jeopardize the sustainability of the approach.

Networks emerge with a purpose in mind. If the purpose has been reached, networks could, in principle, be dissolved. This is a challenge for established networks where innovations from research have been utilized in industry which could shift its engagement from network innovation dynamics to reaping the benefits of the innovation. One might compare this process with life cycle development as discussed in management studies.

However, as innovation support is, in principle, a recurring need, the availability of innovation networks is as well. As a consequence, closing down of innovation networks requires, in order to remain competitive, the re-establishment of innovation networks with a newly emerging purpose in mind. As the re-establishment requires resources in coordination, organization, and public support a circle of closing down and re-establishing networks involves, in principle a negative cost-benefit ratio.

This cannot be in the interest of the sector and especially the public if re-establishments of networks require public funds. As in a majority of cases, public bodies are active as initiators carrying the costs of coordination and organization and, in addition, are asked to provide financial resources for the initial phase such a circle cannot be in the public interest. The approach might be beneficial for nonpublic stakeholders if public support can be assured. However, if public engagement cannot be assured, this process is not attractive to non-public stakeholders either.

From a comprehensive cost-benefit view building on a combined interest of all stakeholders, it is therefore of critical relevance to focus on reaching long-term positive cost benefit effects for its network cooperation through, e.g. a periodic re-activation process.

5.3 A case of flexibility: umbrella network organizations

Of specific interest are umbrella organizations. They build on networks within networks. Two different types are represented in the case studies which can be considered as two opposite ends of a range of organizational alternatives. One type builds on a well-defined structure of regional networks, the other type is open for the establishment of inside networks that develop in response to needs and dissolve if needs have been served. Both types of networks represent a network flexibility that supports its sustainability beyond a focus presently of interest.

Umbrella networks with a well-defined regional structure are represented by a network that has been active for a longer time ('Maschinenringe', DE) and by a network presently emerging ('Spis Nord', DK). In analyzing development of the established network it can be shown that while the umbrella organization remained stable throughout the years, there were dynamic changes within the cluster of regional networks. Activities within the cluster networks increased and decreased depending on needs, interests, or innovation opportunities. With the established structure, an increase of activities in a region that was inactive before did not require much of an investment. This facilitated the uptake of innovation opportunities and kept the network as a whole on a sustainable development path.

An umbrella network with a 'floating' internal network configuration is represented through case study 'Skane Food Innovation Network' (SE). The development of 'networks on the go' according to changing needs and interests is an attractive one from a theoretical point of view. However, it requires a higher level of organizational investment and organizational experience by those who invent and organize such networks.

5.4 The performance issue

Discussing about the performance of a network requires a definition of objectives. An objective 'innovation' is not of much value if it does not relate to positive impacts with stakeholders. One might formulate an artificial objective as a reference and evaluate networks according to the reference. However, as stakeholders will follow their own interests, the evaluation according to an artificial reference will only represent a side-effect.

Looking at objectives of stakeholders the case studies show a variety of alternatives depending on the case study scenario. So we cannot work with a universal evaluation scheme. However, for a business

oriented network with the involvement of research, industry, and public bodies a 'typical' scenario of objectives as supported by case studies could involve the following alternatives:

1. Research is interested in the provision of research projects and contacts with industry.
2. Enterprises are interested in competitive advantage and in recruiting qualified personnel.
3. Public institutions are interested in sustainability of industry and rural development.

In general, research is gaining in initial phases, while enterprises and public bodies need to wait for innovations from research take effect. This makes performance measurements at early stages difficult. The results of the case study interviews underline this argument. One might look at indicators of activities (like meetings, etc.) assuming that activities are linked to future success. While these are weak indicators with regard to stated objectives, they give a hint on continuing interest of stakeholders and their perception of potentials in future benefits, e.g. they still 'believe'. As most case study networks are still at an early stage of development, few allow a clear evaluation of performance with regard to objectives. Exceptions are studies on network developments which show some maturity like the cases on 'Maschinenringe' (DE) or on 'Clusters' in the Netherlands.

6 Conclusion

Identifying network organizations and network dynamics which could be promoted for SME support in innovation and competence development is closely related to the ability to identify performance of networks in varying scenarios and development stages. The analysis discussed in this paper provides a first view on critical issues for network performance and sustainability. It also highlighted the relevance of public support in the network initiation phase but also the potential need for continuing support in SME networks. In addition, the analysis brought forward a number of indicators that could be analyzed further for getting more insight into relationships and success factors.

They involve the following categories of potential indicators:

1. Aims (indicators relating to the basis for innovation and learning).
2. Diversity in membership (indicators for potential of innovation creation).
3. Strength of member relationships (indicator for facilitation of innovation/learning infrastructure).
4. Financial Organization (indicators of success).
5. Interaction (indicators of established infrastructure).
6. Services and initiatives (indicators of direct actions towards innovation/learning).
7. Stability, growth, competitiveness (indicators of success).

Some of the indicators require expertise to judge and the availability of a fitting grading scale. They complement (and partly duplicate) the structural indicators listed in table 1. The identification of success factors is a difficult issue considering the variety of scenarios and the complexity in specifying some of the soft factors like the strength of informal ties with 'others'. One might need to approach the analysis from various angles to arrive at conclusions that could guide network development in the future.

The analysis of the indicators might allow to identifying certain patterns typical for certain network configurations and their performance. Network specific individual indicator evaluations are not of much value. However, the utilization of individual evaluations for the delineation of patterns could support the identification of patterns with some generic relevance. This would greatly facilitate the discussion on suitable network configurations for innovation and learning support.

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Appendix 1: Overview on networks according to country, main focus and relationships with table 1

Country	Network	Main focus
Belgium	WagrALIM (I)	Center of excellence with knowledge institution
	Club-ICHEC PME (II)	Active alumni club
	InnovaTech (III)	Innovation service provider
	Flanders'FOOD (IV)	Center of excellence with knowledge institution
	VLAZ (V)	University analysis service
Denmark	Food Club (I)	Established social network of industry
	Spis Nord (II)	Open food network for innovation, #promotion
	Oresund Food (III)	Food research cooperation network
France	3D Network (I)	Consulting services
	Agency of Innovation Picardy (II)	Consulting services
	BioBourgogne (III)	Advisory and marketing service
Germany	Cluster Food NRW (I)	Open food innovation network
	Maschinenringe (MR) (II)	Farm-driven support network
	GlobalG.A.P. (III)	Business certification network (incl. research)
Hungary	MOSZI (Soda Producers) (I)	Cooperation for focused product innovation
	Pharmagora Cluster (II)	Cooperation for focused product promotion
	Fish product and tech Innovation (III)	Focused business cooperation
Ireland	Food for Health(I)	Dedicated industry research program activity
	Plato Ireland (II)	Mentor based training scheme with alumni
	Cais (III)	Lobby group
Italy	Parmigiano Reggiano Cheese (I)	Management of PDO
	Prosciutto di Parma(II)	Management of PDO
	Fruit sector networks (III)	Cooperatives' service activities
Netherlands	Cluster A (I)	Promotional business interest group
	Cluster B (II)	Business cluster linked with university
	Cluster C (III)	Business interest group
Sweden	Green Tech Park (GTP) (I)	Local development agency
	Skane Food Innovation Network (II)	Business community
	Oresund Food (III)	Food research cooperation network

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