

Innovation Broker Functions in Regional Innovation Systems. A Case study of Food Valley Organization

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Abstract

This paper aims to shed light on the Innovation Broker functions in Regional Innovation Systems by analysing the functions and services of the Food Valley Organization, an important innovation broker in the Netherlands. Based on the number of services that Food Valley Organisation directs to the different functions it can be concluded that next to the innovation broker functions Demand articulation, Network formation and Innovation process management, also Visionary leadership and regional development and Stimulating entrepreneurial experimentation should be included in future analyses of innovation broker functions in Regional Innovation Systems.

Keywords

Regional Innovation Systems, Innovation Brokers, Food Valley Organization

1. Introduction

Over the past two decades social scientists and policy makers have been paying more and more attention to regions as designated sites of innovation and competitiveness in the globalizing economy. The Regional Innovation System (RIS) concept has acquired a prominent position within European technology and innovation policies. In the field of regional development, “region” has been used in this sense to signify the governance of policies to assist processes of economic development; a “regional innovation system” combines the focus on regions with a systems perspective (Cooke *et al.*, 2006; Cooke *et al.*, 2004). According to Asheim (2005) a RIS is defined as “interacting knowledge generation and exploitation subsystems linked to global, national and other regional systems”. In this context a region competes on the basis of unique and difficult to copy “core competencies” compared to other regions. It is, therefore, very important for a region to identify its strengths and to define “regional constructed advantages” as a base for a RIS strategy.

The performance of a RIS depends on the quality of its subsystems and how they interact with each other. For this reason it is very important to establish effective connections among the actors in a RIS. Gaps in connectivity and collaboration reduce the performance of the RIS. Innovation brokers provide mechanisms for regional connectivity, help to bring technologies to the marketplace, identify and market regional strengths, define competitive advantages, identify technology opportunities and help to make to align the different efforts in the region.

In the Netherlands six RIS regions with competitive regional advantages were defined in 2004. One of these regions was Food Valley (FV), a knowledge cluster in the eastern part of the Netherlands. It was chosen because of the combination of the following important elements: a cluster of a large number of international food companies, research institutes and Wageningen University and Research Centre, combined with a science park and an incubator centre, combined with start-up companies and specific research knowledge on e.g. genomics, nanotechnology and horticulture. Food Valley Organization (FVO) was created in 2004 as the

innovation broker for the RIS with the mission to position the FV as the global centre of innovation in the food industry and facilitate the processes of innovation within the region.

The success of FVO depends on the recognition of its value and contribution to the innovation processes in the FV Region. One of the main problems for the evaluation of the contribution of innovation brokers, such as FVO, is the difficulty to measure the value of their services. In their role as facilitator, their contribution cannot be easily distilled as they operate in the early phases of the innovation process and within a multi-network system (Klerkx *et al.*, 2008a).

Up to now, there is not much reported in innovation management literature on innovation brokers at regional level in a RIS. Considering that FVO was created by the joint collaboration of triple helix actors of the region to act at regional level, the main objective of this paper is to compare the main functions that FVO is conducting through its activities and services with the theoretical frameworks to analyse innovation brokering in RIS that are presented in the innovation management literature, in order to see if these frameworks might need adjustments seen in the light of the case study results. In Section 2 the theories of RIS and innovation brokering are presented. Section 3 presents the case study of FV region, FVO and the FV Society and the mapping of the functions and services of FVO. In Section 4 the conclusions are drawn.

2. Theory on Regional Innovation Systems (RIS) and innovation brokering

The concept of RIS includes all regional subsystems, actors, and institutions contributing in one way or another, directly or indirectly, intentionally or not, to the emergence or production of innovation (Hekkert *et al.*, 2007). Initially, the innovation system concept was applied to the national level. It has been generally adopted as the base to develop and analyze the innovation policy of many countries. Later, different researchers introduce new concepts as “technological systems”, arguing that systemic interrelationships are unique to technology fields, or sectoral approach that examine how groups of firms develop and manufacture products of a specific sector and how they generate and utilize the technologies of that sector (Tödtling *et al.*, 2005). Over the past two decades social scientist and policy makers have paid more and more attention to regions as designated sites of innovation and competitiveness in the globalizing economy. In the field of regional development, “region” has been used in this sense to signify the governance of policies to assist processes of economic development. A ‘regional innovation system’ combines the focus on regions with a systems perspective (Cooke *et al.*, 2006; Cooke *et al.*, 2004). According to Asheim (2005) a RIS is defined as “interacting knowledge generation and exploitation subsystems linked to global, national and other regional systems”. Emphasizing the role of interaction, localization and embeddedness, the RIS concept provide the opportunity to analyze regional economies as structuring elements in global competition, as exemplified by alleged regional success stories such as Silicon Valley (Asheim *et al.*, 2005; De Bruijn *et al.*, 2005).

Because of the importance of knowledge diffusion and “spill-over”, it is important to ensure that various parts of the RIS interact in such a way that the long term economic growth of the RIS is supported. In this process, active intervention is required to facilitate the build-up of trust, reduce the threat of opportunism, and facilitate interaction between partners with complementary resources and needs. Trusted and shared norms of openness and reciprocity facilitate organizational learning, because they lower the transaction costs involved in knowledge exchange and support the development of future relationships (Autio *et al.*, 2008). Organizational learning in its various forms facilitates the development of core competences and the build-up of competitive advantages (Asheim *et al.*, 2005; Cooke *et al.*, 2006).

However, innovation problems may result from missing or inappropriate organization of knowledge generation and diffusion in the RIS, as well as a too strong orientation on existing institutions and traditional economic and technological structures (Tödtling *et al.*, 2005). To avoid such problems, innovation brokers have the important task to facilitate innovation processes, reduce gaps, coordinate actions and have an “animator” role in creating new possibilities and dynamism within a RIS (Howells, 2006; Klerkx *et al.*, 2009).

The literature that employs the Systems of Innovation perspective increasingly pays attention to several types of innovation brokers, also referred to as intermediating organizations, third parties, bridge and superstructure organisations. They emerged as a response to constraints and challenges apparent on both the demand and supply side of the knowledge infrastructure. They aim to overcome gaps (information, managerial, cultural and cognitive) in relation to innovation processes (Howells, 2006).

Howells (2006) defined the concept of the “Innovation intermediary” as follows: “an organization or body that acts as agent or broker in any aspect of the innovation process between two or more parties”. Much research has been conducted to study these organizations using different orientations: the process of innovation (Howells, 2006), the sector (Klerkx *et al.*, 2008c), specific roles (Batterink, 2009), relationships (Johnson, 2008) and specific functions (Boon *et al.*, 2008). The specific organizational characteristics and roles of an innovation intermediary depend on the reason for its creation. The term “innovation broker” makes a difference for those innovation intermediaries that have a broker role as their core function (Winch *et al.*, 2007). They are “facilitators of innovation” acting as a member of a network of actors in an industrial sector that are focused neither on the generation nor the implementation of innovations, but on enabling organizations to innovate (Den Hertog, 2000; van Lente *et al.*, 2003; Winch *et al.*, 2007).

The reasons why innovation brokers emerge are diverse, but generally they are created in response to a perceived suboptimal degree of connectivity between the network actors due to market or innovation system failures. In addition, they contribute to reducing uncertainty in the early stages of innovation processes when there is a high risk of failure, which would preclude private parties from innovating (Klerkx *et al.*, 2009 ; Lente van *et al.*, 2003; Smits *et al.*, 2004).

In the last years, it has emerged a new type of intermediary broker which functions at system or network level, in contrast to traditional intermediary organizations that operate mainly bilaterally (van Lente *et al.*, 2003). At the innovation system level, this intermediaries create connectedness within the system, and have an “animator” role of creating new possibilities and dynamism within a system, acting as a catalyst. In addition, they contribute on reducing uncertainty in the early stages of innovation processes when there is a high risk of failure, which would preclude private parties from innovating (Klerkx *et al.*, 2009 ; Lente van *et al.*, 2003; Smits *et al.*, 2004).

2.1 Functions of Innovation Brokers

The review of the literature shows different functions of innovation brokers, and there is also much terminological redundancy and sometimes confusion (Klerkx *et al.*, 2009); Van Lente *et al.* (2003) defined three systemic functions as key elements of ongoing innovation and transition processes for innovation brokers. This framework is used also by other researchers (Batterink, 2009; Klerkx *et al.*, 2008a, 2009 ; van Lente *et al.*, 2003). These functions are:

Demand articulation

In order to clarify innovation demand it is necessary to articulate innovation needs in terms of technology, knowledge, funding, and policy. It includes the search for possible technological applications. It is the role of innovation brokers to facilitate the creative process in order to arrive at real needs and prevent blind spots in self-observation, creating a strategic innovation plan for the actors in the RIS. Foresight studies can help to articulate future demands at higher system aggregation levels. In his study on innovation orchestrators, Batterink (2009) called this function “innovation initiation”.

Network formation

This function is related to System Connectivity. The intermediary works to: facilitate linkages between relevant actors (scanning, scoping, filtering, and matchmaking of possible cooperation partners), help to close information gaps in the innovation system and align the different actors.

Innovation process management

The innovation broker supports the learning processes and other forms of interaction and alignment among partners, enhancing feedback mechanism and by stimulating experiments and mutual adaptation, facilitating intellectual property rights attribution and commercialization of innovation outcomes and optimizing the interaction between the innovation network and the broader innovation system (such as physical infrastructure, reward and incentive systems, funding, and legislation).

In the specific case of Innovation intermediary functions on a regional context, Bendis (2008) presents the experience of a consultancy firm that helps to develop a RIS in the USA. According to Bendis an innovation intermediary at regional level has the following functions:

- Provide operating mechanisms for regional connectivity.
- Accelerate the process of new technologies into the marketplace.
- Identify and market regional strengths and refine and position comparative advantages.
- Incentivize the commercialization process of technology-based opportunities through investment programmes.
- Identify the application of technology opportunities that could be used in the region:
- Visionary leadership, necessary to make innovation based economic development work in and across regions.

Klerkx has studied the intermediary organizations of the Dutch agricultural sector (Klerkx *et al.*, 2008a, 2008b, 2008c, 2009) with important conclusions. His last work (2009) presents an analysis of the intermediary organizations that are fully dedicated to the facilitation of the formation and maintenance of innovation networks and innovation systems from an independent third-party position for the Dutch agricultural sector. He defined seven different types of organization and according to his results, the three main functions described before (demand articulation, network formation and innovation process management) are similar throughout the different types of innovation brokers that have emerged in the Dutch agricultural knowledge infrastructure. However, they may vary with regard to the more specific intermediary functions executed, which in turn depend on the audience of the intermediary organizations, their systems aggregation level and thematic focus. In the specific case of region perspective there is not much documentation on intermediary brokers created to work specifically at regional level. For this reason in the present case study we will analyze the functions of FVO in the FV RIS by combining the three mentioned functions with a new function: “visionary leadership and regional development”.

Table 1. Innovation Broker functions within RIS

Visionary leadership and regional development

To make innovation based economic development work in and across regions
Identify and market regional strengths and refine and position competitive advantage

Demand articulation

Identify the application of technology opportunities to be used in the region

Network formation

Provide operating mechanisms for regional connectivity

Innovation process management

Accelerate the process of new technologies into the market place
Incentivize the commercialization process of technology-based opportunities through:

- Investment programmes
 - Knowledge development and diffusion,
 - Influence on the direction of search,
 - Entrepreneurial experimentation,
 - Resource mobilisation
-

3. Results and main conclusions

3.1 Food Valley Region

The Food Valley Region is the knowledge cluster concentrated near Wageningen University and part of the Eastern Netherlands Region (Gennip van 2004). In 2004 a benchmark study was conducted to find out which are the relevant food clusters in Europe. The conclusion was that Food Valley was indeed among the most important European food clusters, together with Øresund (Denmark and South-Sweden), Emilia Romagna (Parma, Italy), and South-East England (Norwich, Cambridge, Reading, (Crombach *et al.*, 2008). According to Kemperink (2008), 1,442 companies related to the agri-food sector were registered in the region in 2008. It is the home of many prominent international companies and their research centres employing more than 15,000 highly educated researchers. FV is an important knowledge cluster; the presence of Wageningen University and Research Centre is enriched with international R&D (some big companies have established their R&D infrastructure in the area and about 70 companies are directly related to their R&D activities). Furthermore there are important public-private institutes, such as NIZO Food Research, TNO Food and Nutrition and the Top Institute Food and Nutrition, located in the region. The RIS shows a high degree of interdisciplinary working, strong inter-relations between the public and private sector and a high quality innovation infrastructure and support. In addition, the presence of an incubator centre, an agribusiness park and several governmental bodies (e.g. the European Institute for Food Law, Senter-Novem, Development Agency East Netherlands-Oost NV, Syntens and FV) provide support for the development of new businesses and R&D projects in the region. In conclusion, political support, funding, an innovation infrastructure and tools are all important aspects that are present in this region.

3.2 Food Valley Organization

Food Valley Organization is the response to the unification of companies, institutions and governments initiatives aimed to the same direction: strengthening the regional (knowledge) economy in and around Wageningen. Its creation was possible through the participation of the Development Agency East Netherlands (Oost NV), Syntens, Wageningen University and Research Centre (WUR) and four municipalities in the region.

FVO is organized as a foundation and it is constituted by a Board, a Bureau and the FVS. The board is formed by four representatives from the food industry (including the chairman), two representatives of research institutes and two representatives of the region. The Bureau of FVO implements the policy defined by the Board. The Bureau consists of a director assisted by four project managers. An important characteristic of this team is that most of the members work part time for the institutions that support FVO (i.e. Oost NV, Syntens, and WUR). This double role facilitates the alignments and communication between institutions. The Food Valley Society is a platform for networking in the region. The main goal of this network is to discuss and exchange new developments in the food industry and to stay informed on relevant issues in the food industry and on emerging technological developments. Different activities are organized to achieve this goal: meetings, visits, workshops and information spaces on the website.

At the end of 2006 FVO had achieved the main goals defined for the period 2004-2007 attracting four industrial R&D centres and 32 new companies to the region, making 35 new combinations plus 170 matchmakings between companies and knowledge providers. In addition, important activities were conducted by the Bureau as the Annual Conference of Food Valley Society, the innovation meetings and the innovation workshops. For the period 2007-2011 FVO is developing new activities, such as improving the international aspects of the innovation conference, and the development of an expertise centre of innovation.

3.3 Food Valley Society

A data base was built to define the characteristics of the about 100 members of FVS. It was build using the information of the companies and internal documents of FVO. The information collected was analyzed using different classification criteria (size of the company, region, market, age, type of products, ACE classification). Important characteristics of FVS members are:

- 62% of the companies are SMEs and 63% are located in the Eastern Region of the Netherlands.
- According to the NACE code classification most companies are in the manufacturing sector (47%), with 79% being a food producer. Another important sector is “professional, scientific and technical activities” with 28%. The number of management and marketing consultancy firms is lower, 20% of the FVS companies.
- 53% of the companies are selling their products to the European market followed by 33% that produces for the Asian Market. Export to the USA is relatively low.
- The presence of multinational, big companies (e.g. Friesland-Campina, Cargill and Philips) in combination with start-up companies and SMEs provide good possibilities for learning and innovation.
- Thinking of the possibilities of interaction and collaborative work, some key members are missing within FVS. For example, there is only one retailer-wholesaler present in the network. Because of the increased importance of market orientation the retailer voice should be more present in FVS. Also companies from other industries are missing, so important to enable learning across industry borders.

3.4 Mapping of Food Valley Organization’s functions and services

The information required to map the services of FVO was obtained using FVO documents (public and private), audiovisual and website material, and face-to-face interviews with FVO staff. The services’ data base includes the service description and possible ways to evaluate each service. To get a better view on the dynamic of FVO, also services were incorporated that FVO is planning to offer in the near future. In total, the database includes 36 services or activities implemented and to be implemented in the near future.. The list of services is

presented in Appendix 1. To define the possible Innovation broker's functions of FVO as presented in Table 2, the services were related to the conceptual framework presented in Table 1. Each service could be related to more than one function.

FVO is covering the main functions of an Innovation broker: 17 services are related to visionary leadership and regional development, 7 to demand articulation, 18 to network formation and 22 to innovation process management of which 16 are directed to entrepreneurial experimentation. We will elaborate on the different functions below.

Visionary leadership and regional development

Visionary leadership is related to 9 FVO services that are directed to improve the world-wide image of the Netherlands in general and the FV region in particular, as a renowned area for agri-food innovation, production and services. Regional development is related to the articulation of regional strengths, and includes 6 FVO services (e.g. Science and Technology based marketing). According to Cooke *et al.* (2006) the articulation of the regional strengths is the base to develop regional advantages. For a RIS it is, therefore, very important to research, identify and market regional strengths so that it can be continuously refined and positioned (Bendis *et al.*, 2008). Regional development includes also 7 services related to the organisation and support of regional innovation activities. The effect of the direct relationship between FVO and Oost NV can be seen in these activities. It could be interesting to compare FVO functions to the palette of innovation policy instruments available.

Table 2. Relationship between Innovation broker functions, FVO functions and number of FVO services

Innovation broker functions	FVO functions	Nr of FVO services
Visionary leadership and regional development	Improve Dutch/FV agri-food image world-wide	9
	Articulation of regional strengths	6
	Organisation and support of regional innovation activities	7
Demand articulation	Identification of innovation needs	4
	Identification of technology developments	2
	Access to market information	2
Network formation	Providing access to RIS information	5
	Assistance with and promotion of collaboration and networking among RIS members	15
Innovation process management		
Investment programmes	Access to capital	1
Knowledge dev. and diffusion	Knowledge transfer	5
Entrepreneurial experimentation	Entrepreneurial development	4
	Innovation support of SMEs	4
	Innovation stimulation programs	9
Resource mobilisation	Access to knowledge, human resources and innovation infrastructure	6

Demand Articulation

The function demand articulation is very important to promote innovation in the RIS. It includes 7 FVO services related to articulating innovation needs and corresponding demands in terms of technology and knowledge. Within this group, the specific function Identification of innovation needs is very important because this enables to define which actions and activities have to be taken to improve the innovation of the different RIS actors.

Networking formation

The presence of 18 services related to the Networking formation function shows that FVO dedicates much effort to this area. Providing access to RIS information includes a number of FVO services, e.g. the FV Website, the FV Insights and special networking databases. In addition, 15 services are related to support and promotion of collaboration, indicating ways to organise collaborative innovation projects between actors. The large number demonstrates the importance of this function to facilitate interactions between members of a RIS and develop new collaborations (Autio *et al.*, 2008).

Innovation Process Management

Within the Innovation Process management function four specific functions were identified. “Investment programs” includes 1 service directed to finding funding for specific innovation projects of SMEs. Knowledge development and diffusion includes 5 services, e.g. innovation meetings and workshops and Annual Food Valley Conference. Entrepreneurial experimentation is very important and includes 17 services directed to directors of SMEs from different agri-food sectors working together and helping each other with each other innovations. Web based benchmarking is a new service in this area, a platform where FVS members can exchange their innovation experiences and best practices. Resource mobilisation is important to facilitate access to resources (knowledge, human resources and innovation infrastructure). This is referred to by Bendis (2008) as the identification of technology opportunities that can be used in the region, 6 FVO services are directed to this function.

4. Conclusions

The reader should realise that the results are only based on one innovation broker in a RIS what may have lead to over or under emphasis of certain functions. In addition, although every effort was made to make the services comparable, one service may be larger than another. Therefore the following conclusions are tentatively drawn and primarily meant as base for further research.

If we look at the number of FVO services it is clear that Visionary leadership and regional development with 17 services, together with Network formation with 18 services are the most important innovation broker functions of FVO. Within the Innovation process management function, Entrepreneurial experimentation plays such an important role with 16 of the 22 services that, according to the authors, it should be classified as a separate function. We therefore come to the following scheme for future analyses of innovation broker functions in RIS:

- Visionary leadership and regional development,
- Demand articulation,
- Network formation,
- Stimulating entrepreneurial experimentation, and
- Innovation process management.

5. Appendix 1.

Table 3. List of FVO services/activities

1. FV Conference	19. Web base benchmarking
2. FV Award	20. Scie&Techn based marketing
3. Facilitating innovation cooperation between FVS members	21. Make contacts with foreign counterparts for developments in the region
4. Coordination with companies about the themes for conferences of FVS	22. Subsidy & VC for companies
5. Visit to FVS members	23. Match with known technological counterparts
6. "Members only" meeting FVS	24. Facility Sharing
7. Information of FVS	25. Participation in FV Consortium
8. Publicity of FVS	26. Support for special projects
9. Visit for an interesting exchange in Europe	27. FINE
10. Food Valley "Market Insights" (only for FVS members)	28. Development of collaborative projects with other regions
11. International meeting FVS	29. Relationship with other food cluster
12. IFT Food Expo	30. Collaboration to "Juice factory De Sapfabriek"
13. International partnerships	31. Collaboration to "Restaurant of the future"
14. International FV Ambassadors Network	32. Digital library
15. Visit to Food Valley	33. Food Valley Website
16. FV Innovation Link	34. External presentations of Food Valley Concept
17. Innova database	35. AIESEC Wageningen
18. Innovation meetings	36. Dutch Food Valley Classic

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