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## Building Viable and Sustainable Regional Netchains: Case Studies of Regional Pork Netchains in Spain, Germany, and The Netherlands

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### ABSTRACT

The present paper aims to give insight into critical issues contributing to the successful building of viable and sustainable regional netchains, focussing on chain governance mechanisms (coordination mechanisms, quality management systems, information systems) and social embedding. It uses three representative case studies from the regional pork sector in Spain, Germany, and The Netherlands, illustrating different trajectories to commercially viable and sustainable regional netchains. By analysing the cases on each critical aspect, the present paper describes important issues and proposes specific elements of further research, including on the roles for (non)governmental organisations.

*Keywords: Netchain innovation, Region, Governance mechanisms, Social Embedding, Risk, Uncertainty.*

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### 1 Introduction

Widespread disruptions caused by a number of recent events have underlined the vulnerability of today's supply chains. The pork sector in particular is confronted with many and diverse challenges. The sector has gone through a major consolidation and shifted from relatively small family farms to large businesses that are strongly connected within the supply chains in which they operate. However, societal and market concerns are still challenging the present system and question some of its characteristics, such as the large scale production, while at the same time current risk management efforts try to restore public confidence. In particular, environmental issues such as manure handling and dealing with waste streams, animal welfare issues such as housing and transportation of animals, as well as ethical working practices in the case of feed additives, medicine use and traceability aspects, are all issues dominating the political agenda in several European countries.

Although it is argued that the "local production-local consumption" model is no longer reality, there is currently a strong political desire observed at both European and national scales to "re-localise" food production and supply. In the last decades a new kind of European agri-food geography has gained in importance, with a topography shaped by the increasing attention for differentiation in food production and typified by various strategies to valorise local and/or regional food products (Nijhoff-Savvaki et al., 2008, Maye, 2006). An increasing trend can be observed towards development of pork chains that aim at high quality production in regional pork markets. In the changing environment of societal pressures, economically viable and sustainable regional market production may be seen by many producers as a feasible next step. With the pork sector facing increasingly high costs of production (both as a result of higher international costs of feed and other inputs and due to stricter legislation), "uniqueness" of regional pork production may show improved business opportunities.

Representative illustrations of this new vision emphasize economic growth through the production of specialty and regional market foods (Nijhoff-Savvaki et al., 2008, Maye 2006), creating a new kind of regional economic space built around specialist dimensions, such as PDOs (Protected Designation of Origin). To support further professionalization and thereby improvement of the competitive position of regional pork production and supply, without losing its unique market position, this paper aims to arrive at a thorough insight in factors that contribute to the successful building of regional pork production networks, focussing on governance and network embeddedness. To this regard, the *netchain* perspective (Lazzarini et al., 2001), which emphasises that firms are part of multiple networks that are sequentially arranged based on the vertical ties between firms in different layers, may prove particularly suitable in the case of regions as spatial units of decision and implementation (Lazzarini et al., 2001).

The paper has the following structure. Section 2 lists the major theoretical considerations in the field of building viable regional netchains, and presents a research framework on critical aspects for development of these chains. Section 3 describes the research methods used. Section 4 analyses three regional pork netchains in Spain, Germany, and The Netherlands, illustrating their different trajectories to build commercially viable and sustainable regional pork netchains by discussing critical aspects (governance mechanisms and embedding) and identifying important issues. Section 5 elaborates on the results and presents conclusions as well as suggestions for further research.

## 2 Theoretical model

### 2.1 Netchain perspective

There is a growing body of literature highlighting the re-emergence of regional consciousness and political positioning within nations around the world (Drucker, 1994, Keating et al., 1997, Douglas, 2005). The European Union has responded positively to regional identity, especially since 1991, and through regional development budgets, policies and programmes it has fostered the integrity of regional economies, the distinctiveness of particular regions, and has supported several initiatives to conserve heritage landscapes (Douglas, 2005). However, given the rapid development of technologies, the fast changing consumption trends and the ever increasing competition in the agrifood industry, (regional) innovation cannot longer depend on the individual firm alone but increasingly depends on the network, i.e. the supply chain, in which firms are embedded (Gellynck, 2008, Omta, 2002, Powell, 1990). This perspective highlights the need to better understand all the actors involved – the policy makers, non-governmental organizations, civil society organizations and consumers, *as well as* the actors (firms) in the chain and other stakeholders that can influence the rate and direction of innovation. Chain-wide innovative measures are a condition to tackle such challenges and for building regional chains. The network research approach is emphasising the multiple relationships among firms, by incorporating the embeddedness of a firm in a social network (Powell, 1990, Uzzi, 1997, Trienekens et al., 2008; Trienekens et al., 2009). Recently the TCE (transaction cost economics) and the network approach are becoming more integrated, combining the economic and social perspectives into relational or network governance (Borgatti et al., 2003).

In order to analyse relations in these networks we use the “netchain” perspective (Lazzarini et al., 2001), which provides supply chain and network perspectives on interorganisational collaboration. The netchain is a set of networks comprised of horizontal ties between firms within a particular industry or group, which are sequentially arranged based on vertical ties between firms in different layers. Figure 1 depicts a pork netchain with the four major layers, commencing with the production of piglets (breeding), flowing through rearing and finishing, slaughtering and meat processing, to retailers and consumers.

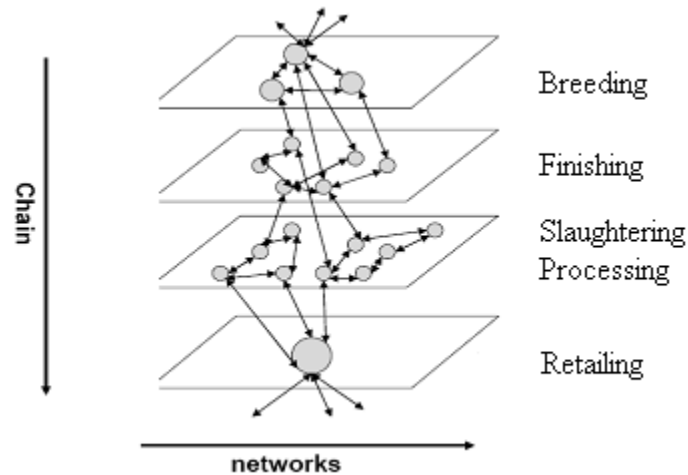


Figure 1. Pork netchain: adopted and modified from Lazzarini et al., 2001

Within these major layers the actors involved in a pork netchain are chain actors such as pig producers, slaughterhouses, processors, distributors, retailers and butchery corners, consumers and various network actors such as transporters and traders, veterinarians, feed industry, and government representatives. There are challenging relationships that exist in every layer, which not only may affect the layer itself, but may also have impact on the entire netchain.

The fresh pork meat chain is lengthy and involves various actors and different types of processes. The production starts with the production of piglets, flows through to fattening and finishing, on to slaughterhouses and meat processors, and finally to retailers and consumers – all during a time period of six months. The chain of activities in this farm to fork process, its quality management, regulations, and information exchange, differs per country and per stage of the chain. Moreover, every netchain is embedded in its unique social-economic environment. Differences in demands of consumers and other stakeholders lead to different ways of organizing and managing the supply chain. The investigation of inter-organisational relationships – “ties” – between different network partners, seem to be suitable in the case of regional pork production.

## 2.2 Governance mechanisms and social embedding

From expert interviews two critical aspects derived that can be seen as being crucial for building and managing growth of regional netchains. These are the netchain’s governance mechanisms and societal embedding. In the present paper we make use of three case studies to provide insight in the relationships between these aspects, and to identify important factors that affect the building of commercially viable and sustainable regional pork netchains, and should be managed to maintain its uniqueness. The critical aspects and factors will be discussed in detail in Section 4.

### *Governance mechanisms*

In its traditional form, governance refers to an institutional arrangement consisting of the rules by which an exchange is carried out and administered (Williamson, 1985, Hendrikse, 2003). From a network perspective, governance can be defined as informal social systems rather than bureaucratic structures within firms and formal contractual relationships between them (Jones et al., 1997, Snow, et al., 1992, Powell, 1990). In the present paper, we view governance as the means of creating the conditions for effective collaboration in the netchain, which is concerned with key characteristics such as partner selection, the type of agreements among netchain actors, as well as the strategic coordination within the netchain. We recognize three elements of governance: chain coordination, chain quality management systems and chain information systems.

### *Social embedding*

Embeddedness usually refers to the fact that economic systems, such as a supply chain, operate within a network of relationships, institutional arrangements and cultural meanings (Granovetter, 1985) that limit the extent to which economic actors can be regarded as purely instrumentally and rational in their market orientation (Roep and Wiskerke, 2006). This paper relates this dimension as societal embedding, namely the extent to which values that represent the pork meat product and its chain are shared by its wider

network of stakeholders, consumers and society in general. This includes values such as environmental friendliness, animal welfare, and brand management aiming to enhance consumer trust and confidence. For example, in a number of European countries animal welfare is an important issue, with themes such as prevention of castration and research on new housing systems high on the political agenda. Also environmental issues receive much attention, including reduction of ammonia, manure and stench, market management aspects, including matching of consumer demand, and improving processing methods (e.g. higher quality, less packaging material, food safety, and convenience).

### 3 Research methods

Using the two previously described concepts the present paper will examine means for regional pork netchains to achieve commercially viable and sustainable growth, while maintaining its unique selling proposition of being regional. In doing so it uses three case studies from the regional pork sector in Spain, Germany, and The Netherlands. The Case Study method is a suitable way to examine such relations (Mauffette-Leenders et al., 2001).

In order to investigate factors contributing to the successful building of viable and sustainable regional pork netchains, we have selected three initiatives in the European pork sector which demonstrate different attempts in bridging 1. tradition, 2. business, and 3. partnership aspects. Besides, these cases represent major differences in chain coordination, chain-wide quality management and information exchange, as well as their relation to societal embedding. The selected cases are: the Iberian cured ham chain in Spain, the Eichenhof cooperative pork chain in Germany, and the De Hoeve pork chain in the Netherlands. Selection is based on a large scale inventory into European pork chains (Trienekens, et al. 2009).

**Spain – case of Iberian ham.** The Spanish meat industry is highly dominated by pork meat products (60%), of which 11% is taken by Iberian pork. Iberian ham is the major product of this sub-sector; it is a speciality product consumed by the higher income and informed consumer group in Spain, in particular during special occasions such as weddings and Christmas. Its business case is built around aspects of ‘tradition’. Due to the recent increase in demand for such high-quality products, producers, processors and retailers have started to implement traceability systems through the whole market channel. The inherent quality characteristics of Iberian ham are linked to the genetics of the animal (the Iberian pig), the feed it consumes (with higher or lower levels of acorns and pastures from the “Dehesa” meadows and woods ecosystem, and the elaboration process which must be artisanal in natural drying sheds (Collado et al, 2006).

**Germany – case of Eichenhof.** Strong cooperative organisations exist in Germany’s pork sector. The regional pork chain Eichenhof is situated in the “pork belt” – the area with the largest pig farm density in Europe. Its business case is based on ‘doing (quality focused) business’, free from specific cultural aspects. It is organised as a corporate cooperation in a closed quality and health management system, with focus on regional marketing, and making use of its own Eichenhof meat brand program. Eichenhof produces around 0.9% of the pigs in Germany (Brinkmann, 2008). Strategies of the Eichenhof chain structure are designed and implemented in a cooperative manner. Through continuous search for excellence quality and health management standards were developed that brought its regional products success.

**The Netherlands – case of De Hoeve.** The De Hoeve pork supply chain is small in size and situated in the Dutch province of Brabant. Its business case is built around ‘partnership’ aspects. The chain includes the “De Hoeve Ltd.”, which is owned by the initiators, pig producers organized in an association, a slaughterhouse, a meat cutter and wholesaler, and a group of high quality butchers operating under the Keurslager (Quality Butchers) hallmark. De Hoeve Ltd. functions as the chain director and is responsible for the overall management of the supply chain. After succeeding in being certified the Environmental Certification Label (Milieukeur) it developed its own environmental certification system for pork meat. De Hoeve has the capacity to mobilize a strong support network, to shorten its supply chain, and to mutually share knowledge, information, and experiences. All partners benefit from the created efficiency and extra value added, resulting in a more solid supply chain.

A substantial part of this paper is based on the results of an inventory study into European pork chains, which was performed as part of the EU’s 6th Framework Integrated Project Q-Porkchains, “Improving the quality of pork and pork products for the consumer” ([www.q-porkchains.org](http://www.q-porkchains.org)). One of the work packages in this project aimed at an in-depth analysis of European pork chains and the establishment of a research agenda for the European pork sector. For the Dutch De Hoeve chain this paper also made use of results from the EU-FP5 integrated SUS-CHAIN project “Marketing sustainable agriculture: an analysis of the potential role of new food supply chains in sustainable rural development” ([www.sus-chain.org](http://www.sus-chain.org)).

## 4 Theoretical model

The market position of a regional netchain is particularly based on its uniqueness. The present paper argues that business growth (or up-scaling) of a regional netchain may lead to the loss of its unique selling proposition in general, as well as to an unbalanced power distribution within the netchain. This can result in lower credibility and authenticity among consumers. The present paper argues that governance mechanisms and societal embedding are critical factors in the implementation and development of these chains. It has identified a number of important issues to support management of these chains, being: chain coordination, chain-wide quality management, chain-wide information exchange, and legitimacy. These will be described below.

### 4.1 Chain coordination

For chain coordination in **Germany**, pig farmers of the Eichenhof are organized as members of the cooperative and as main owners of the slaughter and processing enterprise. A large part of the production is delivered directly to local butcher shops as well as to regional food retailers. All actors in the chain are committed by means of signed contracts to follow a joint quality policy whereby the

Eichenhof meat brand program sets specific requirements on animal husbandry, feeding, health management and quality assurance. The Eichenhof farmers' cooperative is engaged in contractual commitments with farms, respective suppliers and service providers as well as the slaughter and processing enterprise, and acts as a network coordinator, as is illustrated in Figure 2 (Brinkmann 2008, in Ellebrecht, 2008). All chain actors have signed contracts with the cooperative that prescribe quality requirements. All involved market partners work together without exception on a long-term basis.

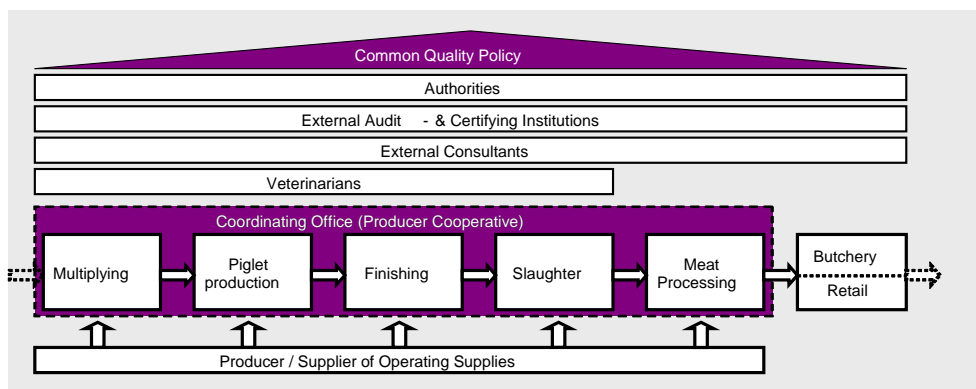


Figure 2. Eichenhof pork chain, managed as a cooperative (source: Brinkmann 2008, in Ellebrecht, 2008)

In **Spain**, coordination in the Iberian cured ham chain is organised by the Control Board PDO. All chain actors are registered and have signed contracts with the control board. Governance forms exist between the chain actors which can be market-based or relational in nature. Vertical integration is mainly achieved by means of product and process standardisation. The strictly enforced PDO regulations align chain-wide activities, in which quality and competitiveness is preserved since the necessary resources are partly provided by these public actors. Compared to figure 2, which describes the German case situation, the focus of governance in this chain is on the Authorities and Audit/Certification level. External consultants and veterinarians seem to have less important roles in these Spanish chains

The De Hoeve pork supply chain in **The Netherlands** emerged in 2004 in response to negative side effects of the conventional pork production: the weak position of farmers, environmental pollution and increasing legitimacy problems (Roep and Wiskerke, 2006). Its organization and chain coordination is based on transparency through strategic alliances: shared decision making processes between chain partners based on trust has led to chain stability, and sharing of risks. 'De Hoeve Ltd.' functions as chain director and is responsible for the overall management of the supply chain. The De Hoeve price system offers pig farmers more certainty, thereby opposing opportunistic behavior and creates more stability in production volumes. De Hoeve lacks the governance layers that can be recognized in the other two cases (compare figure 2). Governance is responsibility of the chain actors themselves.

## 4.2 Chain-wide quality management

In **Spain**, concerning chain-wide quality management, producers have taken advantage of the EU legislation on geographical indications and traditional foods (PDO), Protected Geographical Indication (PGI), and the Traditional Speciality Guaranteed (TSG) for Serrano ham. PDO is one of the most important food quality guaranteed certification systems in the Mediterranean countries, especially relevant for Spain, France and Italy. In the Iberian cured ham case, the objective is to establish quality characteristics for “Iberian meat products” (and to identify the products and guarantee their quality to consumers). It also protects the product’s geographical origin based on the geographical link between hams and shoulders manufactured in the zone and the climate conditions of the area. These are essential not only at farm level but also at the maturing phase. Specific PDO quality standards (see Box 1: quality management regulations) are subject to general European and Spanish regulation on meat production. They preserve quality and competitiveness of traditional products in a transparent market, aiming to protect the rights of both consumers and the sector as a whole. Additional control mechanisms are also in place, including inspections and certifications by independent bodies focused on enforcing breed and feed control and traceability, as well as compliance with quotas for the maximum number of pigs that can be fattened in the farms (Trienekens et al., 2009, Briz et al., 2008).

### Box 1: Chain-wide quality management regulations for Iberian cured ham

The Spanish Iberian cured ham has four designations of origin: Dehesa de Extremadura, Guijuelo, Jamon de Huelva and Valle de los Pedroches. Most Iberian pigs come from the South-Western regions of Spain, in the “dehesa”. Aside from Iberian there are two other types of Spanish PDOs in cured ham: Jamon de Teruel and Trevelez, as well as two brands of quality cured ham: Jamon Serrano, a traditional specialty, and Serrano Espanol, produced for export. Two breed designations exist: the Iberico puro, from sow and boar of pure Iberian breed with genealogic documentation, and Iberico, from pure Iberian sows. Feeding practices in the finishing period are grouped into three designations: Bellota (finished on a diet of acorn, grasses etc. in the “dehesas”); Recebo (finished on partly the same diet as the Bellota animals but with additional concentrates); and Cebo (mostly fed with feed concentrates and sometimes additional acorn and grasses).

(Briz et al., 2008)

PDO certified production provides a number of benefits for both the production and the consumption side of the Iberian ham case. Iberian PDO cured ham producers enjoy faster volumes of sales as well as strengthening of the position of their distinguished products in the market. This creates the space for market diversification through high quality standards and certified production. Yet a possible market risk concerns the timing and quantities of delivery from cured ham industries to retailers depends on the needs of the retailers and on the ageing process. For example, consumption of cured ham is highly seasonal, with around 30% of sales done at Christmas – retailers should thus forecast their needs and communicate them with producers to ensure availability of Iberian cured ham during this period.

In **Germany**, both the national and regional government set baseline quality standards for the pork sector which are in accordance with EU legislation, as well as additional standards which are set by the private chain-wide quality management system Qualität und Sicherheit (QS). QS is widely used in the German pork industry: more than 95% of the pigs produced in Germany are QS-labelled pigs. Yet Eichenhof’s success in terms of chain-wide quality management builds on its own quality meat brand program (which is based on QS standards). All procedures during production and along the chain are contractually and transparently arranged and belong to the agreed quality strategy between supply chain and distributor stage (Brinkmann, 2008). Eichenhof works with supply chain and complaint management procedures for all chain participants. Compliance with private standards is monitored through quality standard audits and inspections carried out by the farmer’s cooperative. In this regard, the controlled breeding, finishing, transport, slaughter, processing, and the end product are all part of the marketing concept and the “Eichenhof” brand. The criteria for Eichenhof’s successful quality and producer guidelines are listed in Box 2 below.

Eichenhof, like most pork chains, faces market risks related to the current increase of piglet imports at national level, and the high prices for feed and land lease. Its strong organisational structure helps it to deal with this by differentiating itself using its quality management system and certified production.

**Box 2: Eichenhof chain-wide quality management criteria**

- Uniform production and hygiene guidelines
- Central feed purchase by selected feed producers; regular feed analyses
- Integrated agricultural enterprises as well as slaughter and deboning enterprises
- Homogeneous finisher-groups, uniform weights, uniform health status
- Integrated veterinarian support system
- Software-supported operational data gathering and data exchange (complete traceability)
- Salmonella-monitoring
- slaughterhouses at maximum 80 km distance

(Ellebrecht, 2008)

In **The Netherlands** the quality assurance scheme Integrated Chain Control (IKB) is the main quality initiative concerning food safety and sustainability throughout the Dutch pork supply chain. IKB is very similar to the German QS. Concerning chain-wide quality management, and in addition to the regular IKB quality standards, the IKB free-range pig scheme has been developed in response to consumer concerns for further attention on animal welfare, yet this did not succeed to stop the societal concerns for industrial pig farming. The setting up of a short regional supply chain for certified fresh pork, which meets specific logistic and quality requirements of the 'Keurslager' group of butchers, resulted in a more transparent and efficient supply chain. The extra value added generated by cost reduction, with consumer prices equal to those of a conventional supply chain, is distributed among all chain actors, which thereby all profit.

#### 4.3 Chain-wide information exchange

In the case of Iberian ham in **Spain**, chain-wide information exchange (and usage) plays a crucial role, in all phases of the process. It determines the quality of the end product. Although the Iberian cured ham chain is organised in a rather traditional way, the information aspect is covered well from farm to fork. The end product that reaches the consumer is extensively labelled, containing information on: the type of product, type of feed, enterprise identification, and on the control institution that certified the product; and on preservation requirements, date of expire or minimum duration date, ingredients used, and batch and sanitary register number. The regulation council of PDO plays an important role in the chain-wide information exchange as well: it provides the list of farmers and cured ham industries and organises professional meetings, like the world ham congress, technical conferences and updates members with market prices and regulations through e-mail or paper (Lehmann, 2008).

The large Iberian product diversity, in combination with a lack of consumer information on some of the products, has caused confusion about the product qualities of Iberian pork in general, and the PDO products in particular. Although higher prices for PDO products are realised in every phase of the supply chain, especially when compared to the regular pork production, price fluctuations are higher for farmers than they are for retailers. One possible reason is that consumers are more concerned with the product being "Iberian ham", appreciating it as a quality product even if it is non-PDO. Recent research on prices showed that businesses and retailers are able to obtain better results from non-PDO than from PDO business activities. On top of this, among consumers there is also a lack of awareness on the existence of the PDO quality control system, which could increase consumer confidence that the end-product passed all controls and stricter requirements than those of conventional products and its distinguishing characteristics with respect to landscape preservation and rural development, which it has to offer (Collado et al., 2006).

Where the Spanish Iberian cured ham chain once started as a small quality-focused regional market, it now finds itself in a position where processing actors take a lead in developing the regional (non-PDO) quality and branding strategy, while it originally were culture and tradition, supported by strict legislation throughout the chain, which were the main drivers for successful commercialisation of the Iberian cured ham product.

Concerning chain-wide information exchange in the **German** Eichenhof case, its successful quality meat brand program ensures that individual actors know each other personally and information is exchanged directly from enterprise to enterprise (Trienekens et al., 2009). This enables a constant information exchange between the various stages of the chain. The information gathered, processed and disseminated

during the production process is directly or indirectly set by quality requirements as well. Important product information include a clear identification of enterprises, animal groups, single animals and slaughter loads as well as the quality of the products. Important process information relevant for quality, such as laboratory results, has to be documented but is only exchanged when necessary. Throughout the Eichenhof chain information is documented and digitalised. Based on the QS-requirements extensive information is being documented in the primary production (climate/light, stable allocation, keeping conditions, feeding data, health status, hygiene, veterinary basic features, biological data and enterprise information). The chain passes on information on the origin and quality of the animals and products, even though this is only transmitted predominantly to the downstream stages. Between actors involved in primary production, slaughtering and processing stages, a large part of this information is exchanged in the chain-wide quality assurance system with the help of the ICT system of the producer and marketing organisation. Planning information, arrangements of delivery times or amounts are exchanged in both directions of the chain (Lehmann, 2008).

The De Hoeve pork supply chain in **The Netherlands** is still small in terms of volume and sales, and is therefore more vulnerable compared to conventional chains. As a result, consumer involvement is still limited, with only the environmental certification of the pork being part of its chain-wide information approach and communicated to consumers, not yet its origin or special consumer values.

The Milieukeur label is hardly known among consumers and still functions as a business-to-business concept. Perhaps as a result of this, Keurslager butchers still sell De Hoeve meat unpacked and anonymous to consumers, without active promotion (Wiskerke and Roep, 2007).

#### 4.4 Social embedding

Concerning legitimacy, and with respect to region-bound embedding, the production system in its societal structure, the PDO scheme in the case of Iberian ham in **Spain** offers society the assurance of an extensive production system which keeps the “dehesa” woodlands in good environmental condition. This system presents a large biodiversity landscape with an open variety of wild fauna and flora that influences the quality of life of its inhabitants. Dehesa is a multifunctional ecosystem where many economic activities can co-exist (variety of livestock breeding, hunting, rural tourism, gastronomy, and forestry), which guarantees higher levels of diversification. Development of the area allows reinforcing rural identity of natives, permitting the maintenance of indigenous culture and traditions. For consumers PDO offers a quality that is bounded to the region due to the strict requirements and controls proposed by the scheme and to climatic conditions of the area influencing the maturing stage of the production. This grants special organoleptic characteristics to these traditional products. Consumers concerned with animal welfare certainly value this production system which protects the well-being of the pig (Briz et al., 2008).

Societal legitimacy and support has been key to the success of De Hoeve in **The Netherlands**. It was created by mobilizing societal organizations and involve them in the development of sustainability indicators and improved environmental and animal welfare performance indicators (compared to conventional pork supply chains). The resulting indicators of this initiative are shown in Table 1. As a result, the De Hoeve farmers now realize lower ammonia emissions and lower nitrogen and phosphate production than average conventional pig farmers (Milieukeur, 2003). In addition, De Hoeve provides net value added to its region in which it operates by means of chain shortening and cost reduction through higher cutting efficiency and loss decrease realized among all chain partners (Wiskerke and Roep, 2007).

Due to the limited scale and production volume this economic contribution to sustainable rural development may be rather modest, De Hoeve did succeed in embedding itself in the region by creating a self-organizing pig production capacity focused on improved environmental performance. It also succeeded in bridging social capital as a contribution to sustainable development. After all, the Milieukeur system got realized in close cooperation with social interest groups, which improved stakeholder’s relationships (Wiskerke et al., 2007).

In the Eichenhof case the social embeddedness is guaranteed by the special quality label that links to the farmer cooperative which, implicitly, is bound to the region of production. The cooperative can make use of the German appreciation of regional products and the “neighbour farmer” image of producers.



**Table 1.***Types of legitimacy aspects, De Hoeve pork chain (adopted/modified from Roep and Wiskerke, 2006)*

Type of legitimacy and support to the De Hoeve chain	Specific aspects
Environmental certification for innovative pig housing system (Green Label)	<ul style="list-style-type: none"> <li>- Willingness to assess novelties created by farmers</li> <li>- Adaptation of Green Label standards</li> </ul>
Environmental Certification of pork (Milieukeur)	<ul style="list-style-type: none"> <li>- Support in development of indicators and standards by institutional stakeholders in the pork sector</li> <li>- Political, regulatory and financial support</li> <li>- Socio-political support for a stepwise approach towards sustainable pig breeding and development of indicators and standards</li> <li>- 50% funding to develop and formalise indicators and standards for pork</li> <li>- Facilitation of the mobilisation of chain partners interested in participating in the new pork supply chain</li> </ul>

## 5 Discussion and conclusions

The regional pork sector in Europe is still in its pioneering stage. Yet, if regional production and sales channels continue to develop at the same rate as they did over the past years then regional pork production seems to have potential for further growth.

In the present paper three case studies of regional pork netchains in Europe were analysed on critical aspects regarding governance mechanisms, and societal embedding.

We found that there are four important issues to take into account for regional netchains when aiming to manage development of these chains. The first is related to chain coordination, especially to choosing the most suitable organisational structure for the regional netchain (e.g. control board, cooperative or chain company). The second important issue is to ensure chain-wide quality management, aimed at ensuring product uniqueness in the process of business growth of the regional netchain. Various types of certification were looked at, e.g. PDO-based certification and setting of own quality management criteria on top of national and/or private quality systems. Third, the issue of chain-wide information exchange was identified. The cases showed that both 'internal' information exchange between chain actors, and 'external' exchange towards the consumer, are important issues. It supports efforts for chain-wide quality management and certification, as well as for communication of uniqueness to ensure continued authenticity and credibility among consumers. The fourth important issue we found was that of social embedding, in terms of embedding the production system in the societal structure, and societal embedding in terms of mobilizing and involving societal organizations in the development of the production system.

Related to the above, the present paper also looked at roles and responsibilities aimed at strengthening sustainable regional arrangements. We found that next to the netchain actors, also government and non-governmental (civil society) organizations have important roles to play. Governments by ensuring the balance between various barriers, incentives and stakeholder interests. Civil society organizations by measuring and comparing the degree to which various production systems meet requirements and expectations of society, and communicate this to the groups which they represent.

In this regard it is important to mention typical barriers for further development of these chains, such as the decreasing willingness of consumers to pay in times of economic crisis, or the necessity to find new governance forms and new ways of societal embeddedness when these chain grow into main-stream like production chains, as is the case with the Spanish ham netchain.

By analysing the cases, the present paper proposes specific directions for further research aimed at closer

partnership between private netchain and (non)government actors. We argue that this enables netchain actors to better develop business models based on different (future) policy options.

On governance mechanisms, the existence of a chain leader seems crucial to their success. This can be the legal counsel, a cooperative, or a strategic alliance between actors. For regional pork netchains to enjoy market growth, structured forms of collaboration among chain actors are seen also as a precondition. We suggest that further research should define roles that government and civil society can play, in close collaboration with chain actors, in supporting certification of produce, strengthen organizational structures, develop branding strategies, and inform consumers on quality labels.

On being socially embedded (e.g. in terms of regional culture and tradition, regional provenance, or societal concerns) being region-bound is critical to success. Visual and collaborative action, as well as effective communication on distinguishing product attributes that raise consumer awareness and confidence, are equally important. In this respect, we suggest that further research is needed on the roles of various stakeholders in promoting quality in terms of being bound to the region or complying to jointly developed sustainability indicators.

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## References

- Brinkmann, D. (2008). "Improving the quality of pork and pork products for the consumer", Case Study Report Task 4.1- Deliverable 4.1.1, University of Bonn, Preventive Health Management Group.
- Briz, J., de Felipe, J., Pena, S. (2008) Description of specific pork supply chains in Spain: fresh meat and Iberian cured ham, Universidad Politecnica de Madrid, ETSIA.
- Borgatti, S., Foster, P. (2003). "The network paradigm in organisational research: a review and typology", *Journal of Management*, **29**: 991-1013.
- Collado, R., Navarro, E., Riccioli, C., Clavero, F. (2006) "Case Study: Dehesa de Extremadura PDO Cured ham", Foresight Studies Area, Spain.
- Douglas, D. (2005). "Rural Regional Development Planning – governance and other challenges in the new EU", 18<sup>th</sup> European Advanced Studies, Institute in Regional Science.
- Drucker, P. (1994). *Post-Capitalist Society*, New York, Harper.
- Ellebrecht, S. (2008). "State of the art of quality systems in European pork chains", Deliverable 4.2.1, University of Bonn, Preventive Health Management Group. [www.q-porkchains.org](http://www.q-porkchains.org)
- European Commission – Europe on the Move, (2004). "From Farm to Fork"
- Gellynck, X., Kuhne B. (2008). "Innovation determinants in traditional food supply chains", 8<sup>th</sup> International Conference on Management in Agrifood Chains and Networks, Wageningen University, The Netherlands.
- Granovetter, M. (1985). "Economic action and social structure – the problem of embeddedness", *American Journal of Sociology*, **91**: 481-510.
- Hendrikse, G.W.J. (2003). *Economics and Management of Organisations; Coordination, Motivation and Strategy*. The McGraw-Hill Companies, London, 507p.
- Jones, C., Hesterly, S., Borgatti, S. (1997). "A general theory of network governance: exchange conditions and social mechanisms", *Academy of Management Review*, **22**: 911-945.
- Keating, M., Loughlin J. (editors), (1997). "The Political Economy of Regionalism", London, Frank Cass.
- Lazarrini, S.G., Chaddad, F.R., Cook, M.L. (2001). "Integrating supply chain and network analysis: The study of netchains". *Journal of Chain and Network Science*.
- Lehmann, R. (2008). "State of the art of information systems in European pork chains", Deliverable 4.2.1, University of Bonn, Preventive Health Management Group.

- Mauffette-Leenders, L.A., Erskine, J.A., Leenders, M.R. (2001). "Learning with cases", second edition, Richard Ivey School of Business, The University of Western Ontario, ISBN: 0-7714-1969-4.
- Maye, D., Ilbery, B. (2006). "Regional economies of local food production", European Urban and Regional Studies, Sage Publications.
- Milieukeur (2003). Annual Report 2003, De Hague, Milieukeur Foundation
- Ministry of Agriculture, The Netherlands, (2006). "Innovatie = Ondernemen: Strategienota Innovatie"
- Nijhoff-Savvaki, R., Trienekens, J., Omta, O. (2008). "Netchain Innovation for Sustainable Pork Supply Chains in an EU Context, Book Chapter : Agri-food business: Global Challenges – Innovative solutions, edited in 2008 by T.Glauben, J.H.Hanf, M.Kopsidis, A.Pieniadz, K.Reinsberg, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol.46, Haale (Saale), IAMO: 22-34. ISBN 978-3-938584-33-0.
- Omta, S.W.F. (2002). "Innovation in chains and networks" *Chain and Network Science*, Vol 2
- Powell, W. (1990). "Neither market nor hierarchy: Network forms of organization", Research in Organisational Behaviour, Greenwich, CT and London, JAI Press, 12.
- Roep, D., Wiskerke, H. (2006). "Nourishing Networks: Fourteen lessons about creating sustainable food supply chains", Reed Business Information, The Netherlands.
- Snow, C.C., Miles, R.E., Coleman, H.J.Jr. (1992). Managing 21<sup>st</sup> century network organisations, *Organisational Dynamics*, 20(3):5-20
- Trienekens, J.H., N.Wognum, R.Nijhoff-Savvaki, M.Weaver, (2008) Developments and challenges in the European pork sector, IAMA Symposium, June 2008, www.ifama.org
- Trienekens, J., Petersen, B., Wognum,N., Brinkmann,D. (2009). European Pork Chains; consumer-oriented production and distribution. Wageningen Academic Publishers: Wageningen, pp 288.
- Uzzi, B. (1997). "Social structure and competition in interfirm networks: the paradox of embeddedness", *Administrative Science Quarterly*, 42:35-67.
- Williamson, O.E. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, The Free Press, New York, NY, 1985
- Wiskerke, J., Roep, D. (2007). "Constructing a sustainable pork supply chain: a case of techno-institutional innovation", *Journal of Environmental Policy and Planning*, 9: 53-74.