Re-localizing pork production and supply: building bridges, not walls

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1. Introduction

Although it is argued that the "local production-local consumption" model is no longer reality, there is currently 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 agro-food geography has gained in importance, with a topography shaped by the "quality turn" in food production and typified by various strategies to valorise local and/or regional food products.(Nijhoff-Savvaki et al,2008, Maye, 2006, Murdoch, 2000, Mardsen, 2002, Goodman, 2004, Ilbery, 2005) Representative illustrations of this new vision are the Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) quality status, which is awarded to dedicated regional foods, as well as various efforts that encourage economic growth through the production of specialty and niche market foods. (Nijhoff-Savvaki et al, 2008, Maye 2006, Parrott, 2002, Ilbery, 2000). This assumes a new kind of regional economic space, built around specialist dimensions of the food economy, including organic, local and regionally branded food products.

The pork sector is confronted with many and diverse challenges in the context of availability of pork meat at all times and at all places, for a reasonable price, and with guaranteed food safety. To meet these expectations the pork sector has gone through a major consolidation and shifted from relatively small family farms to large businesses that are strongly connected within the chains in which they operate. However, present societal and market concerns, such as food safety, animal health, animal welfare, the environment, as well as convenience, are crucial issues challenging the present system. It is now widely accepted that sustainability of today's agri-food system is questioned and that some of it's characteristics, such as large scale production, are viewed as responsible for the unsustainable character of this system.

There is an increasing trend 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 niche 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), the niche of regional pork production may show improved business opportunities. Regional production, with regional inputs, is less dependent on fluctuating input costs and may better be able to anticipate on the increasingly strict legislation. At the same time regional high-quality producers target the growing demand for such produce. To support further professionalization and thereby improvement of the competitive position of regional pork production and supply, we aim to arrive at a a thorough insight in the set-up and governance of regional production networks.

This paper aims to give insight in integrated solutions to balance the roles of the various actors involved in effective regional netchains. In particular, section 2 describes the methodology used and presents a research framework for regional netchains. Section 3 lists the major theoretical and empirical considerations in the field of sustainable regional netchains and it provides insight in the roles and responsibilities of the main actors in these netchains: the government, the civil society and the private sector. Section 4 analyses three regional pork chains in Europe by illustrating different trajectories to sustainable pork production, in Spain, Germany, and The Netherlands respectively. Section 5 compares these innovative regional netchains and formulates a research agenda based on the conclusion that effective multi-actor network structures in regional pork niche markets may be an important precondition for scaling up of these initiatives. Section 6 provides general conclusions.

2. Research methodology

In the context of the EU-FP6 integrated Q-Porkchains Project : *"Improving the quality of pork and pork products for the consumer"* (www.q-porkchains.org), an in-depth inventory of pork chains has been performed with the aim to gain insight in the structure and variety of the European and international pork system, in which five EU and two non-EU countries participated. Participants included experts from major industries, government officials as well as senior researchers from a number of academic institutions. This inventory provides an in-depth overview of the different types of production and distribution chains as well as the systems and technology that govern these chains to link the variety of pork production systems with differentiating markets.

In the first phase of the inventory a general overview of the pork sector in various countries has been obtained through expert interviews, that were structured according to the following topics in the pork chain: governance, information exchange and use, quality management and standards, regulations, performance, value chain, innovation, and social responsibility. Each applied to a selection of the identified chain actors, namely the breeder, feed producer, producer, veterinarian, transporter, slaughterhouse, processor/importer, and retailer. Following these expert interviews, each participating country executed two in-depth case studies. One case study covered the conventional fresh pork meat chain, while the second focused on a special production chain.

This paper will build on the findings of the above case studies and the state-of-the-art report on CSFs for Innovation, using three representative regional niche initiatives in the European pork sector: The Iberian Cured Ham chain in Spain, the Eichenhof Cooperative pork chain in Germany, and the De Hoeve pork chain in The Netherlands. For the last chain the paper will also follow-up on the results of the EU-FP5 Integrated project : SUS-CHAIN : *"Marketing sustainable agriculture: an analysis of the potential role of new food supply chains in sustainable rural development"* (www.sus-chain.org), completed in 2002.

In this paper we compare critical relations between netchain and non-netchain actors (government, civil society and the private sector) and look at how successful relations add to the success of regional niche initiatives. To do so, we have develop a research framework, which is based on the recent developments and challenges of the pork sector, as well as the results of SUS-CHAIN project. We propose that in the case of regional netchains, the success lies in working towards integrated solutions which balances the roles of government, civil society, and the private sector. These are integrated solutions in terms of governance forms based on successful collaboration of the actors in the netchain, societal embeddedness, as well as risk management, as is depicted in figure 1.

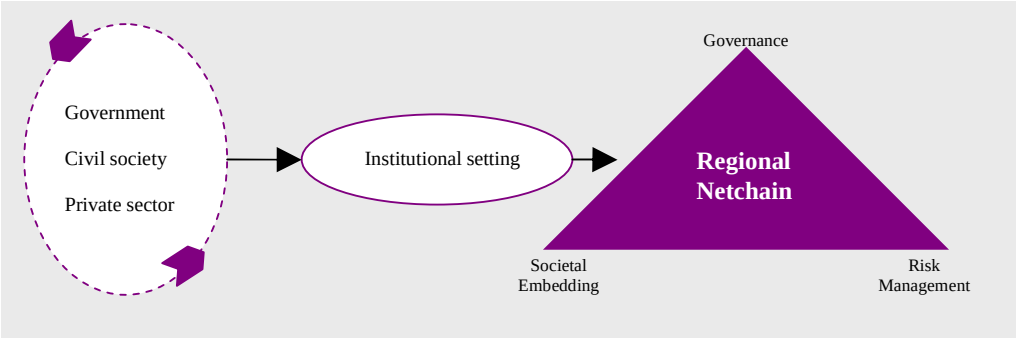

Figure 1: Research Framework for regional netchains

In the following section all variables of the research framework will be explained in detail, and specific examples of the European pork sector will be presented.

3. Theoretical and empirical considerations

In today's academic and professional media there is a considerable body of evidence highlighting the re-emergence of regional consciousness and political positioning within nations around the world (Drucker, 1994, Keating et al, 1997, Douglas, 2005), in which the term a "globe of villages" as against the "global village" may be more accurate on the reconfiguration of human settlement systems on our planet . The European Union has also 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 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 on the network, such as a supply chain, in which firms are embedded (Gellynck, 2008, Pittaway et al, 2004, Omta, 2002, Powell, 1990). This perspective demands a better appreciation of how firms and innovation work, and highlights the need to better understand all the actors involved – the policy makers, consumers, firms, institutions, and other stakeholders that can influence the rate and direction of innovation. Therefore cross-chain innovative measures are a condition to tackle these challenges.

The network research approach is emphasising the multiple relationships among firms, and goes beyond the functional perspective of supply chain management, or the purely economic perspective of Transaction Costs Economics, by incorporating the embeddedness of a firm in a social network. (Powell, 1990, Uzzi, 1997,Trienekens et al, 2003) Recently the TCE and the network approach are becoming more integrated, combining the economic and social perspectives into relational or network governance. (Borgatti et al, 2003)

Regions are challenging and challenged as spatial units of decision design and implementation. However, it so happens that governance in its own indeterminacy, is particularly apt in describing the conditions of regional negotiation, and contributing to the crafting of negotiated processes of intervention and development.(Douglas, 2005)
Furthermore, while institutional economics traditionally focus on formal arrangements, sociological theory has emphasised the role of informal institutions such as norms and social ties in governing a transaction (Granovetter, 1985, Powell, 1990). Repeated exchanges provide the opportunity for social relationships to grow, which promotes norms of flexibility, solidarity, and information exchange. Through these social processes and the resulting norms, relational governance may function to mitigate the same exchange hazards that formal institutions address (Jones et al, 1997). Although all interfirm transactions are carried out within a specific set of formal and informal institutions (Zenger et al, 2002), formal contracts and relational governance function as complements (Lazzarini et al, 2004), and a differential mix of formal and informal mechanisms may lead to the most efficient outcome. (Lazzarini and Zenger, 2002, Bijman et al, 2006)
To this regard, the recently introduced ***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.

In this paper we view ***governance*** as the means of creating the conditions for effective collaboration in the netchain, which is concerned with three key characteristics: *the type of agreements* among netchain actors, *the strategic coordination* within the netchain, as well as *power relations* between netchain actors. Especially the concept of power has rarely been discussed in supply chain management, because lean approaches should be based on equity, trust, and openness (Cox, 1999). However, it is increasingly acknowledged that analysing the effect of bargaining or market power is important to understand the mechanisms and dynamics of business exchanges. It is even arguable that in order to understand the current restructuring processes in the agri-food system it is necessary to take explicitly into account the role of power as a driving organisational force in the system. (Bijman et al, 2006)

Governance in a regional netchain context can be seen as the process by which netchain actors exercise a certain degree of power while at the same time sharing some of its powers with other actors. It aims at capturing the collaborative (and sometimes self-organizing) space that exists between different interests of different actors, and within which new power relations between these actors can be created to achieve common goals.

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 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 to ***societal embedding***, namely the extent to which values, codes and rules that represent the pork meat product and its chain are shared by its wider network of stakeholders, consumers and society in general. This involves values such as environmental friendliness, animal welfare, and successful brand management, in enhancing consumer trust and confidence. In a number of European countries animal welfare is an important issue, with themes such as prevention of castration as well as research on new housing systems high on the agenda. Also environmental issues receive much attention, including the reduction of ammoniac, manure and stench. Moreover, market management becomes increasingly important, including sound matching of consumer demand and improved processing methods (higher quality end product, less packaging material, etc), as well as food safety and convenience.

Notwithstanding the above, since agriculture is carried out in the open air, and always entails the management of inherently variable living plants and animals (Hardaker et al, 1997), it is especially exposed to several types and sources of ***risk.***
Production risk, derives from the unpredictable nature of the weather and uncertainty about the performance of crops or livestock. Increasingly farmers all over the world are being exposed to unpredictable competitive markets for inputs and outputs, so that *price or market risk* is often significant or may increase over time. On the other hand, *institutional risk* occurs when changes in the rules that affect farm production can have far reaching implications for profitability (e.g. changes in the laws governing the disposal of animal manure, income-tax provisions, incentive payments availability). *Business risk* is the aggregate effect of production, market, institutional and personal risk, facing the firm independently of the way in which it is financed, whereas *financial risk* results from the method of financing the firm. (Hardaker et al, 1997)
However, consumers do not perceive risks the same way. As a *social construct*, risk is inherently subjective. In response to the perceived decline in trust, which is caused from the many challenges the agricultural sector in general, as well as the pork sector in particular has faced, current risk management effort tries to restore public confidence by increasing transparency in risk analysis, and increased consumer involvement in risk management decision making. (Jongen et al, 2005)

In this regard, important issues are the role of government, the civil society, and the private sector.
Their individual role is defined by whom they represent, the mandate they have, and the challenges they face in acting accordingly. The mechanism and desired outcomes of effective network governance structures are determined by this ***institutional setting***, in particular by the level of enforcement, commitment, as well as cultural issues affecting the network. The level of *enforcement* that might represent barriers to growth derive either from direct pressures such as government intervention and retail product specification, as well as from indirect pressures such as value and power of information used and exchanged in the netchain and advocacy issues targeting consumers.
The level of *commitment* that can stimulate growth originates from: subsidies, tax relief (public), as well as incentive schemes (balance of quality and cost), and contract schemes. Nevertheless, the success and profitability of a regional network is also highly linked with its effective network relations. Network relations can add value in the network in three ways: by reducing information processing demands on actors within the network, by complementing formal control systems and reduces the costs of monitoring actors, and by shaping the actors' preferences towards a common set of goals. This can reduce negotiation and bargaining costs and foster cooperation that would be difficult to achieve otherwise.(Besanko et al, 2003)

4. Building regional netchains: bridge between tradition, business, and partnership

The fresh pork meat chain is lengthy and involves a number of actors and types of processes. Production commences with the production of piglets, flows through fattening and finishing, slaughterhouses and meat processors, to retailers and consumers during a time period of six months. The chain of activities in the process from farm to fork, including governance, quality management, regulations, and information exchange, differs from one country to another and from one stage of the pork chain to another. Moreover differences in consumer demands lead to differences in organizing and managing the supply chain. This paper focus on the increasing trend towards pork chains that are characterised by relocalization, societal embeddedness and a turn to quality: the regional netchains. In the following sections three regional chains in Europe are analysed, which show that there are different trajectories possible that contribute to sustainable pork production.

4.1 Iberian Cured ham pork chain – Spain

The Spanish meat industry is highly dominated by pork meat products (60%) from which 11% is covered by Iberian pork. Iberian ham is the major product of this sub-sector, it is a speciality product consumed by higher income and informed consumers from Spain, in particular at special occasions like weddings and Christmas. It's inherent quality characteristics are linked to the genetic of the animal – Iberian pig, the feed consumed with higher or lower levels of acorns and pastures from the "Dehesa" ecosystem (meadows and woods), and the elaboration process which must be artisanal in natural drying sheds.(Collado et al, 2006) Due to the recent increased demand for high-quality products, producers, processors as well as retailers started to implement traceability systems through the whole market channel.

Spanish producers have taken advantage of the EU legislation on geographical indications and traditional foods, known as Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG) for Serrano ham . PDO is one of the most important food quality guaranteed certification systems of the Mediterranean seaside countries, especially relevant for Spain. The basic regulation for meat products of the Iberian breeds is RD 1469/2007. The objective of this regulation is to establish quality characteristics for "Iberian'' meat products, to identify these products and to guarantee their quality to consumers. It further includes a protection of the geographical origin of products based on the geographical link between hams and shoulders manufactured in the zone and the climate conditions of the area which are essential not only at farm level but also at the maturing phase.

Box 1: 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 Spanish PDOs in cured ham, Jamon de Teruel and Trevelez. Moreover, there are two brands of quality cured ham; Jamon Serrano, a traditional specialty, and Serrano Espanol (produced for export.(Trienekens etal, 2008). There are also two breed designations: "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 (Iberian pigs grow up to 160 kg) are also grouped into four 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 quality standards are subject to general European and Spanish regulation on meat production. These regulation preserves quality and competitiveness of these 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 that include inspections and certifications by independent bodies focused on enforcing breed and feeding controls and traceability, as well as compliance with quotas for the maximum number of pigs that can be fattened in extensive farms (Trienekens et al, 2008, Briz et al., 2008). The regional government is responsible for protecting the reputation of PDO, as well as the chain actors involved. The regional government delegates this responsibility to the regulatory council (Consejeria de Agricultura, Industria y Comercio), a legally independent entity, which is responsible

for the territory, production and elaboration zones, setting and monitoring enforcement of quality standards, and organising brand management activities. It also determines the requirements of the animals like breeds, weights for slaughter, feeding possibilities, allowed concentrates, conditions in the slaughterhouse (e.g. 24 hours before slaughtering animals have to be in the yards), process conditions and temperatures. Chain actors who want to use the PDO label have to be approved by this regulatory council. However, not all the PDOs follow the same production and marketing process. Only one out of two PDO pigs enters the industrial process and gets commercialised under the PDO quality status, although an increasing trend in certifications has been observed (Collado et al, 2006)

Coordination in the Iberian cured ham chain is organised by the Control Board PDO, as is depicted in figure 2. 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. Nevertheless vertical integration is mainly achieved by means of product and process standardisation. The strictly enforced PDO regulations implicitly align chain wide activities, in which quality and competitiveness is preserved, since the necessary resources are partly provided by these public actors.

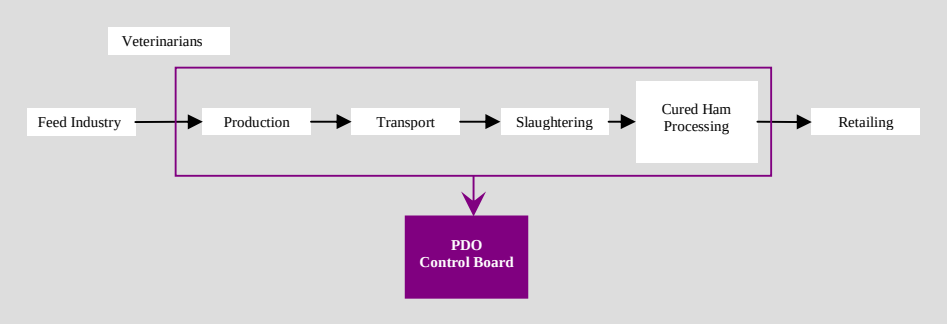

Figure 2: Iberian Cured ham chain (source: own compilation)

The information which is used and exchanged throughout the chain plays a crucial role as well in all phases of the process, determining the quality of the end product. Although the Iberian cured ham chain is organised in a rather traditional way, it may be stated that this aspect is sufficiently covered all the way from farm to fork. The end product reaching the consumer is also extensively labelled, containing the type of product, type of feeding, enterprise identification, control institution which has certified the product, preservation requirements, date of expire or minimum duration date, ingredients used, batch number and sanitary register number. The regulation council of PDO plays also an important in the information exchange in the chain: 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. (Lechman, 2008)

PDO certified production provides a number of benefits for both the production, as well as the consumption side. Iberian PDO cured ham producers enjoy faster volume of sales as well as strengthening the position of their distinguished products in the market creating the space for market diversification. The delivery timing and delivery quantities from cured ham industries to the retailers depends on the needs of the retailers and the ageing process. The consumption of cured ham is highly seasonal as around 30 % of sales are done for Christmas. Retailers should thus forecast their needs and communicate them with the producers in order to have availability of Iberian cured ham during this period of time.
Concerning societal embeddedness, the PDO scheme offers the assurance of an extensive production system keeping the “dehesa” woodlands in good environmental condition. Besides, this system presents a large biodiversity landscape, with an open variety of wild fauna and flora which influences the quality of life of their inhabitants. Dehesa is a multifunctional ecosystem where many economic activities co-exist (wide variety of livestock breeding, hunting activities, rural tourism, gastronomy, forestry) guaranteeing higher levels of diversification. The development of the area allows to reinforce rural identity of natives, permitting the maintenance of indigenous culture and traditions.

Concerning consumers PDO offers a quality bounded to the territory 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, which grants special organoleptic characteristics to these traditional products. Consumers concerned with animal welfare, do certainly value this production system which protects the well being of the pig. (Briz et al, 2008)

However, the large Iberian product diversity, combined with missing consumer information at some of the products cause confusion about the Iberian pork product qualities in general, and about the PDO products in particular. Concerning pricing, although higher prices for PDO products are realised in every phase of the supply chain, compared to the regular pork production, the price differences are higher for farmers than for retailers. One of the possible reasons is that consumers are generally more concerned with "Iberian ham", appreciating it as a quality product even if it is non PDO. Recent research on prices has shown that industries and retailers are able to obtain better results from non PDO business. In addition it seems to be a lack of awareness among consumers about the existence of the quality control system offered by the PDO to the Iberian pork sector, which could increase their confidence that the product bought has passed all the controls and stricter requirements than conventional ones, and its distinguishing characteristics with respect to landscape preservation and rural development, which it has to offer.(Collado et al, 2006)

4.2 Eichenhof cooperative pork chain – Germany

In Germany strong cooperative organisations exist, in particular 121 strong regional cooperatives, and 150 producer organisations, making the German pork sector one of the best organised in Europe. The regional pork chain Eichenhof is situated in the north-west part of Germany, known as the "pork belt", i.e. the area with the largest pig farm density in Europe. 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 (Trienekens et al., 2008).

The pig farmers, members of the cooperative, are the main owners of a 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 a signed contract to follow a joint quality policy, whereby the Eichenhof meat brand program sets specific requirements on animal husbandry, feeding, health management and quality assurance.

Both the German and regional government set baseline quality standards for the pork sector, which are in accordance with the EU legislation, as well as additional standards which are set by the private chainwide 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 pigs. The Eichenhof meat brand program is based on, but extends, QS standards. All procedures during and along the production are contractually and transparently arranged and belong to the agreed quality strategy between supply chain and distributor stage. (Brinkman, 2008). In addition supply chain management as well as complaint management exist for all participants. Compliance with private standards is monitored by means of quality standard audits and inspections by the farmer's cooperative. In this regard, the controlled breeding, finishing, transport, slaughter and processing, as well as the end product are all part of the marketing concept and the brand Eichenhof. The criteria for the quality and producer guidelines are listed in Box 2.

Box 2: Eichenhof quality management criteria

- Uniform production and hygiene guidelines
- 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 of max. 80 km distance
- Central feed purchase by selected feed producers; regular feed analyses

(Ellebrecht, 2008)

Although the German meat industry is continuously questioned with issues on environmental performance, there is little evidence so far available on sustainable resource use and waste treatment. Just a small number of slaughter and processing enterprises have adopted an environmental management system (Brinkman, 2008), which is similar to the rest of Europe.
The farmer's 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 3.(Ellebrecht, 2008). All chain actors have signed contracts with the cooperative that, prescribe quality requirements and which services and products are included; all involved market partners work together without exception on a long-term basis. The individual actors also know each other personally and information is exchanged directly from enterprise to enterprise (Trienekens etal, 2008, FoodNetCenter, 2008). This also enables a constant information exchange between the various stages of the chain.

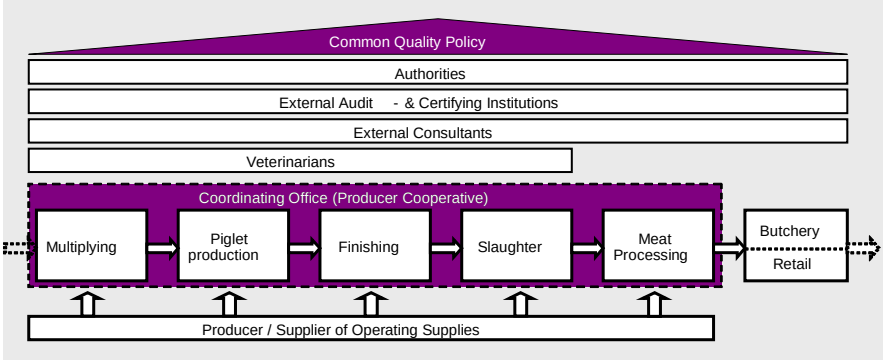

Figure 3: Eichenhof cooperative chain (source: Brinkman, 2008)

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, like laboratory results, has to be documented but is only exchanged when necessary. Throughout the Eichenhof chain information is documented and digitalised. Due to 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 about the origin and the quality of the animals and products, even though this is only transmitted predominantly to the downstream stages. Between the actors of the primary production and the 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. (Lehman, 2008)
As it has been discussed earlier, the Eichenhof pork chain as well as the German pork sector in general enjoys a strong organisational structure which is very well supported by the quality management system of the chain. This situation enables all chain actors to act in a transparent way, nevertheless a certain degree of opportunistic trading is still observed. In addition the present federal structure of the legislation system affects and sometimes delays decision making processes, which could eventually harm market competitiveness. Another possible market risk is related to the present increase of piglet imports, as well as the high feed and lease prices.

4.3 De Hoeve pork chain – The Netherlands

The emergence of De Hoeve pork supply chain dates back to 1996, situated in the province of Brabant, south-west part of The Netherlands. It is actually a simple story of a pig farmer who needed an environmental license from the municipality to get a formal permit for his self-developed pig farm with a range of technological novelties. During the process he got in contact with the second key player of the chain, an agricultural engineer and owner of a consultancy engaged in environmental

engineering. Together they succeeded to get the technological novelties of the pig farm certified by the Environmental Certification Label (Milieukeur). This stimulated both actors to orient themselves at the development of an Environmental Certification system for pork meat. To realize this idea they became business partners by establishing the De Hoeve Ltd.

The Dutch quality assurance scheme Integrated Chain Control (IKB) forms the main initiative concerning food safety and sustainability throughout the Dutch pork supply chain (in which De Hoeve also falls under), being very similar to German QS. In addition to the standard IKB quality standards, the IKB free-range pig scheme has been developed in response to consumer concerns for further attention on animal welfare. However, this did not succeed to stop the societal concerns for industrial pig farming. "As a result of internal and external pressures being exerted on the dominant agro-industrial regime to pork production, new windows of opportunities for setting up alternative modes of pork production arise. The case of De Hoeve is an example of such an alternative mode or development path". (Wiskerke et al, 2007)

In this regard, De Hoeve pork supply chain has emerged in response to negative side effects of the conventional pork marketing strategy : the weak position of farmers, environmental pollution and increasing legitimacy problems. In a bottom up and step by step approach, starting with a number of technical innovations developed by the farmer who reduced environmental pollution significantly, the initiators developed a new supply chain for environmental certified pork. Subsequently they extended the strategic alliance with chain partners and created a new market outlet for this certified pork, implying a new division of roles and new agreements with regard to pricing, logistics and production.(Roep and Wiskerke, 2006) De Hoeve is, since 2004, a small scale pork supply chain which includes: "De Hoeve Ltd, owned by the two initiators, 16 pig producers organized in an association, a slaughterhouse, a meat cutter and wholesaler and 26 high quality butchers, operating under the Keurslager (Quality Butchers) hallmark, in the province of Brabant. De Hoeve functions as chain director and is responsible for the overall management of the supply chain, as is shown in figure 4.

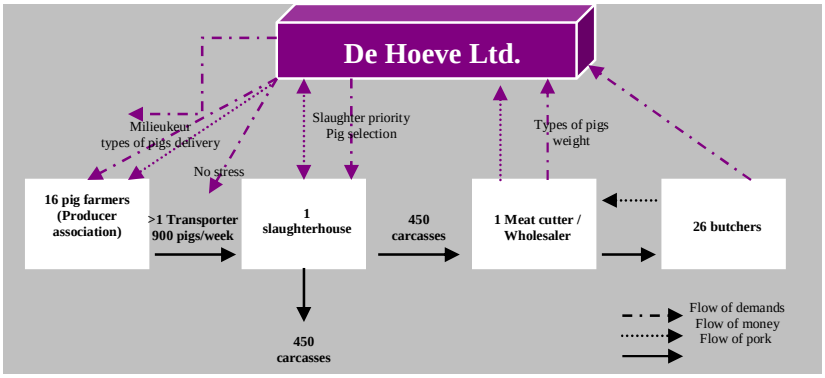

Figure 4: De Hoeve pork chain (source: Roep and Wiskerke, 2006)

This entails among other things commercial transactions: the weekly purchase and sale of 900 pigs produced according to the criteria of Milieukeur. Setting up a short regional supply chain for certified fresh pork that meets specific requirements (logistics, technical quality) of Keurslager butchers, has resulted in a more transparent and efficient supply chain. The extra value added generated by cost reduction, with consumer prices equal to conventional supply chain is distributed among all chain actors, who in turn all profit.
The organization and governance of the chain is based on transparency by means of strategic alliances: on shared decision making processes between chain partners, based on trust, chain stability and shared risks. The De Hoeve price system offers pig farmers more certainty, opposes opportunistic behaviour and creates more stability in production volumes.
The capacity to mobilize a strong support network, a shortening of the supply chain and mutual sharing of knowledge, information, and experiences turned De Hoeve into a successful initiative. The

different types of support that have been provided in all four stages of the De Hoeve initiative are depicted in figure 5. All partners benefit from the created efficiency and extra value added which results in a more stable supply chain. Social legitimacy and support for this initiative was created by mobilizing societal organizations and have them involved in the development of sustainability indicators and better environmental and animal welfare performances in comparison to the conventional pig-meat supply chain.

Environmental certification (Green Label) for innovative pig housing system	- Willingness to assess novelties created by farmers - Adaptation of Green Label standards
Environmental Certification of pork (Milieukeur)	- Support in development of indicators and standards by institutional stakeholders in the pork sector - Political, regulatory and financial support - Socio-political support for a stepwise approach towards sustainable pig breeding and development of indicators and standards - 50% funding to develop and formalise indicators and standards for pork - Facilitation of the mobilisation of chain partners interested in participating in the new pork supply chain
De Hoeve as a chain director	- Chain management - Developing a new strategic alliance among chain partners - Improving sustainability performance, especially with regard to environment and animal welfare - Developing a transparent monitoring system - Marketing and communication of Milieukeur pork
Scaling up	- Exploring product diversification and niche markets for high quality products - Developing a business plan for market differentiation - Learning and dialogue

Figure 5 : Types of Public-Private support to the De Hoeve pork chain

De Hoeve farmers realize lower ammonia emissions and lower productions of nitrogen and phosphate than the average conventional pig farmer. In addition contribution to global warming is 7% less than in conventional pig farming. (Milieukeur, 2003) Less than 2% of the De Hoeve pigs has lung or liver deviations, while there is 50% lower drop-out rate of fattening pigs and 40% lower drop-out rate of piglts after weaning. (Milieukeur, 2003, Wiskerke et al, 2007) Here is worth considering that organic drop-out rates are higher, i.e.: 4,9% vs 1,8%. (Milieukeur, 2004, Wiskerke et al, 2007)
Moreover, the Hoeve provides Net Value Added in the region by means of chain shortening and cost reduction (higher cutting efficiency and decrease of losses, which is realized among all chain partners. (Wiskerke et al., 2007).

Although De Hoeve's economic contribution to sustainable rural development is rather modest due to limited scale and production volume, it did succeed to successfully be embedded in the region it operates. De Hoeve succeeded to create self-organisational capacity of regional pig producers with focus on better environmental performance. It also succeeded to bridge social capital as a contribution to sustainable development. After all, Milieukeur system got realized in close cooperation with social interest groups, which improved stakeholders relationships. (Wiskerke et al, 2007)
However, De Hoeve pork supply chain is still rather small in terms of volume and sales. De Hoeve is also vulnerable because of a conventional bypass. Substantial part of the pigs produced by the associated pig farmers is dependent on conventional market outlets. Furthermore, consumer involvement is still limited. Only the environmental certification of the pork is communicated to consumers, not its origin or special consumer values. Milieukeur label is hardly known by the consumers and still functions as a business-to-business concept. Moreover, Keurslager butchers sell De Hoeve meat unpacked and anonymous to consumers without active promotion. (Wiskerke et al, 2007)

5. Measurement of success : Scaling up

Although scaling up usually refers to commercialising a bigger volume of pork meat, we argue that this option would not (as such) reinforce regional netchains. It is important to mention that commercial scaling up can also lead to negative effects within the chain, such as loss of unique selling proposition, a less even distribution of power throughout the chain or even a concentration of power in only one chain actor. This may cause loss of credibility and authenticity, which in certain cases brought originally a regional chain into success.
In order for regional netchains to enjoy market growth, effective multi-actor network structures in regional pork niche markets are becoming a precondition for scaling-up. In such case, scaling up should derive from a balanced combination of roles and responsibilities of the main actors involved, namely the government, civil society, and the private sector.

When comparing the network structures between the three cases investigated, great differences are observed.
Whereas the Spanish Iberian cured ham chain once started as a quality - focused niche market it now finds itself in the position where mainly the processing actors are taking a lead in developing a regional quality and branding strategy. However, it is the culture and tradition, heavily supported from strict legislation throughout the chain, that acted as main driver for commercialising successfully the Iberian cured ham.(Box 1)

Meanwhile, the Eichenhof cooperative pork chain in Germany has organized itself as a niche business player from the start. The chain's structure is organized entirely different from that in Spain, and strategies are designed and implemented in a cooperative manner. Here is the continues search for excellence in management of quality and health creation standards that brought Eichenhof regional products (among others) success. (Box 2)

In the case of De Hoeve the capacity to mobilize a strong support network, a shortening of supply chain and mutual sharing of knowledge, information, and experiences turned the pork chain into a successful initiative, where all partners benefit from the created efficiency and extra value added resulting in a more stable supply chain. Moreover, in the Netherlands there is no real national tradition for specific niche markets for fresh pork. Neither the strict legislation created success for De Hoeve. It is mainly the civil society that is highly influencing with their concern about industrial pork production and its impact on environment that pushed for change. Clearly, in this case partnership and collaboration has been considered the key to De Hoeve's success. (Figure 4)

Figure 6 illustrates the variables and their relations that formed the success in each pork chain investigated.

		TRADITION	BUSINESS	PARTNERSHIP
		Iberian Cured Ham (S)	Eichenhof Cooperative (D)	De Hoeve (NL)
Institutional setting		Culture / Law	Quality	Public-Private support
Regional Netchain	Governance	Legal Council	Cooperative	Strategic alliance
	Societal Embedding	Culture – Region	Provenance	Advocacy
	Risk Mgmt	Brand risk Cost control	Visual management Opportunistic trading	Brand risk Culture absence

Figure 6: The bridge between tradition, business, and partnership

The pork chains we investigated showed us that the existence of a chain orchestrator has proved crucial to their success, whether that was the legal council in the case of the Iberian cured ham, a cooperative in the case of Eichenhof, or a strategic alliance in De Hoeve´s case.
Furthermore each one of the three chains succeeed in being embedded in the region in which they operate, whether it was in terms of culture and tradition linked to specific regions (Iberian), regional

provenance (Eichenhof), or advocacy due to societal concerns (De Hoeve), proving that regional netchains should pave a form of embeddedness.

However, the presence of risks in this process should not be underestimated. Regional netchains will continue to be vulnerable because of a conventional bypass. Therefore, the effectiveness of risk management mechanisms, meaning the effectiveness of controlling costs (within and beyond reach) will act as a catalyst in developing and sustaining the "quality turn" that these chains are aiming for. In particular the focus should be on preservation of financial margins, reducing the discrepancy between demand and supply, improving the misalignment between consumer requirement and product specification, as well as preventing demand amplification. Conflict management due to imbalanced chain actor's relationships as well as lack of production consistency leading to chain fragmentation can also form a threat to the netchain. Therefore a preliminary conclusion would be that visual management within the netchain is essential as well as marketing communication of the distinguished attributes of the regional products in creating consumer awareness, and building consumer confidence.

Governments need to balance various interests and are confronted with many factors in the political process, each representing a particular interest. Regional netchain actors should strive for ***proactive compliance*** in anticipating changes in regulation and legislation. Proactive compliance should take place in two levels: On a *partnership* level, the netchain should be able to cope with the turmoil caused by pressures and/or changes in the sector, reduce any possible social and individual costs of change, and focus on optimisation of the region's potential through empowerment of the public to mobilise its available resources. On a *entrepreneurial* level, government should assist in removing barriers for entrepreneurship through concerted action, and should act as an organiser of a "meeting of minds", as well as contributing to bridging global trends with local traditions.

Civil society organizations often represent a single issue and have to take into account the public they represent. To this respect, the degree to which the production system meets the requirements and expectations of the society, known as ***societal conformity***, plays an important role. In the case of regional netchains aspects that influence societal conformity include *provenance* – consumers and society in general should gain trust in the quality of the product and being sufficiently informed about their purchase choice. On the other hand, *product consistency* – on-shelf availability as well as *price sensitivity* play an equally important role as well.

On the other hand the private sector has, as a result of decreasing profit margins, little space to maneuver and change direction accordingly. Concerning regional netchains it is the ***market position*** of the netchain that is more important than the sales volume itself. Actors in the netchain should strive for exploring their *Key Performance Indicators (KPIs*), to successfully compete in the arena of industrial mass production. Moreover creating *lean thinking* within the netchain, namely focus on minimising waste in the chain wherever feasible while maximising value, will strengthen their commercial performance. Last, effective *demand management* (pull vs push), as *well production consistency* need to be carefully looked at.

The structure of the netchain is shaped by these key issues. Equally important however is the weight of each of the issues and the balanced combination of barriers and stimuli that it represents to growth. This will mainly depend on the individual (geographical) situation: whereas in one EU country the government, civil society and private sector are stimulated to work towards joint regional initiatives and partnerships, in another country this may look entirely different. Different governments (culture, history) will wish to have different roles and responsibilities. Civil society organizations in one country have more experience and influence than in another country. Private sector actors (retailers, providers of financial and business services) in one country will face more pressure to look at sustainable solutions than in another country. As a result, each of these actors will in one country be more willing to work towards regional netchains than another country.

Hence we find that specific cases are engaged into specific power relations that reflect an overall (combined) influence by government, civil society and private sector. A specific power relation

represents specific types of barriers (pressures) and stimuli (commitment) for regional netchain to grow. This requires specific governance mechanisms to arrive at successful netchain innovations.

6. Conclusion

To conclude, although the regional pork sector in Europe is still in the pioneering stage has a large growth potential. Yet a number of obstacles that hinder growth must be put out of the way as it is mentioned earlier. However, when the regional production and sales channels continue to develop at the same rate, and environmental pressure by industrial food production will be increasingly charged by means of fiscal instruments leading to higher food prices, then regional pig farming will continue to grow. Nevertheless, determining and checking clear norms that guarantee the sustainability of regional pork products in this growing market is an absolute condition, and realization of the benefits requires some fundamental shifts in the role of pork chain actors as well as the institutional environment involved. Therefore strengthening the image of regional production must be worked at from one integral vision.

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