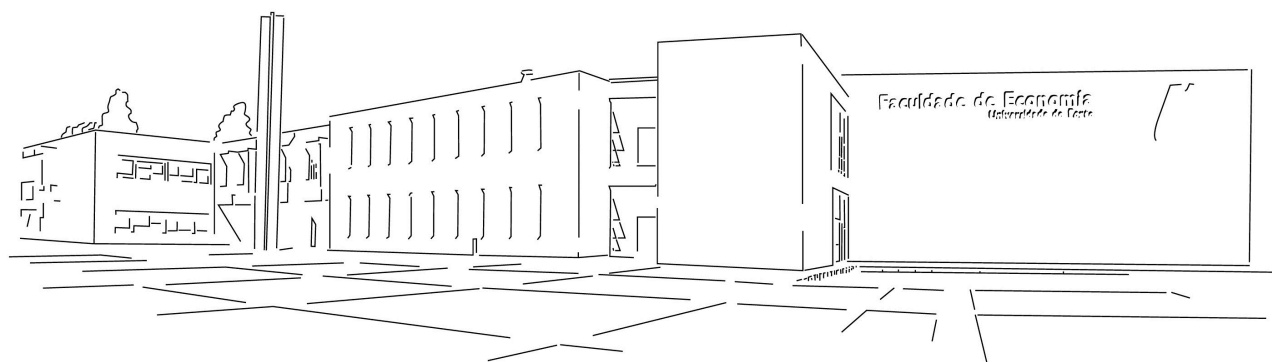


# Are Networks for Innovation an Important Strategic Tool For Sustainable Rural Development?

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**Are Networks for Innovation an Important  
Strategic Tool for Sustainable Rural  
Development?**

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## **Short Bio**

Joana Leão was born in Recarei, Paredes, on 23<sup>rd</sup> of December, 1987.

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At professional level, integrated its first job between September 2009 and June 2012, at Associação para o Desenvolvimento de Lagares, in which the main functions were the financial management of the CLDS project and the promotion of candidatures to the funding programs, namely ProDer. In August, 2012, started to collaborate in RURAL INOV project, at Universidade de Trás-os-Montes e Alto Douro, in data collected process, in the scope of the study of Innovation in Rural Areas, passing to fellow research in period between January and June, 2013. During this period, starts the study regarding networks for innovation in rural context, in the scope of RURAL INOV yet. By December of the same year, integrated Centro de Gestão Agrícola entre Douro e Côa, where it continues to perform functions at level of farmers' accompaniment in candidatures and agricultural accounting.

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## **Abstract**

The literature related with innovation in rural contexts it is scarce. Those few studies in the area has been discussing inter-organisational networks from the view point of structures that boost the generation of new ideas, the acquisition and share of knowledge and resources, the improvement or even creation of new products and services and/or the reach of new markets, namely foreign ones. The issues of content and dynamics of networks and the relation of these latter with regional development are not yet fully addressed specially in the context of rural areas and medium-low technology activities.

Considering networks as an innovative structure by itself, this study intends to characterize *Lavradores de Feitoria* (LDF) case – a network involving, among others stakeholders, wine producers - accordingly to its structure, content and dynamics resorting to a micro, meso and macro analysis. The study seeks to ultimately respond to the question whether networks for innovation are an important strategic tool for sustainable rural development. Therefore, the present research aims to empirically contribute for the current literature by extending the range of information on collaborative behaviours between organisations, particularly in rural contexts.

In a first stage, based on a qualitative research, we define the core concepts allowing the characterisation of the network configuration and the theoretical framework to the analysis of network evolution and their performance outcomes over the period 2000-2013. In a second stage, data was gathered through eleven in-depth interviews among the fifteen Douro grape producers that constitute the case study.

Key findings of the present work include the characterisation of the network case as a formal and hierarchical organisational structure; horizontal and vertical in terms of relations in value chain and horizontal in terms of spatial relations. It was possible enumerate a set of contextual factors and features of network highlighting the main transactional and transformational outcomes that have been positively achieved, such as dimension and quality, financial performance and sustainability, resources access, innovation and attitudinal and behavioural adjustments of the network. Results also show that LDF network has operated as an important tool to producers in the sense of overcome some constraints. Such evidence suggests that the implementation of networks as an organisational model is capable to contribute to rural sustainable

development.

*Keywords:* network; innovation; content and structure; inter-organisational dynamic; collaborative performance; performance outcomes; rural areas; rural development;

*JEL-Cdes:* O13; O18; O35; O43; Z13

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## **Introduction**

Literature has evidence that in context of rural development, networks formation or collective actions seems to be an important tool for trigger the development of small business, allowing them to build social relations and improve economic performance (Brunori and Rossi, 2000). Relating the rural context with a very specific activity, Hellin (2012) draws attention to the changes in the global agricultural economy, presenting farmers' new challenges and opportunities mostly related to markets access and the need to increase agricultural production and productivity. In the same stream, Thiele et al. (2011) disclose the collective actions as a solution to connect small farmers, as well as, to answer to some problems, such as small volume of production and the difficulty in respond to the demand issues, in terms of quantity, quality and delivery timelines.

Most literature around innovation networks has concentrated in the analysis of how technological processes develop through collaboration and how network is managed in collaborative R&D development (Arranz and Arroyabe, 2012). In an opposite way, related with rural development and more specifically with agricultural sector, studies have highlighted that issues associated with collective action role in innovation process has been little discussed (Hellin, 2012). Also little attention has been given to the dynamics and outcomes that could derived from the collaboration for innovation, influenced by the actors' features (Corsaro et al., 2012).

Notwithstanding, similarly to our analytical framework, other studies (e.g. Arranz and Arroyabe, 2012; Rooks et al., 2012; Wang and Fang, 2012) have addressed the close relation between network structure and innovative performance. On one hand, Arranz and Arroyabe (2012) stress the idea that the effects on network performance differ with the context of network, so it is important to identify its different dimension, also assuming that heterogeneity of network actors is an important efficiency source in the innovation process. Thus, the structure of the network and environmental uncertainty contributes to innovative performance (Wang and Fang, 2012). On the other hand, it is concluded that a network structure is a way to solve information and cooperation related problems and simultaneously, facilitates the access to information about new markets, technologies and business opportunities (Rooks et al., 2012). Furthermore, the importance of dynamic nature of the relationships within a collaborative structure has also been highlighted. Lampela (2012) underlined three main perspectives through

which the dynamics should be analysed: characteristics of the collaboration relationships, the process of learning and the final products. In order to promote and maintain dynamics collaborative structures, it seems to be often important the existence of an internal or external network broker, which attracts and fosters collective action and innovation system (Hellin, 2012). This latter author recommends that these network brokers should adopt a neutral position, ensuring that they are seen as truly mediators and not as competitors.

Network performance involves a range of activities execution, which generates a dynamic process of interactions that leads to the achievement of the network objectives (Arronz and Arroyabe, 2012). Thus, across networks literature we can find a wide range of outcomes provided by the collaborative structures, the most often identified are: i) reduction of transaction costs, economies of scale and scope (Brunori and Rossi, 2000; Romeiro and Costa, 2010; Hellin, 2012); ii) attain competitive advantages (Wirtz, 2011); iii) opportunity to complement the actors skills and access to new product, resources and markets segments (Romeiro and Costa, 2010; Wirtz, 2011; Rooks et al., 2012); iv) share of material and financial resources (Copus and Skuras, 2006); (v) empowerment, reputation and information acquisition (Bizzi and Langley, 2012);

Towards creating and disseminating innovation, networks have become a pertinent organisation form in many sectors (Wirtz, 2011). Returning to rural development and to agricultural sector, to which it is assign particular attention in this work, networks and collective actions, have been proved to be an important way in which the bargaining power of small farmers is improved, the agricultural production is increased and the market access is facilitated (Hellin, 2012). Ultimately, a collaborative structure boosts rural innovation, driven by social changes in which network actors are active agents whose strategies and interactions shape the development outcome (Hellin, 2012).

Thus, this research intends to contribute to the networks and rural development empirical literature, through the approach of a network case and its qualitative description and analysis, at a micro, meso and macro level. Through the analytical model adopted from Lamprinopoulou (2009), we propose to relate the context factors, network features and the performance outcomes, departing from network characterisation in its three dimensions: structure, content and dynamics and finally, verify if networks for innovation are an important strategic tool for rural development.

This dissertation is structured as follows. In Chapter 1, we proceed to a literature review in innovation networks and rural innovation, presenting a brief definition of rural areas and rural development and it's introduced the theoretical framework of analysis. Chapter 2 illustrates the selection of the case study, operationalization of the framework of analysis and data collection process. Chapter 3, presents the results extracted from the empirical analysis. Finally the Conclusion section, summarizes the contributes of this work and the main limitations.

# **1. Literature review on innovation networks and rural development**

## **1.1. Key concepts**

### **1.1.1. Networks**

The literature seems to agree that a network can be defined as a series of nodes (or vertices) that are connected to each other by relationships and for some type of exchange (Copus and Skuras, 2006; Cannarella and Piccioni, 2008; Ojasalo, 2008; Almodovar and Teixeira, 2012). For defining nodes, the type of relationships that are established between the actors, the type of actors who are involved in network, and what is exchange in those relationships, it is useful to conceive networks in three main dimensions: network dynamics, structure and content (Almodovar and Teixeira, 2012).

#### *Structure of the network*

Network is often used to represent the multiple relations among organizations (Chiffolleau, 2005) and, therefore, is seen as an interdependent organizational structure (Romeiro and Costa, 2010) or as an infrastructural grid of interactions (Cannarella and Piccioni, 2008).

Indeed, network structure can be characterized by a set of links or relationships that connect a number of nodes (or vertices) to each other. Nodes or vertices represent the positions occupied by agents, such as firms, local institutions, households, trade associations and other types of organization (Cannarella and Piccioni, 2008; Ojasalo, 2008). Complex interactions drawn between those positions are called relationships (Ojasalo, 2008).

A network can be defined as “an integrated and co-ordinated set of ongoing economic and non-economic relation embedded within, among and outside business firms” (Copus and Skuras, 2006: 81), involving “stable and long term formal/informal systematic relation collaborative webs among local agents (...) sharing a common information and knowledge source on the basis of a more or less formal agreement” (Cannarella and Piccioni, 2008: 217). Referring this latter aspect, Romeiro and Costa (2010) and Ojasalo (2008) argue that organizational networks exclude mechanisms of the pure market and of hierarchy, or that at least hierarchies must be avoided or minimized.

The structure of a network can be classified (cf. Table 1) according to their nature,

configuration (Cannarella and Piccioni, 2008), position of agents on value chain of production and spatial relations (Copus and Skuras, 2006).

**Table 1: The structure of a network: nature, configuration and position of agents on the value chain**

	Network classification	Source
Nature	Formal	Transactional mechanism defined as a formal contract when the role, routines, rights and obligations of partners are specified with detailed and formal operational procedures.
		Arranz and Arroyabe, 2012
		Resulting from an explicit agreement among agents that define their roles, duties and responsibilities.
		Cannarella and Piccioni, 2008
Informal		“ <i>Personal network</i> ”; relations are based on trust and friendship or relatives relations.
		Copus and Skuras, 2006
		The agreement established among agents is just verbal or tacit; less bureaucratic, rather flexible.
		Cannarella and Piccioni, 2008
Configuration		Relational norms and trust based on exchange partner’s confidence or belief in the honesty and benevolence of the other partners.
		Arranz and Arroyabe, 2012
	Hierarchical	Network involves a dominant agent.
		Cannarella and Piccioni, 2008
		Relationship with submissive character, based on instructions that happen within organisations
		Wirtz, 2011
	Non-hierarchical	All agents within network are in the same importance level.
		Cannarella and Piccioni, 2008
Position on the value chain		The linkages of the network are at the same stage of the production chain.
		Copus and Skuras, 2006
	Horizontal	Interactions among a group of interdependent companies doing similar things.
		Virkkala, 2007
		Relations between rival companies.
		Giuliani, 2007
		The linkages of the network are at different stages of the production chain.
		Copus and Skuras, 2006
	Vertical	Relates to interactions between suppliers and customers.
		Virkkala, 2007
		Relations among customers and suppliers.
		Giuliani, 2007
Spatial relations	Horizontal	“provide relationships with locally based producers, institutions, and consumers.”
		Copus and Skuras, 2006
	Vertical	“alliances with externally located consumers, suppliers, distributors, retailers and institutions and are, it is suggested, fundamental to the long-term success of a marginal, rural region”
		Copus and Skuras, 2006

Source: Based on Cannarella and Piccioni (2008),

### *Content of network*

The content has to do with what is exchanged in a network structure. The network content is closely related with goals and functions of relationships between agents (Almodovar and Teixeira, 2012), thereby it may have various senses according to the type of network. This content of the inter organizational structures can include goals related to the reduction of transaction costs, facilitate the access of new markets and resources, access of economies of scale (Romeiro and Costa, 2010), profit making or personal self-fulfilment (Ojasalo, 2008). Chiffolleau (2005) in his work relates two types of networks for the same case study and reveals different contents for each of them. In the first case, the relationships are established in order to promote the production and diffusion of knowledge. In the second case, the network works as a mean to create solutions to solve daily problems as well as to share resources and advice.

### *Dynamics of network*

Networks watching to its development over time and maintain a pattern of dynamic relations between the several actors involved. Thus the networks appear as a collective activity (Chiffolleau, 2005) in the sense that are seen as multiple relations among people, objects or events (Chiffolleau, 2005; Novelli et al., 2006), comprising diverse spaces (Murdoch, 2000). It also comprises sharing of knowledge, interdependency and long-lasting relations (Romeiro and Costa, 2010; Almodovar and Teixeira, 2012). Almodovar and Teixeira (2012) point relevant aspects that should be taken into account on the network dynamics approach. The first is the boundaries definition of a network, through a definition of a reference unit for the study of network. Second, network relationships change over the time and, finally, changes in innovative capabilities of firms drives to changes in the pattern of network. In a similar way, Ojasalo (2008) regards that a network can be addressed in terms of its activities, resources and actors and therefore is a dynamic structure, because actors, relationships, needs, problems, capabilities and resources change as time goes by.

#### **1.1.2. Networks related with innovation**

Innovation is an interactive process of learning (Autio, 1996; Virkkala, 2007; Freel and Jong, 2009; Almodovar and Teixeira, 2012) and it has been suggested, as Ojasalo (2008) observed, that networked cooperation among individuals and organizations improves innovation. In networks an innovation should not be considered as the product of one

actor, but rather the result of interactions between multiple actors (Ojasalo, 2008).

The Organization for Economic Cooperation and Development (OCDE, 2005:46-47) defines innovation as "... the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organization or external relations". Accordingly, it can involve a myriad of activities, including scientific, technological, organisational, financial and commercial tasks that are critical for the implementation of innovations. Other authors, as Wirtz (2011), refer to the innovation as development of a technical, organizational, business related, institutional or social solution of a problem and its establishment in a successful way, which is perceived as pioneering and new, accepted by pertinent users and pursued by innovators in anticipation of achievement.

To understand networks for innovation is equally important perceive their structure and content. Freel and Jong (2009) stress that idea and thus regard the interactions with external agents to organizations (e.g., competitors, universities and business partners) and the strength of ties established between them as an important feature of development of innovations. Thereby, they present four types of relevant ties which may occur in an innovation network: *weak*, *strong*, *sparse* and *cohesive*. *Weak ties*, although allowing to obtain new perspectives, are characterised by temporary, passing relations, depleted from emotional closeness. In the case of *strong ties*, these involve long-term relations, frequent contacts, reciprocal, trust and emotional proximity, allowing the transfer of complex knowledge. Finally, *cohesive* networks encompass structures where the circulation of knowledge is facilitated whereas *sparse* structure is just as a marginal indicator of innovative network (Almodovar and Teixeira, 2012).

Relatively to the content of the network related with innovation, some authors as Chiffolleau (2005), Copus and Skuras (2006), Virkkala (2007) and Freel and Jong (2009) have been referring the flow of resources and knowledge. Drawing on Chiffolleau's (2005: 1194), network stands as "... social spaces wherein knowledge is produced for innovation". Another interesting insight about network content is presented in work of Romeiro and Costa (2010) where they relate the role of network, at local scale, with the increase of competitiveness and innovation in rural tourism. Accordingly, the content of networks can be different according to the types of connections. Specifically, it may involve disclosure of the services provided by multiple companies, coordination of different activities available or development of strategies to combat some of the

business constraints. In general, to the cooperation form that is engaged in the development and marketing of innovation and which connect legally and economically independent companies and other partners with each other, we can call innovation network (Wirtz, 2011).

### **1.1.3. Rural development**

To introduce the concept of rural development, it is advisable to start by briefly contextualize the definition of rural areas. In a general way, according to Mitchell and Clark (1999), differences between rural and urban areas are essentially in terms of population density, settlement pattern and land use intensity. Both areas, however, experiment a common aspect: the economic pressures and processes. In the European Union (EU), 90% of the territory is classified as countryside and over half of population lives in those areas. Thus topics highlighting rural development are extremely important (Pasakarnis et al., 2013).

The economic activity in rural areas remains predominantly agricultural, making farms an important source of rural employment and many times agricultural industry is the only activity that is viable in these areas (Glover, 2012). Indeed, rural areas face persistent structural problems, such as stagnation of traditional economic sector (Seeland et al., 2011), the competitive factors disadvantage related with human capital (Fink et al., 2013), and the need to improve rural services and infrastructures as well as to enhance communications and job opportunities (Pasakarnis et al., 2013).

Thereby, rural development, involving a set of strategies and presented as a multidimensional process, is a mean to promote resources, reduce local difficulties (Fonseca and Ramos, 2008) and transforming rural areas in economically sustainable spaces (Pasakarnis et al., 2013). Some authors (e.g., Fonseca and Ramos, 2008; Pasakarnis et al., 2013) have been arguing that, in order to rural development strategies become effective, it is indispensable the communication and cooperation among private and public actors. Extant literature points ways to rural development. On the one hand relates it with territorial promotion or territorial marketing (Mititelu et al., 2010; Talaya et al., 2010), and on the other hand considers fundamental the incentives for rural economic diversification (Talaya et al., 2010; Seeland et al., 2011; Pasakarnis et al., 2013). The concept of sustainable development further adds improvements on human

welfare, stability in local economy and conservation of natural resources (Osei, 1996; Farsani et al., 2012).

Current strategies to rural sustainable development are based on three main pillars: economic, environmental and social (Müggenburg et al., 2012). Specifically, the EU has focused its development strategies in the promotion of competitiveness of land-based activities (agriculture and forestry), environmental and rural areas improvement, and to promote better life quality in rural areas and incentive to rural economy diversification (Pasakarnis et al., 2013).

## **1.2. Main sub-topics on rural innovation**

Rural innovation has been approached through different dimensions and involving distinct topics of analysis.

Besides the rural innovation theory building, it was possible to identify other main topics, organized from micro to macro approach (cf. Table 2): Innovation adoption and diffusion; Entrepreneurship; Innovative performance; Collaborative behaviour; Public policies; Innovation, development and competitiveness; Innovation and socio-economic changes; and Social development.

In the **'Innovation adoption and diffusion'** topic it is discussed aspects such as adoption and diffusion of new technologies and Information and Communication Technologies (ICTs) or the adoption of innovative method of production. Taking into account the recognised benefits of the ICTs, some authors (e.g., Mitchell and Clark, 1999) analyse the main reasons that lead rural firms to adopt and use such technologies, pointing the pressure from customers and suppliers as the critical adopting factor. At the countryside level two tiers firms were identified: ICT intensive firms and outward-oriented (creating extra-regional or even international market linkages); and business with low degree of ICTs and inward-oriented (producing traditional rural goods and commercialised predominantly on local market). On the other hand, some authors (Wei and Zhang, 2008; Heffernan, Thomson and Nielsen, 2011; Martín and Herrero, 2012) examine what factors lead to the adoption and diffusion of technologies, not from the point of view of enterprises, but rather to the standpoint of individuals, emphasising not only the behavioural and psychological factors, but also determinants as income, gender and education. Several studies (e.g., Jinqiu et al., 2006) recognise that in rural areas, which are viewed as underdeveloped at social and infrastructural level, it is difficult to

disseminate and implement an expensive innovation, such as ICTs, by the lack of capacity to sustain them. Additionally, it is recognised the importance of entrepreneurs in dissemination, adoption and knowledge improvements regarding to new technologies, namely at the small business level (Karanasios and Burgess, 2008). Likewise, other researchers highlight the relevant role of institutional/organisational initiatives on process of technology transfer in rural areas (Jinqiu et al., 2006; Lagos, 2008). Regarding to new methods of production, some studies argue that new technologies may be seen as a positive aspect on development, improvement and sustainability of rural sectors (Lu and Swatman, 2009; Reino and Frew, 2011; Hermans et al., 2011) as well as its applied can provide innovation and rural development (Cannarella and Piccioni, 2011; Michailidis et al., 2011).

**Table 2: Main topic and sub-topics identified on rural innovation literature**

	Topics	Sub-topics
Conceptual theorizing	Rural innovation theory building	
Microeconomic based	Innovation adoption and diffusion	New technologies and ICTs adoption/diffusion, adoption of innovative method of production
	Entrepreneurship	New business creation, location, employment
	Innovative performance	Firms, activity sector, employees product/service/process development, innovative practices of firms
Meso based	Collaborative behaviour	Networks, cooperation, collective actions
Macroeconomic based	Public policies	Public financing projects, governmental decisions
	Innovation, development and competitiveness	Region, territory, sustainability, rural development
	Innovation and socio-economic changes	Institutional reforms, infrastructural changes, economic, social and cultural issues
	Social development	Improvements in social welfare, poverty combat

Source: Author

The new business creation, localisation of the new enterprises or creation of employment are issues discussed in ‘**Entrepreneurship**’ that is currently a hot topic. Some studies have recognized the innovation and entrepreneurship as important tools of economic growth (e.g. Henderson and Weiler, 2009), investigating the relationship between innovation, entrepreneurship and growth. Henderson and Weiler (2009) argue that entrepreneurship provide local economy development, namely at the rural level,

and direct benefits to local communities and to neighbouring communities, for example in job growth. In this stream, other studies seem to agree with the positive relation between entrepreneurship and rural development, most notably Lafuente et al. (2010) who analysed the determinants influencing the choice of firms in relation of its location, between rural and urban areas, introducing the entrepreneurship as an important factor to economic and rural development and innovation policy. Indeed, the emergence in developing areas of these entrepreneurs as an ‘instrument’ of innovation have captured attention (e.g. Zossou et al., 2010; Sonne, 2012) discussing a common problem, the difficulty in financing new ventures.

Other studies are developed in the sense that the decision making and learning processes as well as the introduction and development of innovations within rural firms are closely related with entrepreneurial behaviours and profile of producers (Chaves et al., 2010; Glover, 2012). Regarding to innovative behaviours/practices within enterprises or activity sectors it was identified another topic named ‘**Innovative performance**’. For instance, Hinrichs et al. (2004) take the case of sellers at farmers’ markets and studied the innovative practices at marketing level which were introduced by sellers through the social learning provided by the relation with clients and others sellers. Furthermore, many researchers studied innovative practices in small and medium firms, namely in tourism (Nybakk and Hansen, 2008), relating these behaviours with environmental context (embeddedness) of firms (Vaz et al., 2006; Cesário and Vaz, 2008, Heanue and Jacobson, 2008) and with human and social capital available in firms (Nam et al., 2010). This latter, may be considered a relevant factor in the improvement and development of new production systems. Some studies, such as the one by Hosseini et al. (2012) point innovation as a fundamental factor to sustainability of small rural business, evaluating the success in transforming ideas into innovations. Thus, some authors (e.g. Forsyth, 1995; Beckford and Barker, 2007; Wu, 2010) emphasised that the exploration of additional activities and enhancement in technologies within a rural business or even the application of local knowledge to innovate, represent greater improvements to the farmers’ welfare and to rural development.

The topic ‘**Collaborative behaviour**’ deserves here a special attention as it includes the issue of networks. The literature has shown that the process of innovation within a company is closely related with the activities of others firms and organizations (Kaufmann et al., 2003). Beside networks, several sub-topics were identified, most

notably cooperation and collective action among firms or other organisations.

Often, in order to have innovative capacity and bridge the lack of resources and knowledge, individuals and organisations choose to integrate a network structure where diverse agents share their capabilities, thus making possible the development of innovation processes (Spielman et al., 2009). Networks have been addressed in different ways. Many studies approach networks by geographical lenses as that of Kaufmann et al. (2003), which explores the use of the internet to create innovation networks among distant partners turning networks free of geographical space, but at the same time emphasising the importance of local and regional networks and the personal contact between actors. The relation between regional characteristics, formation and performance of networks is analysed by several studies (e.g., Copus and Skuras, 2006; Virkkala, 2007; Isaksen and Onsager, 2010). Additionally, networks have been studied as potential structures to enhance business competitiveness and innovation (e.g., Romeiro and Costa, 2010), resulting in the sharing of resources which allows achieving innovative responses to global market challenges. More recently, Arora (2012) points the network structures as source of knowledge transmission among producers promoting development and collective learning, whereas other authors (e.g., Kjeldsen and Svensen, 2011; Duffhues et al., 2012; Rooks et al. 2012) point these structures as sources of social capital.

Cooperation among rural business has also been approached by the literature (e.g. Thiele et al. 2011; Ilbery and Saxena, 2011) focusing mainly on the strategic vision to overcome small business difficulties, namely logistic issues, and promotion of innovation and coordination between business already fixed in a given region. However, administrative barriers and the weak inter-sectorial collaboration are presented as constraints to cooperation. Many authors, including Koutsou and Vounouki (2012), approached collective actions as a relevant tool to innovate, emphasising the fact that collective actions lead to innovation and the need of producers to innovate leads to the collective actions organisation.

Regarding to macro-related issues, some studies address the topic '**Public policies**'. In a general way, and in the context of rural development, public policies take shape through incentive instruments, special regulations or assistance to private initiatives (Bazile et al., 2012). Some studies (e.g. Gomez Jr and Buenaventura, 2012; Zhang, 2012), describe the political reforms and governmental decision that allow to respond more

efficiently to the local needs, such as democratisation and decentralisation, as facilitators in transforming new ideas in productive competencies, as well as in promoting rapid infrastructural expansion. In particular, Xiaojun (2012) stated that sometimes political reforms, including democratisation, lead to composition of political elites, elite recruitment, dominant ideologies and power bases. Despite this, it is argued that political changes toward rural economy may minimize the private investments constraints and stimulate gains in efficiency, boosting the rural industry as an engine of growth and employment (Li and Rozelle, 2003). According to Williams (2011), it is possible to implement new ventures in developing rural areas, for example in the scope of the development of ICTs, provided that innovation policies adopt the right market incentives and stimulate the private sector to invest and make profit.

**‘Innovation, development and competitiveness’** topic comprises all those studies that somehow discuss the local, territorial or regional development and competitiveness, either through local innovation systems, entrepreneurship or governance structures. Studies suggest that the local development has been researched based on factors such as local entrepreneurship, social networks, synergies, innovation and dynamic learning, being over emphasised, in the context of regional development, the role of innovation and their diffusion (Ritsila, 1999). North and Smallbone (2000) argue that regional competitiveness and local economies have been studied based on innovation within rural SMEs, concluding that more innovative SMEs have effectively an important role on external income generation and employment promotion. Sharing the same line of argumentation, Rametsteiner and Weiss (2006) stress that innovation is fundamental to economic growth, competitiveness and employment, highlighting that it is important not only in high-tech sectors, but for all sectors and economies, including rural areas. To reinforce this idea, Ortega and Jesus (2011) reveal in their study that high regional productivity and strong production are consequences of productive process modernisation by applying a set of technological innovations.

Furthermore, some articles (e.g. Doloreux et al., 2007; Saether, 2010) have addressed this field through the existence and response of local/regional innovation systems, aimed to the economic and technological development which is based on knowledge and know-how supporting systems. Additionally, articles such as the one from Burstein (2009), discussed the nature and extent of local integrated development projects, considering that communities may have a fundamental role in securing integrated

planning, not as participating actors but also as promoters of inter-sectorial initiatives (Illsley et al., 2010).

Other works within the topic ‘Innovation, development and competitiveness’ studied the governance structures, referring that local governance is often pointed as an important factor of rural development, promoting power distribution, defining resources and priorities (Fonseca and Ramos, 2008), in the same way, it's also argued that regional efficiency and sustainability derives from governance structures (Ónega-López et al., 2010).

Related with economic, social, cultural or infrastructural changes, other topic was identified: ‘**Innovation and socio-economic changes**’. By socio-economic restructuring it is meant the transformations that occur in a spatial-temporal context which drives to changes in local resources configuration (Fink et al., 2013). Some works (e.g. Osei, 1996; Ingold and Zimmermann, 2011; Seeland et al., 2011) focused in socio-economic changes that lead rural business, namely activities related with forestry sector, and its adaption and performance. Such changes have been demanding that companies adopt and implement innovations in response to new market requirements. In a different way, other studies discuss the migration phenomenon: on the one hand, they study the communication and technologies innovations as facilitator in maintain the connection with their own community, despite long distance (Barcus and Brunn, 2010); on the other hand they try to understand which determinants, at social and political level, lead to mobilization, pointing aspects such as economic policies and incentives or even the governmental policies to development of communities (Seto, 2011).

Beside this, a reasonable number of studies (e.g. Huning et al., 2011; Kashyap, 2012; Fink et al, 2013) stress the infrastructural changes and planning, highlighting the importance of regional specificities, local skills and local communities’ needs. Generically, these studies suggest that infrastructural planning may be conceptualized in order to change demographic, environmental and socio-economic conditions (Huning et al., 2011).

Subjects related with ‘**Social development**’ have been discussed among several actors, namely local people, economists and policymakers (Nautiyal, 2011). This (macro) topic identified within the rural innovation literature has been developed mainly from poverty

related issues. Rao (2008) approaches the implementation of ICTs and their role in social development, suggesting that to overcome the poverty situation and the lack of infrastructures, governments must define policies and strategies to implement innovation in order to increase income level. As conclusion, the author points that for such innovations achieve success, it is necessary the creation of synergies among several actors, government, private organisations and development organisation, ensuring responsiveness, stability and access and participation of the locals. In the same way, other studies (e.g. Müggenburg et al., 2012; Ramani et al., 2012) discuss the poverty combat through the entry of product innovations in poor rural areas, which can respond to basic needs of households and increase the social welfare.

### **1.3. The importance of innovation networks in rural innovation literature: a bibliometric exercise**

Using as keyword 'Rural innovation', we performed a search in Scopus (in February 2013) limiting to articles published in journals (no limit was imposed regarding the period of publication). Out of this research, it resulted a list of 294 articles that was exported and organized in an excel document. The first analysis of the articles was taken through the reading of the abstracts, making a selection of relevant literature (by relevant literature we considered the set of articles that directly addressed rural innovation related issues). After this first selection, 130 articles were removed from the excel data because they did not fit within the scope of our study.<sup>1</sup> Thereby, the work was further developed with the 164 remaining articles. We categorized the selected articles accordingly to the topic, type of study, unit of analysis, sector of activity and country of analysis in order to provide a comprehensive picture of the importance of networks in the rural innovation literature.

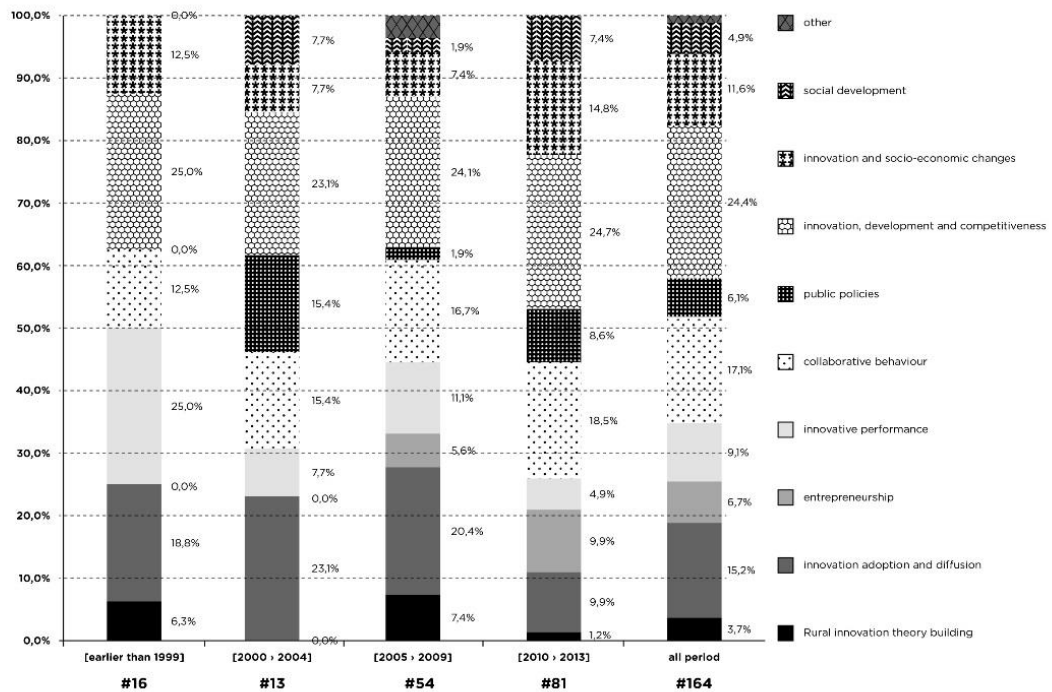
The bibliometric analysis on rural innovation allowed us to infer some important aspects regarding the evolution of the literature over time. In what follows, we start with the analysis of the main topics explored, followed by the type of study (conceptual/empirical), unit of analysis, sector of activity and finally, the core countries that have been focused.

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<sup>1</sup> These excluded articles mainly mention issues related with innovations in health and care services (e.g. Hoffman et al., 2012; Mitton et al., 2011; Berta et al., 2010; Manthorpe et al, 2008), and innovations on development and application of treatments in combat of mortal diseases (Ohl et al. 2013; Woud, 2008; Gruber and Coffrey, 2005; Wu et al., 2002).

### 1.3.1. Main topics

Considering the whole period, it is quickly recognized that the issues related with ‘Innovation, development and competitiveness’, ‘Collaborative behaviour’ and ‘Innovation adoption and diffusion’ are the most often researched within rural innovation (cf. Figure 1). These topics have shown, however, quite different dynamics. In the case of ‘Innovation, development and competitiveness’ (which represents 24.4% of the total articles) and ‘Collaborative behaviour’ (17.1%), both have captured an increasing attention by the researchers. The latter topic, which includes network structures, cooperation and collective action, has increasingly attracted a higher interest among scholars. The weight of the first topic has been more or less stable over time.



**Figure 1: Evolution of the main topics in rural innovation**

Source: Own computations based on 164 articles from Scopus Sciverse.

‘Innovation adoption and diffusion’, although being one of the most explored topic in the overall period (representing 15.2% of the total), observed a marked decline in the last two periods (2005-2013), losing almost 11 percentage points.

In a general manner, micro related topics lost importance in relation to macro related topics, with the exception of the topic ‘Entrepreneurship’. This latter can be considered an ‘emergent’ topic as until 2004 was non-existent, but in the most recent period (2010-2013) it represents almost 10% of the total articles.

In addition to the 'Entrepreneurship', topics such as 'Innovation and socio-economic changes', 'Public policies' and to a smaller extent, 'Social development', might be considered emergent. In each one of them the proportion in the total articles increased substantially in the last period (2010-2013), reaching 14.8% in the case of 'Innovation and socio-economic changes', 8.6% in 'Public policies', and 7.4% in 'Social development'.

'Innovative performance' is considered a micro related topic and similarly to the 'Innovation adoption and diffusion' observed a marked fall in relative importance over the period in analysis. Initially ('earlier than 1999') it represented 25.0% of the articles whereas more recently (2009-2013) it is almost vanished, representing less than 5% of the total.

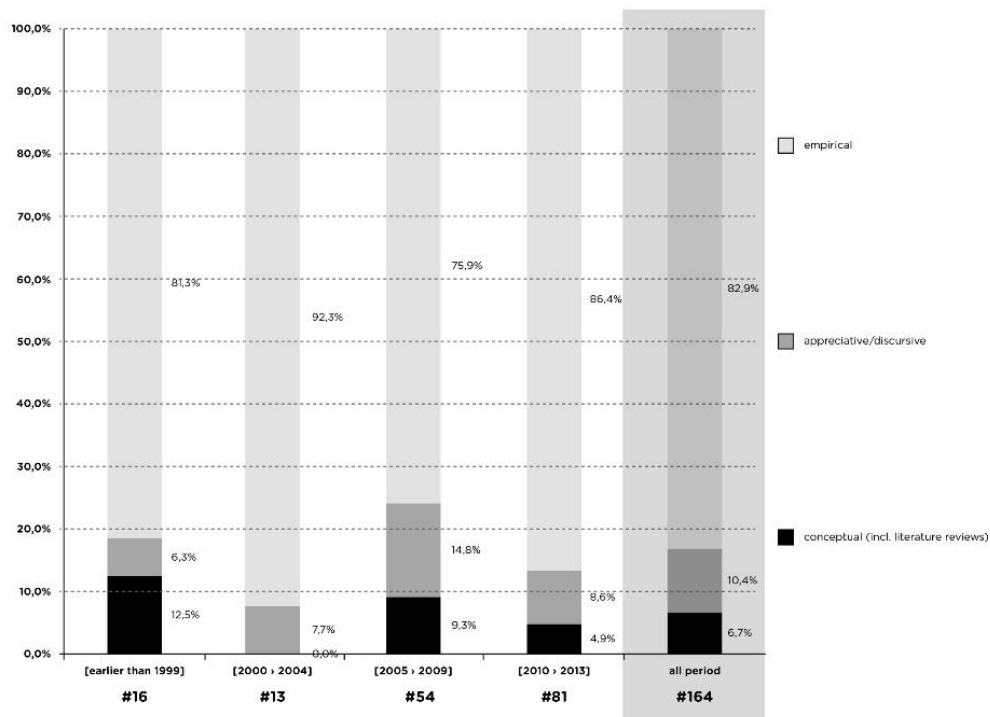
'Rural innovation theory building' presents a very low weight, suggesting that there is still space for the development of the rural innovation's conceptual framework.

### **1.3.2. Type of studies**

The bulk of studies (over 80%) on rural innovation are empirical, that is, involve the analysis and/or testing of hypotheses related to the subjects. Studies involving some kind of appreciative theorizing represent about 10% of the studies (Figure 2). By appreciative studies, we consider all of those that consist in appraisals, comments and/or discussions about a particular topic (Silva and Teixeira, 2009). This type of paper contrasts with that of formal theorizing, which is based on analytical and logical framework, applying mathematic models or simulations (Silva and Teixeira, 2009). In our sample, no formal articles exist.

Taking into account the argument developed by Cruz and Teixeira (2010), there are scholars defending that the existence of exclusively empirical studies, focused on specific cases of the reality, limits science. On the one hand it hinders the building of a solid conceptual base and, on the other hand, the lack of theorizing makes it difficult the applicability of these studies to other realities. Similarly, the existence of the exclusively formal studies, although presenting exceptional sign of scientific rigor, it is not sufficient to support decisions about the reality, for example in the development and implementation of policies. Thus, based on conclusions presented by Cruz and Teixeira (2010), it seems fundamental the progress of literature on rural innovation towards a balance between the scientific rigour and policy oriented approaches through the

emergence of studies which combine formal and empirical methodologies.



**Figure 2: Evolution of type of studies in rural innovation up to 2013**

*Source:* Own computations based on 164 articles from Scopus Sciverse.

The bibliometric exercise regarding the type of studies on rural innovation makes evident that there is a clear insufficiency of articles involving both formal theorizing and theory building (conceptual studies). Indeed, empirical related studies and, to a smaller degree, appreciative research, are the types that experienced higher growth dynamics.

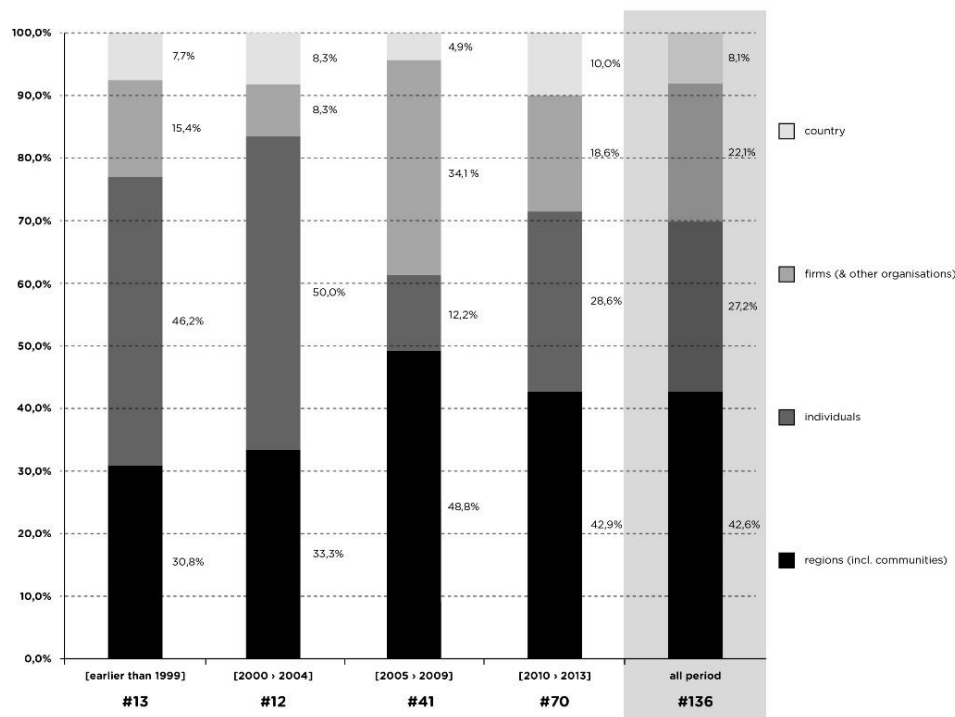
### 1.3.3. Unit of analysis

Considering only the empirical studies, we observe that ‘Regions’ (incl. communities), have been the unit of analysis more often approached over the period in analysis, representing 42.6%, followed by ‘Individuals’ (27.2%), which include farmers, entrepreneurs and households (cf. Figure 3).

During the first two periods, ‘Individuals’ showed a growing interest compared to the other units of analysis considered. In the period [2005; 2009] the situation reversed, with ‘individual’ unit of analysis losing weight (decreasing 37.8 percentage points), and more interest was raised by ‘firms’ and other organisations (until then a little neglected) and by ‘regions’, including communities (encompassing 34.1% and 48.8%,

respectively). In the most recent period, the majority of the empirical studies focuses on ‘regions’ (42.6%), ‘individuals’ re-gained some ground (28.6%), and ‘firms’ lost some importance (18.6%). Despite showing some changes over the time, the relative weight of ‘Country’ as unit of analysis has been quite negligible; this is understandable given the topic in analysis.

Taking into account the increasing trend towards macro related studies, the increase observed in the unit of analysis ‘regions’ (incl. communities) seems to be a natural process of change in the literary panorama.



**Figure 3: Evolution of unit of analysis on rural innovation up to 2013**

*Note:* Only empirical articles are considered in the analysis.

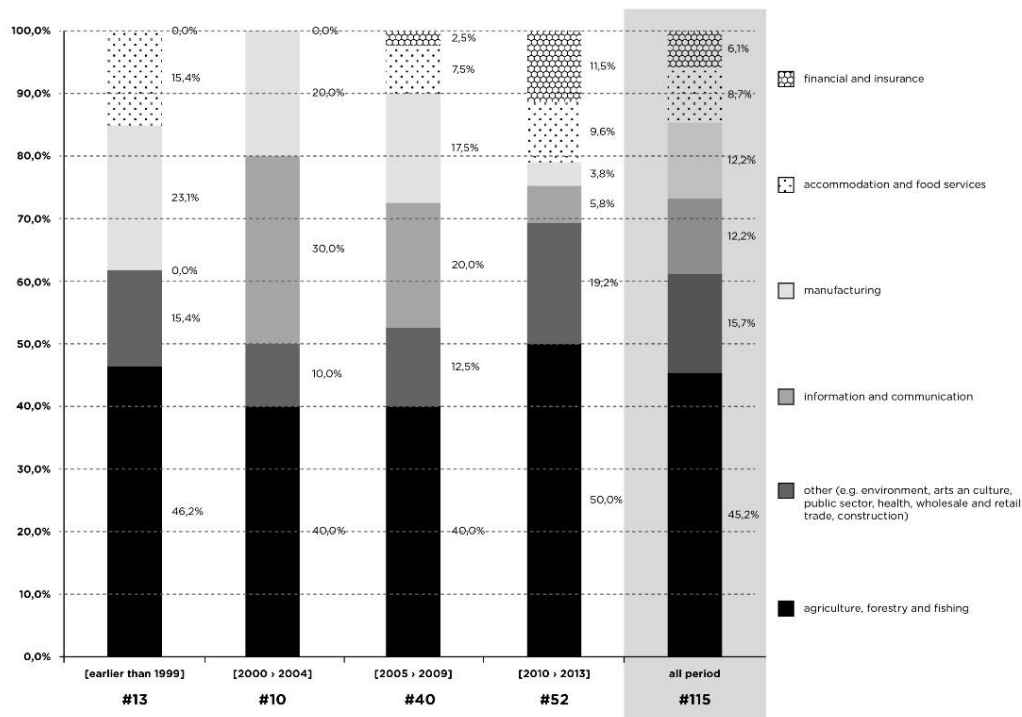
*Source:* Own computations based on 136 empirical articles from Scopus Sciverse.

### 1.3.4. Main sectors of activity

In the set of empirical articles that explore an activity sector, the results reveal that the main sectors studied by rural innovation research include ‘Agriculture, forestry and fishing’, presenting for the whole period a weight of 45.2%, followed by ‘Information and Communication Technologies’, and ‘Manufacturing’, capturing 12.2% each (Figure 4).

‘Agriculture, forestry and fishing’ is the most analysed sector and although there was a decrease in the period 2000-2004 in favour of ‘Information and communication’, over the period in analysis, the weight of the former is constantly superior to that of the remaining activities. This might reflect the fact that agriculture is still an important activity in rural and remote areas, and farms are an important source of employment (Kazakopoulos and Girdarakou, 2003). Often, agriculture is the only viable industry in rural areas (Glover, 2012).

Regarding to ‘Information and communication’ and ‘Manufacturing’, these exhibit the same weights for the overall period, having, however, experienced different dynamics. In the beginning (‘earlier than 1999’) the ‘Information and communication’ was a sector without any expression, but in the following period (2000-2009) it gained a great deal of attention from researchers. In the most recent period, however, it evidenced a sharp decline. The ‘Manufacturing’ sector presents a marked decrease of attention from scholars since the beginning period. Currently, articles related with ‘Information and communication’ are about 5.8% whereas ‘Manufacturing’ represents 3.8%.



**Figure 4: Evolution of activity sector on rural innovation up to 2013**

*Note:* Only empirical articles are considered in the analysis.

‘Accommodation and food services’, which include tourism activity, and ‘Financial and insurance’ have received greater attention in the period 2010-2013. ‘Financial and

insurance’ was not analysed at all until 2005. The trend observed in these two cases is in large extent associate to the increase of the subjects focused on rural entrepreneurship, an ‘emergent’ topic as stated above.

Concerning to ‘Other’, which includes all the activities that individually do not have significant expression (e.g., environment, creative activities, public sector, health, construction and wholesale and retail trade), it represents 15.7% of the articles analysed, observing in general an increase in its relative weight over time.

### 1.3.5. Countries of analysis

Over the period in analysis, India and China have been the most widely researched countries, alongside with the UK and Spain (Figure 5). Both India and China have registered drastic reductions in percentage of population in poverty situation as well as have been examples in promoting a more equitable distribution of economic and social opportunities (UNPD, 2013). Their high consolidated progress in development and growing issues, namely regarding the development and implementation of innovative programs with priority in income transfer and the guarantee of rural employment (UNDP, 2013) has been notorious and justifies their leadership in terms of researchers’ interest.

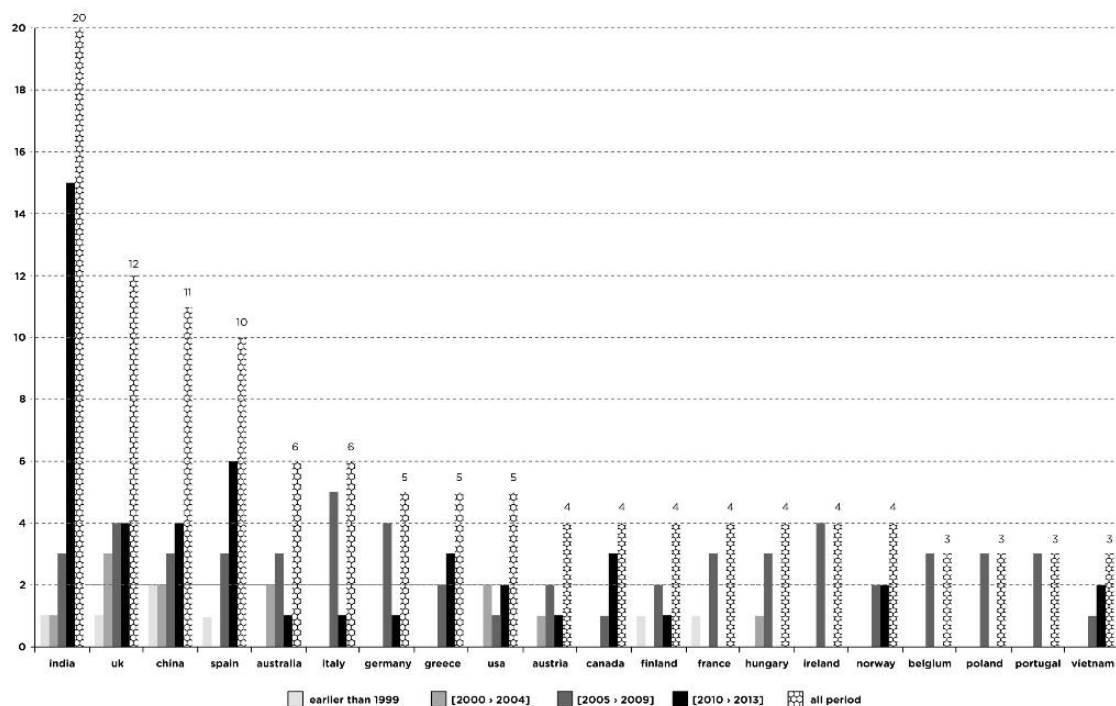
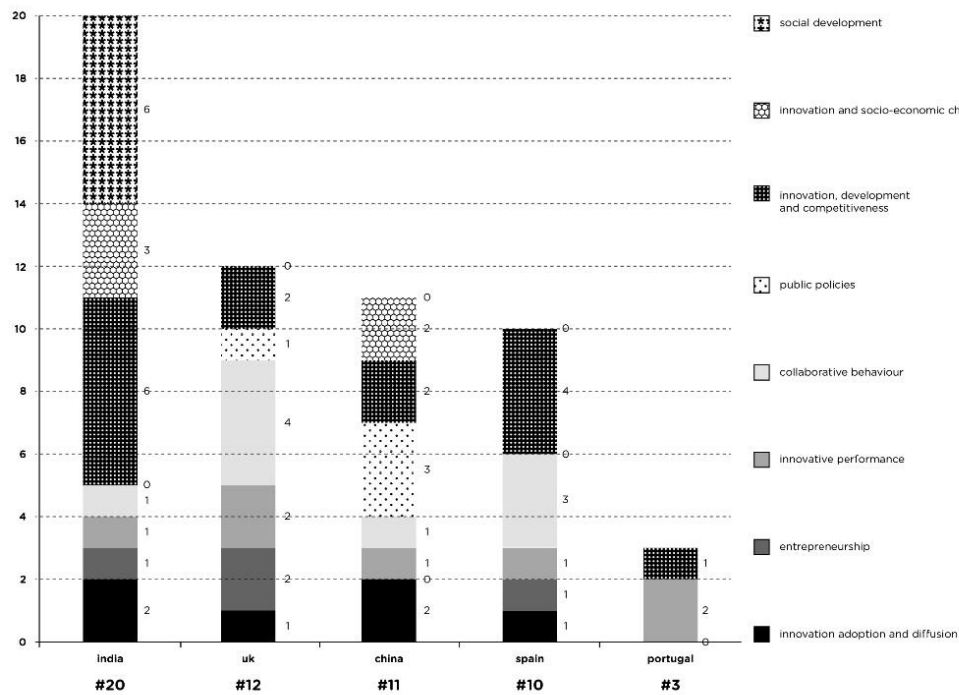


Figure 5: Evolution of main countries of analysis

Source: Own computations based on 136 empirical articles from Scopus Sciverse.

Indeed, topics as ‘Innovation, development and competitiveness’ (Simon, 2010; Prasad and Singh, 2010; Gnatzy and Moser, 2012), ‘Social development’ (Thakur et al., 2001; Rao, 2008; Sita et al., 2011) and ‘Innovation and socio-economic changes’ (Purushotham et al., 2010; Shylendra, 2011; Kashyap, 2012) have been quite addressed in India case, mostly in the period 2010-2013 (Figure 6)



**Figure 6: Main topics of analysis by country**

*Source:* Own computations based on empirical articles from Scopus Sciverse.

China’s case has been particular interesting in the context of ‘Public policies’ (Li and Rozelle, 2003; Zhang, 2012; Xiaojun, 2012), followed by issues related with ‘Innovation adoption and diffusion’ (Jinqiu et al, 2006; Wei and Zhang, 2008), ‘Innovation, development and competitiveness’ (Lin, 1991; Chen and Rozelle, 1999), and finally ‘Innovation and socio-economic changes’ (Liu et al., 2009; Long and Li, 2012).

Highly developed countries, namely the UK and Spain, have also been rather researched, particularly from and during the period 2005-2009 (as it was also the case of Ireland, Belgium, Poland and even Portugal). Derived from socioeconomic structural changes in rural areas, developed and industrial countries, especially the European ones, have chosen to adopt strategies less focused on the sectoral development in favour of

territorial development strategies (Neumeier, 2012). Thereby, at least the EU countries implemented new development policies (taking place in the period 2007-2013), which particularly targeted rural areas. The policies' main goals included reaching improvements at the level of competitiveness of sectors related with agriculture and forestry, environment and the countryside, the quality of life in rural areas and boosting diversification in rural economy context (European Commission, 2008).

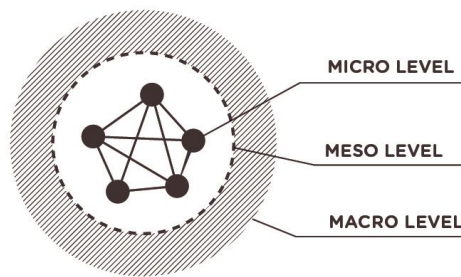
In the set of developed countries, those receiving more attention were, as seen above, the UK and Spain. For the UK case, the scholars have found a special interest in issues related with 'Collaborative behaviour' (Macpherson, 2005; Ilbery and Saxena, 2009; Klerkx and Proctor, 2013), focusing on subjects related with networks, cooperation and/or collective action. The main subject researched by Spanish related studies were 'Innovation, development and competitiveness' (Ortiz, 1999; Díaz-Puente et al., 2008; Ónega-López et al., 2010), and 'Collaborative behaviour'(Copus and Skuras, 2006; Ortiz-Miranda et al., 2010; Romeiro and Costa, 2010).

As apparent, Portugal has been barely explored in this field of research. Only three empirical studies were published (and indexed in Scopus), addressing the topics of 'Innovative performance' and 'Innovation development and competitiveness'.

#### **1.4. A theoretical framework for studying network dynamics, structure, content and performance**

Different contextual factors influence the evolution of networks, as well as their features, which ultimately influence their performance. Lamprinopoulou (2009) developed a theoretical framework which permits an in depth analysis of networks evolution and their performance outcomes. Such a framework emphasises the idea of the importance of analysis both at the individual level (individual organisations) and at the level of the network as an entity *per se*. Specifically, it recognises three different levels of analysis (Figure 7): micro, meso and macro.

The micro level refers to the analysis of individual organisations involved in a network structure, whereas the meso level refers to the analysis beyond individual actors, proposing an approach to the network as a whole. The macro level looks into the networks context and their external environment.



**Figure 7: Levels of analysis**

Source: Author

An adequate study of networks encompasses all the dimensions of analysis, and thus it identifies the contextual factors that influence network evolution, the features of networks, and the main performance outcomes (see Figure 8).

Regarding the contextual factors capable to influencing the evolution of network, Lamprinopoulou (2009) distinguishes three: market conditions, social cohesiveness, and external institutional support.

**Market conditions** respect the definition of a specific market in which individual organisations and the network operate. Thereby, the definition of markets is based on identification of “products, services, clientele, competitors, suppliers, function performed, time and territory” (Lamprinopoulou, 2009: 82), as well as “infrastructural technologies (...), product technologies, technological processes and relationships with particular research laboratories and universities”.

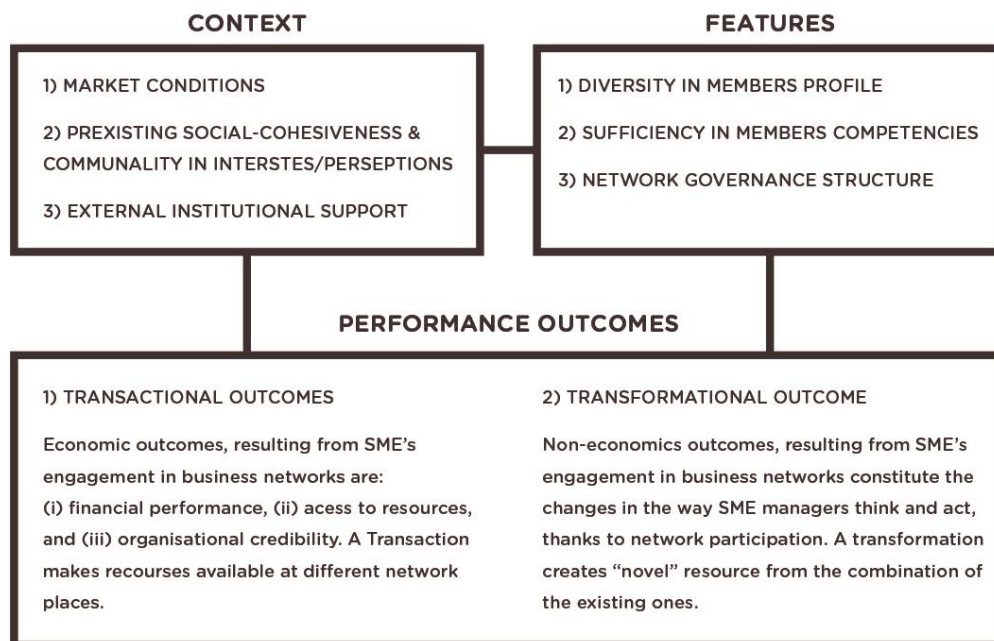
These market conditions might be analysed in five different perspectives:

- 1) Existence of a segment of final consumers that differentiate between categories of products. This situation encourage the network to create quality products and brands;
- 2) Existence of well-differentiated substitute products or imitations in market. This situation strengthens the ties among network;
- 3) Existence of monopolies. This factor may have a negative or positive effect on the network evolution. The negative effect consists in the fragmentation of the network, which derives from the fact that stronger organizations are more attractive than others. The positive effect derives from the fact that the fragmented suppliers tend to establish social lateral interactions;

- 4) Existence of “physical and technological constraints” that increase production and marketing related costs and change the relations among organisations and their suppliers and distributors. This situation leads organisations to establish or adopt new interactions that can be real or virtual relations;
- 5) Quality certification system as a pre-condition for market entry. This aspect stimulates the fragmented suppliers to search for a vertical integration.

**Social cohesiveness** “refers to the nature and extent to which network actors share common ties, interests and perceptions” (Lamprinopoulou, 2009: 84). Thus, the pre-existence of common social ties, values, beliefs, goals, interests and perceptions, between members reinforce the emergence and stability of network relationships. However, it seems to be important the existence of a capable leader.

The **external institutional support** concerns the political and institutional context of the network and “refers to the nature and extent to which regional and national governments’ ‘public support’ is offered” (Lamprinopoulou, 2009: 86). External institutional support has a positive effect on network evolution as long as adequate funding and other supports are available to the network structure keeping, at the same time, its autonomy and self-management.



**Figure 8: Framework of analysis of networks evolution, features and performance**

*Source:* Adapted from Lamprinopoulou (2009).

The features of network, including the diversity in members' profile, sufficiency in members' competencies and network governance structure, are also key factor for influencing the performance of a network.

In general, **member profile** assumes that low diversity between network members emphasizes performance outcomes. However, it may constitute a constraint to innovation because it hinders the generation of new, different and alternative ideas. In this sense, a low diversity in members' profile allows the share of knowledge, goals and perspectives in a harmonious way. Members profile can be analysed through the observed (*physical* profile) and less visible (*attitudinal* profile) attributes. The first consists in attributes such as age, gender and locations and the second one, in attributes such as "members' behaviours, perspectives and goals" (Lamprinopoulou, 2009).

In a network it is expectable that coexists a diversity of competences between members (**member competencies**). If such competencies can be shared, the network performance could be enhanced, becoming more efficient and sustainable in terms of outcomes.

Thus, special attention is given to *production related capabilities, marketing and entrepreneurial skills* alongside with *collective-management capabilities*. Production related capabilities involve all the impacts felt by members on relationship development and stability, influenced by product and service quality. Marketing and entrepreneurial skills refer to the market-oriented view of some organisations into the network structure, taking into account the expectations of the other members.

The managers should pay attention to the network and its context and make the rational decisions considering the right perceptions of the internal and external environment and not taking decisions affected by own opinion and personality.

Collective-management capabilities consider the way that organisations meet the collective needs and work toward a collective vision. The collective learning about how to cooperate with others is a continuous process of experiences characterized by the network dynamic character. Five important responsibilities of network management are identified in this regard: accountability, legitimacy, conflict, design of governance and commitment. Moreover, it is important to distinguish between network managers and members responsibilities. Furthermore, three forms of network governance are identified: Self Governance (participant-governed networks), Lead Organisation (Organisation-governed networks), and Network Administrative Organisation.

In the analysis of **network governance** Lamprinopoulou (2009) takes into account the distinction between informal and formal governance. Informal governance is based on honesty, reciprocity and trust, which is considered a transformational outcome of the relationships.

In a network it is necessary to find equilibrium between both informal and formal governance mechanism, in the sense of regulating five important aspects present in an inter-organizational structure: 1) power distribution, 2) accountability and formality, 3) diffusion of information and knowledge, 4) resolution of conflict and trust building, and 5) monitoring, evaluation and planning. If these aspects are sufficiently regulated, network performance is enhanced.

Regarding the performance outcomes, Lamprinopoulou (2009) distinguishes between two types of positive results: economics and non-economics. Economics results refer to *transactional outcomes* consisting in “enhanced resource acquisition or gains in performance” (Human and Provan, 1997: 386). Economic results are divided in three categories: organisational credibility, access to resources, and financial performance.

Non-economics results refer to *transformational outcomes* and are defined as changes in the ways agents of network think and/or act (Human and Provan, 1997).

## 2. Methodology

### 2.1. Selection of the case study

The main goals of the present dissertation are to discuss networks for innovation in three main perspectives: i) characterising the configuration of the network, from the viewpoint of an innovative inter-organizational model within the context where is embedded, according to three dimensions: structure, content and dynamic; ii) analysing the evolution and performance outcomes and the extent to which they are influenced by contextual factors and network features and, iii) understanding whether networks for innovation are an effective strategic tool for sustainable rural development.

In order to select the case study, a set of criteria were defined: localisation, activity sector and scope. First, once that this research ultimately intends assess if networks are an important tool for rural development, the network case would have identified within this context. Second, according to definition of rural areas, the predominant sector of activity, and often the most feasible, is agriculture activity, therefore, we consider imperative to relate the case study with this second criteria. Lastly, being networks for innovation the investigation focus, the scope of the case study, would have to respect the parameters of what literature considers innovation.

In order to answer to the research questions, we adopted the *Lavradores de Feitoria Vinhos de Quinta, S.A.* (LDF) case, defining the unit of analysis of the research, as a collaborative structure of small producers. Considered an innovator organisational model, LDF tries to escape of the cooperative traditional model and to create a distinct model which allies the tradition and vanguard, associating in a harmonious way the profitable desire with a collaborative essence and the individual stability of the members constructed through the collective vision. The scope of LDF is mainly associated to the reach of critical dimension to operate in foreign markets. LDF network is localised within a very specific rural and agricultural context – Douro Demarcated Region – belonging to Trás-os-Montes and Alto Douro Region (NUT III), where the viticulture and winemaking economic activities are the most widely practiced. Currently, the Demarcated Region comprises 250.000 hectares (ha), of which nearly 45.000 ha relate to planted vines. It is localised a northeast of the country, along the Douro river in a 100km extension, since Barqueiros, in confluence of the Marão and Montemuro Mountain, up Barca D'Alva, in Spanish frontier (Magalhães, 2008).

Taking into account the theoretical framework, LDF case seemed to be a case it might be possible approach them in three different levels of analysis: at micro level, analysing the producers (actors of the network) features, behaviours and perspectives; at meso level, analysing the network as whole within the specific environment and finally at macro level, analysing the specific context factors that influence the network evolution. The apparent consolidation and good performance of LDF network seemed to us to be a valid starting point to relate adopted case with possible effects on rural development strategies.

## 2.2. Operationalizing the framework of analysis

To capture all dimensions of the adopted model (described in Section 1.4) and to understand how and whether networks can be an important strategic tool for rural development, this work resorted to qualitative methods, based on an in depth study of a network of wine producers, *Lavradores de Feitoria* (LDF). Table 3 describes the parallel between the frameworks developed and the questions made to the network's producers during the interviews.

**Table 3: Parallel between framework of analysis and the questions made during the interviews**

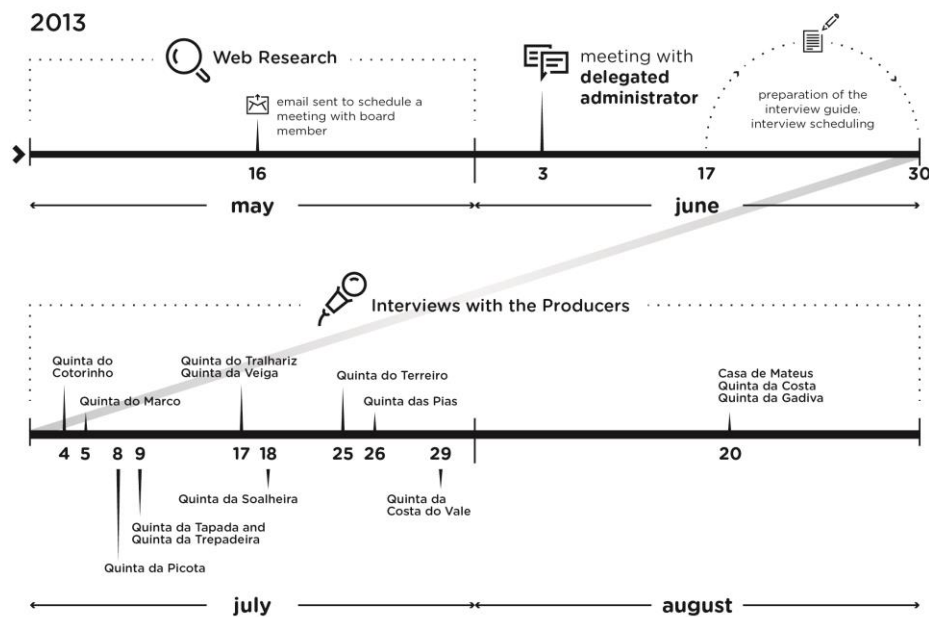
		Questions (the number depicted are those included in the questionnaire applied)
Context	Market conditions	<p><b>Description of members organisations</b></p> <p>1. Briefly describe you organisation' ( e.g. kind of products/services available, company location).</p> <p>3. Current competencies which provide competitive advantages to the organisation:</p> <ul style="list-style-type: none"> <li>▪ What organisational characteristics provide sustainable advantage?</li> <li>▪ What are the markets in which the organisation operates (what competitive factors and strategies of prices/costs/quality, presents in these markets?</li> <li>▪ Who are the customers of the organisation and how do you characterise them?</li> <li>▪ What determine/constitute the attitude of the organisation regarding the customers? What do you emphasise in the relationship with customers?</li> <li>▪ How many competitors does the organisation faces? What determines the attitude regarding them?</li> <li>▪ What are the substitute products existing and what is the impact they have in the organisational products?</li> <li>▪ To what level is the organisation product better positioned comparatively to the competition supply?</li> </ul>
	Social-cohesiveness	<p><b>Integration and interaction with Lavradores de Feitoria (LDF)</b></p> <p>7. How and why did your organisation integrated the LDF network?</p> <p>8. Main sources of information/advising/know-how about (established ties before and after integrating LDF network):</p> <ul style="list-style-type: none"> <li>▪ Markets</li> <li>▪ Certification processes</li> <li>▪ Technology</li> <li>▪ Legislation</li> <li>▪ Public/European Union initiatives</li> <li>▪ Innovative solutions related with production and marketing</li> <li>▪ Availability and capacity of human resources</li> <li>▪ Potential business partners</li> <li>▪ Capital sources</li> <li>▪ Training and education</li> </ul> <p>9. Regarding the established relationships with LDF network, please describe the following questions:</p> <ul style="list-style-type: none"> <li>▪ What is the process by which the organisation obtains information about LDF network?</li> <li>▪ What result do you expected of the LDF relationship, to you and to the other network actors?</li> <li>▪ What do you offer/invest to establish and maintain the relationship? How easy is it? In your vision, how important is each relationship for the organisation growth?</li> </ul> <p>10. Do you have any shared learning experience with other producers network and/or other entities? Please, describe it.</p>

(...)

		<b>Questions (the number depicted are those included in the questionnaire applied)</b>
	External institutional support	<p><b>Analysis of the factors which may influence the relation dynamic</b>            15. Does it exist or existed any external stimulus (e.g. incentives, obligations, initiatives) to consciously (intentionally) enhance relations with others, promoted by any public or private agency? Give us more details about it. (what, when, how have you been involved in these processes; Did you attend some training or project? What did you learn through these experiences?)</p>
Features	Member profile	<p><b>Organisation identity</b>            Localization            Dimension  <b>Description of members organisations</b>            4. Goals and futures plans of the organisation (emphasize the role of the LDF)  <b>Importance of cooperation and collective action</b>            5. Describe what does cooperation mean to you? Please give us more details and examples regarding this (definition, existence of some principles, how easy it is to establish a cooperation relationship, existence of some critical points in this proceeding?)            6. What may lead to a collective action in the business world? How?  <b>Analysis of the factors which may influence the relation dynamic</b>            12. According to your opinion, what can lead to changes on the organisation relationship with others? (any organisational change regarding to their needs/goals/strategies over time or any change in the organisation environment).            13. To what extent does your organisation try to stimulate or avoid those changes? Why?            14. What determines your attitude concerning the organisation relationship with others?</p>
	Members competences	<p><b>Organisation identity</b>            Role in the organisation            Complementary professional activities  <b>Description of members organisations</b>            1. Briefly describe your organisation? (e.g. foundation, history, kind of products/services available)            2. Internal organisation structure</p>
	Network governance structure	<p><b>Integration and interaction with Lavradores de Feitoria (LDF)</b>            9. Regarding to the established relationships with LDF network, please describe the following questions:  <ul style="list-style-type: none"> <li>▪ Are there any rules, proceedings or norms (written or not written) inside the inter-organisational relationship? What are those rules? Who defines them? Why? How you characterized them?</li> </ul> <b>Analysis of the factors which may influence the relation dynamic</b>            16. Have you been facing obstacles/problems in establishing/maintaining/breaking any kind of relationship with other entities? Please, give us more details regarding that.            17. How do you manage the conflicts with other organisations? Does it exist a mediator? Please, give us more details regarding that (what kind of conflict, how it was resolved, what was the mediator paper, how and why as that conflict influenced the inter-organisational relationship).            18. What can you suggest to improve your networking activity? Is there some issues/problems on which you are not sure about the way to resolve them? What kind of support you suggest that may be efficient?            19. Identify the characteristics of the relations established by your organisation, you consider being good and for that reason is important maintain it. Suggest how it can be done. Who must be responsible?            20. Identify the characteristics of the relations established by your organisation that you consider to be the "dark side" and for that reason is important to be recognized and minimized. How do you try to defend against negative aspects of a relationship?</p>
Performance outcomes	Transactional outcomes	<p><b>Evaluation of the impacts of LDF network and collective action in the organisation performance and local community</b>            21. Until today, how you characterize the results of the relationships derived from the LDF network, at level:  <ul style="list-style-type: none"> <li>▪ Financial performance</li> <li>▪ Sustainability facing a changeable environment</li> <li>▪ Management method, attitudes</li> <li>▪ Organisational structure of the company</li> <li>▪ Mode of operation</li> <li>▪ Innovation, quality improvement</li> <li>▪ Decision-making process</li> <li>▪ Conception and implementation of strategies</li> <li>▪ Consumers service</li> </ul>           22. Do they meet your expectations?</p>
	Transformational outcomes	<p><b>Evolution of the interaction between the organisation and the LDF network actors over time</b>            11. Over the time and after the integration in LDF network, have you registered changes regarding the relation with other companies/agencies/people, when compared with the past (before integrate the LDF), in particular at level of:  <ul style="list-style-type: none"> <li>▪ Type of organisations (producers, universities, technological centres)</li> <li>▪ Number of organisations</li> <li>▪ Type of shared resources</li> </ul>           23. Do you think/plan to make any change on the existent inter-organisational relationship?            24. How easy do you expect it to be?</p>

### 2.3. Data collection process

Data was gathered from three distinct sources of information. We started with a deep web search about the case, *Lavradores de Feitoria* (LDF), followed by a meeting with an element of the administration and lastly, in depth interviews to the grape producers, members of LDF. The process of data collection is depicted in Figure 9.



**Figure 9: Timeline of data collection process**

Source: Author

The web search was carried out during May 2013. From this research we obtained a starting base of information, which allowed us to formulate some queries and to obtain some answers regarding the structure, content and dynamic of the network. Thereby, it was possible to gather information about internal structure of the LDF, such as, board members, technical team and grape producers (network nodes); localization of the organisation headquarter, as well as the estates localization; economic activity, which products are available to the market and the main market in which LDF operates. In addition, this first search was useful to familiarize ourselves with the concept adopted by LDF and its main objectives. With the development of the research we realized that some web information was not updated, namely information related with network dynamics, as the case of producer members entries and exits.

In the 16<sup>th</sup> of May 2013 we sent an e-mail to *Lavradores de Feitoria* requesting a meeting with a board member and were greeted by the Delegated Administrator on the 3<sup>rd</sup> of June, in the organisation premises. The meeting was scheduled accordingly to the organisation availability. The reunion allowed us to consolidate and/or rectify some previously collected information and to register new one. Thus, in this stage of the research, we obtained further information regarding the organisation history and the initial and current business vision. They began to describe us how the idea of the LDF formation appeared and what were the main motivations to advance with the creation of the inter-organisational structure, the actors involved in the idea creation and development, how the LDF producers were selected, why the adoption of a public stock company model and the initially stipulated main goals. In relation to the business vision, a lot of information was provided. It was explained to us the wine production operation and how they ensured the drain of the producers grapes, what the main markets was at the beginning of the project and presently, and finally their own perception about the determinants to the development and sustainability of the network model, as well as their opinion about the possibility of the structure adopted by LDF, to be replicated in other sectors and regions. In addition, an updated list of the producers was also provided, alongside the respective contacts. In this way, we stayed with a general vision, from the view point of the administration, about the LDF's structure and operation.

Lastly, we began scheduling the interviews in late June, which begun on the 4<sup>th</sup> of July ending on the 20<sup>th</sup> of August. The logistics for conducting the interviews was organised accordingly to the estates localisation and producers availability. Figure 9 shows the date of the interviews by estates.

The interviews were made at the producers' residence and the duration of each ranged between 3 and a half and 4 hours. Despite some producers own more than one estate, the meeting happened in a single place. Table 4 presents producers, the estates and its localisation. The bold indicates the producers and locals where the interview occurred.

**Table 4: Producers, estates and localisations**

<b>Producers</b>	<b>Estates</b>	<b>Localisation</b>
<b>Antónia Patrício</b>	Quinta da Tapada	<b>Sabrosa</b>
<b>António Martins</b>	Quinta do Cotorinho	<b>Vila Real</b>
Aprigio Matias (heirs)	Quinta de Meruge	S. João da Pesqueira
<b>Benjamim Moutinho</b>	Quinta do Marco	<b>Alijó</b>
<b>Eurico Carrapatoso</b>	Quinta das Pias	<b>Sabrosa</b>
<b>Fernando Albuquerque</b>	Quinta da Costa das Aguaneiras	Sabrosa
	Casa de Mateus	<b>Vila Real</b>
	Quinta da Gadiva	Sabrosa
<b>Francisco Monteiro</b>	Quinta da Costa do Vale	<b>Régua</b>
<b>João Casimiro Coelho</b>	Quinta de Tralhariz	<b>Carrazeda de Ansiães</b>
	Quinta da Veiga	Carrazeda de Andiães
<b>José Joaquim Taveira</b>	Quinta do Terreiro	<b>Mesão Frio</b>
José Lacerda	Quinta da Estrada	Peso da Régua
José Meireles	Quinta da Mata de Baixo	Régua
<b>Manuel Sousa</b>	Quinta da Trepadeira	<b>Régua</b>
Maria Glória Moreira	Quinta da Formiga/Casa da Capela	Sabrosa
<b>Teresa Canavarro</b>	Quinta da Soalheira (Casa dos Barros)	<b>Sabrosa</b>
<b>Tomé Ribeiro</b>	Quinta da Picota	<b>Alijó</b>

The interview guide followed the framework of analysis providing an important supporting tool for gathering information related with features, context and the performance of the network. The parallel between the framework of analysis and the set of formulated questions was explained in the previous section (Section 2.2).

At the end of the process, 11 out of the 15 grape producers were interviewed; the remaining producers did not reply to the several contacts attempted (by phone and e-mail) or were not willing to receive us.

### 3. Empirical results

#### 3.1. Describing the *Lavradores de Feitoria (LDF)* network

As discussed in Chapter 1, the network analysis should be developed considering three main dimensions: structure, content and network dynamics. In this section, we introduce the case study according to the aforementioned dimensions.

##### 3.1.1. Structure

In the light of the literature, a network structure can be defined as a set of nodes (actors) that are connected to each other, through some type of relationship. Thereby, we will present *Lavradores de Feitoria* network starting from the referred concept.

*Lavradores de Feitoria Vinhos de Quinta, S.A.* is a public stock company (*Sociedade Anónima*, in Portuguese), directed to the production of Douro wine (blend and estate wine) composed by a set of Douro Demarcated Region grape producers (our analysis focuses on these actors) and other agents, which according to LDF's private and profitable character, integrate it but only as financial members. When created, one of its main objectives was to gather several small Douro estates owners in order to gain a minimum scale so it could target external markets. In this way, 15 grape producers were gathered, owners of 18 estates, with different sizes and localised along Douro Region.

Starting from the network concept above mentioned, the type of relations among the actors can be characterized accordingly to their nature, configuration, position on the value chain and spatial relations (Table 5).

**Table 5: The structure of LDF network: nature, configuration, position on value chain and spatial relations**

<b>Nature</b>	Formal	Informal
<b>Configuration</b>	Hierarchical	Non-hierarchical
<b>Position on the value chain</b>	Horizontal	Vertical
<b>Spatial relations</b>	Horizontal	Vertical

*Note:* Grey cells indicate the characteristics of LDF.

*Source:* Author's own interpretation.

##### *Nature*

Regarding to the nature of LDF network, it is considered to be a formal structure in the sense that there are pre-defined rules that guide the members behaviours and are formally accepted by all. These rules seek to regulate a range of situations, namely the functioning of the own structure of LDF as a business model, the establishment of the

annual prices of the grape, the entry of (new) actors, the methods of grape production (in terms of quality requirements) and the grape delivery. Each one of these situations is later discussed (in network content and dynamics characterization).

### ***Configuration***

Accordingly to the literature, if a dominant agent exists within a network this latter is classified as a hierarchical structure. This fact can be analysed by two points of view. By one hand, the LDF as a physical structure operates as the central actor, in which all productive (in terms of wine) and commercial activity depend on. Actually, a mutual dependence relationship between producers and LDF exists – producers guarantee the raw-material (grapes) assuring the necessary volume, in its turn LDF guarantee the production of quality wine and its viability in the marketplace. In this way, LDF has full autonomy to decide about the final product and the way to commercialise them, thus in these stage the producers lose the contact with the product. In order to achieve the established parameters of wine quality, the grape production is followed by the LDF technical team, guiding producers about production methods and treatments to apply during the year.

By the other hand, in an attempt to escape from the usual cooperative model, LDF adopted a public stock company model, so the higher the share of capital of a member, the greater it is that member's decision power. According to Olga Martins (Delegated Administrator), the administration tries to avoid these domain situations making producers in overall the main decision makers in the General Assembly since the majority of capital belongs to them.

### ***Position in the value chain***

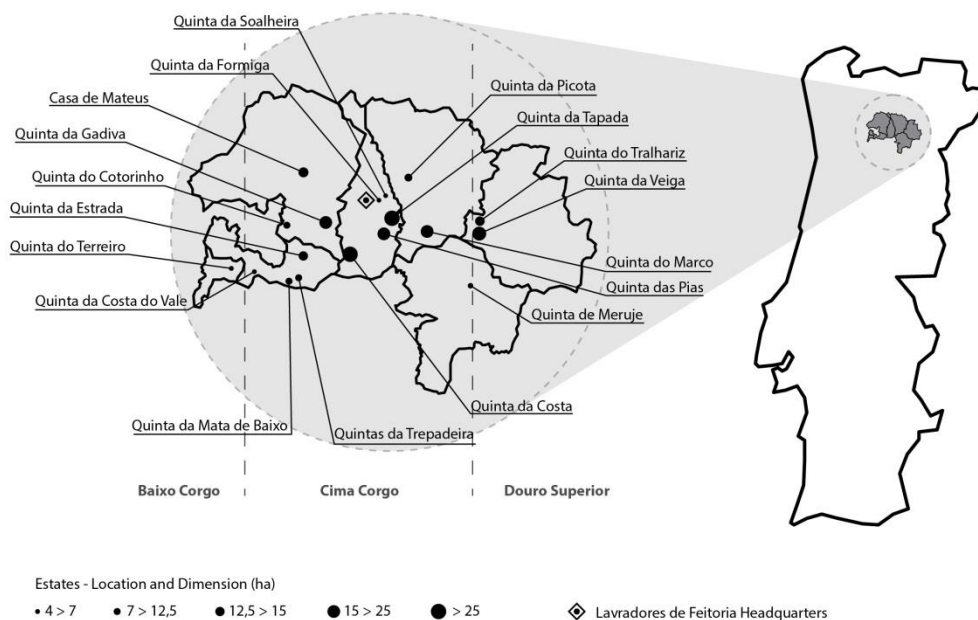
Concerning to the position in the value chain, according to the perspective of analysis, we can considered the network structure as horizontal or vertical. If we look at the relationship between LDF producers members, the conclusion is that we are facing a horizontal structure. However, if we consider the relation between LDF, as an entity within the network, and the producers members, then we have a vertical structure.

From the first relation, we verify that all producers are in the same stage of the production chain doing a similar activity. Their only activity is viticulture and thereby a horizontal linkage exists among these actors. From the relation between LDF and

producers we observe two different stages of production, on one hand the viticulture activity (producers) and on the other hand the winemaking activity (LDF). This interaction resembles to a relation between a supplier and costumer, hence it is classified as vertical relationship.

### *Spatial relations*

As suggested by Figure 10, we are facing a regional network, therefore we can classify it as a horizontal network. LDF and the estates are localised in Trás-os-Montes and Alto Douro Region, more specifically in Douro Demarcated Region – Alto Douro Vinhateiro, covering the entire region from the point of view of its three Sub-regions, Baixo Corgo, Cima Corgo and Douro Superior.



**Figure 10: Estates localisation**

*Source:* Author's own mapping through the ArcGIS platform

Taking into account that the network is focused in Douro wine production, the LDF considers this coverage an important 'trump-card'. Thus, given the specificity of each sub-region and the diversity of grape varieties, it is possible to obtain a high quality final product provided with complexity.

Globally the LDF structure comprises three distinct groups: the board, the technical team and the producers (this latter already identified – cf. Table 4). The elements that

constitute the board and the technical team are identified in the Table 6.

**Table 6: Board members and technical team of LDF**

<b>Board members</b>	
<b>Position</b>	<b>Members</b>
General Assembly President	António Barreto (Sociologist)
Board President	Fernando Albuquerque (President of Casa de Mateus Foundation and producer member of LDF)
Delegated Administrator	Olga Martins (LDF commercial director and Chief Executive Officer (CEO))
Administrator	Paulo Ruão (LDF Technical Director Enology)
Administrator	Eurico Carrapatoso (non-executive board member; Assistant Professor at Faculdade de Engenharia da Universidade do Porto (FEUP) and producer member of LDF)
Administrator	Dirk Niepoort (non-executive board member; Port and Douro wine producer - <i>Niepoort (Vinhos), S.A.</i> )
<b>Technical Team</b>	
Technical Director Enology	Paulo Ruão
Winemaker	Raul Pereira
Viticulture Manager	Margarida Martins

*Source:* Author

### 3.1.2. Content

The content of a network structure is closely related with what is exchanged among the actors and the goals from which the network was created.

The *LDF* project emerged from the collective effort of the individuals linked with Douro Region, who know the area and producers needs. These needs resulted from different difficulties shared by producers, namely in draining the product into the market, producers lack of capacity and resources (most notably, insufficient size and lack of specialized technicians), and inadequate functioning of existing wineries and cooperatives (low prices; late payments; no preservation of grape quality).

The concept developed by LDF involves an innovative management model that targets sustainability, associated with a kind of cooperative character. Summing-up, it allies vanguard with tradition. Although cooperation is at the core of this network, the business model is quite distinct from that of traditional cooperatives. Basically, LDF aims at assuring that all members wine production is sold but high quality requirements need to be previously assessed and guaranteed. Thus, LDF guarantees volume and quality (in order to achieve the adequate dimension to export), image promotion in

external markets, and the sharing of resources and knowledge.

According to Olga Martins, LDF network sustainability relies on the good relationship between existing members, transparency rules and their rigorous compliance, as demonstrated by the annual prices setting. Specifically, regarding this latter, prices are established according to the wine quality, which further motivates producers to enhance the quality of their vines. Grape harvesting and winemaking are done separately by each producer and then, after a blind-folded taste of wines, the prices are settled. Previously a month before grapes harvesting, the prices are proposed by the board and finally established in General Assembly encompassing all members.

Specifically the main goals underlying to the LDF network development were the creation of a 'tool' to bridge the small Douro producers needs and difficulties; improve the grapes which by the lack of quality were being wasted and through the cooperation, achieve the capacity (in terms of dimension – volume and quality) to operate in the marketplace, particularly in foreign markets, promoting and marketing a profitable product.

### **3.1.3. Dynamics**

As we reviewed in the literature section, the scholars highlight the importance of dynamics within the network structure analysis. The dynamics can be induced by the changing in the network actors, activity and resources. Therefore, we can characterize the LDF network as relatively inert.

In the first steps of the project, the contacts with potential network members (mainly producers) were quite informal. Several estates were contacted which in turn appointed other estates with who they maintained close relationships. By 2000, out of those contacted during 1999, 15 accepted to participate in the LDF network structure. Nowadays, the acceptance of new members goes through a highly selective process (namely based on vines analysis), so it may be possible to keep up with the quality standards required. Beyond this parameter, the entry of new members, implies the acquisition of the organisation shares.

Presently LDF is composed 15 producers which comprises 18 estates (cf. Table 7).

**Table 7: Producers and estates, network entries and exits**

Producers	Estates	Admission year	Exit year
Antónia Patrício	Quinta da Tapada	2002	
António Martins	Quinta do Cotorinho	2000	
Aprigio Matias (heirs)	Quinta de Meruge	2000	
Benjamim Moutinho	Quinta do Marco	2000	
Eurico Carrapatoso	Quinta das Pias	2000	
Fernando Albuquerque	Quinta da Costa das Aguaneiras Casa de Mateus Quinta da Gadiva	2000	
Francisco Monteiro	Quinta da Costa do Vale	2012	
João Casimiro Coelho	Quinta de Tralhariz Quinta da Veiga	2004	
José Joaquim Taveira	Quinta do Terreiro	2000	
José Lacerda	Quinta da Estrada	2000	
José Meireles	Quinta da Mata de Baixo	2000	
Manuel Sousa	Quinta da Trepadeira	2000	
Maria Adelaide Melo e Trigo	Quinta do Couquinho	2000	2003
Maria Glória Moreira	Quinta da Formiga/Casa da Capela	2011	
Rui Magalhães	Quinta da Paradeira de Cima	2000	2008
Sociedade Agrícola da Quinta da Sabordela, Lda	Quinta da Sabordela	2000	2012
Teresa Canavarro	Quinta da Soalheira (Casa dos Barros)	2000	
Tomé Ribeiro	Quinta da Picota	2000	

Source: Author

Over the period of 14 years (2003-2014) the network did not change much in terms of membership. From the initial members, only three producers - Quinta do Couquinho, Quinta da Paradeira de Cima, Quinta da Sabordela - quitted. Regarding to Quinta do Couquinho, in 2004 (harvesting of 2003) launched its own brand in the market, disassociating of the LDF. With respect to the Quinta da Paradeira de Cima and Quinta da Sabordela, the only information that we have is that both no longer deliver the grape production to the LDF.

Concerning to the LDF activity, since beginning the aim of LDF was to produce Douro quality wine. In this way, LDF had/has available two lines of products, estate wines and blend wines. The first is produced with the grapes harvested in the only one parcel. To this wine is given the name of the origin estate (e.g. Quinta da Gadiva). Blend wines are produced from the grapes of the several estates. Over the time, no changes were registered in terms of productive activity and commercialized products.

Lastly, the shared resources within the LDF network are basically at the level of

physical and technical (knowledge) resources. The LDF is not prepared with own wine-cellar, thereby every year the winemaking is made in some members premises, which provide the wine-cellars properly prepared. As already mentioned, the LDF guarantee the draining of the grapes of producers members, being this a fundamental resource. The grape delivery is made from the signed of a 10 years contract between members and LDF, where a parcel of vine is defined; there is a buying and selling obligation of that parcel. Concerning to the parcel contracted, the technical accompaniment is made by the winemaker and viticulture technician during the year. The technical team is common for all members.

### **3.2. Features, context and performance of *LDF* network**

Following the model presented in Section 1.4, and according to the information gathered through the producers interviews, in the present section we discuss the LDF network features, context and performance.

Recalling the basic assumption of the model, the network features are influenced by the context factors that simultaneously influence the network evolution (dynamics) and ultimately, both features and context stimulates the network performance outcomes.

#### **3.2.1. Features of LDF**

The analysis of the network features might be subdivided in the observation of three main segments: member profile (analyzing the diversity between network members, in terms of their physical and attitudinal traits), members competencies (referring to the competencies that can be shared among members), and network governance (regarding to formal or informal governance model).

From the analysis of these three segments, we conclude that despite the members are fairly homogeneous in terms of perspectives, goals and behaviours, the sharing of new ideas and skills is clearly reduced.

As identified in the literature, members profile can be analysed according to their physical profile, which are the observed attributes, and less visible attributes which we call attitudinal profile.

Starting by the physical profile, a low diversity was found in attributes such as, gender, location and professional activity. Regarding to gender, the members are mostly male; in terms of location, as we saw in Section 3.1 (Figure 10) all members are localised in

Douro Demarcated Region and lastly a large part of the members has (or had) a complementary professional activity. Concerning to the age and exploration dimension, a larger diversity was detected. The members age ranges between 40 and 83 years old and the farm size ranges between 6 and 75 hectares (ha), in terms of the parcels signed with LDF, and between 7 and 140 ha, in terms of total area (including vineyards and other crops).

The LDF members exhibit homogeneity in respect to attitudinal attributes. The awareness of cooperation importance is common and therefore cooperation or active action is seen as an efforts union to achieve better results, where the members share a common vision and goals and the existent rules are accepted by everyone. Cooperation is pointed as an instrument to survival, whereby is possible to obtain a better quality final product, larger scale and dimension and consequently a greater bargaining power; in organisational terms, it is a way to gain higher financial results, margins for investments, costs reduction and share of human and productive resources. In order to achieve these results, it is up to each individual producer to maximize the efforts in production, accepting the technical advices and the quality criteria of the LDF. To improve the productions, producers have resorted to the vineyard reconversion and mechanisation, enabling the increase of production and the reduction of related costs (e.g. labour costs).

Despite the members share the same vision about cooperation, there seems to be a contradictory attitude regarding to establishing relationships. As we will analyse in the context factors, beyond the good linkage with LDF, the members do not establish relations with the other members. The individualism of Douro producers is appointed as the main constraint to the development of new relations.

In terms of **member competencies**, it was found that its share and diversity is low. At this point a special attention is given to the production related capabilities, market and entrepreneurial skills and collective-management capabilities. The complementary professional activities of the members, do not relate with wine production and/or commercialisation, hence the members have permanent employees to treat the vineyards during the year, keeping a close relationship with LDF technical team. Thereby, incumbent to the LDF as central entity of the network, provide the members with sufficient skills in order to obtain a quality product. In this sense, the share of productive skills between members is almost inexistent. LDF is assigned with

marketing and entrepreneurial responsibilities, as well as, the role of Lead Organisation with collective-management competencies. According to producers, the members should present ideas and strategies in General Assembly, but it is the LDF responsibility, work the market in order to answer to the members expectations, “(...) *each producer endeavours to produce the better grapes and the LDF undertakes with production and commercialisation.*”.

In the analysis of **network governance structure**, we need to consider the equilibrium between formal and informal governance. Once more, the governance role is assigned to the LDF. Starting by formal governance, the actors indicate the existence of rules, namely concerning to the quality parameters, harvesting and price setting (including the wine quality classification – base, upper or extra). The rules are characterised as transparent and in a general way are not seen as an imposition, but as a method to achieve better results. Sometimes, small resistances situations arise, particularly related with price setting and quality classification. However, producers agree that the LDF administration has been efficient in the management of these situations. Thus, the resolution of the problems that punctually emerges is based in dialogue, trust and in the close collaboration between members and LDF administration and technical team.

Summing up, the informal governance is a fundamental part in the maintenance of the network relationships. The theoretical framework also indicates the importance of regulation of five essential aspects, which are: (1) power distribution, the members consider that this point can be enhanced, since a bigger decision power seems to be concentrated in a very restricted group; (2) accountability and formality, a 10 years contract is signed between members and LDF requiring the production delivery and thus ensuring sufficient dimension; a quality-reward system was implemented, producers are aware of the quality criteria and after the winemaking, each wine is classified as base, upper or extra and rewarded according to the assigned classification. In order to establish a quality standard among producers, LDF administration and technical team provide support (advice system) during the year. Furthermore, producers are also shareholders of the LDF, therefore they feel the responsibility from year to year to reach a bigger and better production once the financial results and the organisation sustainability also depend on it; (3) diffusion of information and knowledge, whenever an organisational change occur (e.g. entry/exit of producers) the members are informed, however a regular system of information diffusion could be implemented, keeping

members well-informed about the “organisation life” (e.g. sales and entry of the new markets). The relation between members should be further stimulated, with regular meetings beyond the two General Assembly, in order to exist an increased flow of knowledge and where the members could be themselves producers of knowledge; (4) resolution of conflict and trust building, about this point, the members considers that administration has had a fundamental role, the good relation, trust and the strong collaboration between LDF and members has been decisive in conflicts resolution, however and similarly to the previous aspect, the proximity relationships and trust building among members should be more stimulated by the administration side; lastly (5) monitoring, evaluation and planning, regarding to this aspect producers believe that LDF has done the possible to achieve satisfactory results for the whole group, monitoring each producer individually and introducing and openly discussing, in General Assembly, the annual LDF behaviours, actions (namely in the marketplace) and annual results.

Generally, despite some network aspect may need to be improved, the result is the existence of a equilibrium between formal and informal governance and the governance structure seems to be sufficient.

### **3.2.2. Context of LDF**

After the description of the network features, we now propose to examine the context factors which are capable, not only, to influence the features, but also the network dynamics. The adopted model of Lamprinopoulou (2009) highlights three main contextual factors: market conditions (specific markets and conditions in which individual organisations and the network operate), social cohesiveness (relations, interests and perceptions commonality) and external institutional support (political and institutional context in terms of public support available).

**Market conditions** are assessed through the identification of the products, competitors, customers and suppliers, time and territory, as well as the technological, productive and human resources, available to each producers individually as to the network as a whole. Concerning to the individuals organisations activity, the members are very similar. The crops are the vineyards, producing grapes to Douro wine (through the LDF network) and to Port Wine (maintaining a strictly commercial relationship with others winemaking entities) and, in some cases, the olive grove (mostly to olive oil homely

production). Producers drain the entire raw-material into the own Douro Demarcated Region. With regard to the grapes for Port Wine, is not difficult to drain the product, individually, they do not feel the pressure of the competitors, and in term of payments, it is more guaranteed and fair compared with the payments of the grape for Douro wine.

Presently, the production of grapes of Douro wine is totally sold to LDF network, by which initially it was paid a higher price regarding to the ruling prices in the market. Before the entrance in the network, the lack of individual dimension and resources to establish by themselves on the market, the difficulty in drain the grapes at a reasonable price (often by the lack of the product quality) and the late payments by the cooperatives and other wineries, were the most serious problems that producers faced.

To the view point of the network the analysis becomes more complex, on the one hand, by the existence of a segment of final consumers that differentiate between categories of products and, on the another hand, by the certification system as a pre-condition for market entry. The main product and market goals of LDF network are to produce high quality wine and the attainment of critical dimension to operate in the external markets. LDF operates in the market of Douro quality wine, DOC (Appellation of Controlled Origin) Douro, in this way all production is subjected to a certification process according to the national legislation, regulated by Port and Douro Wine Institute (IVDP) that passes by a sensorial and chemical analysis. The labels and packaging in the case of DOC Douro wine are also legislated and once that LDF network operates essentially in external market (around 65% of produced wine intended to foreign market, mainly European), it takes into account the relevant legislation of the European Union and destination countries. On the producers side, all vines should be legal (that is, producers should have detention of the plantation rights) and certified by IVDP as Appellation of Origin. Only that way, the grapes could be used in DOC Douro wine production. The members are aware that LDF struggles with a strong competition and therefore it is necessary a high effort at individual level, within the responsibilities that compete to each one, and at collective level.

Concerning to the technological, productive and human resources, the LDF is not provided with a wine-cellar, thereby resorts to the productive resources of some network members. After the winemaking process, on its own premises, they have the equipment to wine aging/storage, bottling, labelling and packaging. Regarding to the human resources, as we saw, LDF has a technical team (winemakers and viticulture technician)

which provide advice services to the network members. Apart from the technical team, which is common to all producers, each one individually, beyond the permanent employees, manages their own staff in pruning and harvest periods.

Analysed the **social-cohesiveness** factor, a lack of common social ties was noticeable. Notwithstanding, in fact the commonality in goals, values, beliefs, interests and perceptions was registered. The difficulty in grape draining, late and low payments and the bad functioning of Douro cooperatives were a common problem among members, thus these constraints were the core motivation to the network entrance. Generally, producers consider that the grapes were being underused and presently a bigger yield is possible to obtain through the same product. When approached about the relationships with the other network members and the own LDF, the answer was unanimous, relations of closeness between members are inexistent highlighting the difficulty in establish links among Douro producers, since these are typically closed. Actually, some linkages of acquaintances among members exist, but these are not in depth developed.

Regarding to relationship with LDF, the producers characterize them as fundamental partner to the market and as main source of information, advising and know-how in relation to innovative solutions related with production and marketing, “(...) *the LDF importance, beyond the production and commercialisation, is the viticulture advisement (...). Port Wine not much different the grapes quality.*”.

Annually, two meetings are scheduled (General Assembly) and in addition to these, few or none contact exist between members during the year. Although, clearly the pre-existing social-cohesiveness is low, LDF members acknowledge that the individual interests and goals must be abreast with the global ones, and that these latter and the global results must be prioritized. Therefore, is perceptible the sharing of the same cooperation sense among members. In conclusion, producers have common perspectives, goals and even problems, however the relationships between them, before and after the network entrance, remains scarce and almost unchanged.

Regarding to **external institutional support**, which according to the literature refers to the available public support at level of regional and national governments, a few individual encouragement was registered. The real stimulus that induced the producers to integrate the LDF network was the proposed attractive project, the possibility to guarantee a greater safety to the activity (ensuring the grapes draining) and

simultaneously a greater return of production. In addition, some producers recall the importance of the Spidouro, a public-private organisation created in order to promote the Douro and Trás-os-Montes enterprises and investments, at date already extinct, in the accompaniment of the LDF network creation. A large part of producers established a first contact with the project through the Spidouro elements.

### **3.2.3. Performance of LDF**

As we have seen in the literature, performance outcomes are divided in two types. Transactional outcomes, related with resources acquisition or performance gains, which accordingly to the model are associated to economic outcomes, evaluated through financial performance, access to resources and organizational credibility. On the other hand, transformational outcomes, concerning to actors changes in behaviors and thinking, resultant of the network participation.

Regarding **transactional outcomes**, currently the LDF ruling prices to the grape payments, are similar to the prices on the marketplace. This situation is not desirable for the producers and so they believe that when the present economic constraints are overcome, the results can be improved. Nonetheless, they still ensure the draining of the total product and its payment within the prices and dates agreed. LDF as a whole has been gathering a good reputation on the market, keeping a strong position in terms of image and brand, providing them credibility before suppliers, customers and competitors. LDF proves to be a consolidated organization, not only by the increase of business volume registered in the last years, but also by the way that has been ensure the buying of the grapes, reaching minimum scale to export and eliminating the previously problems experienced by producers. The LDF network has been shown decisive to producers in terms of financial performance (despite the expectations are not entirely reaching yet), sustainability facing a changeable environment and innovation and quality improvement.

**Transformational outcomes** are noticeable. Producers have been adjusted to the production needs (quantity and quality) and have been resorting to reconversion of the vineyards in order to obtain more quantity and better quality on production. A long-term linkage characterizes the LDF network, observing its stability in terms of actors' fixation. Network members feel motivated with project, considering it innovative and positive to the region promotion and development. The innovative character comes to

the innovative organizational model, characterized as pioneering in Douro region. Members are not only simple material-raw producers and suppliers, but also they are part of the organization, having an active voice, as financial investors.

Concerning the network, *“Unprecedented example in Douro, unprecedented and innovator character, is the prove that in Douro it is possible cooperate (...) the members have to consider that business is also your, for this propose there has to be personal financial investment.”*

In addition, the network is a source of knowledge too, through the LDF professional advice service it was possible to learn to produce higher quality grapes and apprehend new production methods more efficient.

### **3.3. Relation between features, context and performance of LDF network**

Until now, we have come to uncover the main insights related to the features, context and performance outcomes of the network case, following the theoretical framework aspects. In this section, we proceed to the analysis of the inter-relation, between different parameters of the model, taking into account the expected results and the founded ones. In the interest of simplifying the analysis, we begin by approach the outcomes, followed by network features, and finally the context factors.

The Lamprinopoulou (2009) model propose that performance, at transactional and transformational level, is reached or enhanced through the observation of a set of elements, which can constitute an leverage or a constraint to the network outcomes. As we saw in the previous section, LDF network has come to achieve positive performance results (cf. Table 8), at both transactional and transformational outcomes, as demonstrated by its organisational stability and consolidation on the marketplace.

Thus, the results derived from the LDF relationship meets the members expectations:

*“The results meet the expectations; however I consider that in a few years the organisation will have possibilities to provide more support to the members, particularly producer ones.”*

*“The results meet the objectives, but expected a little more. However given the economic context, I understand that the raw-material payments are low; when entering in the network, the expectation was that the payments kept above the market price”*

Identified the performance outcomes of the LDF network, and considering its positive impact to the network members and to the LDF functioning, we proceed to check if the model appointed elements are verified in the LDF case and how they influence the outcomes.

**Table 8: LDF identified performance outcomes**

Performance outcomes	Type of outcomes
<b>Transactional outcomes</b>	Dimension (in terms of production) and quality (allowing to operate mostly in the external market)
	Financial performance (individual and collective, however producers considered that this result can be improved in the near future);
	Sustainability facing a changing environment;
	Sharing of human resources; quality technical support, at advisement level (regarding to the production methods and accompaniment in vines reconversion);
	Sharing of productive resources (wine-cellar);
	Reputation in the marketplace, either by the quality products, either by recognised success of the organisational model;
<b>Transformational outcomes</b>	The main difficulties in the scope of producers activity were eliminated;
	Innovation (knowledge transfer – production methods more efficient);
	Quality enhancement (empowering producers through the competencies to the production of a high quality product);
	Sense of responsibility by producers, regarding to organisation success (members are not only producers and sellers, but also shareholders of the LDF organisation);
	Conception and implementation of strategies (members considered the collective within the individual decisions);

*Source:* Author's own interpretation based on direct data gathering and personal interviews with the network's members.

For the relation analysis, we consider the analytical perspective exposed on the literature. From the literature and according to Lamprinopoulou (2009) model, the features of the network must be observed on the member profile, member competencies and network governance point of view (cf. Table 9).

**Table 9: Features of network and model analytical perspective**

Features	Analytical perspective proposed by model	Outcomes impact
<b>Member profile</b>	Low diversity in both physical and attitudinal members profile;	+
<b>Member competencies</b>	Diversity of competencies between members namely production related capabilities, marketing and entrepreneurial skills alongside with collective management capabilities;	+
<b>Network governance</b>	Governance structure as a tool capable to regulating five key aspects: (1) power distribution; (2) accountability and formality; (3) diffusion of information and knowledge; (4) resolution of conflict and trust building, and (5) monitoring, evaluation and planning;	+

*Source:* Based on Lamprinopoulou (2009) model

Regarding to member profile, the model considered that a low diversity between member have a positive impact on the performance outcomes. Low diversity in members profile contributes to the relationship peacefulness. In relation to the member competencies, the model suggest that the existence of a sufficient range in members skills, namely at production, marketing and collective management level, according to their responsibilities, contribute positively to the network outcomes, making it more efficient and sustainable. At level of network governance, within the network must exist a mechanism capable to regulate the following five aspects: 1) power distribution; 2)

accountability and formality; 3) diffusion of information and knowledge; 4) resolution of conflict and trust building and 5) monitoring, evaluation and planning. If these aspects are sufficiently regulated, the performance is enhanced.

Concerning to members profile, it was found some diversity at physical attributes level, however, the attitudinal profile is identical. The model considers that low diversity on physical and attitudinal members profile reinforce the performance outcomes but, at the same time, constitute a constraint to the innovation, because it hinders the appearing of new ideas. In LDF case, it seems to exist a balance between the diversity in physical profile, which could stimulate the generational discussions and the promotion of some new and different ideas, and the attitudinal homogeneity that allows the share of knowledge, goals and perspectives in a friendly way. Thus, the outcome at transformational level is positive.

In terms of competencies, in order to the network outcomes may become more efficient and sustainable, the model indicates that it is expectable the coexistence of diversity in skills, that can be shared between members. The model, specifically highlights three main capabilities: (1) production related capabilities (the impact on relationship triggered by product quality); (2) marketing and entrepreneurial skills (market-oriented view, taking into account the expectations of the members) alongside with (3) collective management capabilities (the way that organisations meet the collective needs and work toward a collective vision).

In fact, it is the member responsibility the production of quality grapes, but the producers are accompanied by LDF technical team along the year, providing them with sufficient knowledge and competencies to produce a great product.

*“I considered more profitable the entrance in LDF, I didn't had capacity to commercialize, I wasn't paid; was a possibility to produce with better quality.”*

At the same time, producers are aware that the stability of the network also depends on the product quality; therefore members feel the duty of maximize the efforts in order to obtain an exceptional production. LDF is responsible to the conception of the final quality product, in order to answer to the market and members expectations. LDF is also accountable for the marketing and entrepreneurial related inquiries, as well as, the collective management.

*“Besides the production and commercialization, the LDF relationship is also important in terms of viticulture advisement.”*

Despite the low diversity in competencies between members are noticeable, sufficient capabilities are perceptible by LDF administration and technical team, which have been shared with members and therefore it allows the reaching of a good performance outcomes.

Finally, in network governance, we found a balance between formal and informal governance. In this way, according to the model, the structure of the network governance influences positively the network performance outcomes, namely the transformational ones. However, some of the five aspects (indicated in Table 10) in the network governance, must be enhanced.

**Table 10: Identified results regarding network features**

<b>Features</b>	<b>Identified results</b>
<b>Member profile</b>	Some diversity in physical attributes is perceptible (e.g. age and land size);
	Existence of homogeneity in attitudinal profile;
<b>Member competencies</b>	Low diversity in members competencies;
	Inexistence of competencies shared between members;
	Sharing of knowledge and skills between LDF administration/technical team and each one of the producers at productive level;
	The members are passive agents in terms of market exploration and strategies; to the LDF is assigned the market-oriented view;
	To LDF incumbent understand the producers interests and needs, defining strategies taking into account the collective and the network members expectations;
<b>Network governance</b>	Balance between formal and informal governance;
	Power distribution: a higher decision power seems to be centralised in an very restrict group, this situation have to be minimized, once is an inhibition factor to the members with low decision power (restricts communicative interventions);
	Accountability and formality: this point are regulated according to members expectations;
	Diffusion of information and knowledge: this aspect can be enhanced, the dissemination of relevant information and knowledge between LDF administration/technical team and producers individually is noble, however between producer is inexistent; share of productive problems and methods must be stimulated, even the share of productive resources (e.g. machinery);
	Resolution of conflict and trust building: on the one hand, LDF administration/technical team have been efficient in terms of collective management, therefore the conflicts have been simple situations which informal governance (trust and good relationship) has a fundamental role; on the other hand trust building among members must be stimulated, building closeness relationship between them;
	Monitoring, evaluation and planning: this point are regulated according to members expectations;
	Existence of a lead organisation (LDF), as central entity, responsible to manage the network structure as a whole;

Source: Author

Regarding context factors, let's explore its impact on network evolution and consequently on network features (Table 11). The results are demonstrated in Table 12.

The analytical perspective proposed by the model, starting to define different market conditions and in which circumstances they have a positive or negative impact on network evolution. The Existence of a segment of end-users that differentiate between categories of products, influences positively the evolution, once that motivates the development of quality products and brands; the existence of well-differentiated substitute products or imitations in market reinforce the collaboration sense and thus have a positive impact on network evolution; Existence of monopolies, on one hand, the model consider that this situation inhibits the collective action, so can have a negative effect on network evolution, on the other hand, is expected that the actors at a disadvantage position join to counterbalance the power concentration, promoting a positive impact on the network evolution; Existence of physical and technological constraints, this aspect can produce a positive or negative effect on network evolution. The positive consequences comes through the motivation to search new interactions with other organisations, real or virtual, in order to reduce the production and marketing related costs; the negative effect appear if tools to avoid opportunistic behaviours within the network structure, are inexistent or inefficient. The existence of a quality certification system as a pre-condition to the market entry have a positive impact in network evolution, because leads producers to search new integrations (e.g. cooperatives) as a way to respond to this specific market condition. Pre-existence of social cohesiveness, it's another context factor and contributes positively to the network evolution, in sense that the existence of common ties, beliefs and goals reinforces the stability of the collective structure. Finally, external institutional support, similarly to some market conditions, can have a positive or negative effect on network evolution. Has a positive effect as long as adequate funding and other supports are available in order to network development; the effect is negative if network structure depends almost exclusively on this supports.

Regarding market conditions, no situation was identified related with the existence of pressure by well-differentiated substitute products or imitations, existence of monopolies and existence of physical and technological constraints. Thus, our approach was limited to the existence of final consumers that differentiate the products and to quality certification system as a pre-condition for market entry. Both situations reveal to be important to the development of quality products and brands, reinforcing the network link. Considering the network stability and its consolidation on market, the results are in

accordance with the expected ones.

**Table 11: Context factors and model analytical perspective**

Context factors	Analytical perspective proposed by model	Impact
<b>Market Conditions</b>	Existence of a segment of final consumers that differentiate between categories of products;	+
	Existence of well-differentiated substitute products or imitations in market;	+
	Existence of monopolies;	+/-
	Existence of physical and technological constraints;	+/-
	Quality certification system as a pre-condition for market entry;	+
<b>Social Cohesiveness</b>	Pre-existence of common social ties, values, beliefs, goal, interests and perceptions between members, combined with the existence of a capable leader;	+
<b>External institutional support</b>	Public support available by regional and national governments;	+/-

Source: Based on Lamprinopoulou (2009) model

The absence of pre-existing social cohesiveness it is clear.

*“It’s difficult to stablish professional relations with other producers; there is no motivation to create new relations (...) the most important relationship is with LDF.”*

The model indicates that pre-existing social ties, common values, beliefs, goals, interests and perception between members, reinforce the emergence and stability of network relationship. In fact, the lack of common ties seems to be overcome and compensated by the existence of common goals and interests combined with the existence of a central entity capable to manage the maintenance of relationships in an efficient way. The existence of capable leader enables the diffusion of knowledge; the inexistence of deep relations between members, in our perception, generates a debilitated critical mass. Although the expected result was the existence of closeness linkage between the members, the current circumstances in which network operate seems to be sufficient to influence positively the network evolution and its harmonious functioning.

Regarding external institutional support factor, which is summarized by the political and institutional context, we do not consider it relevant to the analysis, since the network structure is totally autonomous, not depending on any public funding or other public support.

**Table 12: Identified results regarding context features**

<b>Context factors</b>	<b>Identified results</b>
<b>Market Conditions</b>	Existence of the final consumers willing to pay by the quality and particularity of the products;
	Existence of quality certification system to produce DOC Douro wine, at the level of vines and final product certification, as fundamental requisite to operate in the quality wine market;
<b>Social Cohesiveness</b>	Scarce nearness links between members by opposite to the existence of close relations between members and LDF administration/technical team;
	Existence of common beliefs, goals, interests and perception; the same problems, between members, get them to the seeking an solution through LDF network entrance;
	The lack of pre-existence social-cohesiveness in addition to the imbalanced power decision, generate a critical mass a little debilitated by producers side;
<b>External institutional support</b>	Not applicable;

Source: Author

## Conclusion

Over time many studies have come to approach networks from the point of view of relation between regional characteristics, creation and performance of the network structures in rural areas (e.g., Copus and Skuras, 2006; Virkkala, 2007; Isakesen and Osanger, 2010; Wang and Fang, 2012). They have also been studied as potential structures to eliminate the small producers' limitations or absence of knowledge and resources, allowing innovative answers against the challenges of global market (Spielman et al., 2009; Romeiro and Costa, 2010; Arora, 2012).

In diverse network approaches, many outcomes are listed, most notably innovative performance. This latter is commonly interpreted as a fundamental factor to the sustainability of small rural business (Hosseini et al., 2010), as well as, to the enhancement of farmers welfare and to rural innovation and development (Forsyth, 1995; Beckford and Barker, 2007; Wu, 2010; Hellin, 2012).

With the aim of contributing to the literature on this field, as well as to the regional development strategies, the purpose of this work was to provide empirical evidence on the role of networks for innovation in a rural context.

We considered a network as a multidimensional organisation, which can be characterised according to its structure, content and dynamics. We considered that the structure, evolution and performance of innovation network are influenced by a set of context factors and network features.

The empirical results allowed us to conclude that, although not all the context factors that influence positively the network evolution are verified in the case of *Lavradores de Feitoria* (LDF), and some features of the network do not convey the expectable results (according to the theoretical model), there are positive performance outcomes, namely in terms of innovative performance. The whole set of outcomes evidenced in the analysis – dimension and quality, financial performance, organisational sustainability, sharing of human and productive resources, reputation in the market place, answer to difficulties and needs of producers, innovation, quality enhancement, changes in the producers attitude regarding to their role within organisation – leads us to conceive the adoption of the structures of a network for innovation as a valuable strategic tool to sustainable rural development.

The analysis of the network structure, content and dynamics reinforces what the

literature conveys. The LDF network has functioned as a valuable tool to the small producers in the sense that it eliminated the previous problems such as the insufficiency of human resources (specialised technicians) and knowledge, the lack of quality, the difficulty in draining the grape production, the deficient payment system by cooperatives and other wineries and the absence of individual capacity to operate in the marketplace (lack of dimension). Thus, the LDF network stimulated farmer members to produce a high quality product, providing them with sufficient technical skills.

The LDF stand as case of a network for innovation, not only by its pioneering organisational model, within Douro Demarcated Region, but also by the capacity in, through knowledge transfer, transforming a previously wasted product due to the lack of quality (grapes) into a product full of market value potential. The innovation on the productive methods and processes became a prerequisite to respond properly to the changing requirements by consumers and markets, and contributed to the enhancement of the final product and its adaptation to the final market.

Thus, as suggested in literature, when we refer to the agriculture related sectors, innovation stands a key strategy to reach important goals, namely economic and social ones. The outcomes of the present study show us that this LDF network has contributed to rural development, boosting the economic sustainability of the small producers, generating a competitive and profitable product through collaborative relations and promoting the more traditional Douro Region sector in foreign markets.

Based on the above conclusions there is evidence to suggest that European Union (EU) rural development strategies, which usually includes the promotion of competitiveness of land-based activities (agriculture and forestry), environmental and rural areas improvement, and to promote better life quality in rural areas and incentive to rural economy diversification, should also increasingly rely on the promotion of collective actions, most notably the encouragement of network models in regional (or even local) development policy definition.

In fact, the Rural Development Program (PDR 2020, into effect between 2014-2020), which succeeds to the National Strategic Plan of Rural Development 2007-2013, recognizes a set of necessities of the national rural areas, particularly regarding innovation issues, new markets dynamics, diversification of economic activity, enhancement of the agriculture producers' empowerment and advisement, and the

promotion of farms restructuring. In order to respond to the necessities identified, it is expected that PDR 2020 attributes special importance to innovation related initiatives by (Gabinete de Planeamento e Políticas, 2014): financing, through the development of operational groups, linking several actors, namely agriculture producers, entities of R&D (e.g., universities) and others agents associated with local and regional development; transferring of knowledge, through the operationalization of agricultural advisement initiatives, as proximity services, specific to each sector and lastly, to prioritize initiatives developed by producers organisations, namely those related with investments in farms and with transformation and commercialisation of agricultural products.

Therefore, it seems to be primordial the approach and characterization of the organisational models that are able to face the existent constraints identified in rural development process and, simultaneously, to be replicated in other regions and sectors related with agriculture activity. In this context, the study of the LDF network might constitute a concrete example on how a network for innovation contributes to the regional development strategies.

The present study, however, displays some limitations. First, it comprises a single case study, localised in a very specific region – Demarcated Douro Region. It would be interesting to analyse similar networks in other regions (rural area) and other agriculture activity. This would permit to compare results and realize the extent to which rural development contributions happens in the same or distinct fashion. It would be equally interesting to undertake a comparative study with other organisational models, namely the traditional cooperatives model. Despite the limitations, the present work might be considered a relevant contribution to the field of networks for innovation in the rural development context, allowing to describe and understand the development and functioning of a network model in those specific areas.

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