Knowledge and innovation transfer via intermediary organizations in the agro-food value chain

Raffaele Dicecca

Università di Foggia
Dipartimento di Economia

Ciclo XXVIII
Dottorato di ricerca in Economia e diritto dell'ambiente, del territorio e del paesaggio.

Knowledge and innovation transfer via intermediary organizations in the agro-food value chain

Dottorando
Raffaele Dicecca

Docente tutor
Prof. Francesco Contò
Supervisor
Prof. Stefano Pascucci

Aprile 2016

Table of Contents

CHAPTER ONE

General Introduction

1.1 General Introduction

In recent decades, the agro-food sector faces many challenges such as, among others, volatility of food prices, global resource scarcity and climate change. Serious constraints to agricultural and rural development include weaknesses for farmers and local rural actors reacting at market fast-breaks and global changes. Global agricultural and rural warnings need to be tackled with a better organization between different actors and winking at how to trigger innovation process in agriculture. The growing focus on knowledge and innovation system in agriculture has emerged around important topic regarding the orchestration and facilitation of innovation processes as an opportunity to deal with global issues. Indeed, the facilitation and transfer of agricultural innovation and knowledge, has increasingly attracted attention between scientists but also practitioners under the 'agricultural extension studies' perspective, which represents a topic of interest in this thesis.

During the last 50 years, the way of thinking at agricultural innovation transfer has processed more than few step forward and acknowledged changes. The old fashioned technology transfer, in which agricultural stakeholders experienced a 'one-way-transfer' of knowledge and innovation from central and dominant institutions to 'sluggish laggers', it is long way past. The so-called 'linear model of innovation' (Leeuwis 2004, Klerkx et al. 2012, Hall et al. 2006) has been replaced by a more comprehensive process in which innovation adopters are seen as part of the institutional, societal, technological, organizational changes (Roling 1992, Hall 2005, World Bank 2012). This new perspective on (support of) agricultural development and innovation, implies a mutual dependency between different stakeholders, local actors or partners and traditional central institutions (innovation suppliers, research centers, public authority managers) and generates a co-evolutionary innovation process reinforcing the agricultural value chain and enhancing capabilities to assimilate changes. Facilitation and transfer of knowledge and innovation affecting the agro-food sector, is indicated also as a key strategy also for European Commission, which recognizes successful innovation processes as vital determinants for growth and development (World Bank 2006, EC 2012, Hartwich and Scheidegger 2010).

However, when local actors involved in the agro-food value chain have to meet innovation requirements, such as getting crucial information and training,

applying for resources or increasing links and networks with other key actors, often experience troubles. As matter of fact, farmers get hampered by different constraints that limit the adoption and assimilation of innovation processes. Among others, low level of education, inadequate farm size, unwillingness to collaboration, geographical dispersion and isolation, and insufficient competencies on how to organize innovation (Feder et al 1985, Besley and Case 1993), are some of the factors that hinder the assimilation of innovative process.

The introduction of intermediaries as broker in the knowledge and innovation provision and facilitation within the agricultural innovation system, can be a key-driver for the development of agricultural value chain. Literature on agricultural innovation and extension systems, has widely recognized that intermediary organizations (or specifically, in this book, innovation intermediaries) perform an important role in agricultural value chain (Howells 2006, Hardagon 2002, Bessant and Rush 1995, Winch and Courtney 2007). However, there is the need to review and adopt their role, contributing at further development on the academic literature on this field. As a result, this book frames role and function of intermediary organizations, from (i) smallholder farmers needs' view on intercepting innovation, (ii) explaining also changes in agro-food value chain they could introduce, and (iii) analysing potential of rural policies in fostering their functioning. In doing so, the following central objective is put forward in this book.

Main objective. To identify critical factors that innovation intermediaries introduce in the agro-food value chain to foster knowledge and innovation.

1.2 Research context. The importance of Innovation in agro-food sector

In recent years, there has been a profound change in view of demand and supply of innovation in general, but above all in agro-food sector. This thesis makes use of the OECD definition of innovation (OECD 2005, pag.46): "innovation is 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 organisation or external relations. Innovation activities are then all scientific, technological, organisational, financial and

commercial steps which actually lead to, or are intended to lead to, the implementation of innovations. Some innovation activities are themselves innovative, others are not novel activities but are necessary for the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation" (OECD, 2005, p. 47). Innovation is indicated as a key strategic element to tackle issues in market participation, and, more in general, to contribute to agricultural and rural development (European Commission 2013, 2014; World Bank 2006). Agricultural development demands, as well as depends on, innovation and innovation systems (OECD 2009). According to OECD (2009), innovation is widely recognized as a major source of improved productivity (Castellani et al. 2006; Malerba 2002), competitiveness (Clark and Guy 1998; Carneiro 2000; Cantwell 2005) and economic growth (Fagerberg et al. 2006; Aghion and Howitt 1990). It also plays a relevant role in creating jobs, generating income, alleviating poverty, and driving social development (OECD, 2009).

With regard to agriculture, one of the main problems is related to the dispersion and fragmentation of demand for innovation, which is poorly linked with the supply side. The primary sector suffers particularly from this structural weakness. Without proper horizontal and vertical integration it is particularly difficult to identify priorities related to the technological areas of intervention. Main causes of this structural issue are reflected of the fact that there is a low level of awareness among, above all, smallholder farmers, farmer associations and their representatives, insufficient factors to trigger innovation and no communication with the world of information. In the past, the effectiveness of advisory services, dissemination and training was also limited by the lack of farmer participation in their own farm management and, above all, to their direct involvement for collaboration. Agricultural innovation therefore is also translated in capturing new organizational patterns and innovative information flows. Combination of resources, particularly ideas, skills, information, different types of capabilities, inter organizational learning and knowledge, and/or specialized assets could trigger development at both farm and chain level. It is not only referred to product innovation but, as underlined in the OECD definition, agricultural innovation has to include new type of logistics, organizational structures and explore the market opportunities for cooperation with other stakeholders. Innovation in agriculture, therefore, has to be seen as a systemic mechanism that should involve the entire actors of the value chain.

According to the World Bank (2012, pag. 2) 'An innovation system is a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance' (World Bank 2006). The importance of addressing the multiplicity of actors and institutional factors in the process of innovation in the agro-food sector has become recognized since the 2000's under the 'Agricultural Innovation System' perspective (Klerkx et al.2012b, Hall et al. 2001, Spielman 2005). The AIS perspective goes beyond the development of research and technology as key ingredients for innovation (National Agricultural Research Systems, NARS, and Agricultural Knowledge and Information -later, Innovation- Systems AKIS, see Materia et al. 2014 for a better understanding) frameworks, recognizes that agricultural innovation does not consist in the mere adoption of new technologies introduced by the field of research and transferred to farmers but it requires a balance between new practices and alternative ways of organization, starting from the markets and creating a new distribution of the benefits. The AIS concept implies institutional changes, meanings that farmers and local actors are involved and embedded in innovation system and are, in somehow, influenced by the policy decisions processes.
From a value chain perspective, the key challenge is to link supply and demand in the most effective way, and knowledge and information sharing is very useful for enabling these different agricultural stakeholders' linkages.

1.3 The agricultural Knowledge and Innovation system and EU innovation rural policy

More recently, talking about the evolution of the concept related knowledge and innovation transfer, the idea of embed farmers, scientists and extensionists together collaborating in participatory research to create knowledge in agriculture, has further evolved (Materia et a, 2014, Klerkx and Leeuwis 2009). The Standing Committee on Agricultural Research (EU SCAR, 2012) opens the Agricultural knowledge system definition at the support of innovation, mainly due to the privatization of extension services system (not only research centre and public institutions as in the past but more and more private organizations)

and the need to include a participatory approach based on interactions between actors in agro-food actors, which overtakes the 'linear model of innovation' (previous paragraph). This change brings to the Agricultural Knowledge and Innovation System (AKIS) concept which integrates farmers, agricultural educators, researchers and intermediary organizations in the process of enhancing knowledge and information from various sources for better farming and improved livelihoods, as well as development in rural areas (Rivera et al. 2005, Knickel et al., 2009b). An AKIS should be able to propose and develop practical ideas to support innovation, knowledge transfer and information exchange (EU SCAR, 2012). Innovation policy needs to reflect the manner in which innovation actually occurs today: often through diffuse networks of actors who are not necessarily focused on traditional research and development. Policies related to innovation and innovation system could be therefore very complex. Diffusion and transfer of innovation may be responsibility of different subjects and different policies.

In recent years agricultural and rural innovation policies have increasingly been driven by multi-actor networks, which consist of combinations of stakeholders (knowledge actors, socio-economic actors, end users, policy actors). There are various forms of multi-actor networks: learning groups, marketing networks, producer consumer associations, communities of practice, innovation partnerships, multi-stakeholder consortia, innovation platforms etc. These networks are often formed outside the AKIS mechanism, especially in new areas of agricultural and rural activity, such as multifunctional farming, environmental technologies, rural services (EU SCAR, 2012). AKIS actors, research and educational institutions, regional and local governments and development agencies often get involved in these hybrid networks once they have developed to a certain point, become established and offer the potential for developing innovations (EU SCAR, 2012). More recently (since the 1990s, year of LEADER I) innovation also became an objective of regional development policy, particularly in rural areas, through the Leader programs, as well as in national policies (EU SCAR, 2012). The Leader approach (*Liaison entre actions de développement rural)* has attempted to analyse and promote the specificities and peculiarities of European rural areas with an innovative participatory approach based on 'community-based initiatives', 'participation', 'decentralization', 'partnership and collaboration' (Shortall 2008, Ray 2000). According with the Standing Committee on Agricultural Research, the approach is part of the "reorientation of the Common Agricultural Policy (CAP) and the

increasing importance of a wider rural policy agenda have significantly altered the overall context in which agriculture is practiced. The diversification of agricultural and rural activities has become a more important goal, which is embodied in the notion of the 'European Model of Agriculture' and explicitly supported by recent CAP reforms" (EU SCAR, pag. 36) The Rural Development Regulation for the period 2007-2013, used in this book to analyze factors that affect decision on activate innovation projects, establishes three visibly defined economic, environmental and territorial objectives of the CAP: agricultural restructuring, environmental concerns and the wider needs of rural areas.

1.4 Research objectives

The overall aim of this book is to fully understand the role and functioning of intermediary organizations and the implementation of factors affecting changing in the value chain. This central objective is translated into three research objectives, described below. On the basis of three consecutive objectives, we run into a descriptive analysis on innovation intermediaries, via specification about smallholder's constraints adopting knowledge and innovation, modification in the value chain and policy recommendation on rural innovation, making use of Leader approach, which is used as a specific case study for innovation intermediaries functioning. The first research objective, dealing with a literature review on intermediaries, forms the basis to understand the rest of the thesis, focusing on the facilitation and transfer of knowledge and innovation in the agro-food value chain.

Research objective 1
Regardless of the specific context, smallholder farmers deal with a number of so-called structural constrains, such as lack of information, weak financial capacity, and insufficient network-wide competences. Many studies have dealt with this topic in several institutional and socio-economic contexts, for example in transition countries such as European former communistic countries, or emerging and developing contexts, and, regionally speaking, mainly in South-East Asian, Latino-American, and Sub-Saharan countries. These studies mostly stress the impact of recent changes on agricultural systems and agro-food chains

(Swinnen 2009; Swinnen and Vandeplas 2010), and underline the importance of smallholders' market participation and innovation to foster development patterns (Barrett et al. 2007; Gomez et al. 2011; Reardon et al. 2009). Among others, innovation is indicated as a key strategic element to tackle issues in market participation, and, more in general, to contribute to (agricultural and rural) development (European Commission 2013, 2014; World Bank 2006).

More specifically, the introduction of innovation through intermediary organizations can be a key-driver for the development of smallholder farmers, and foster the adoption and diffusion of innovation, and ultimately allows them to play a role in market exchanges. However, smallholder farmers are affected by a very fragmented and disorganized supply chain, and face different constraints in accessing sources of innovation. The literature on intermediaries of innovation practices, analyses how they create collaborative links between different agro-food chain actors, and how they foster the adoption of innovation and knowledge in innovation system perspective.
To address these gaps, the following research objective is posed:

Research objective 1. To contribute at the further development of the academic literature on innovation intermediaries from an international-oriented agro-food chain perspective.

Research objective 2
The variety of innovation intermediaries is represented by diversified organizational forms, ranging from individual entrepreneurs, for example operating as innovation brokers or info-mediaries (Klerkx, L. and C. Leeuwis, 2008), to complex network-based organizations, such as public private partnerships. Although innovation processes through intermediary organizations are considered a key-driver for the development of smallholder farmers (Madzudzo, 2011; Poulton *et al*., 2010; Klerkx *et al*. 2012; Kilelu *et al*., 2013), the relationships between typologies of intermediary organizations and types of innovation processes and changes at value chain level are still under investigated. In dealing with value chain participation, what is particularly lacking is a clear conceptual understanding on how different types of intermediaries can 'provoke' changes in chain configurations via facilitating

innovation and development for smallholder farmers. Therefore, the following research objective is posed:

> *Research objective 2*. To develop a conceptual framework in which we identify relationships between challenges for smallholder farmers, needs for innovation intermediations, and effects in the reconfiguration at value chain level.

Research objective 3

The facilitation of innovation is not easily framed in a specific context, since in each area there could be different organizations that, even implicitly, accomplish the role of brokers of innovation in agricultural and rural area. Innovation facilitation and transfer activities are somehow already existing within the Italian agricultural innovation system. Producer organizations, local rural organizations, cooperatives, even NGOs are all types of actors involved in brokering innovation in Italian rural areas (Cristiano et al. 2014). Regulation in Rural development programmes stresses the need to stimulate innovation, particularly through implementing a new model of knowledge transfer in a more collaborative way. A potential application of facilitation of innovation processes in agro-food chain, could be mirrored in the use of LEADER approach (ENRD 2010, 2013). In order to understand the decision-making process behind the strategy and the selection of the priorities to be pursued in local rural areas, we investigate the role of Local Action Groups (LAGs) under the LEADER approach in the Italian context.

Not many studies have dealt with the potential of transfer of innovation processes that local action groups could drive in the rural development strategies. The majority of the analysis on rural development mostly stresses LAGs performance under operational lens (Oreszczyn et al. 2010, Katona-Kovacs 2011, Loizou et al. 2014), social and network analysis on the partnerships (Esparcia 2014, De rosa et al. 2008, Lazzarini et al. 2008), sociological aspects (Navarro et al. 2015, Sanchez-Zamora et al. 2014), and government issues (Falkowski 2011, Ramniceanu and Ackrill 2010, Wellbrock et al. 2013). To address these gaps, the following research objective is posed:

Research objective 3. To understand the factors that affect the decision to activate measures related to innovation, understanding the determinants behind the selection processes of policy measures implemented by Local Action Groups.

1.5 Research design and thesis setup

Chapters 2, 3 and 4 present three studies aiming to better explore the nature and the functioning of innovation intermediaries. After the selected works from the literature, theory building approach seems to be an appropriate way to investigate and understand the overall picture of these organizations. Particularly in the third chapter, we adopted an explorative multiple case research perspective. According to Eisenhardt and Graebner (2007), the explorative multiple case research, also known as phenomenon-driven case research, helps to tackle 'why' and 'how' questions (Yin, 2013), as well as supporting a deeper understanding of the studied phenomenon (Eisenhardt, 1989) and facilitating conceptualization at different levels of the analysis.

In Chapter two, we explore, as we said before, the nature of innovation intermediaries, making use of a broader documentation collected by desk analysis during the first years of the doctoral period. The literature helps to get different kind of intermediaries on the basis of more than 200 papers. These works were selected on the basis of several meetings with experts on selection of key words to use on traditional database of peer-reviewed literature. Specifically, at the first phase, we type: innovation, Intermediation, knowledge transfer, open innovation, intermediaries, innovation broker, and smallholder. Results were showing more than three thousand scientific works, so we further introduced the following key words: Agricultural Knowledge and innovation system and extension service.

Chapter three is based on 21 cases that have been selected and analysed based on a literature review of more than 110 papers dealing with innovation intermediaries and value chain participation of smallholder farmers. The *unit of analysis* is a case in which an intermediary organization has been used by smallholder farmers to tackle issues of innovation. We then reflect on whether

the interactions between the organization and farmers have provoked changes at value chain level. We are especially interested in whether different intermediary organizations, defined in terms of organizational features and functions, may lead farmers to different value chain participations, thus provoking different reconfigurations of the value chain. The selection of these cases permits to build a framework capable to identify different organizations in different areas and to assess the governance and changes.

The empirical analysis presented in chapter 4, defines the case of LEADER approach, by the use of Local Action Groups (LAGs), as potential innovation facilitator. To better understand the innovative support that LAGs give to local agro-food chain with the Leader approach, we used and analyzed two measures that are among the most directly connected with principles and practice of fostering innovation in rural areas and agro-food value chains, according to the Rural Development Programs of each regions (RPDs) (ENRD 2010, 2013). Particularly, the analysis focuses on decision to activate measures related to the modernization of farms (measure 121) and the diversification into non-agricultural activities (measure 311) which in turn facilitate two different typologies of innovation. The first is related to a more traditional approach to innovation and development, based on the acquisition of new technologies and infrastructure that aim at enhancing the productivity of local actors. Conversely, the second invites to innovate through a connection with the resources of local areas and involves the development of diverse entrepreneurial competencies. Both measures in our analysis are analyzed empirically to fully understand factors that affect the decision to activate them or not.
To collect data, all Italian 192 LAGs from 21 regions, were investigated. We make use of the data contained in the database 'GEOGAL'. The latter displays information on LEADER approach in Italy at national, regional, territorial level in different arguments: socio-economic characteristics of the territories, facilities, local development strategies and financial resources. The dataset is then enriched with others sources collected through desk analysis (from national institute of statistics) and concerning innovation rate, environmental certification, employment and unemployment rates, level of education in Italian regions. We build a two-stage Heckman model (Heckman 1979), in which we model both the probability that a LAG activated measures 121 and 311 according to their Local Development Strategy (LDS) and exploring factors we expect to influence the decision to activate (stage 1) and the final allocation of

funds on the specific measures (stage 2), making use of STATA for the econometrics procedures and get results.

General discussion, main conclusions and direction for further research are presented in Chapter 5.

Table 1.1 Thesis setup

Chapter 1	**General introduction**	
Chapter 2	An overview of the role of intermediaries to foster innovation for smallholder farmers in the agro-food sector.	Literature review
Chapter 3	Understanding the role of intermediary organizations to facilitate innovation processes in agro-food value chain.	Findings from cases on agro-food value chain changes
Chapter 4	The role of Local Action Groups to facilitate innovation processes in the Italian agro-food value chains: an empirical analysis on factors affecting the decision to activate innovative RDP measures.	Findings from an empirical analysis on Rural Development Policy
Chapter 5	**General discussion and conclusion**	

CHAPTER TWO

An overview of the role of intermediaries to foster innovation for smallholder farmers in the agro-food sector

2.1 Introduction

The agro-food sector faces rapid and fast-spreading challenges such as, to mention the most relevant ones, increased uncertainty due to rising of food price, resource scarcity, and climate change (World Bank 2012). In this context, smallholder farmers face several challenges in their attempt to participate in market exchanges. Participation in agro-food chains imposes a number of requirements, such as, amongst others, improving the coordination of information, participating in innovation processes, and improving risk management and quality control. Thus, even in contexts in which institutions are well established and supportive (i.e. in more developed economies), smallholder farmers find it increasingly difficult and costly, to participate in market exchanges (Barrett 2008; Barrett and Bellemare 2006). Ultimately, participation in agro-food chains requires effort and investment (Reardon et al. 2009). Regardless of the specific context, smallholder farmers deal with a number of so-called structural constrains, such as lack of information, weak financial capacity, and insufficient network-wide competences. Many studies have dealt with this topic in several institutional and socio-economic contexts, for example in transition countries such as European former communistic countries, or emerging and developing contexts, and, regionally speaking, mainly in South-East Asian, Latino-American, and Sub-Saharan countries. These studies mostly stress the impact of recent changes on agricultural systems and agro-food chains (Swinnen 2009; Swinnen and Vandeplas 2010), and underline the importance of smallholders' market participation and innovation to foster development patterns (Barrett et al. 2007; Gomez et al. 2011; Reardon et al. 2009). Among others, innovation is indicated as a key strategic element to tackle issues in market participation, and, more in general, to contribute to (agricultural and rural) development (European Commission 2013, 2014; World Bank 2006). Agricultural development demands, as well as depends on, innovation and innovation systems (OECD 2009). According to OECD (2009), innovation is widely recognized as a major source of improved productivity (Castellani et al. 2006; Malerba 2002), competitiveness (Clark and Guy 1998; Carneiro 2000; Cantwell 2005) and economic growth (Fagerberg et al. 2006; Aghion and Howitt 1990). Innovation also plays a relevant role in creating jobs, generating income, alleviating poverty, and driving social development (OECD, 2009).

While the role of innovation in agricultural development is almost unanimously recognised, what is still under investigation is exactly *how* the increase in complexity and uncertainty shapes the way actors (i.e. smallholder farmers) seek innovation (Leeuwis 2000; Davis 2013; Klerkx and Leeuwis 2009). Particularly as a reaction to new challenges, agricultural actors seem to be seeking more heterogeneous and tailor-made sources of innovation (Leeuwis 2000; Davis 2013; Klerkx and Leeuwis 2009). At the same time, innovation opportunities are being offered by a larger cohort of "suppliers", more and more embedded in a "market-like" system of incentives, mainly due to the privatization of public agricultural knowledge and innovation systems (AKIS) (Klerkx and Leeuwis 2009). This creates a shift from supply-driven to demand-driven knowledge and innovation provision. This shift then fosters the establishment of intermediary organizations which act as providers of knowledge in many different ways (Howells 2006; Hardagon 2002; Hertog 2000; Bessant and Rush 1995; Miles et al. 1995; Dalzier 2010).

More specifically, the introduction of innovation through intermediary organizations can be a key-driver for the development of smallholder farmers, and foster the adoption and diffusion of innovation, and ultimately allows them to play a role in market exchanges. However, smallholder farmers are affected by a very fragmented and disorganized supply chain, and face different constraints in accessing sources of innovation. While several papers have looked at how smallholder farmers are tackling this issue in specific socio-economic contexts, our research question focuses on the more general (and almost universal) role of innovation intermediaries in enabling smallholder farmers to alleviate constrains on development, regardless of context-specific considerations. By doing so, this work aims to contribute at the further development of the academic literature on innovation intermediaries from an international-oriented agro-food chain perspective.

The chapter starts by developing a conceptual framework in which we identify main characteristics and functions of innovation intermediaries. We review literature on intermediaries of innovation practices (Howells 2006; Winch and Courtney 2007; Bessant and Rush 1993; Freeman 1991), analyse how they create collaborative links between different agro-food chain actors (Batterink et al. 2010; Klerkx and Leeuwis 2008; Sarkar and Costa 2008), and how they foster the adoption of innovation and knowledge (Hall 2004; Lam 2004; Dosi, Silverberg and Orsenigo 1988; Feder and Umali 1993; Feder et al. 1985) in such innovation system perspective (Nelson 1993; Freeman 1995; Asheim and

Isaksen 2002; Lundvall et al. 2002; Todtling and Trippl 2005; Malerba 2002; Etzkowitz and Leydesdorff 2000; Cooke et al. 1997). Next, we focus on issues and challenges linked to smallholder farmers' participation in innovation processes, and how this consequently impacts their likelihood to participate agro-food chains and enhance development (Klerkx and Leeuwis 2009; Markelova et al. 2009). Then we classify intermediary organizations, identify the main development issues for farmers, and we proceed with their analysis and matching. Discussion and concluding remarks are presented in the last section of the chapter.

2.2 Conceptual framework

Intermediary organizations and the intermediation process in innovation have lately been studied in many different ways (Howells 2006; Hardagon 2002; Bessant and Rush 1995; Stankiewicz 1995; Lynn et al. 1996). It has become widely recognized that intermediary organizations (or specifically innovation intermediaries) run an important role in the system of innovation and transfer of knowledge at different levels, such as at the national system level (Lundvall 1992; Nelson 1993), regional level (Cooke et al. 2004), and sector level (Malerba 2002).

However, providing a unified definition of them is still not an easy task. Smedlund (2006, 210) defined intermediary organization as "an organization that functions in the midst of the users and producers of knowledge". Looking at them in more depth, a useful definition by Winch and Courtney (2007, 751) provides a comprehensive view of their 'third agent' characteristic: "an organization acting as a member of a number of actors in an industrial sector that is focused neither on the organization nor the implementation of innovations, but on enabling other organizations to innovate". Moreover, innovation intermediaries are organizations that could offer a "pure" private service, as highlighted by Hargadon, such as so-called knowledge brokers which are defined as agents that help innovative firms by combining existing technologies in new ways (Hargadon 2002). Often intermediaries are defined as private actors, such as the so-called Knowledge-Intensive Business Service, KIBS, in Den Hertog (2000) and Hargadon (2002), which operate between different domains or industries and "innovate by recognizing how knowledge learnt from working in a certain domain may be valuable to clients in another"

(Hardagon 2002, 46). Howells (2006) focuses his definition on intermediaries seen as organizations, in which intermediation is considered a process. His definition is related to a working prospective in which an innovation intermediary is "an organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties" (Howells 2006, 720). In literature, intermediaries are defined in many other ways: for example as "bridging organizations" (Sapsed et al. 2007), or "superstructure organizations" (Lynn et al. 1996), "boundary organizations" (Guston 1999), or "knowledge intermediaries" (Millar and Choi 2003). They all address intermediaries as different organizational structures, and focus on finding strengths and weaknesses of the networks in which they act. Many common aspects of innovation intermediaries have emerged, referring to their capacity to address the demand of innovation from farmers and other agro-food actors, and thus their capability of creating the right conditions for farmers to develop, and often acting as coordinators/facilitators of the Agricultural Knowledge Innovation System.

From all contributions, the perspective we adopt in this work takes Howell's definition into account, and particularly focus on how intermediaries could facilitate and foster innovative interventions for smallholder farmers, acting as brokers for agricultural development. More than other target groups, smallholder farmers might lack resources to participate in innovation processes and thus are the ones who benefit the most from support to create collaborations with supply chain stakeholders that are primarily involved in innovation processes. Moreover, innovation intermediaries' functions might prove to be useful tools to tackle the disaggregation and fragmentation of the agro-food supply chain. In this section we further explore the characteristics of these intermediary organizations and how they can help and face the farmers' challenges. The first step of the analysis deals with the main conceptual elements useful to classify different sets of intermediary organizations. Then, in order to understand how to support development processes through innovative actions, we proceed listing the problems that affect smallholder farmers. We particularly focus on three characteristics of intermediary organizations and namely the different types of functions they are concerned with, their legal status and length of their intervention/actions.

2.3 Intermediary features and challenges for smallholder farmers

Intermediaries' characteristics

Different types of functions

Scholars have found different functions of specific intermediary organizations or types of intermediation (Watkins and Horley 1986; Mantel and Rosegger 1987; Aldrich and von Glinow 1992; Shohert and Prevezer 1996; Hargadon 1998; Cash 2001; Millar and Choi 2003; Burt 2004; Howells 2006; Johnson 2008). After a broad review, we classified the functions into three categories: i) 'linking role' functions; ii) 'idea transformation and development' functions, and; iii) 'knowledge transfer' functions (Howells 2006) (see also Table 2.1)[1]. The linking role functions enclose and reinforce all activities in which the organization plays a primary role in providing information and translating this information into directly applicable knowledge for farmers. This is demonstrated in Howells (2006), who indicates communication and the gathering and scanning of information as the main functions for an intermediary organization. Such intermediary functions can include: helping to find potential collaborator(s) (Klerkx and Leeuwis 2008); helping to get advice, funding, and support for the innovation activities (Howells 2006); and reinforcing previous collaborations with other organizations. Through these activities, organizations are facilitators of diffusion of innovations in a broadcast mode, reducing risk for adopters, acting as innovation broker (Winch and Courtney 2007). With the idea transformation and development functions, the intermediary organizations are seen as developers, transforming ideas into innovation and solving (unique/peculiar) problems through means of consultancy. The intermediary organizations that deal with these functions could be research organizations, research consortia, and technology development industries that apply their products in different and/or several disciplines or sectors. The kinds of activities related to this function are well explained in Dalzier (2010). They include facilitating access to expertise and equipment (Howells 2006; Mian 1996), development of standards, testing and validation of new technologies (Grindley et al. 1994; McEvily and Zaheer 1999), adapting technologies for alternate applications (Mazzoleni and Nelson 2007; Bessant and Rush 1995), and intellectual property management (Dalzier 2010).

[1] See Leewis and Aarts, 2011 for a brief overview of the role of communication in innovation processes

The last category of functions refers to knowledge transfer including networking and developing activities, and it is complementary to the first two, (Klerkx and Leeuwis 2008, 2009; Howells 2006; Winch and Courtney 2007). Bessant and Rush (1995, 100) emphasise the role of intermediaries as actors facilitating knowledge transfer "to assist and advice firms, effectively to compensate for a lack of capabilities". In this perspective, consultants (seen as bridge builders) are like bees, and function to facilitate cross-pollination between firms, carrying experiences from one location to another (Bessant and Rush 1995) even between different markets or industries.

Table 2.1 Elements for intermediaries' classification.

Elements	Functions	Intermediaries type
Different types of activities	Linking role	Gather and provide information, communication, collaboration and support: Facilitator, Orchestrator (Howells 2006; Klerkx and Leeuwis 2008; Winch and Courtney 2007)
	Transforming and developing ideas	Developer (Dalzier 2010)
	Knowledge transfer	Bridge Builders, Consultants (Bessant and Rush 1995; Hardagon 1998)
Legal status	Public	National or regional institutions, academic institutions (Triple Helix model Etzokowitz and Leydesdorff 2000) or innovation communities (Fichter 2009)
	Private	Private research Organisms, Private Consultants, Firms (Hertog 2000; Hardagon 2002)
	Public-Private Partnership	Hybrid Organizations, PPPs (Hartwich and Tola 2007; Spielman et al. 2007)
Length or duration	Temporary	Projects, Platform
	Permanent	Long-term Consortia, Businesses

Source: Our elaboration

Legal Status

The legal status of the intermediary organizations is another key aspect. Already recognized as a crucial topic by many authors (see for example Winch and Courtney 2007; Bessant and Rush 2006; Klerxk and Leeuwis 2008, 2008b, 2009b) we will define them in three different ways: public, private, or public-private partnership. In this case the question is to figure out which actors are involved in the ownership of the innovation intermediaries. For example, donors or shareholders can modify the scope and purpose of an intermediary organization (Klerkx and Leeuwis, 2008a). A public organization refers to a national or regional institution. These can be either academic institutions such as universities as indicated in the Etzkowitz and Leydesdorff (2000) Triple Helix Model, or public innovation communities (Fichter 2009) or somebody who can enable collective action, such as agricultural extension agencies (Chowdhury et al. 2014; Rivera 2011, Hellin 2012). A private intermediary organization, on contrary, is owned or controlled by private actors, which are organizations centred on private research, or consultants or firms that offer knowledge services (Den Hertog 2000; Hargadon 2002). In other cases, we observe a mixture of the first two, often defined as public-private partnership (PPP). PPP is a hybrid organization which combines different ownership elements. According to various studies (Hartwich and Tola 2007; Spielman et al. 2007; Klijn and Teisman 2010), partnerships can be seen as "cooperative arrangements between two or more institutions of the public and the private sector which involve shared ownership and responsibility, joint investment, shared risk taking and mutual benefit" (Hartwich and Tola 2007, 242). PPPs exploit capacities, skills and resources across public and private sectors, facilitating exchanges of knowledge and technology between them that reduce transaction costs (Spielman et al. 2007). Benefits and costs are shared and can take different forms, both from the innovation process perspective (for public actors: increasing agricultural production and productivity, and employment opportunities and food supply for local markets; for private actors: development of new products, cost reduction, etc.), and from the partnering perspective (joint learning and complementary funding for both partners) (Hartwich and Tola 2007). Others common benefits for participating actors (both public and private) can be material/financial ones (i.e. profits, working space), or more intangible, for example related to reputation and/or general knowledge development.

Nevertheless, the key aspect in PPPs is represented by the added value of synergy, i.e. "being able to develop a product with characteristics that would not

have been available without a public-private partnership" (Klijn and Teisman 2010, 137). PPPs in agricultural research and development could be a great bridge to reduce gaps between developing new technologies and deploying new products for the benefit of small-scale farmers. It remains to be seen whether they promote innovative research and foster the brokering of knowledge, and whether they enhance smallholder developments. The organizational identity is therefore a critical topic. Howells puts his intermediaries in a central position (and thus close to the traditional function of intermediary organizations, i.e. contract research and technical service) in the network in which they act. Van Lente et al. (2003), conversely, make a separation between traditional innovation intermediaries (sources or carriers of innovation) and 'new' innovation intermediaries which fulfil an independent systemic role and add more to facilitation of innovation (Klerkx and Leeuwis 2009).

Length or duration

The final element of the classification of the intermediary organizations, relates to the length of the intermediation. We consider it to be very relevant to distinguish between a permanent intermediation and a more temporary-based one, as well as distinguishing between short and long horizon intermediation (see also Klerkx and Leeuwis 2008). Innovation intermediaries can be involved in long-term processes and engage structural changes with a relatively extended time horizon. However, most of the time, innovation intermediaries have short, or even spot, interactions with farmers. This is particularly evident in processes of privatization of intermediaries' services, mostly depending on the type of legal status of the intermediary organization, in particular on the degree of private actors' involvement. Depending on the institutional structure (i.e. public or private, start-up or existing organization), an intermediary organization is focused on different goals and objectives, with a substantial difference in terms of time horizon. Bessant and Rush (1995, 113) clearly refer to the innovation intermediaries as playing a "missionary work" when they have public support, which "needs to be recognized as a long term education and development process rather than a short-term consultancy, and subsidized as part of infrastructure development within industrial policy". Also Klerkx and Leeuwis (2008), referring to the time horizon as a policy instrument, highlight the more continuous nature of innovation intermediaries. Particularly, they highlight how innovation and knowledge transfer interactions and exchanges need constant adaptation to assist farmers in dealing with continuous change. However the

debate around the role of same thing of innovation intermediation and its effect of farmers' development is not unanimous and unambiguous. On one hand, scholars have emphasise that a long-term innovative brokerage activity seems to more likely foster smallholder farmers' development and creates the proper (institutional and social) environment for agricultural networking. On the other hand, a short-term oriented intermediation is requested to tackle certain (fast-spreading) innovation gaps for smallholder farmers, thus pushing for the development of more consultancy and advisory oriented activities.

Issues and challenges of development for smallholder farmers

The agro-food sector is rapidly and forcedly changing. The United Nations forecast that the global population will grow to over 9 billion by 2050. To feed everyone, food production will have to increase by 70 per cent (OECD 2009). Moreover, the agricultural sector is strongly affected by climate change due to its freshwater use of 80 per cent of availability (World Bank 2012). Generally, environmental and societal crises required a radical change into a new agro-food production system to deal with these challenges (Leeuwis 2000). Many of the world's poor belong to agriculturally based rural households. In this context, it is necessary that attempts to reduce global poverty focus on smallholder agriculture.

Scholars' attention for analysing interrelations between agricultural and developmental challenges is not new. Recently, the role of agriculture in tackling fundamental development issues, such as poverty reduction and economic growth, has attracted a lot of renewed attention (World Bank, 2012). The 2008 World Development Report identifies agriculture as a vital development tool for achieving the Millennium Development Goal of halving the number of people suffering from extreme poverty and hunger by 2015 (World Bank 2006). Other studies stress the importance of supporting both wider as well as fairer participation of agricultural actors (i.e. farmers) in agro-food value chains.

This work deals with better development of smallholder farmers. As Shiferaw et al. (2009) state, smallholder farmers are typically and often referred to as farm-households. They could be easily influenced by several inter-connected factors, both on the demand, as well as on the supply side (Shiferaw et al. 2009). There is increasing recognition of the fact that the opportunities for smallholders to raise their incomes from agricultural production, and so working on their

development, depends on their ability to add special value to the agro-food chain and how successfully they participate in markets (Markelova et al. 2009). However, smallholder farmers run into difficulties as operating under imperfect information and market conditions impedes their decision making capabilities for investment or production (Shiferaw et al. 2009). Added to this, the economic and environmental crisis called for a shift from the so-called 'homogenous agriculture' (Klerkx and Leeuwis 2009), in which farmers could produce abundant quantities of various crops, to a 'selected agricultural production', in which tailor-made knowledge is required due to the multifunctionality of agriculture, see also Knickel et al. (2009). The demand for higher value and more processed food products has grown worldwide (Gehlhar and Regmi 2005). In a study on a global food analysis, Costa and Jongen (2006), argue that socio-economic and technological developments have unleashed the need for a change in the agricultural and food industry sectors' orientation from production to market. Farmers meet various barriers when trying to find the right market position (Narrod et al. 2009), which requires them to transform and readjust their organization and production, taking into account new ways to develop strategies or improve existing ones.

As a matter of fact, the World Bank (2006) considers the adoption of innovation a key strategy for facing and reinforcing the agricultural value chain. Innovation and the successful introduction of new knowledge and technologies in productive processes has become a key determinant for growth and development in today's rapidly modernizing societies (Hartwich and Scheidegger 2010; Contó, Fiore and La Sala 2013). However, handling innovation processes remain a challenge for many farmers, especially the small ones. Kilelu et al. (2011), referring to the smallholder farmers' awareness to evolve demand-driven agricultural innovation, put a lot of emphasis on their necessity to build capacities for innovation strategies and participation in agricultural value chains. Furthermore, smallholder farmers encounter difficulties when adopting on innovations (Rosemberg 1976; Hall 2004), regardless of the type it may refer to (new or improved products, processes, marketing methods, or organizational methods; see the OSLO Manual definition of innovation for a deepest comprehension, OECD 2005). In recent years, however, attention is increasingly paid to the ties between agricultural knowledge and innovation system perspectives (Nelson 1993; Freeman 1995; Asheim and Isaksen 2002; Lundvall et al. 2002; Todtling and Trippl 2005) that bring on so-called 'extension agriculture' (Faure et al. 2012; Christoplos 2010;

Moumouni et al. 2009; Muyanga and Jayne 2008). According to Davis (2013), "many governments have been prompted to review agro-food innovation systems and policies; and in some cases to introduce changes to make systems more efficient and effective in creating and diffusing innovations within agro-food sectors". An extension of agricultural knowledge connected with an organised innovation system (Spielman 2005; World Bank 2006; Rivera 2000), could help spread the adoption of innovation, especially for small farmers (also through the so-called 'participatory approach', as put forward in Abebe et al. (2012)). However, a highly fragmented and disorganized supply chain hampers the farmers' development.

The main constraints that limit the adoption of innovation by the smallholder farmers (wide body of literature by Feder, Just and Zilberman (1985), or Besley and Case (1993)) can involve different factors: lack of credit (Hazarika and Alwang 2003; Shah et al. 2002; Freeman et al. 1998; Jaine et al. 2004), limited access to information (Shepherd 2007; Gereffi et al. 2005), aversion to risk and resource allocation (Wolgin 1975; Dillon and Anderson 1971; Marra et al. 2003; Sunding and Zilberman 2000), bad communication in adoption of innovation (Leeuwis and Aarts 2011; Sulaiman et al. 2012; Sseguya et al. 2012), inadequate farm size (Fernandez-Cornejo et al. 2002; Fan and Chan-Kang 2005), inadequate incentives associated with farm tenure arrangements, insufficient human capital or low educational levels (Bingen et al. 2003), absence of equipment to relieve labour shortages (Alwang and Siegel 1999), chaotic supply of complementary inputs (such as seed, chemicals, fertilizers and water), geographic dispersion and inappropriate transportation infrastructure (Feder et al. 1985; Feder and Umali 1993; Ruijs at al. 2004; Miehlbradt and MacVay 2005), and reluctance to collaboration within innovation process (Narrod et al. 2009; Hellin et al. 2009; Markalova et al. 2009). Moreover, other barriers to agro-food innovation emerge because of a lack of concrete knowledge on how to organize the innovation process (Costa and Jongen 2006), economic considerations, and insufficient competences (Batterink et al. 2010). In the next section, we will examine three of the abovementioned constraints in detail: limited access to information, lack of credit and resource allocation, and low availability to collaboration within farmers network, as these fit well within the/our analysis on increased development in the sector.

The main research question of this chapter is related to understanding how intermediary brokers can support smallholder farmers in tackling innovation implementation challenges. More specifically, we want to conceptually

investigate how intermediaries support smallholder farmers in the process of adoption and diffusion of innovation, thereby increasing their development standards. With this aim in this section, we focus on a possible classification of innovation intermediaries based on a literature review in which we connect intermediaries' features and their impact on smallholder farmers' innovation and development.

Intermediaries' classification

We first focus on classifying intermediaries and sketching three different types of intermediary organizations (Table 2.2).

Table 2.2 Main functions of intermediary organizations.

	Main Functions	**Legal status**	**Duration**
Single Consultants	Transforms and develops idea; Information gatherer; Provider of technological skills.	Private	Short time
Knowledge Transfer Organizations	Transfers knowledge and supports new ideas; Bridges between different sectors.	Public or Hybrid	Long time horizon
Broker Organizations	Linking role as Facilitator and embedded agricultural network system; Creates collaboration between farmers.	Private or Hybrid	Medium-long term

Source: Our elaboration

- ***Single Consultants***: in this category, intermediaries' main activity is to transform and develop ideas, which basically entails performing consultational functions. They mainly have a private legal status, and are viewed as bridge builders (Bessant and Rush 1995) between the agro-food-chain stakeholders. Single consultants could operate for short time spans, bringing great results in the identification of innovation

processes. They can offer specific technological or non-technological competences, and they are often involved in interaction processes providing information and services. They cover the gap between useful knowledge requirements and the smallholder farmers' needs.

- ***Knowledge Transfer Organizations***: these kinds of intermediaries refer mostly to industrial sectors and include actors from across different networks. According to Hargadon (2002) and Hertog (2000), they act as an organization, performing all the activities identified in the second chapter. They provide and gather information, build collaborations between different actors in the chain, connect demand and supply for services to support innovation, develop and transform innovative ideas, and also work as knowledge transfer facilitators. They are also oriented to long-run interactions and activities. Examples of such intermediaries include national institutions, university liaison departments, regional technology centres, public innovation agencies, innovation platform, and long-term consortia.
- ***Broker organizations***: this category includes all traditional intermediary organizations, named in many different ways by researchers: third parties, innovation brokers, bridging organizations, technology transfer intermediaries, boundary organizations etc. (Howells 2005; Winch and Courtney 2007; Hargadon 1998). Their main activities usually concern their "linking role" as facilitator of embedding agricultural system networks and helping to create trust in the adoption of innovations for farmers. They have a strong impact on the development of the innovation processes, which could last for a medium- to long-term period. They usually refer to a private structure, or hybrid organizations (PPPs typically act as broker organizations), but their nature has not yet been specifically identified in literature.

Analysis of smallholder farmers' challenges to innovate

We focus on challenges faced by smallholder farmers when it comes to adopting innovations. Particularly we emphasise the role of information availability, lack of capital, and reluctance to network.

1. In our analysis, farmers have **limited access to information** mainly due to the disorganization within the agricultural chain. Several sources of information can be identified such as exposure to mass media, level of education, acquiring knowledge through travels or so-called 'absorptive

capabilities' (Hartwich and Scheidegger 2010), i.e. the ability to search for useful information and to use that information in productive processes. The exploration and exploitation of knowledge through information flows are key aspects, especially in weak networks, in which it is essential to find available technology. Furthermore, referring to the optimal cultivation strategy for farmers, Key and Runsten (1999) stress the importance of the research of information in smallholder farmers' networks for applying efficient production methods (i.e. when and how to apply chemicals, water, weed, rotate crops, etc.). Plus, according to Gulati et. al. (2007), smallholder farmers often lack market information, struggle to meet buyers' food safety and quality control requirements, and are seldom able to provide standardized products continuously (Hellin et al. 2009).

2. Low adoption rates of innovation can be explained by looking at capital constraints, which limit the ability of many smallholder farmers to make initial investments, or finance the variable costs associated with improved innovative action or processes (Freeman et al. 1998). Access to credit can facilitate optimal levels of input.
3. The final constraint that can explain the challenges of adoption of innovation by smallholder farmers refers to the reluctance to build network collaboration or cooperation, especially in innovation processes. As mentioned previously, smallholder farmers usually operate in a very fragmented and disorganized context. This context inevitably creates mistrust for innovation practices and low willingness to invest in new equipment or human specialized resources. Building associations or collaborations are often translated in novel organizational forms or the so-called 'networks', which help to access new technologies and skills to improve innovation capacity (Smart, Bessant and Gupta 2007). Referring to the issues about risk and uncertainty for smallholder farmers' choices (Marra et al. 2003; Sunding and Zilberman 2000), collaboration would mean an additional source of scientific and economic agricultural knowledge. Positive effects from cooperation to achieve innovation encompass many aspects: increased turnover, higher profit rates, and expansion of the product range (De Jong and Vermeulen 2006; Gils and Zwart 2004; Batterink et al. 2010). Collective actions (to get easy access to market), farmers' association, and cooperative partnership (to acquire necessary

capital) (Narrod et al. 2009; Hellin et al. 2009; Markalova et al. 2009) could enhance innovation strategies and strengthen the role of farmers in the agro-food supply chain.

2.4 How intermediary organizations can address farmers' challenges

We now shift our focus to the manner in which different types of intermediaries can address smallholder farmers' constrains to innovate as presented in the previous sub-section. Particularly, we propose an analysis of how single consultants, broker organizations, and knowledge transfer organizations (purposely divided into these three categories for simplicity) deal with main smallholder farmers' constraints such as access to information, lack of capital, and reluctance to network (Figure 2.1). The result of this analysis is summarised in a double entry table (Table 2.3) in which we 'puzzle' with the main functions of innovation intermediaries. Boxes are marked by a plus or minus, indicating the degree of influence/relevance that the different intermediary types have on farmers' constrains.

According to our perspective, and looking at Table 2.3 column-wise, we start matching types of intermediaries with an challenges related to **lack of information and knowledge transfer**. Specifically we concentrate on analysing which of the typologies could address more peculiarly targeted and farmer-based challenges when it comes to information and knowledge transfer. Accordingly, single consultants' functions and features seem to address challenges concerning specific and targeted information for smallholder farmers. Therefore, in this role, we look at single consultants as 'advisors', to emphasise that their functions can be a targeted, specialized, and competence-based type of information and know-how transfer. Often, farmers are flexibly and interactively involved in this transfer process with "advisors" receiving flows of information and know-how specifically addressing their individual needs (Bessant and Rush, 1995).

Knowledge transfer organizations seem to work more at "group/network" level, thus being able to facilitate information and knowledge transfer between farmers and tackle more general and less "farmer-specific" challenges. Broker organizations also work at "group/network" level and appear to be specialised in and suited for facilitating access to information and know-how related to technology adoption. As previously indicated, the problem of **lack of credit**

limits smallholder farmers' investment in innovation processes. Among other functions, knowledge transfer organizations particularly facilitate specific financial support to farmers by adjusting and classifying critical resources.

Table 2.3 Matching intermediaries type with smallholder farmers' challenges.

Intermediary Type	**Smallholder farmers' challenges**		
	Limited access to information	**Lack of credit**	**Reluctance to network**
Single Consultants (Advisor)	+ Main function is gathering and providing information	Not involved in access to funds but useful for seeking financial channels	-\+ Connect agricultural actors and create networks
Knowledge Transfer Organizations (Developer)	-\+ Exchange knowledge and experiences between smallholder farmers	+ Bridge Builders, main function is fostering access to capital	+ Involve farmers from weak networks, fulfilling an innovation process management role
Broker Organizations (Facilitator)	-\+ Provide access to knowledge and technology	-\+ Help find complementary funding	+ Linking role between and within the agricultural system network

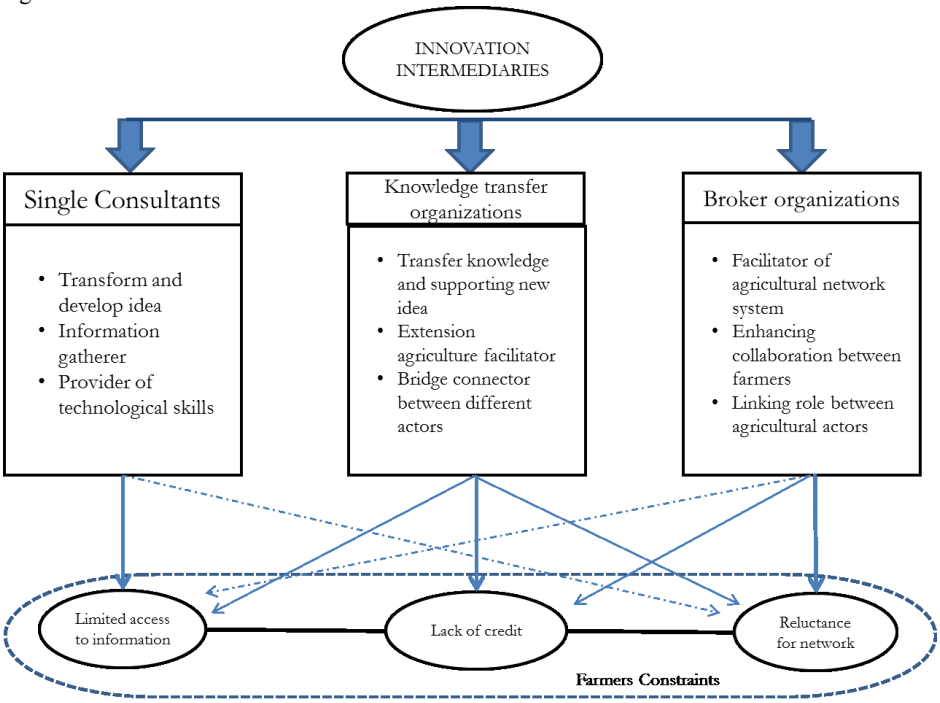
Note: + indicating a strong matching; +\- moderate matching; - weak matching

Source: our elaboration

To address financial issues and access capital markets, farmers need to develop highly specialized skills and competences. Knowledge transfer organizations are sufficiently empowered to tackle this challenge, as well as to facilitate capital transfer from financial institutions to smallholder farmers. They can also

facilitate farmers' interactions in order to create trust and manage risks, thus fostering incentives for financial institutions to participate and invest in innovation system processes. Moreover, knowledge transfer organizations can offer great opportunities to develop innovation strategies, and can help farmers to fund-raise or make larger projects accessible.

Figure 2.1 Innovation intermediaries and farmers' constraints.



Source: Our elaboration

Broker organizations can also facilitate relationships between farmers and financial institutions (i.e. banks or donors), for example providing the required warranties on funding and act as match makers, thus supporting farmers' capabilities to find complementary funding. Single consultants are seen more as seekers of financial channels rather than having a proper 'financial function' (see also Figure 2.1).

From our perspective, broker organizations are more suited to help reduce farmers' **reluctance to network**. They can play a fundamental role in

enhancing and strengthening cooperation thanks to their nature as brokers and as facilitators in embedding agricultural system networks, helping to create trust among farmers in, for example, processes of innovation adoption. There are several explanations as to why farmers are sceptical when it comes to implementing new technologies or creating cooperations: they operate independently and only within certain areas (Batterink et al. 2010); they do not have a strong sense of membership orientation, or at least limited willingness to be involved in innovation project; limited experiences in joint research, and are constrained by many cultural differences (Hoffmann and Shlosser 2001). Thus, broker organizations help to build network identification, recognition of network membership, enhance social interactions between farmers, and promote the diffusion of agricultural knowledge within the innovation network. This intermediation function permits to create trust in collaboration and cooperation between farmers, which, consequently, may show instability and mistrust to achieve innovation practices if they are not embedded in some kind of (social) network. Also, knowledge transfer organizations and single consultants provide useful services in that function in closing network-orientation gaps. Consultants, for example, connect agricultural actors and create networks through the dissemination of information, while transfer-organizations act as "bridge-builder" by involving farmers in networking activities and stimulating the emergence of network-oriented competences and attitudes.

2.5 Discussion and concluding remarks

The main aim of the Chapter is to provide insights into the nature of intermediary organizations in their role of supporting development through facilitating processes of innovation adoption and diffusion of smallholder farmers. This work digs in the disparate international literature about intermediary organizations and their different roles and functions related to the development of agro-food sector in several geographical and socio-economic contexts. Particularly we have focused on the functions of three (stylised) innovation intermediaries in addressing smallholder farmers' constrains in accessing information, capital, and participation in networks. The findings of our research highlight that matching functions of innovation intermediaries and types of farmers' challenges is crucial when attempting to enhance adoption and diffusion of innovation and ultimately support development. Limited access to

information, lack of capital (and financial resources), and unwillingness to network in the agricultural knowledge system explain why it is very important to rely on innovation intermediaries for fostering smallholder farmers' developmental patterns. We found that single consultants ('advisors') seem to better facilitate farmers in gathering information and provide the right services to access specific agricultural knowledge and skills particularly related to technology-transfer. Knowledge transfer organizations help farmers mainly to grasp opportunities to make (start-up) investments in innovation practices, and seem to be the most suitable type of intermediaries to tackle almost all the identified smallholder farmers' constraints and challenges. Therefore, we look at these organizations as proper 'developers'.

Finally, broker organizations seem to mostly foster the opportunities of smallholder farmers to engage in collaboration within wider agricultural networks. Therefore, we look at them as 'facilitators'. We believe that 'categorizing' functions and typologies of intermediary organizations can widely contribute to the debate on how to distinguish and classify those intermediary organizations (among others: Howells 2006; Winch and Courtney 2007) due to their wide range of features and context-specific peculiarities. We also believe that having a clearer overview of how functions of intermediation can match challenges of development for smallholder farmers, can further facilitate how academics as well as practitioners can design strategies when it comes to fostering innovation adoption and diffusion in the agro-food sector. The study found three different ways in which intermediary organization could lead smallholder farmers to tackle the barriers that impede adoption of innovation, as we have drafted in Table 4. In accordance with other studies (Howells 2006; Dalzier 2010; Johnson 2008; Klerkx and Leewis 2008; Batterink et al. 2010), we conclude that intermediary organizations affect innovation processes in different ways, depending on their features and main functions. Regardless of the specific context, we highlight that policy-makers could increasingly focus and stimulate a better matching between types of intermediary organizations and challenges faced by smallholder farmers, thus enabling them to set priorities. In order to stimulate smallholder farmers' participation in innovation network, we particularly emphasize the need to stimulate the emergence of more diverse forms of intermediations. Public actors could more intensively try to facilitate the establishment of intermediary organizations in less developed contexts, in which smallholder farmers operate

more often, by, for example, stimulating the emergence of ‘developers’ such as farmer cooperatives or associations.

We also acknowledge some limitations of our study, which call for further investigation in this domain. Firstly, it is not yet clear how to use our classification in order to set specific priorities when given a well-defined context or challenge. For example, it is difficult to identify the specific circumstances in which a single consultant may be more suitable to be used to tackle lack of information rather than a knowledge transfer organization. This can vary depending on whether sources of information relate more to the domain of farms, rather than to the system domain, as well as more to an individual rather than a group level. Moreover it would be useful to better understand how the interrelations between the nature of the context influence the suitability of the different typologies of innovation intermediaries to tackle farmers challenges.

Secondly, even though we addressed the main features and functions of intermediary organizations as highlighted in literature, other features and functions would still need to be investigated further. For example, the literature still not sufficiently addresses the role of, and the interrelation between, legal status and duration, and little has been said on the different functions of profit and non-profit intermediary organizations (which may be different from merely distinguishing between the role of public and private actors). Moreover, we emphasise the need to analyse the role of length and duration, type of funding, and persistence of innovation intermediation, for which more empirically oriented methodologies are needed, especially to perform more quantitative oriented measurement and assessment of intermediary functions. To answer these questions, future research is indeed required.

CHAPTER THREE

Understanding the role of intermediary organizations to facilitate innovation processes in agro-food value chain

3.1 Introduction

Agro-food value chains are facing rapid and fast-spreading challenges such as, to mention the most relevant ones, increased uncertainty and complexity due to price volatility, resource scarcity, and climate change (World Bank, 2012; Pascucci et al., 2015). In this context, smallholder farmers face several challenges in their attempt to innovate and participate in market exchanges through value chain relations. Participation in agro-food chains imposes a number of requirements, such as, amongst others, improving the coordination and alignment with partners, accessing and sharing information, participating in innovation processes, and improving risk management and quality control. Thus, even in contexts in which institutions are well established and supportive (i.e. in more developed economies), smallholder farmers find increasingly difficult and costly to participate in value chains (Barrett, 2008; Barrett and Bellemare, 2006). In dealing with value chain participation, and regardless of the specific context, smallholder farmers often deal with a number of specific constraints, such as lack of information and knowledge, weak financial capacity, and insufficient network-wide competences (Reardon *et al*., 2009). As a reaction to new challenges, agricultural actors seem to be seeking more diverse and tailor-made sources of innovation (Leeuwis, 2000; Davis, 2013; Klerkx and Leeuwis, 2009b). At the same time, innovation opportunities are being offered by a larger cohort of "suppliers", more and more embedded in a "market-like" system of incentives, mainly due to the privatization of public agricultural knowledge and innovation systems (AKIS) (Klerkx and Leeuwis, 2009; Klerkx *et al.,* 2012). This creates a shift from supply-driven to demand-driven knowledge and innovation provision. This shift has fostered the establishment of intermediary organizations which act as providers of knowledge in many different ways (Howells, 2006; Hardagon, 2002; Hertog, 2000; Bessant and Rush, 1995; Miles *et al.*, 1995; Dalzier, 2010). This variety of intermediaries is also represented by diversified organizational forms, ranging from individual entrepreneurs, for example operating as innovation brokers or info-mediaries (Klerkx, L. and C. Leeuwis, 2008), to complex network-based organizations, such as public private partnerships as showed in the previous chapter.

Although innovation processes through intermediary organizations are considered a key-driver for the development of smallholder farmers (Madzudzo, 2011; Poulton *et al*., 2010; Klerkx *et al*. 2012; Kilelu *et al*., 2013), the

relationships between typologies of intermediary organizations and types of innovation processes and changes at value chain level are still under investigated. What is particularly lacking is a clear conceptual understanding on how different types of intermediaries can "provoke" changes in chain configurations via facilitating innovation and development for smallholder farmers. In this chapter we aim at start tackling this conceptual gap, and contributing to the existing literature with a number of novelties. Firstly while several papers have looked at how smallholder farmers are dealing with innovation and value chain participation in very specific socio-economic contexts, our research focuses on innovation intermediaries engaging with smallholder farmers and provoking value chain reconfigurations regardless of context-specific considerations. Secondly, by doing so, this work aims to contribute at the further development of the academic literature on innovation intermediaries from a value chain organization perspective, which we believe it is still lacking. Finally the chapter aims at revitalising the debate around so-called net-chain analysis (Lazzarini et al., 2001), in which interconnections between horizontal and vertical relationships between actors are simultaneously investigated.

In order to tackle this knowledge gap we implemented an inductive, multiple-cases oriented research with the aim to develop a conceptual framework (i.e. theoretical propositions) in which we start identify relationships between challenges for smallholder farmers, needs for innovation intermediations, and effects in the reconfiguration at value chain level. We start by presenting our methodological approach. Then we move into the theory-building exercise by desk reviewing literature dealing with main characteristics and functions of innovation intermediary organizations. Then we move into comparing and contrasting evidence from case studies on intermediaries of innovation practices (Howells, 2006; Winch and Courtney, 2007; Bessant and Rush, 1993; Freeman, 1991), analyse how they create collaborative links between different agro-food chain actors (Batterink *et al.*, 2010; Klerkx and Leeuwis, 2008; Sarkar and Costa, 2008). In doing so we were able to identify and set up a set of propositions which form our conceptual framework. Propositions are meant to facilitate further understanding of how different typologies of intermediaries can provoke changes (i.e. re-configurations) at value chain level. Overall, 21 cases have been selected and analysed based on a literature review of more than 110 papers dealing with innovation intermediaries and value chain participation

of smallholder farmers. Discussion and concluding remarks are presented in the last section of the chapter.

3.2 Methodology

As said, in this Chapter we adopt an inductive, theory-building approach. This approach entails an explorative multiple case research perspective, also known as phenomenon-driven case research (Eisenhardt and Graebner, 2007). This approach is particularly suitable for theory building since it can help the researcher to tackle "why" and "how" questions (Yin, 2009), as well as supporting a deeper understanding of the studied phenomenon (Eisenhardt, 1989) and facilitating conceptualization at different levels of the analysis. The research can be categorized in three phases: (i) initial literature review (or theoretical analysis), (ii) evidence analysis, and (iii) proposition formulation. Although the three phases are presented as sequentially organized, the research was an iterative process. For example, to assess theoretical and practical evidence in the proposition formulation phase we had to conduct additional literature reviews and data analyses.

While single-case research can extensively describe the richness of a phenomenon (Eisenhardt, 1989), multiple case research provides a stronger base for theory building (Yin, 1994). Multiple cases enable comparisons that clarify whether an emergent finding is simply idiosyncratic to a single case or consistently replicated across several cases (Eisenhardt & Graebner, 2007; Pettigrew, 1985). The method is especially suitable for getting a deep and comprehensive understanding of the phenomenon of interest (Eisenhardt, 1989; Yin, 2009). The multiple case study method is appropriate for this research as we build theory on how different intermediary organizations can provoke changes at value chain level. In order to build propositions and specify the analytical framework we require insights in the specific contexts, knowledge and experience of experts and stakeholders in the field. This research needs meet the criteria for choosing the case study method (Eisenhardt and Graebner, 2007; Miles and Huberman, 1994; Yin, 2009). Despite its relevance for this study, the (multiple) case study method is not free of limits and shortcomings, which we carefully consider in the research design and implementation phases. Limits are often linked to the risk of lacking of reliability and rigor, external validity, high costs and time in collecting data and conceptualizing, and limited

internal validity resulting from a lack of control over independent variables (Eisenhardt and Graebner, 2007; Yin, 2009). In order to properly use a theory-building from cases approach the researcher need to consider each case as an experiment that stands on its own as an analytical unit (Eisenhardt and Graebner, 2007). The definition of the analytical unit is based on the research question (Benbasat *et al.*, 1987). Subsequently, different data collection strategies can be adopted (Yin, 2009).

In our research the *unit of analysis* is a case in which an intermediary organization has been used by smallholder farmers to tackle issues of innovation (as described in the second chapter). We then reflect on whether the interactions between the organization and farmers have provoked changes at value chain level. We are especially interested in whether different intermediary organizations, defined in terms of organizational features and functions, may lead farmers to different value chain participations, thus provoking different reconfigurations of the value chain.

To ensure validation, which is important in providing theoretical insights for formulating new propositions, we strive for theoretical and purposive sampling in selecting cases, thus selecting cases that have potentials for replication, extension of theory, contrary replication and elimination of alternative explanations (Eisenhardt and Graebner, 2007). Thus in order to help to define limits to generalization of the findings and to control for irrelevant variation, we established case study selection criteria (Eisenhardt, 1989). The following criteria for pre-selecting cases were considered: (i) the case meets the definition of intermediary organization operating with smallholder farmers to facilitate innovation; (ii) the case fits the scope of the research, thus it is either an expired project with clear understanding of the outcomes or still ongoing but with clear assessment of intermediate results; (iii) the case has an "interesting" and "informative" story within the set of cases, and contributes to the diversity of the case study set. This diversity is especially important in explorative research; (iv) finally the case is supported by the availability of rich content.

3.3 Empirical and conceptual findings

Typologies of intermediary organizations tackling innovation challenges

We here shift our focus to the analysis of how different types of intermediaries can support smallholder farmers' to overcome challenges to innovate, and then

how they can provoke changes at value chain level. We used intermediary organization typologies as defined in the literature review analysis of the second chapter of the thesis, and compare and contrasted evidence from 21 cases. The list and main features of the selected cases are reported in Appendix A.

In figure 2.1 (of chapter two) we summarize how different typologies of intermediary organizations can deal with main smallholder farmers' challenges to innovate, distinguished in lack of access to information, lack of capital, and reluctance to cooperate or network. According to our findings *single consultants* are more likely to address challenges concerning specific and targeted information for smallholder farmers. Therefore, in this role, we look at single consultants as "info-mediaries" or knowledge "advisors/facilitators", to emphasise that their functions can be the transfer of a targeted, specialized, and competence-based type of information and know-how.

Knowledge transfer organizations work more at "group/network" level, thus being able to facilitate information and knowledge transfer between farmers and tackle more general and less "farmer-specific" challenges. Among other functions, knowledge transfer organizations particularly facilitate specific financial support to farmers by adjusting and classifying critical resources. To address financial issues and access capital markets, farmers need to develop highly specialized skills and competences. Knowledge transfer organizations are sufficiently empowered to tackle this challenge, as well as to facilitate capital transfer from financial institutions to smallholder farmers. They can also facilitate farmers' interactions in order to create trust and manage risks, thus fostering incentives for financial institutions to participate and invest in innovation system processes. Moreover, knowledge transfer organizations can offer great opportunities to develop innovation strategies, and can help farmers to fund-raise or make larger projects accessible.

Broker organizations work at "group/network" level and seem to be specialised in facilitating access to information and know-how related to technology adoption. They can facilitate relationships between farmers and financial institutions (i.e. banks or donors), for example providing the required warranties on funding and act as match makers, thus supporting farmers' capabilities to find complementary funding. From our perspective, broker organizations are more suited to help reduce farmers' reluctance to network. They can play a fundamental role in enhancing and strengthening cooperation due to their nature as facilitators in embedding agricultural system networks, helping to create trust among farmers in, for example, processes of innovation adoption (Ruitemburg

et al., 2014). There are several explanations as to why farmers are sceptical when it comes to implementing new technologies or creating co-operations: they operate independently and only within certain areas (Batterink *et al*., 2010); they do not have a strong sense of membership orientation, or at least limited willingness to be involved in innovation project; limited experiences in joint research, and are constrained by many cultural differences (Hoffmann and Shlosser, 2001). Thus, broker organizations help to build network identification, recognition of network membership, enhance social interactions between farmers, and promote the diffusion of agricultural knowledge within the innovation network. This intermediation function permits to create trust in collaboration and cooperation between farmers, which, consequently, may show instability and mistrust to achieve innovation practices if they are not embedded in some kind of (social) network. Also, knowledge transfer organizations and single consultants provide useful services in that function in closing network-orientation gaps, but mainly at farm level. Consultants, for example, connect agricultural actors and create networks through the dissemination of information, while technology transfer organizations often act as "bridge-builder" by involving farmers in networking activities and stimulating the emergence of network-oriented competences and attitudes.

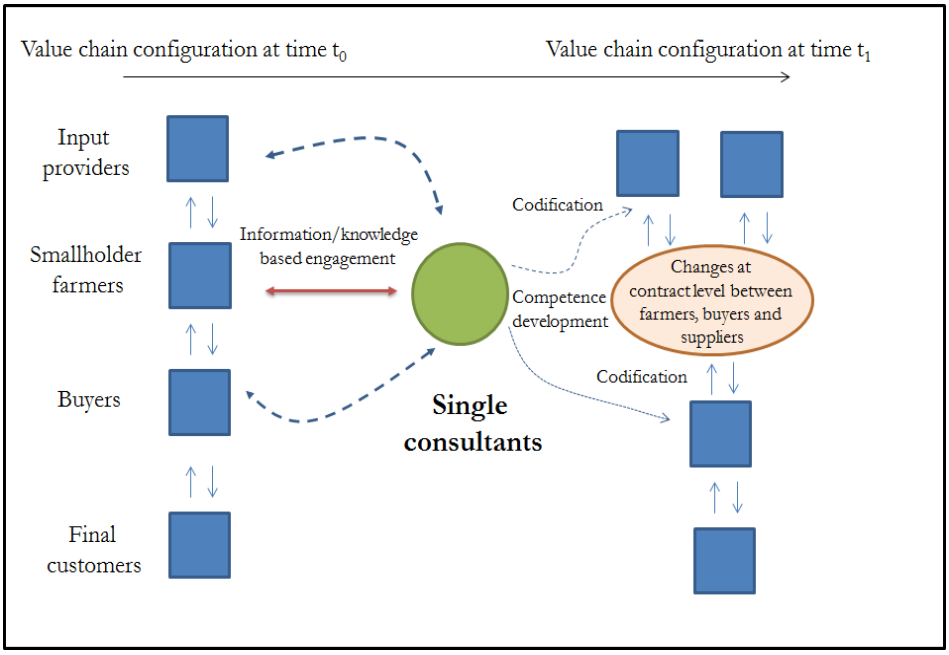
Conceptualization and theory building results

The final step of our research includes the analysis of existing connections/associations between typologies of innovation intermediaries and changes at value chain level. We define changes by looking at three main features affecting the governance of value chains (Gereffi et al., 2005): (i) changes in the level of information codification along the chain and particularly between smallholder farmers and their input providers or buyers, (ii) changes in the smallholder farmers abilities/competences to act and operate in the value chain, and finally (iii) the overall complexity of the transactions/relationships in the value chains. By comparing and contrasting the information reported in the cases we have been able to define few main conceptual regularities, which we summarise in figures 3.1, 3.2 and 3.3.

When looking at the ability of single consultants to provoke change we notice that changes mainly occur at "micro" level, by modifying the way smallholders engage in transactions with their buyers and input providers. Changes are

provoked mainly by transfer of knowledge, competence development and increased codification of information.

Figure 3.1. Changes in agri-food value chains via smallholder engagement with single consultants



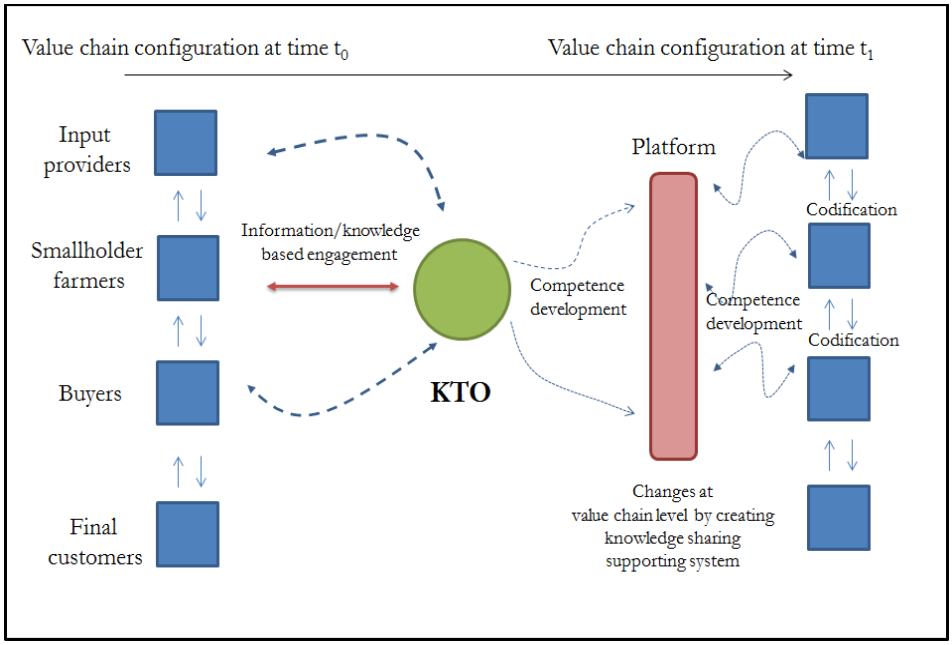
Source: own elaboration on cases

In the IMBARAGA case (Wennink and Heemskerk, 2006), for example, farmers have individually developed competences to explore new contractual solutions with their buyers, as well as marketing services have been implemented to help the transfer of information and knowledge. Chowdhury et al. (2014) describe how Bangladeshi farmers increased their ability to long-term planning and access technology by using advisory organizations, thus leading them to improve quality and access different marketing channels. The cases described by Morgan (2011) also indicate how marketing services could provoke adoption of arrangements improving farmers' coordination with buyers. Although relevant for smallholder development, single consultants mainly provoke changes in specific stages of the value chain, thus without creating/facilitating more substantial reconfigurations.

When analysing changes provoked by Knowledge Transfer Organizations it could be noticed that they still focus on farmers' engagement in the value chain

but they operate in multiple stages of the chain. Particularly this is due to the fact that KTOs often facilitate knowledge platform or partnership formation in which competence are "co-developed" by different actors of the chain simultaneously (see Figure 3.2).

Figure 3.2 Changes in agro-food value chains via smallholder engagement with Knowledge Transfer Organizations (KTOs)

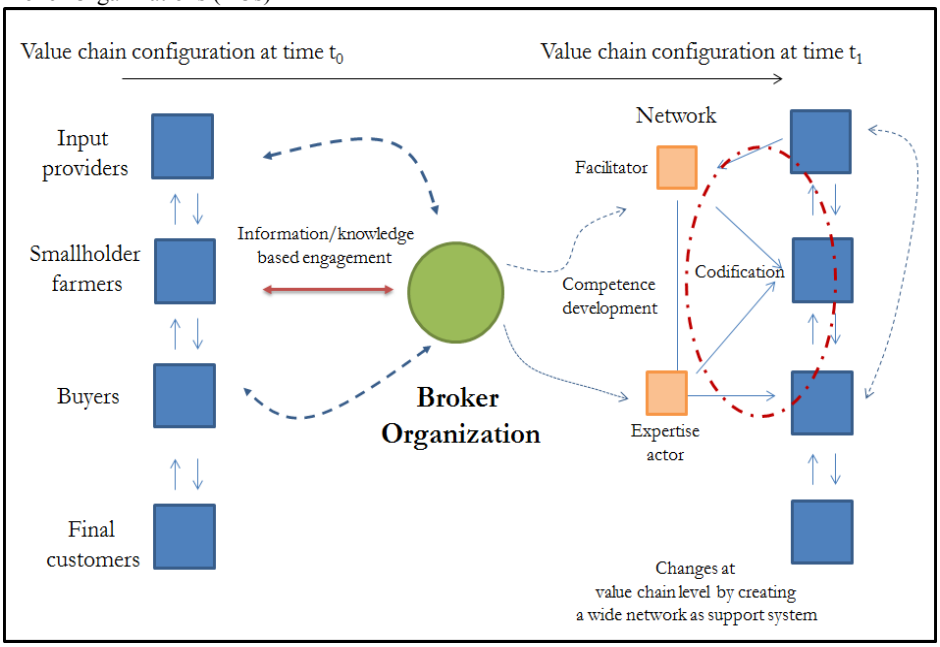


Source: own elaboration on cases

Wennink and Heemskerk (2006) describe the MVIWATA case in Tanzania creating a platform to share and diffuse best practices among farmers, as well as to build trust and improve group dynamics. Klerkx et al. (2013) discuss the case of innovation platforms in the palm oil, coffee and cacao value chains in Ghana and Benin, facilitating knowledge diffusion (best practices) on quality management and post-harvest issues. This seems to have provoked a more substantial repositioning of several actors of the chains, moving towards a more "quality-oriented" type of value chain engagements. Other two works provide evidence on KTOs, and namely Nederlof and Wongtschowski (2011) on knowledge platforms in Nigeria and East and Central Africa, and Kilelu et al. (2013), focusing on the East Africa Dairy Development programme.

Consistently with the works of Wennink and Heemskerk (2006) and Klerkx and colleagues (2013) they highlight the centrality of the platform infrastructure to facilitate changes at more value chain level. It is the formation and access to this "institutional infrastructure" which can provoke "meso" and "macro" level changes in the value chain. Since knowledge platforms are often participated by public authorities and deal with strategic crops the impact of platforms can often be reshaping the rules and business practices at higher level, thus provoking more substantial value chain reconfiguration with a potential effect at global/export market level (see the case of cocoa in Ghana as reported in Klerkx et al., 2013).

Figure 3.3 Configurational changes in agro-food value chains via smallholder engagement with Broker Organizations (BOs)



Source: own elaboration on cases

The same magnitude of change can be provoked by Broker Organizations. However they operate by forming and facilitating access to mostly informal networks (Figure 3.3). In this way they are able to transfer knowledge and best practices, as reported by Madzudzo (2011) in the case of the Fodder Innovation Project (FIP) in Nigeria, and Wennink and Heemskerk (2006) for the

MVIWAMO case in Tanzania, and tackle issues of coordination in the input providing stage of the chain. Broker Organizations are able to facilitate changes in the relational elements and rules that govern value chains, by supporting knowledge-based networking as well as trust-building interactions and dynamics. The main difference when compared to KTOs is the limited used of formalized institutional infrastructures. As reported by Shad et al. (2011), broker organizations operate via relational arrangements which support learning as well as information codification and sharing. However the transfer of these changes in to value-chain wide reconfigurations depends on a number of factors, including the role of the public authorities and degree of involvements of the buyers in the network dynamics. When buyers and public authorities are actively contributing to the network formation and knowledge/information sharing than the likelihood to observe more value chain wide changes is higher, as highlighted by Madzudzo (2011) and Shad et al. (2011).

3.4 Discussion and concluding remarks

The main aim of our study is to provide insights into the nature of intermediary organizations in their role of facilitating processes of innovation adoption and diffusion for smallholder farmers. We adopted an inductive, theory-building approach. This approach entails an explorative multiple case research perspective, also known as phenomenon-driven case research (Eisenhardt and Graebner, 2007). Particularly we use findings of the second chapter on the functions of three innovation intermediaries in addressing smallholder farmers' constraints in accessing information and knowledge, capital, and participation in partnerships and networks. Then we have investigated the associations of different typologies to changes at value chain level, using 21 key case studies drawn from the literature.

When looking at how different intermediary organizations can provoke changes at value chain level we found out little main regularity. In accordance with other studies (see for example Howells, 2006; Dalzier, 2010; Johnson, 2008; Klerkx and Leeuwis, 2008; Batterink *et al*., 2010), our study found that consultants mainly "stimulate" changes at micro level, supporting the individual farmer to engage in different contractual solutions with either buyers or input providers. Both KTOs and BOs operate at meso and macro level. While KTOs create institutional and organizational infrastructures (i.e. knowledge platforms)

in which new rules are formalised for the entire value chain, BOs facilitate creation of informal networks, thus supporting more relational/trust based oriented reconfigurations of the value chain.

We also acknowledge some limitations of our study, which call for further investigation in this domain. Firstly, although we tried to control for issues of 'replicability' and internal and external validity, we acknowledge that our results are far from being conclusive as well as 'generalizable'. Cases were drawn from existing literature, however to further define and fine-tune the theory building process we would have needed to triangulate secondary data and information with primary data. Moreover we lack diversity of sources, thus a combination of information gathered from actors as well as reports and external sources could have improved validity and the 'generalizability' of our work. Related to this point we also acknowledge lack of robustness check, meaning that we do not know what would happen to our definitions and primary assessment of the effect at value chain level when more cases are added to the sample. This is also a shortcoming that needs to be considered in future approaches. Third limitations refer to lack of "embeddedness" of our research. We did not investigate the role of contextual factors in shaping intermediaries actions as well as effects at the value chain level. The interaction with the existing institutional and socio-economic environment is key to figure out the how intermediaries can change/reconfigure value chains at different levels.

3.5 Appendix A – Cases selected for the empirical analysis

Source	Case code and geographical scope	Challenges	Type of intermediary organizations	Changes at value chain level
Kilelu et al. (2013)	Case 1 Kenya (Regional)	Smallholder farmers operating in the dairy sector lacking productivity, competitiveness, and facing barriers for improving their livelihoods. Specific challenges: (i) improving breeding and animal health; (ii) improving feed management and enhancing access to quality and affordable feeds; and (iii) strengthening market access for smallholders	Knowledge Transfer Organizations East Africa Dairy Development programme EADD (consortium of 5 organizations that act as intermediator) in 3 countries including Kenya. Their roles: (i) demand articulation for adopting new technologies, (ii) knowledge and supporting services; (iii) brokering networks; (iv) supporting learning for innovation. Focus on knowledge access and support for agricultural innovation.	EADD facilitated an institutional innovation, through building capacity of dairy companies to use a milk chilling plant as platform where actors converge to provide different services and through a credit (check-off) system, with the aim of improving access and quality of services and building trust between these actors. Before EADD intervention the dominant institutional model for dairy farming enterprises was based on dairy cooperatives. After the intervention the interactions facilitated in the innovation platform provoked more alignment and better and more complex coordination in the overall dairy value chain, raising farm-level productivity, and livelihood improvements.

Madzudzo (2011)	Case 2 Nigeria (Regional)	Increased use of fodder considered as a critical element to phase out poverty for smallholders, since quality fodder is a key constraint in livestock production. Need to supply new fodder varieties premised on a linear relationship between technology and fodder availability. Bottlenecks: Policy gaps, What is needed is public policy on innovation brokers.	Broker Organizations Fodder Innovation Project (FIP) FIP identified key partner organizations:SG2000, an international NGO, state governments' extension units known as Agricultural Development Programmes (ADP). Focus on networking and credit access.	SG2000 facilitates institutional changes in solving policy gaps in Nigeria, coordinating the services of other actors, solving the issues of lock in and technology transfer old models. Brokering is facilitating institutional change. FIP farmers became eligible for the fertilizer voucher scheme on the strength of their registered cooperatives as well as the deposits held at the NACRDB (bank). Through networking they could access other opportunities like the fertilizer programme. Through network building, livestock farmers, the bank and other extension workers were able to gain an understanding of how the other actors operated. Through brokering relationships, transaction costs for interaction declined albeit at a small scale.

Wennink and Heemskerk (2006)	Case 3 Benin (Regional)	Improve access market by mean of an innovation platform in the cotton sector.	Broker Organizations FUPRO National Federation of village farmers' group and associations, district and provincial union) key actor in the Benin cotton sector, created with assistance from the public sector services. FUPRO participates in a national private-sector platform that allocates resources to public sector cotton research and agricultural extension through a central fund, which is derived from cotton levies.	In FUPRO case we move from a typical market value chain to more explicit coordination among actors.
	Case 4 Ruanda (Regional) IMBARAGA (National farmers' association operating in the potato production and marketing chain)	Improve access to markets.	Single Consultants IMBARAGA assisted potato-producing associations to form federations that lobby for their interests and negotiate with the private sector. In cooperation with public-sector services and local NGOs, IMBARAGA facilitated farmer participation in research and extension.	IMBARAGA combines the chain and community approach when organizing knowledge-for-innovation services: through their participation in platforms with other chain actors, federations are informed about market demands, and farmers embed knowledge transfer into a local community context. Production and outbound operation (marketing) changed for suppliers

	Case 5 Tanzania (National - MVIWATA Farmer-led network)	Farmers are not sustainable without external assistance and there is no access to services such as input supply, credit facilities and marketing	Knowledge Transfer Organizations MVIWATA's experience actively disseminates information on best practices in technological (agricultural practices), institutional (relations with service providers) and organizational (group dynamics) innovations by publishing information and broadcasting via radio programmes.	Before: Tanzania has a wide variety of farmers' groups at the community level, through both farmer-led initiatives and development projects. However not all these groups are genuine, or registered, and are not sustainable. Service providers increasingly seek collaboration with farmers' groups but do not have sufficient background information about them. After and with MVIWATA: Networking capacities allow these farmers' groups to be strengthened and thus become key partners for innovation. Farmers' institutions are now being increasingly recognized as a 'capital' for agricultural innovation.
	Case 6 Regional (Tanzania): MVIWAMO	Farmers need networking, access to input supply and credit facilities	Broker Organizations MVIWAMO encourages networks to organize complementary services to their member farmer groups. Openness of (public and private sector) services for collaboration and functional district-planning and communication fora	The extension services provided to members, access to input supply and credit facilities, and marketable crops and livestock products.

			are therefore required	
Chowdhury et al. (2014)	Case 7 Bangladesh (Interregional)	Need of organize smallholder farmer groups and establish institutional building process. Moreover, enhance the capacity of smallholders for the production of High Value Crops	Single consultants The North-west Crop Diversification Project (NCDP) was built on a systems approach and had similar elements of an AIS, such as facilitation of learning, formal and informal institutions and multi-actor organizational partnerships. The aim is to improve farmers capacity for innovation through various social mobilization activities (e.g. developing plans, networking, and entrepreneurship), and social and technical trainings.	Involvement of other actors to boost the agricultural extension services. Non-Government Organization (NGO) partners were responsible for facilitation of discussions about group values, norms, project supports, credit facilities, technological options etc.

Morgan (2011)	Case 8 UK, Wales (Local Community of Practice))	Exploring social learning processes among organic farmers. Need: commercial motive, farmers need to sell	Single Consultants Community of practice as extension approach: Farmer-led Marketing Group. Farmers in one locality working together to produce and market organic meat. The choice of a collaborative venture rather than a formal co-operative creates a loose relationship between members, and the group eschewed stronger membership rules and/or financial investment.	The farmer's commitment is to supply an annual minimum number of livestock for marketing and accept commission charges on sales. The central marketing organisation provides marketing services, and organises advice and discussion events that focus on market and processor requirements, as well as addressing topics of basic organic management. Changes are observed in terms of more degree of coordination between actors.
	Case 9 UK, Wales (Local Community of Practice)	Exploring social learning processes among organic farmers. Need to improve farmers' organic production and management knowledge	Single Consultants Community of practice as extension approach: Farmer Discussion Group. Farmers are invited to join the group by a facilitator who organizes meetings about reflection on the demands and structure of the organic food market but without a marketing function	
	Case 10 UK, Wales (Local Community of Practice)	Exploring social learning processes among organic farmers. Need to explore self-organising, spontaneous social learning	Single Consultants Community of practice as extension approach: Neighbourhood Group. It is a collection of organic farmers associated by	

		processes	their spatial proximity	
Shad et al. (2011)	Case 11 Vietnam (Regional)	Need of transform extension systems from predominantly top-down orientation to extension approaches that view innovation as a product of multi-stranded interaction among multiple actors. Difficult in East and Southeast Asian, pig husbandry chain.	Broker Organizations Group-based Extension Approaches: All groups focus their learning efforts on the introduction of new or improved breeding practices at an early stage of group constitution and have a fixed duration. Objectives: stimulate innovative modes of cooperation between extension agents and farmers; share experiences; find solutions for common problems.	Before: how to foster this kind of approach (Group-based extension) within the hierarchical extension policy setting and how to effectively shape and enable learning groups. After: cases helpful in building capacity and fostering collaborative learning.
Christoplos et al. (2010)	Case 12 Cameroon (Regional)	Need of strengthen famers' ability to manage their farm	Single Consultants Management Advice for Family Farms (MAFF): partnership between researchers, extension agents and farmers has created a process of mutual learning, so that they now listen to, exchange opinions with, and better understand each other.	Farmers who participate in these new MAFF operations now have a different attitude towards work; they have achieved better labour productivity; they are now concerned about food safety, and they are all engaged in new enterprises

Klerxk et al. (2013)	Case 13 Ghana (Regional - Agricultural Innovation Platforms called Concertation and Innovation Groups)	Improving oil processing procedure and quality of palm oil to reduce negative environmental and health impacts and gain access to export market	Knowledge Transfer Organizations Oil palm innovation platform. Objectives: improve the processing capacities of small-scale palm oil processors to be able to produce better quality crude palm oil; generation of knowledge in good processing practices, and enactment of rules and regulations governing processing practices.	The production of better quality oil will enable processors to access better markets which will ultimately result in improved income and livelihoods for smallholder farmers and processors.
	Case 14 Ghana (Regional - Agricultural Innovation Platforms called Concertation and Innovation Groups)	Enhancing an equitable value chain (cocoa sector) with good information access for smallholders	Knowledge Transfer Organizations Participants: Cocoa–Coffee–Sheanut Farmer Association and related cocoa input company; farmer-based marketing company Kuapa Kokoo; the Ghana Cocoa Board (CoCoBod) with representatives of its Research Institute CRIG and Quality Control Company officers at national and regional level; researcher of Ghana Standards Authority; and the adviser board (FOB) price; the Minister of Finance and Economics.	Transparency in the pricing of cocoa by improving information; Network and linking policy information; Stimulate local demand based on trust and confidence, and access to Minister.

	Case 15 Benin (Regional)	Bottlenecks related to water management, fertilizer availability, and relationships between rice producers and traders	Knowledge Transfer Organizations Innovation Platform contributes to improve the livelihood of smallholder farmers in the country, with particular attention to vulnerable groups and categories.	On-farm innovation processes; development of post-harvest enterprises at regional and national levels, and processes of value generation and distribution along particular commodity value chains in which stakeholders are involved. Implementation of projects, getting co-operation, co-ordination and synergy among stakeholders involved
Nederlof and Wongtschowski (2011)	Case 16 Ghana (Local - Region of Brong Ahafo)	Need of a better interaction among the different players in the soybean chain in order to boost soybean agribusiness services	Knowledge Transfer Organizations The soybean cluster (Inn.Plat.) introduces technologies including new varieties to farmers and other interested cluster members; Monitors and evaluates project activities; Builds the capacity of other business development service providers; and Organises field days, meetings and workshops in order to bring various stakeholders together to share knowledge, review and plan activities	Cluster members learnt about technologies and how to operate as part of a value chain (sharing info); Before: farmers did not have access to credit because they could not meet the minimum criteria of the banks. After: new modalities through which farming credits could easily be accessed by farmer groups have been explored with the rural banks and co-operative credit unions.

	Case 17 Nigeria (Local: Ikara - Local Governm ent Area in the Northern Guinea Savanna of Nigeria)	Improve the maize legume production systems	Knowledge Transfer Organizations Innovation Platform focuses on smallholder maize-legume production systems. Activities: Training programmes, meeting schedule, participatory rural appraisal tools to conduct diagnoses at community levels.	Participatory approaches were used by facilitators at the Institute for Agricultural Research and the Agricultural Development Programme to organise mutual learning processes starting from the diagnosis of problems at the community level to the development of options for improved maize-legume production systems.
	Case 18 Uganda (Regional)	Strong focus on policy and sector-wide co-ordination in the Ugandan Oilseed Sub-sector	Knowledge Transfer Organizations The platform took an interest in exploring pathways to enhance innovation, up-scale proven and locally invented technologies, and promote a demand-driven research & development programme that links farmers and processors with research and stimulates local innovativeness. Strategic focus on enabling policy and regulation: advocacy for coherent sector-specific policy and legislation, stimulating linkages to decentralised government resources and a	The platform adopted a policy lens in looking at technological upgrading and innovative capacity; Constructing a research & development market place for stakeholders in the sub-sector; Improved planting material, selection and conflict resolution; Innovation, out-scaling and network building. The value of Platform' contribution in terms of conflict resolution, common language and network building, was recognized by its members and also by external agencies, in particular the government and donor agencies

			functional division of labour between stakeholders in public-private partnerships	
	Case 19 Tanzania (Regional)	Need of how to improve the local innovation capacity for increased use of research outputs, new knowledge and technologies in order to develop profitable agribusiness enterprises (in the poultry sub-sector)	Broker Organizations Research Into Use (RIU) Programme (innovation network approach). Core activities consisted in: building production capacity of farmers, providing support to local hatcheries and breeder farms, providing support to develop advisory services and input supply, as well as mobilising market investors.	The indigenous poultry industry has transformed into a viable economic activity that is boosting household incomes and building business networks that include local and smallholder producers. Through its brokering role, the RIU programme has been able to establish necessary infrastructure to stimulate efficient private and public sector engagement in the indigenous chicken industry.

	Case 20 Nigeria (Regional)	Capacity-building assistance for the cowpea-soybean chain in Nigeria	Knowledge Transfer Organizations The cowpea-soybean platform is a multi-stakeholder intermediary (within RIU programme). Functions include: Sharing business information to member organisations about potential sources of new knowledge, technologies, financing or market opportunities; Discussing common challenges facing the two crop sectors; policy advocacy; Maximising access to improved seed varieties, inputs supplies, technical services, and market opportunities for all stakeholders within the combined value chains.	New ways of working in which the platform was furthermore envisaged to catalyse innovation in cowpea and soybean value chains among the platform members.
	Case 21 Eastern and Central Africa (Regional)	Need of foster and stimulate collaborative work in agricultural research for development in the Eastern and Central Africa region. Mission: promote economic growth, fight poverty, reduce hunger and	Knowledge Transfer Organizations Innovation Platform in The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) a not-for-profit sub-regional organisation. Functions: provide a learning space. Stakeholders in the	Through the Competitive Grant System, ASARECA contributed to improved stakeholder interactions at all three levels: sub-regional, national and local.

		enhance resources through regional collective action in agricultural research for development	platforms periodically share and exchange experiences with, and learn from, each other; the interaction between stakeholders generates a lot of valuable information and knowledge, which can transform the platform into a knowledge/learning hub	

CHAPTER FOUR

The role of Local Action Groups to facilitate innovation processes in the Italian agro-food value chains: an empirical analysis on factors affecting the decision to activate innovative RDP measures.

4.1 Introduction

Research on rural development policy is increasingly focused on the importance of participatory-based approach among local stakeholders in order to support innovative ideas and strategies for development. Agricultural and rural policy guidelines ask for analysing the role of facilitators in supporting innovation in the agricultural system and to explore knowledge transfer and innovation in agro-food value chains. In the previous chapters, we deeply investigate the role and function of the so-called intermediary organizations (innovation brokers, single consultants, knowledge transfer organizations, innovation platform centres, multi-stakeholders consortia and so on) in the agricultural innovation system, and how they intervene in the agro-food value chain, regardless the specific context. We see that brokering knowledge and innovation is not easily framed in a specific context, since in each area there could be different organizations that, even implicitly, accomplish the role of brokers of innovation and knowledge in rural area. This work starts from the need to study potential intermediary organizations in the development of agro-food sector in specific geographical and socio-economic contexts by means of fostering innovation. In Italy there is peculiar situation thinking at this kind of organizations. Knowledge and innovation transfer activities are somehow already existing within the Italian agricultural innovation system. Producer organizations, local rural organizations, cooperatives, even NGOs are all types of actors involved in brokering innovation in Italian rural areas (Cristiano et al 2014). Here we analyse a potential application of facilitation of innovation processes in agro-food value chain focusing on factors that affect the decision of Local Action Groups to activate measures related to innovation, making use of the Italian Rural Development Programme 2007-2013 (RDP). Particularly, the analysis focuses on decision to activate measures related to the modernization of farms (measure 121) and the diversification into non-agricultural activities (measure 311) which in turn facilitate two different typologies of innovation. The first is related to a more traditional approach to innovation and development, based on the acquisition of new technologies and infrastructure that aim at enhancing the productivity of local actors. Conversely, the second invites to innovate through a connection with the resources of local areas and involves the development of diverse entrepreneurial competencies.

Generally speaking, lately in Europe, regulation in rural development programmes stresses the need to stimulate innovation, particularly through implementing a new model of knowledge transfer in a more collaborative way. Indeed the RDP for programming period 2007-2013 made use of the European Agricultural Fund for Rural Development (EAFRD) that is build to emphasize the importance of promoting innovative products and processes as key drivers of sustainable, economic growth in rural areas. Among the EU-funded programs supporting a sustainable rural development by prioritizing the diffusion of innovation, the LEADER (Leader stands for 'Links between actions of rural development[2]) approach has attempted to analyse and promote the specificities and peculiarities of European rural areas with an innovative participatory approach based on 'community-based initiatives', 'participation', 'decentralization', 'partnership and collaboration' (Shortall 2008, Ray 2000). The importance of the LEADER approach in the context of a local development strategy has been recognized all over Europe and has been running for more than 20 years performing valuable results for development of rural areas. In order to understand the decision-making process behind the strategy and the selection of the priorities to be pursued in local rural areas, we investigate the role of Local Action Groups (LAGs) under the LEADER approach in the Italian context.

Not many studies have dealt with the potential of facilitation of innovation processes that local action groups could drive in the rural development strategies (interesting analyses on farm advisory models in measure 124 of regional RDP in Vagnozzi 2011, Cristiano et al. 2014, Cristiano and Proietti, 2014). The majority of the analysis on rural development mostly stresses LAGs performance under operational lens (Oreszczyn et al. 2010, Katona-Kovacs 2011, Loizou et al. 2014), social and network analysis on the partnerships (Esparcia 2014, De rosa et al. 2008, Lazzarini et al. 2008), sociological aspects (Navarro et al. 2015, Sanchez-Zamora et al. 2014), and government issues (Falkowski 2011, Ramniceanu and Ackrill 2010, Wellbrock et al. 2013).
The chapter understands the factors that affect the decision to activate measures related to innovation, analysing the determinants behind the selection processes of policy measures (measures 121 and 311 of Rural Development Programme 2007-2013) implemented by LAGs, through Local Development Strategies

[2] In french, *Liaison entre actions de développement rural*.

(LDS). Moreover, it contributes to academic debate on intermediary organisations by adopting the leader approach as case study to facilitate innovation in the agro-food value chain. The analysis collects data on 192 Local Action Groups (LAGs) from 21 Italian regions, using secondary official sources. The research aims at building a two-steps Heckman selection process in which we model both the probability that a LAG activated measures 121 and 311 according to their LDS and exploring factors we expect to influence the decision to activate (stage 1) and the final allocation of funds on the specific measures (stage 2). The chapter starts by developing the context around which LAGs operate, exploring the functioning of rural development policy and LEADER approach. Then explains how measures 121 and 311 are related to the diffusion of innovation processes. In session 'Methodology and data' presents the empirical methodology and dataset. Results and conclusions are presented in the last section of the chapter.

4.2 Context

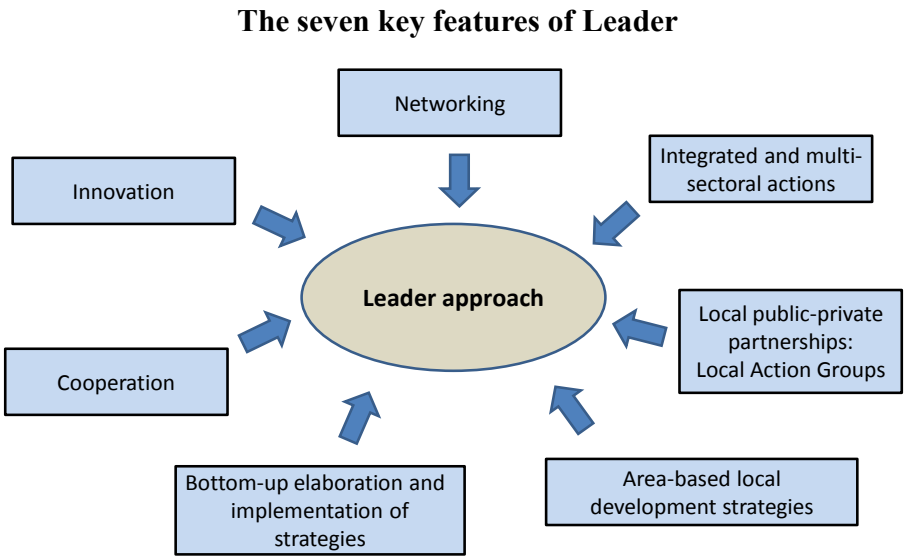
Research on rural development and LEADER approach

Research on rural development is increasingly focused on the importance of participatory-based approach involving local stakeholders in supporting innovative ideas and strategies for development (Shortall 2008, Teillmann 2012, Dargan and Shucksmith 2008). Innovation has been the core concept behind the latest agricultural policy programmes, in which there has been a gradual transformation from a traditional top-down way of transfer to a more systemic and embedded one. In other words, there has been a shift from a 'linear' to an 'interacting' view of innovation that implied a huge change in rural development and enhanced the agricultural innovation system. In interactive 'system' innovation, building blocks for innovations are expected to come from science, but also from practice and intermediaries, including farmers, advisory services, NGOs, researchers, etc. as actors in a bottom-up process. Innovation represents a fundamental principle also in the LEADER approach since its inception, enabling a culture of creativity to be developed in LAG areas across the Member States (EC 2013). Indeed, among the EU-funded programs supporting a sustainable rural development, the LEADER approach attempts to analyse and promote the specificities and peculiarities of European rural areas with an innovative participatory approach based on 'community-based

initiatives', 'participation', 'decentralization', 'partnership and collaboration' (Shortall 2008, Ray 2000). The importance of the LEADER method in the context of a local development strategy has been recognized all over Europe and has been running for more than 20 years performing valuable results for development of rural areas. The Leader approach is designed to help rural actors improve the long-term potential of their local areas. It is aimed at encouraging the implementation of integrated, high-quality and original strategies for sustainable development for local areas, drawn up and implemented by broad-based local partnerships, namely Local Action Groups (LAGs). LAGs operate through important tools to enhance innovation in the agricultural sector that they implement through Local Development Strategies. We follow the work of High and Nemes (2007), saying that a general assumption for Leader is that there is an added value because of a better identification of local needs and solutions, more commitment of stakeholders and a greater scope for innovation. Further benefits are the pooling of endogenous resources, networking to allow mutual learning and an integrated approach to address complex economic and social issues (High and Nemes, 2007). The innovation facilitation that a LAG could bring to local rural territories is translated also through a novelty in the organizational settings. Using Esparcia (2014) considerations about new activities that a LAG performs through different projects, organizational novelties are involved in the following: agro-tourism and other rural activities connected with the protection of the environment; technologies for irrigation, pollution control and waste treatment; innovative processes through projects based on the cooperation of stakeholders; and more in general promotion of cooperation and development of more resilient models to face new challenges (Esparcia, 2014). In this context LAGs help to find differences and potentials in local areas, fine tuning needs of agricultural actors and adjusting constraints that hamper the rural development. Therefore, Local Action Groups born from the dialogue between civil, private and public individuals and/or organizations that bring together local development strategies (Kovach, 2000). These partnerships, widespread all over the Europe, receive financial support to develop and implement a local development strategy based on the LEADER approach. The main features are based on the following concepts (figure 4.1): (i) area-based local development strategies, (ii) public-private partnerships, (iii) a bottom-up strategy, (iv) the implementation of innovative strategies, (v) the implementation of cooperative projects, (vi) a cross-sector approach and (vii) the networking of local partnerships (EC 2006, Art. 61). Moreover the added

value of the local groups is a better identification with local needs and an increased capacity for innovation.

Figure 4.1 The seven key feature of Leader



Source: Our process on LEADER community initiative gateway

Accordingly with the European initiative, LAGs are seen as 'network of practice' where local actors perform mutual learning and integrated approach to address complex rural issues. Their key concepts rely on assembling people with various backgrounds, fostering a good communication and cooperative climate. LAGs help to initiate innovative activities on the basis of a rural development strategy (see below the section on RD policy). They depict useful tool for the establishment of new relations and partnerships between local actors, boosting the current rural areas (European Network for Rural Development, ENRD 2013). The legal status could differ according to their partnership's composition, mainly composed by public (local institution, municipalities, others such as parks and public consortia) and private actors

(farmer's association, farmers, banks and so on). Thank to the involvement of various local rural actors, they answer to the innovation process' construction need in rural areas. Indeed, it is widely recognise their value and contribution on development of rural areas under different perspectives: establishing new models of governance (Wellbrock et al. 2013, Falkowski 2013, Pemberton and Goodwin 2010), fostering diffusion of innovation and network (Esparcia 2014) or measuring social capital (Teilmann 2012, Shortall 2008). Accordingly, the European Network for Rural Development (ENRD 2013b) highlights the need to overcome the disadvantages created by the lack of networks and cooperation in rural areas through the establishment of the Local Action Groups. Finally, LAGs could stimulate the local market's opportunities and add additional income to the local areas.

Short history of Leader approach

The initiative started with LEADER I (1991-1993) and II (1994-1999) and during the 3rd programming period 2000-2006 evolved into LEADER +. In the early stage, the initiatives were conceived as a laboratory to encourage the emergence and testing of new approaches to integrated and sustainable development and to influence, complement and/or reinforce rural development policy in the local community (Lukesch, 2007). Since its launch in 1991 by the European Commission as a Community Initiative, the LEADER approach has provided rural communities in the EU with a method for involving local partners in shaping the future development of their area. The LEADER approach has attracted a high level of interest within the EU and far beyond, not only in rural areas but also in urban and coastal areas. The early generations of LEADER received funding from the EU structural funds as a separate rural community initiative. The programme reached a 'maturity' phase in 2004-2006 and, since 2007, has been implemented under the Rural Development Programmes and co-funded under the European Agricultural Fund for Rural Development (EAFRD). The success of the initiative in rural areas led other EU Funds to open up the possibility of applying this approach to other types of areas. In the 2007-2013 period it was successfully transferred to the European Fisheries Fund and the number of LAG partnerships established during this programme was nearly 2.500. From 2014 it also became available in the European Regional Development Fund (ERDF) and the European Social Fund (ESF). For this wider application the term 'Community-Led Local Development' (CLLD) is used for the new programming period 2014-2020 and

represents the extension of LEADER approach. Through the CLLD model, LAGs will be able to use a combination of different funds and different measures to implement their LDS. This extension of LEADER activity has the potential to enable rural areas to develop the social capital and common identity that underpin innovation, and pursue innovative solutions to local challenges through a far broader range of measures.

The rural development program 2007-2013 and the LEADER axis

In this session we give a picture on how the RDPs are organized, with a special focus on the four axes that define the EU strategies and the Leader approach. In the light of the EU Strategic Guidelines for the period 2007-2013 the EU 27 Member States have developed their national rural development strategy, based on the analysis of their own needs. The strategic guidelines outline the focus of rural development policy in three key areas, namely: the agro-food economy, the environment and the broader rural economy and population (ENRD 2010). These guidelines form the framework within which the 2007-2013 generation of rural development strategies and programs have been developed at Member State level in line with this framework built around four axes. The national/regional Rural Development Programs 2007-2013 deliver the national strategy objectives through the implementation of measures co-financed by the European Agricultural Fund for Rural Development (EAFRD). The principles and practice of fostering innovation in rural areas are deeply embedded in the EAFRD. The latter lays down the general rules governing Rural Development Policy for the period 2007 to 2013, as well as the policy measures available to Member States and regions. Three major objectives for Rural Development Policy have been set for the period 2007-2013:

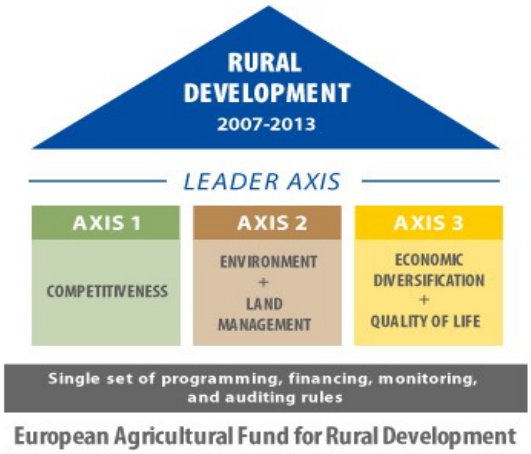
- Increasing the competitiveness of the agricultural and forestry sector,
- Improving the environment and countryside through support for land management,
- Enhancing the quality of life in rural areas and promoting diversification of economic activities.

According to the Council Regulation (EC) No 1698/2005 of 20 September 2005, EU Member States implement rural development programs, choosing from 41 ‘measures’ that suit their needs. Each Member State implements the rural development policy for the period 2007-2013 through its Rural

Development Program(s). The policy provides a set of tools (measures) from which all Member States can choose and for which they can receive EU financial support to implement integrated Rural Development Programs. A Member State may have either a single program for its entire territory or a set of regional programs (the case of Italy). The programs are built on four axes (ENRD 2010):

- Axis 1**:** to improve the competitiveness of the agricultural and forestry sector including a range of measures that target human and physical capital in the agriculture, food and forestry sectors (promoting knowledge transfer and innovation) and quality production.
- Axis 2**:** to improve the environment and the countryside, providing measures to protect and enhance natural resources, as well as preserving high value farming and forestry systems and cultural landscapes in Europe's rural areas.
- Axis 3**:** to enhance the quality of life in rural areas and diversification of the rural economy, offering support develop local infrastructure and human capital in rural areas, to improve the conditions for growth and job creation in all sectors and the diversification of economic activities.
- Axis 4**:** based on the LEADER experience, introduces possibilities for innovative governance through locally based, bottom-up approaches to rural development.

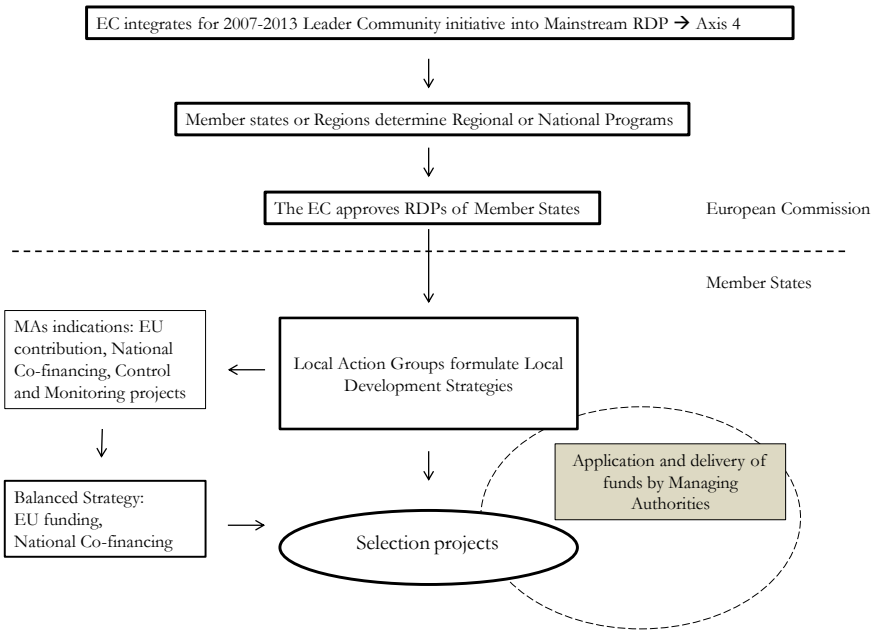
Figure 4.2 RDP 2007-2013 scheme



Source: ENRD

As you can see from the figure 4.2, the RDP 2007-2013 integrates the Leader Community Initiative into mainstream RDPs. Leader is considered as a methodological axis. Indeed the Axis four comprises all the measures contemplated in the other three axes and the scope of Leader operations varies very considerable between Member States. In this context, Axis four is seen as a complex test by LAGs in understanding their own role, now more focused as local development agency which should facilitate and trigger rural development processes. Moreover, in order to ensure a balanced strategy, a minimum funding for each thematic axis is required.

Scheme 4.1 Functioning of EU funding



Source: Our process

The proposed minimum funding percentages of 10%, 25% and 10% respectively for axis 1, 2 and 3 are a safeguard to ensure that each program

reflects at least the three main policy objectives, but the percentages are set sufficiently low to leave Member States or regions a high margin of flexibility (55% of EU funding) to emphasize the policy axis they wish in function of their situation and needs. For the LEADER axis a minimum of 5% (which is the case of Italian LAGs, become 2.5% for the new Member States) of the EU funding for each program is reserved (ENRD 2010). For a brief understanding on the functioning of EU funding, also looking at the Italian case, have a look at scheme 4.1. Member States determine the national or regional programs for the implementation of Leader approach, and must be approved by the Commission. Then LAGs develop local development strategies according to the national or regional requirements and apply for funding to the Managing Authorities (MAs). The selection of LAGs, the provision of EU contribution and national co-financing, as well as control and monitoring of the project implementation, are under the responsibility of Member States. In this process LAGs select projects up to a certain annual budget allocation and MAs involved (regional authorities) dealing with the application and delivery of funds. There are cases in Europe in which LAGs are responsible for the entire process with annual budgets from which provide funds for inclusive rural projects.

Concluding this session, we give a snapshot of the Italian situation in terms of public expenditures of EU funding, having a look on the four axis of the program and focusing on measures 121 and 311. The Italian Rural Development Program have budgeted for 2007-2013 a total public expenditure of €17.7 billion (European Agricultural Fund for Rural Development and Member State contribution). At the end of 2013, €11.7 billion were spent out of the allocated budget: the Axis 1 has utilized nearly 63% of its allocated budget; Axis 2 has used 80% of its budget; Axis 3 has utilized 46% of its budget; and Axis 4 has spent approximately 28% of the allocated budget (ENRD 2013b). Measure 121 has the second largest budget in the Italian RDPs and the utilized expenditure is 69% of its allocated funds. Modernization of farms represents 19% of the total public expenditure of the program. Measure 311 covers more than 50% of utilized expenditure of its allocated funds (ENRD 2013).

4.3 Supporting innovation in the RDP 2007-2013. The measures 121 and 311

To better understand the innovative support that LAGs give to local agro-food chain with the Leader approach, we used and analyzed two measures that are among the most directly connected with principles and practice of fostering innovation in rural areas and agro-food value chains. Several EU publication and working papers already highlight the success of support provided by rural development policy to foster innovation and knowledge transfer (ENRD 2010, 2013, 2013b). A publication of the European Network for rural development, reviewing the measures that are and will be the main sources for innovation support from the EAFRD in the 2007-2013 and the next (2014-2020) programming periods, indicates measure 121 (modernization of farm holdings), measure 311 (diversification into non-agricultural activities) and the LEADER axis (ENRD 2013b). Using one or more measures of the regional RDPs explaining functioning of rural policies, it is not new between researchers (Cristiano et al. 2014, Grieve and Weinspach 2011, Ascione et al. 2011). Cristiano and other colleagues (2014) indeed utilized the measure 124 of RDP to study the farms advisory system in Italy (Cristiano et al. 2014). Here we make use of measure 121 and 311 highlighting their innovative nature for i) improving and enhancing the productivity of rural areas (under the investment on measure 121 of RDP) and promoting innovation through the diversification of rural activities (under the investment on measure 311 of RDP). Theoretically speaking and for the purpose of this chapter, the measures refer to two different typologies of innovation. Measure 311 invites to innovate through a connection with the resources of local areas and involves the development of diverse entrepreneurial competencies. Whilst in measure 121 there is to a more traditional approach to innovation and development, based on the acquisition of new technologies and infrastructure that aim at enhancing the productivity of local actors. Both measures in our analysis are analyzed empirically to fully understand factors that affect the decision to activate them, in two different models of approaching innovation.

The scope of the measure 121 is focused on the competitiveness of the agricultural sector that requires an improvement of the productivity of physical capital. Modernization of farms is crucial to improve their economic performance through better use of the production factors including the introduction of new technologies and innovation. Investments are also

supported in forestry, however we will not take in account these kinds of investments in our analyses. Some example of investments in modernization of agricultural holdings could interest projects focused on the processing and marketing of existing products, as well as in the development of new products, processes and technologies that can improve the added value to agricultural products. Such investments could be the construction, acquisition or improvement of immovable property, the purchase or lease-purchase of new machinery and equipment and general costs linked to expenditure such as patent rights and licenses (ENRD 2013b). In a context of increased competition, RD policy also encourages cooperation for development of new products, processes and technologies in the agriculture, to ensure that the sector can take advantage of market opportunities through widespread innovative approaches in developing new products, processes and technologies. The target groups of these interventions are in general farmers, micro, small and medium sized enterprises, organizations/entities gathering primary producers in agriculture and forestry, and the processing industry with specific eligibility criteria under the measure (ENRD 2013b).

Under the investment on measure 311, rural development policy supports members of farm households who diversify into non-agricultural activities. There are different categories of non-agricultural activities that can be supported, for instance: service activities (such as bed and breakfast, education and social activities on farms, farmhouse, farm-holidays and agricamping); craft activities (such as pottery and production of local products), and trade activities (such as the creation of stores attached to farms, where artisan products are sold directly to the customer) (ENRD 2013). The target groups of these interventions are members of farm households, micro enterprises as defined in the Commission Recommendation 2003/361/EC (i.e. less than 10 workers and less than €2 million of turnover), and the population in rural areas in general. Both measures are included in Leader axis (axis 4) that also contributes on the competitiveness of the agricultural sector and on the diversification of rural economy. Leader projects support bottom-up rural development priorities, such as business competitiveness, environmental sustainability, economic diversification and quality of life. Local development strategies (part of the Leader approach) often aim at creating new jobs in non-agricultural activities.

The selection process

To understand the factors that are affecting decisions on activate or not these two measures, we need to figure out the procedures that bring LAGs to receive funds for specific projects. We already saw in figure 4.1 that Managing Authorities are responsible on delivering and applying for LAGs project. But which is the functioning of the selection process that brings LAGs to spend their budget in certain measure of the RDP rather than others? Regions within their RDPs address a certain level of allocated budget for certain measures. It is the case of Italy in which each region gives guidelines for Local Development strategies of LAGs that are part of that region. They indicate how to use RDP measures according to one or more geographical characteristics of the regions, composition of rural territories, economic structure of the regions, and so on depending on the nature of the specific measure. Then each LAG, according to their LDS and needs of the local territory, chooses the projects that best fit the context, making use of EU funding and national/regional co-funds that have been allocated. So here is the issue regarding the selection procedures: even if a LAG has been constrained by Regional guidelines about whether and how to activate a given RDP measure, there is still room for decision makers operating in a LAG to decide to active a certain measure or not, and definitely to allocate a certain budget to it. This process inevitably affects the choice of the most appropriate econometric methodology to estimate the factors that determine decisions on activating 121 and 311. It should account for LAGs who may have decided to not active measures 121 and 311, even if regional budget have been already allocated for project involving the innovative measures. So methodological procedure on LAGs should provide information on determinants who consider the regional allocation of the resources to all the LAGs and then further analyze only those projects that effectively active 121 and 311 measures according to the LDS.

Previous studies have used analytical methods that separately consider the decision making (investment) expenditure for a particular type of product and the decision regarding the level of expenditure (Yen 1993, Byrne et al. 1996, 1997 and Park e Capps 1997). Following the procedures applied in a very interested work of Materia and colleagues (Materia et al. 2015) on the selection process of public research projects in agriculture, we apply the same econometric model to intercept the factors that affect the decision of LAGs to activate (stage 1) and to allocate funds (stage 2) related to 121 and 311 RDP measures. We make use of the two-steps Heckman model (Heckman 1979).

4.4 Methodology and data

In this section we focus on analysing the attributes of the LAG and the role of regional policy guidelines on RDP in the decision process of activate and allocate funds related to measures 121 and 311. Moreover we will introduce control variables to focus also on economic, geographical and societal aspects such as regional rates on innovation, environmental certification and employment. We build a two-stage Heckman model (Heckman 1979) in which in the first stage we model the probability that a LAG is activating measures 121 and 311 as conditional on regional policy guidelines, attributes of partnership and other factors we expect to influence the decision to invest. The dependent variable takes value of 1 for LAGs that are admitted to the second round and 0 otherwise. In the second stage, we analyse the amount of funds allocated by LAGs on each measure. The amount of funds is again regressed on regional policy guidelines, on number of private partners, total endowment of the LDS, and other factors including a vector of the expected value of the error term (so-called inverse Mills Ratio). The Heckman procedure allows the analyses to control for the selection bias between the first and second stage, since fund allocation in second stage is indeed not randomly determined. The two-stage Heckman procedure addresses such potential selection bias, and thus adds to the robustness of our results. Since we made two different models for measure 121 and 311, in the following session we split the analysis in two parts.

Analysis on measure 121

To understand the role of LAGs attributes that could affect the decision to activate innovative measures regarding the modernization of farms we used in the model two explanatory variables. We firstly include the number of private partners of each LAGs (PRIVATE) that is supposed to catch the potential beneficiaries in the partnership. Indeed measure 121 can be activated and applied only by single farmers, association of farmers or other private entities. A positive sign for the associated coefficient would then suggest that an extra unit of private partner could affect a positive decision to activated projects in the measure. Conversely a negative one would mean that the bigger is the partnership the less are the chances to participate in measure 121. Secondly, to give a geographical asset in the analysis of LAGs, we insert an independent variable assuming that a plain or flat LAG is more incline in fostering activities

related to the boost the production and competitiveness of the farmers of the area rather than diversify the rural activities. Indeed in our analysis the LAGs that belong to coast or the plain ones (COAST) are expected to be associated with measure 121, due to his nature of enhance a 'productivistic' innovation (as mentioned in previous session).

We generally expect a positive coefficient. To proxy the role of regional guidelines associated to the probability of activate innovative projects on 121, we use a percentage that indicates the ratio between the total amount of regional allocation for measure 121 on the total public expenditures of regional RDP (RDP_121). This variable gives an explication on whether the LAGs compensate the regional strategies in its LDS. An extra point of this percentage, we expect to give a positive associated coefficient, and so would lead to increased probability of activate the selected measure.

To investigate the amount of funds allocated to measures that have been selected in the first stage we introduce also an explanatory variable regarding the total endowment of the local development strategy (TOT_LDS) in the model of the second round. We expect a positive sign for the associated coefficient that would suggest a biggest amount of funds for measure 121.

We also introduced a number of control variables in order to consider other potential factors that affect the probability to invest in innovative projects about modernization of farms. Besides the attributes of LAGs expressed above, we include some controls of the economic structure of the population and percentage of young people in the LAGs. The first represents the structural dependency ratio (NOT_ACT), which is the ratio of the population in active age (0-14 years and over 65 years) and the population of working age (15-64 years) within each LAG, multiplied by 100 (for every 100 active ones there are some that are non active in the territory of the LAG). An extra unit of the ratio would increase the aging territory of the LAGs. This means that we expect a negative sign of the associated coefficient. The second control variable indicates the Percentage of Young Population on each LAG (YOUNG). Projects related to the measure 121 also serve to encourage young farmers (first settlement) to approach agriculture sector. So the case in which a LAG includes a high percentage of young people may affect the probability to activate the measure. Also for this control we expect a positive sign for the associated coefficient.

Table 4.1 Description of the variables

Variable	Definition
Dependent Variables	
INVEST121 (0/1)	Probability that a LAG invests on measure 121 in the first stage of the process of 121 model.
INVEST311 (0/1)	Probability that a LAG invests on measure 311 in the first stage of the process of 311 model.
MEASURE121 (€)	Amount of funding spent on the measure 121 of the LDS in the second stage of the process by LAGs that have been selected in the first stage.
MEASURE311 (€)	Amount of funding spent on the measure 311 of the LDS in the second stage of the process by LAGs that have been selected in the first stage.
Explanatory variable	
PRIVATE (number)	Number of private partners in each LAG. Variable that affects both models in the first stage of the process.
COAST (0/1)	Coastal LAGs. Type of altitude zone that affects the decision to invest in productivity (measure 121) in the first stage of the process.
MOUNT (0/1)	Mountain LAGs. Type of altitude zone that affects the decision to invest in diversification (measure 311) in the first stage of the process.
TOT_LDS	Total budget allocation of LAGs in each Local Development Strategies.
RDP_121	Percentage of funds allocated for the 121 on the total amount of the regional RDP. It controls both stages of the model on measure 121.
RDP_311	Percentage of funds allocated for the 311 on the total amount of the regional RDP. It controls both stages of the model on measure 311.
Control Variables	
NOT_ACT	Economic structure of the LAG Population. Percentage of not active population in the territory of the each LAG. It affects both models in the first process.
YOUNG	Percentage of Young Population on each LAG. It affects both models in the first process.
UAA	Percentage of Utilized Agricultural Area on Total Agricultural Area of each LAG. It affects both measure models in both both stages.
TURISM	Percentage of tourist attraction in each region in which LAGs operate. It affects the second stage of the analysis on measure 311
ENVIRON	Percentage of organizations with environmental certification in the LAGs region. It affects both models in the second stage of the process.
INNOV	Rates of innovation on production in the region of the LAGs. It affects both models in the second stage of the
EMPLOY	process.
SIZE	Rates of Regional employment. Density (Inh/Km2) of each LAGs.

Finally, another regional control considers the percentage of Utilized Agricultural Area on Total Agricultural Area of each region (UAA).
For the second stage of the process we include a control variable indicating the size of each LAG (SIZE). It regards the concentration of individuals expressed by the ratio between the number of inhabitants and the surface of the area (number of inhabitants per square kilometre). The biggest is the ratio the more would be the amount to invest in the measure. Moreover we include in the analysis of second stage control variables related to regional environment rate (ENVIRON) and the rate of innovation on production in the region of the LAGs (INNOV). The first regards the percentage of organizations with environmental certification in the LAGs region. This variable is associated with the fact that the measure 121 encourages also the introduction of environmental quality systems and certification for farmers. The second depicts the rate of innovation of the regional production system. The variable is supposed to strength the hypothesis under which the measure favourites the diffusion of innovative action on the productivity of the farms. We expect that the higher is the rate the less there is the need to increase the amount of funding in the measure selected. Finally we introduce two other regional controls in both stages. Firstly, the regional employment rate (EMPLOY), that is linked to the fact that the measure 121 favours the increase of job position in selected territories through innovative projects. It is positively associates both with the decision to activate the measure and also affects the amount of funds in case of selected LAGs for the second stage. The second regional control considers the percentage of Utilized Agricultural Area on Total Agricultural Area of each region (UAA).
In sum, we build the following two empirical specifications:

$$INVEST121 = \gamma_0 + PRIVATE\,\gamma_1 + COAST\,\gamma_2 + RDP\_121\gamma_3 + NOT\_ACT\,\gamma_4 + YOUNG\,\gamma_5 + UAA\,\gamma_6 + EMPLOY\,\gamma_7 + \mu_2$$

$$MEASURE121 = \beta_0 + PRIVATE\,\beta_1 + TOT\_LDS\,\beta_2 + RDP\_121\beta_3 + INNOV\,\beta_4 + ENVIRON\,\beta_5 + UAA\,\beta_6 + EMPLOY\,\beta_7 + SIZE\,\beta_8 + \lambda + \mu_1$$

where INVEST 121 equals 1 if the LAGs activated the measure, 0 otherwise, and MEASURE121 is the amount of funds given by the EAFRD and co-financing by regions.

Analysis on measure 311

We conduct basically the same analysis for the model related to the measure 311. It captures LAGs attributes and policy guidelines that could affect the decision to activate innovative project regarding the diversification into non-agricultural activities. In the first process also here we include three explanatory variables. The first is PRIVATE that is supposed to catch also in this model the potential beneficiaries in the partnership. Measure 311 can be activated and applied by single farmers, association of farmers or other private entities. A positive sign for the associated coefficient would then suggest that an extra unit of private partner could affect a positive decision to activated projects in diversification of rural activities. The second, as in the previous analysis on 121, gives a geographical asset in the analysis of LAGs. We assume that a mountain LAG is more incline to diversify the rural activities, basically because the local territories give the chance to integrate activities such as tourism (remember the type of innovation we want to underline in this work, as described in session before). Indeed in our model the LAGs that belong to mountains (MOUNT) are expected to be associated with measure 311, due to his nature of enhance innovation through diversification. We generally expect a positive coefficient.

To take into account the role of regional guidelines in the decision of activating measure 311, the third explanatory variable is also here a percentage that indicates the ratio between the total amount of regional allocation for measure 311 on the total public expenditures of regional RDP (RDP_311). This variable gives an explication on whether the LAGs compensate the regional strategies in its LDS. An extra point of this percentage, we expect to give a positive associated coefficient, and so would lead to increased probability of invest in the selected measure. As control variable, in this the model we add also the total amount of funds allocated to each LAGs (TOT_LDS) in both rounds. We expect a positive sign for the associated coefficient that would suggest a biggest amount of funds for measure 311, as in the case of the measure 121.

To better explain this decision mechanisms, we introduced other control variables in explaining factors that affect the probability to activate measure related to the diversification into non-agricultural activities. As in the previous model, we introduce a variable that indicates the percentage of the young population (YOUNG), since also the measure 311 encourages and valorises incentives for young farmers; also here we expect a positive associated coefficient. Same story for the structural dependency ratio (NOT_ACT), in

which an extra unit of the ratio would increase the aging territory of the LAGs. This means that we expect a negative sign of the associated coefficient. Last control variable of the first stage of the process is also for measure 311, is the percentage of Utilized Agricultural Area on Total Agricultural Area of each region (UAA), that we expect with a positive coefficient, since an extra unit of the ratio would increase the probability to activate the measure.
For the second stage of the process we include the same factors that could affect the amount of the measure 311 with the same expectations of the measure on modernization of farms: the size of each LAG (SIZE); the rate of innovation on production in the region of the LAGs (INNOV); the regional environment rate (ENVIRON); and the regional employment rate (EMPLOY). Moreover, in the second process we introduce another control variable that could affect the decision on amount allocation of 311. Indeed we include the percentage of tourist attraction in each region in which LAGs operate (TOURISM). That is due to the fact that measure 311 intercepts different categories of non-agricultural activities that can be supported, including services for tourist attractions, as in the case of creation bed and breakfast or campground in the farms. With an extra point of this percentage, we expect positive associated coefficient, and so an increasing in the allocated amount of the selected measure.
In sum, also for the analysis on measure 311, we build the following two empirical specifications:

$$INVEST311 = \alpha_0 + PRIVATE\,\alpha_1 + MOUNT\,\alpha_2 + RDP\_311\alpha_3 + NOT\_ACT\,\alpha_4 + YOUNG\,\alpha_5 + TOT\_LDS\,\alpha_6 + UAA\,\alpha_7 + \mu_4$$

$$MEASURE311 = \nu_0 + PRIVATE\,\nu_1 + RDP_{121\nu_2} + TURISM\nu_3 + INNOV\,\nu_4 + ENVIRON\,\nu_5 + UAA\,\nu_6 + EMPLOY\,\nu_7 + SIZE\,\nu_8 + \lambda_1 + \mu_3$$

where the dependent variable INVEST 311 equals 1 if the LAGs activated the measure, 0 otherwise, and MEASURE311 is the amount of funds given by the EAFRD and co-financing by regions.

Data

To collect information and data on dependent and independent variables we make use of the data contained in the database 'GEOGAL'. GEOGAL[3] displays information on LEADER approach in Italy at national, regional, territorial level. The dataset is then enriched with others sources collected through desk analysis (from national institute of statistics) and concerning innovation rate, environmental certification, employment and unemployment rates, level of education in Italian regions.

Table 4.2 Descriptive statistics on measure 121

Variables	Obs	Mean	Std. Dev.	Min	Max
Dependent variables					
INVEST121	189	0.3544974	0.4796313	0	1
MEASURE121	67	1719.413	3775.226	0	35000
Explanatory variables					
PRIVATE	189	36.24339	43.00797	0	217
COAST	189	0.2857143	0.4529538	0	1
RDP_121	189	26.63767	7.968476	7.19	50.05
TOT_LDS	189	6720.153	3594.303	16330	201240
Control variables					
NOT_ACT	189	56.10582	6.085334	45	79
YOUNG	189	201.6508	74.80631	78	492
UAA	189	73.35979	12.79161	33	91
EMPLOY	189	0.5453598	0.1012218	0.4	0.719
INNOV	189	0.2990159	0.062599	0.195	0.422
ENVIRON	189	0.1236772	0.0240207	0.085	0.184
SIZE	189	138.7196	115.9557	19	665

[3] The study has been conducted by 'Rete Rurale nazionale' (a public italian network which built programmes on behalf of the italian Minister of Agriculture, Food and Forestry) and collected information about LAGs in different arguments: socio-economic characteristics of the territories, facilities, local development strategies and financial resources. http://geogal.crea.gov.it/

Source: Our elaboration

Database is composed of a Population of 192 LAGs from 21 regions. As in the table 4.2 the observation regarding the measure 121 are 189. The three missing LAGs are related to the Valle d'Aosta region, which in the period 2007-2013 has not made public expenditure on axis 1 of the RDP.
Conversely all 192 LAGs have received funds for the measure 311 (table 4.2.1). The summary statistics show that around the 35% of the sample of LAGs activated measure 121, representing 67 LAGs of the total sample.

Table 4.2.1 Descriptive statistics on measure 311

On the other hand 131 LAGs have been selected for the second process of the

Variables	Obs	Mean	Std. Dev.	Min	Max
Dependent variables					
INVEST311	192	0.6822917	0.4668026	0	1
MEASURE311	131	9601.344	12684.27	0	51000
Explanatory variables					
PRIVATE	192	35.75	42.8493	0	217
MOUNT	192	0.4010417	0. 4913908	0	1
RDP_311	192	5.049531	2.992559	1.28	11.18
Control variables					
TOT_LDS	192	66540.891	36030.782	16340	201240
NOT_ACT	192	56.0625	6.05094	45	79
YOUNG	192	200.849	74.51851	78	492
UAA	192	72.93229	13.13883	33	91
EMPLOY	192	0. 5472135	0. 1015015	0.4	0.719
INNOV	192	0. 2975469	0. 0631961	0.195	0.422
ENVIRON	192	0.1236772	0.0240207	0.085	0.184
SIZE	192	137.75	115.3904	19	665
TOURISM	192	7.015104	8.517714	2.2	57.4

model related to measure 311, representing approximately the 68% of the sample.

4.5 Results

Table 4.3 and table 4.4 presents the estimates of the two-stage Heckman model related to the measure 121. The statistics at the bottom of the tables indicate that the explanatory variables have power, and the statistical significance of the Mills Lambda (Heckman 1979) is showing that the selected non-selected LAGs for the second stage do differ.

Table 4.3 Results of the first stage: Probit estimates of Full Model on 121(robust Standard Errors)
(dependent variable: Invest121 = 1 if the LAG is selected, 0 otherwise)

Variable	**Probit estimates of Full Model**	
	Coefficient	**P**
Explanatory variables		
Number of private partners (PRIVATE)	-0.0031	0.020
Percentage of Total RDP amount on measure 121 (RDP_121)	0.0015	0.722
Presence of Coastal LAG explaining geographical attributes (COAST)	-0.1761	0.044
Control variables		
Economic structure of the LAG Population. Percentage of not active population (NOT_ACT)	-0.0367	0.008
Percentage of Young Population in LAGs (YOUNG)	0.0026	0,005
Rates of Regional employment (EMPLOY)	0.9279	0.041
Percentage of UAA on Total Utilized Agricultural Area (UAA)	0.0043	0.218
Const	0.8909	0.634
Observation:	189	
McFadden's Pseudo R2:	0.1634	
Wald chi2(7):	30.25	
Prob > chi2:	0.0001	
Multicollinearity condition number	66.5703	

Source: Our elaboration

It is also important to notice that the multicollinearity condition number for both models is elevated, which could raise concerns about inference.

In line with expectations, the presence of private actors in the model is a significant factor in both stages. PRIVATE presents a negative coefficient in the first stage, probably due to the fact that in the selection process is not possible to capture potential beneficiaries, whilst in the second stage shows a positive coefficient. PRIVATE in the second stage says that an increase of one unit of partner is translated with more than €61,000 increase in funding (table 4.4). The explanatory variable COAST is also significant and gives a negative coefficient. The expectation that the regional guidelines through the percentage of regional allocation in measure 121 is a strong predictor on the decision to invest or not, is not fully verified. We find that an increase in RDP_121 score is not associate strongly with the probability that a LAG activates the measure of interest. Conversely in the second stage, the variable is significant (LAG compensates regional strategies) and an extra unit of the variable decreases the amount of funds received by LAGs because the associated coefficient is negative. The last explanatory variable TOT_LSD is in line with expectation that an increase on the total endowment achieve by LAGs would increase also the amount of funds allocated for the measure. For the model an extra unit of amount in the LDS is translated with approximately €100 increase in funding.

In addition to these variables, we find a number of other factors that influence the decision to activate or not the measure. We find that control variables such as NOT_ACT, YOUNG and EMPLOY are factors that influence the decision to activate measure 121, since all of them are statistically significant predictors. The results in table 4.3 describe that the coefficients of the employment rate and the young population in the territory of LAGs are positive, meaning that an extra unit of their scores gives more probability to activate the measure. Conversely, the structural dependency ratio shows a negative coefficient. An extra unit of the ratio would decrease the probability to activate.

Also concerning control variables in the second stage, the results in table 4.4 indicate statically significance for all the factors, except for the variable related to the environment certification in the region. An extra unit on the rate of the innovation and the utilized agricultural area means a decrease of the amount allocated to the measure, so they present a negative associated coefficient. Factors such as SIZE and EMPLOY in the second stage affect an increase of the amount of the measure, giving that both coefficient are positive.

Table 4.4 Results of the second stage: Regression estimates on 121(robust Standard Errors)

(dependent variable: Total amount of Measure 121 activated by LAGs)

Variable	Probit estimates of Full Model	
	Coeffici ent	P
Explanatory variables		
Total amount of Endowment of Local development strategies of LAGs (TOT_LDS)	0.8837	0.000
Number of private partners (PRIVATE)	61.468	0.001
Percentage of Total RDP amount on measure 121 (RDP_121)	-692.619	0.000
Control variables		
Rates of innovation on production in the region of the LAGs (INNOV)	-28125.63	0.043
Percentage of organizations with environmental certification in the LAG region (ENVIRON)	-65241.63	0,065
Rates of Regional employment (EMPLOY)	56197.97	0.000
Density (Inh/Km2) of the LAGs (SIZE)	12.88	0.000
Percentage of UAA on Total Utilized Agricultural Area (UAA)	-333.39	0.000
Lambda	-2955.57	0.047
Const	26211.74	0.000
Observation:	67	
McFadden's Pseudo R2:	0.8142	
Multicollinearity condition number	80.5317	

Source: our elaboration

Table 4.5 and table 4.6 presents the estimates of the two-stage Heckman model related to the measure 311. Also in this model, statistics at the bottom of the tables indicate that the explanatory variables have consistency, and the statistical significance of the Mills Lambda (lambda 1) is showing that the selected non-selected LAGs for the second stage do differ. Condition number

for both models of the measure 311 is elevated, which could raise concerns about inference, as in the analysis on 121.

Table 4.5 Results of the first stage: Probit estimates of Full Model on 311(robust Standard Errors)
(dependent variable: Invest311 = 1 if the LAG is selected, 0 otherwise)

Variable	**Probit estimates of Full Model**	
	Coefficient	**P**
Explanatory variables		
Number of private partners (PRIVATE)	-0.0020	0.027
Percentage of Total RDP amount on measure 121 (RDP_311)	0.0051	0.000
Presence of Mountain LAG explaining geographical attributes (MOUNT)	0.025	0.723
Control variables		
Economic structure of the LAG Population. Percentage of not active population (NOT_ACT)	-0.051	0.000
Percentage of Young Population in LAGs (YOUNG)	0.0040	0,000
Total amount of Endowment of Local development strategies of LAGs (TOT_LDS)	0.0004	0.001
Percentage of UAA on Total Utilized Agricultural Area (UAA)	0.0001	0.743
Const	7.341	0.000
Observation:	192	
McFadden's Pseudo R2:	0.2781	
Wald chi2(7):	61.62	
Prob > chi2:	0.0000	
Multicollinearity condition number	70.1421	

Source: our elaboration

The variable private actors in the model is a significant factor in both stages. Findings show that also in this analysis we have a negative coefficient in the first stage (probably due to the fact that in the selection process is not possible to capture potential beneficiaries of the measure 311) and positive in the second for PRIVATE. According to table 4.6 an increase of one unit of private partner

is translated with more than €41,000 increase in funding for the measure selected. The variable MOUNT in this model, even if shows a positive coefficient is not significant. The expectation that the regional guidelines through the percentage of regional allocation in measure 311 is a strong predictor on the decision to invest or not, is fully verified in this model. We find that an increase in RDP_311 associates strongly with both the probability that a LAG activates the measure, as well as with the amount of funding allocated. So an extra unit of the ratio related to RDP_311 raises the probability of invest on measure 311 by 0.51 percentage point (table 4.5). The variable is significant also in the second process, however shows a negative coefficient: an extra unit of the variable decrease the amount of funds received by LAGs.

Also in this analysis, findings show that the control variables are good predictors of the model. In the first stage, factors such as TOT_LDS and YOUNG presents positive coefficient and are statistically significant. Meaning that an increase of total endowment of LDS and percentage of young population would increase the probability of activate the measure 311. Whilst NOT_ACT, the structural dependency ratio, shows a negative coefficient. An extra unit of the ratio would decrease the probability to invest (table 4.5). The variable UAA, conversely, is not statistically significant in this stage, even if presents a positive coefficient.

Also concerning control variables in the second stage, the results in table 4.6 indicate statically significance for all the factors, as in the first analysis on measure 121, with the difference that in this model is the variable SIZE that is not significant. In this process the factor TOURISM has significance, as we expected, and returns a positive associated coefficient. Accordingly, an extra unit of the percentage related to the tourist attraction ratio, increase the allocated amount on 311. Moreover, according to the findings, an extra unit on the rate of the innovation is translated in a decrease of the amount allocated to the measure, so it presents a negative associated coefficient. Finally, factors such as SIZE, UAA and EMPLOY in the second stage affect an increase of the amount of the measure, with an extra unit of their score, giving that their associated coefficient are positive.

Table 4.6 Results of the second stage: Regression estimates on 311(robust Standard Errors)
(dependent variable: Total amount of Measure 311 activated by LAGs)

Variable	Probit estimates of Full Model	
	Coeffici ent	P
Explanatory variables		
Number of private partners (PRIVATE)	41.87	0.014
Percentage of Total RDP amount on measure 121 (RDP_121)	-1390.43	0.002
Control variables		
Rates of innovation on production in the region of the LAGs (INNOV)	-1434.33	0.043
Percentage of organizations with environmental certification in the LAG region (ENVIRON)	-65241.63	0,018
Rates of Regional employment (EMPLOY)	-53236.03	0.042
Density (Inh/Km2) of the LAGs (SIZE)	4.37	0.521
Percentage of UAA on Total Utilized Agricultural Area (UAA)	920.95	0.000
Percentage of tourist attraction in each region (TOURISM)	1443.03	0.000
Lambda 1	-7178.26	0.007
Const	-35233.62	0.010
Observation:	131	
McFadden's Pseudo R2:	0.6379	
Multicollinearity condition number	70.4190	

Source: our elaboration

4.6 Conclusion

The main aim of this chapter is to better understand the role of factors that affect the decision to activate measures related to innovation. More specifically we aim at understanding the determinants behind the selection processes of policy measures implemented by Local Action Groups. This work starts from

the need to study potential intermediary organizations in the development of agro-food sector in specific geographical and socio-economic contexts by means of fostering innovation. Particularly, the analysis focuses on the decision to activate measures related to the modernization of farms (measure 121) and the diversification into non-agricultural activities (measure 311) and investigating two different typologies of innovation. The first is related to a more traditional approach to innovation and development, based on the acquisition of new technologies and infrastructure that aim at enhancing the productivity of local actors. Conversely, the second invites to innovate through a connection with the resources of local areas and involves the development of diverse entrepreneurial competencies. We have focused on 192 Italian Local Action Groups, defined as public private partnerships that could function on addressing innovation processes according to the regional Rural Development Programs. We employ a two-stage Heckman model that addresses together the influence on the decision to activate (stage 1) and the final allocation of funds on the specific measures (stage 2). Our results on decision to activate and final allocation on measure 121 and 311 need to be considered as a work in progress and a first attempt to analyze potential intermediaries. The findings of our research highlight that Italian LAGs activated measure related to the 'productivistic' view of innovation in 67 out of 189 cases, conversely more than 60% of LAGs activated measure 311. This result underlines that in Italy LAGs territories ask for further development in activities not related only to mere agriculture, but also that involve societal and economic aspects. Number of private partners is an important factor explaining the activation and funding of measure 121 and 311, indicating that LAGs show interest on local actors needs in both stages of the process. Also regional guideline is a strong predictor, but only for the outcome related to the allocation of funds. Notably, LAGs compensates the regional strategies in the second stage, while the factor does not affect the decision to activate the innovative measures, showing a certain 'space' for decision makers operating at LAG level. Factors that influence the decision to activate the measures are related to the internal LAG aspects, indicating that LAG decision makers pay attention also specific characteristics of the local population such as active population and youth. On the other hand, we found that factors affecting the final allocation of funds on measure 121 and 311, are more closely correlated to regional indices concerning innovation, employment, environment certification and tourist attraction (only for measure 311) rate. Finally the total endowment of LAGs influences the allocation of

funds for the measure 121, and the decision to activate the measure in the case of 311. We also acknowledge some limitations of our research. First, biases could potentially raise from the fact that variable such as regional guidelines do not allow for a precise investigation on whether the percentage is assigned to a given LAG, because is an exogenous variable. Secondly, even though we test different indices on regional characteristics as influencing factors, we can suffer of similarities in the evidence. Moreover we did not investigate deeply the composition of beneficiaries that could affect the decision on activate certain measures by Local Action Groups. Moreover the analysis is still empirically driven, while further conceptualization is needed to better understand decision making processes of LAGs. We thus advise to treat these results as a preliminary empirical investigation on this topic, while further research is indeed required to increase reliability and conceptual soundness.

Still we believe that analyzing the way in which Local Action Groups make decision and affect regional guidelines, is a good contribution both to study the facilitation of innovation processes in the local agro-food chain and to the debate on how to distinguish and classify intermediary organizations. LAGs, according to the analysis developed in first and second chapter, appear to have some similarities with the so-called Broker Organization (see table 2.3 and figure 3.3) when attempting in linking role between and within the different agricultural stakeholders and help finding complementary funds. Measure 121 and 311 have to be seen as important tools to foster innovation process both at farm production level and enhancing capabilities for farmers and in general for rural actors involved in the agro-food chain. However, LAGs that have been observed during the chapter do not stick explicitly to any specific innovation intermediaries functions, but obtain different tasks depending on the typology of territories and farmers needs. Recommendation for policy-makers could focus on fact that often LAGs is oriented to set and activate projects and initiatives which respond to general matters of public interests rather than trying to target effectively the farmers and local stakeholders' needs.

CHAPTER FIVE

General Conclusion

The final chapter of this book presents main findings and main conclusions. Section 6.1 provides brief answers to the research questions raised in chapter one. Section 6.2 presents main conclusions, discusses the contribution of the thesis to the literature, policy implication, limitations and direction for further research.

5.1 Conclusions on research objectives

The transfer of knowledge and innovation via intermediary organizations is a key-driver for the development of agricultural value chain. The innovation intermediaries can answer different questions about how to foster and facilitate innovation processes according to different stakeholder needs and different areas. Consequently, as indicated in Chapter 1, the main objective of the thesis was to identify critical factors that innovation intermediaries introduce in the agro-food value chain to foster knowledge and innovation. This central objective has been investigated using multiple perspectives, resulting in three main research objectives.

Research objective 1
Chapter 2 made the first attempt to connect intermediaries to smallholder farmers and their need of innovation. The aim of research objective 1 was to contribute at the further development of the academic literature on innovation intermediaries from an international-oriented agro-food chain perspective. The Chapter 2, firstly, presents the literature review on innovation intermediaries, giving a clear picture on the functions of three (stylised) innovation intermediaries; secondly addresses smallholder farmers' constrains in accessing information, capital, and participation in networks. We found the following type of intermediaries: i) Single Consultants (SCs), that mainly transform and develop ideas into practical actions, gather useful information and provide technological skills for farmers; ii) Knowledge Transfer Organizations (KTOs) that mostly provide and gather information, build collaborations between different actors in the chain, connect demand and supply for services to support innovation, develop and transform innovative ideas, and also work as knowledge transfer facilitators (i.e. national institutions, university liaison departments, regional technology centres, public innovation agencies, innovation platform, and long-term consortia); and iii) Broker organizations (BOs) which main activities usually concern their "linking role" as facilitator of

embedding agricultural system networks and helping to create trust in the adoption of innovations for farmers (i.e. innovation brokers, bridging organizations, technology transfer intermediaries, boundary organizations). Main constraints to meet innovation processes for farmers were indicating as: low access to information, lack of capital (and financial resources), and unwillingness to network.
We found that SCs (also called 'advisors') seem to better facilitate farmers in gathering information and provide the right services to access specific agricultural knowledge and skills particularly related to technology-transfer. KTOs (also called 'developers') help farmers mainly to grasp opportunities to make (start-up) investments in innovation practices, and seem to be the most suitable type of intermediaries to tackle almost all the identified smallholder farmers' constraints and challenges. Finally, BOs (also called 'facilitators') seem to mostly foster the opportunities of smallholder farmers to engage in collaboration within wider agricultural networks.
Chapter 2 gives a great contribution also to the central research objective since explain in detail factors that affect the need of innovation in the agro-food value chain. Concludes that intermediary organizations affect innovation processes in different ways, depending on their features and main functions. Regardless of the specific context, the chapter highlights also that policy-makers could increasingly focus and stimulate a better matching between types of intermediary organizations and challenges faced by smallholder farmers, thus enabling them to set priorities. In order to stimulate smallholder farmers' participation in innovation network, it particularly emphasizes the need to stimulate the emergence of more diverse forms of intermediations. Public actors could more intensively try to facilitate the establishment of intermediary organizations in less developed contexts, in which smallholder farmers operate more often, by, for example, stimulating the emergence of 'developers' such as farmer cooperatives or associations.

Research objective 2
The second research objective moved from the fact that the relationships between typologies of intermediary organizations and types of innovation processes and changes at value chain level are still under investigated. Notably, the aim was to develop a conceptual framework in which we identify relationships between challenges for smallholder farmers, needs for innovation intermediations, and effects in the reconfiguration at value chain level. Chapter

3 is fully dedicated to cover this gap. It defines changes of value chain by looking at three main features affecting the governance of value chains: i) changes in the level of information codification along the chain and particularly between smallholder farmers and their input providers or buyers, ii) changes in the smallholder farmers abilities/competences to act and operate in the value chain, and finally iii) the overall complexity of the transactions/relationships in the value chains. The chapter found 21 different cases, drawn from the literature, and listed according to the three stylised innovation intermediaries presented in the previous analysis. The study found that consultants mainly "stimulate" changes at micro level, supporting the individual farmer to engage in different contractual solutions with either buyers or input providers. Changes are provoked mainly by transfer of knowledge, competence development and increased codification of information. Both KTOs and BOs operate at meso and macro level. While KTOs create institutional and organizational infrastructures (i.e. knowledge platforms) in which new rules are formalised for the entire value chain, BOs facilitate creation of informal networks, thus supporting more relational/trust based oriented reconfigurations of the value chain.
Looking at the central research objective of the thesis, chapter 3 concludes underling the importance of the interaction with the existing institutional and socio-economic environment as key to figure out how intermediaries can change/reconfigure value chains at different levels.

Research objective 3
The facilitation of innovation is not easy to identify as 'one fits all' model, since in each area there could be different organizations that, even implicitly, accomplish the role of brokers of innovation and knowledge in rural area. To explore so, we took the case of Italian agricultural innovation system. Regulation in rural development programmes stresses the need to stimulate innovation, particularly through implementing a new model of knowledge transfer in a more collaborative way. A potential case of intermediary organizations in agro-food chain could be mirrored in the use Local Action Groups under the LEADER approach explained in Chapter 4. The aim of the research objective 3 was to understand the factors that affect the decision to activate measures related to innovation, understanding the determinants behind the selection processes of policy measures implemented by Local Action Groups. The empirical analysis on innovation measures (defined also in Chapter 1) 121 and 311 permits to give findings and conclusions in chapter 4. The latter

highlights that Italian LAGs activated measure related to the 'productivistic' innovation in 67 out of 189 cases, conversely more than 60% of LAGs activated measure 311. This result underlines that in Italy LAGs territories ask for further development in activities not related only to mere agriculture, but also that involve societal and economic aspects. Findings on main factors, affecting the decisions to activate the innovative measures, are here briefly summarized. Number of private partners is an important factor explaining the activation and funding of measure 121 and 311, indicating that LAGs show interest on local actors needs in both stages of the process. Also regional guideline is a strong predictor, but only for the outcome related to the allocation of funds. Notably, LAGs compensates the regional strategies in the second stage, while the factor does not affect the decision to activate the innovative measures, showing a certain 'space' for decision makers operating at LAG level. Factors that influence the decision to activate the measures are related to the internal LAG aspects, indicating that LAG decision makers pay attention also specific characteristics of the local population such as active population and youth. On the other hand, we found that factors affecting the final allocation of funds on measure 121 and 311, are more closely correlated to regional indices concerning innovation, employment, environment certification and tourist attraction (only for measure 311) rate. Finally the total endowment of LAGs influences the allocation of funds for the measure 121, and the decision to activate the measure in the case of 311. Overall, analyzing the ways in which Local Action Groups act as facilitator for innovation processes in rural areas, contribute also to give an answer to the main research question, studying the facilitation of innovation processes in the local agro-food chain and helping to distinguish and classify intermediary organizations.

5.2 Overall conclusion and discussion

The agro-food sector is changing in response to new market opportunities and productivity requirements, new resource management problems, and new roles assumed by public, private, and civil actors. The facilitation of innovation and knowledge are the keys that enabling stakeholders to quickly react at these changes. To back at general introduction propositions, we explain in this book the experience of a shift in agricultural extension services and ways in which innovation is approach. The systemic view of innovation is now more and more

embedded in the agro-food value chain, fostering cooperation and enhancing relationships also between private local entities and public institutions. We acknowledge the shift from a linear top-down model of innovation to a more stakeholder-inclusive one. We see that innovation system concept relies on the introduction in the agro-food value chain of intermediary organizations that help the transmission and facilitation of new processes and organizational patterns. This thesis covered multiple aspects related to them, from the way in which they support strategically and operationally smallholder farmers, on how they provoke changes at value chain level and finally to orienting rural policy towards the support of innovation. In general, we can conclude for the purpose of this thesis, that innovation is understood to be a mix of appropriate technical, organizational and institutional (in the sense of formal or informal rules and regulations) elements. A principle of innovation is that new (or improved) ways of doing things result from interaction. Innovation intermediary facilitates interaction within and between farmers and hence innovation, in a way that fits the specific needs and realities of local actors. It is the case of the 21 cases selected in chapter 3, in which we approach innovation platforms, community of practices, farmers' group associations, innovation projects or group-based extension approaches, all fostering interaction and innovation in different contexts. Also findings on Local Action Groups emphasize the positive aspect of being together in a public private partnership that could offer the possibility to enhance innovation process around the productivity of farmers and boosting the potential of single territories.

This study has three main limitations, which in turn has implications for future research. Firstly, as we can see in the first chapter, intermediaries provide space for negotiation, diffusion and sharing of information, joint planning, working and learning, but not always within clear boundaries and purposes. Innovation intermediaries (i.e. innovation platforms but also local group-based approaches as in the case of LAGs) are by their nature dynamic and flexible. Therefore it is not possible to design in detail. It is difficult to identify the specific circumstances in which, for example, a single consultant may be more suitable to be used to tackle lack of information rather than a knowledge transfer organization. This can vary depending on whether sources of information relate more to the domain of farms, rather than to the system domain, as well as more to an individual rather than a group level. Moreover it would be useful to better understand how the interrelations between the nature of the context influence

the suitability of the different typologies of innovation intermediaries to tackle farmers' challenges. Secondly, in the analysis of value chain, we tried to control for issues of 'replicability' and internal and external validity, but we acknowledge that our results are far from being conclusive as well as 'generalizable'. Even if 21 cases were drawn from existing literature, to further define and fine-tune the theory building process, we would have needed to triangulate secondary data and information with primary data. We lack diversity of sources, thus a combination of information gathered from actors as well as reports and external sources could have improved validity and the 'generalizability' of our work. Related to this point we also acknowledge lack of robustness check, meaning that we do not know what would happen to our definitions and primary assessment of the effect at value chain level when more cases are added to the sample. Limitations arise also for the analysis of Italian LAGs, in which no data are gathered on specific elements regarding for example the legal status or dimension of beneficiaries. Biases could potentially raise, also, from the fact that variable such as regional guidelines do not allow for a precise investigation on whether the percentage is assigned to a given LAG, because is an exogenous variable. Finally, even though we test different indices on regional characteristics as influencing factors, we can suffer of similarities in the evidence.

In conclusion, LAGs that have been observed in the chapter 4 do not fit explicitly to any specific innovation intermediaries functions (even if, conceptually, could be close to broker organizations type), but obtain different tasks depending on the typology of territories and farmers needs. However, recommendation for policy-makers could focus on fact that often LAGs are oriented to set and activate projects and initiatives which respond to general matters of public interests rather than trying to target effectively the farmers and local stakeholders' needs. LAGs are seen basically as rural development agencies or more often as animators of local territories.

REFERENCES

Abebe, G. K., J. Bijman, S. Pascucci, and O. Omta. 2013. "Adoption of improved potato varieties in Ethiopia: The role of agricultural knowledge and innovation system and smallholder farmers' quality assessment." *Agricultural Systems*, 122, 22-32.

Aghion, P., and P. Howitt. 1990. "A model of growth through creative destruction (No. w3223)." *National Bureau of Economic Research.*

Aldrich, H. E., and M. A. von Glinow. 1992. "Business start-ups: the HRM imperative." In: Birley, S., MacMillan, I.C. (Eds.), *International Perspectives on Entrepreneurial Research*. North-Holland, New York, pp. 233–253.

Alwang, J., and P. B. Siegel. 1999. "Labor shortages on small landholdings in Malawi: Implications for policy reforms." *World Development*, 27(8), 1461-1475.

Ascione, E., Cristiano, S., & Tarangioli, S. 2011. Farm advisory services for the agro-food supply chain as a foster of innovation: the case of Veneto Region. *Proceedings in Food System Dynamics*, 447-461.

Asheim, B. T., and A. Isaksen. 2002. "Regional innovation systems: the integration of local 'sticky' and global 'ubiquitous' knowledge." *The Journal of Technology Transfer*, 27(1), 77-86.

Batterink, M. H., E. F. Wubben, L. Klerkx, and S. W. F. Omta. 2010. "Orchestrating innovation networks: The case of innovation brokers in the agri-food sector." *Entrepreneurship and Regional Development*, *22*(1), 47-76.

Barrett, C. B. 2008. "Smallholder market participation: concepts and evidence from eastern and southern Africa." *Food Policy*, 33(4), 299-317.

Bellemare, M. F., and C. B. Barrett. 2006. "An ordered Tobit model of market participation: Evidence from Kenya and Ethiopia." *American Journal of Agricultural Economics*, 88(2), 324-337.

Besley, T., and A. Case. 1993. "Modeling technology adoption in developing countries." *The American Economic Review*, 83(2), 396-402.

Benbasat, I., D. K. Goldstein and M. Mead, 1987. The case research strategy in studies of information systems. MIS quarterly, 369-386.

Bessant, J., and H. Rush. 1995. "Building bridges for innovation: the role of consultants in technology transfer." *Research policy*, 24(1), 97-114.

Bingen, J., A. Serrano, andJ. Howard. 2003. “Linking farmers to markets: different approaches to human capital development.” *Food Policy*, 28(4), 405-419.

Boughton, D., D. Mather, C. B. Barrett, R. Benfica, D. Abdula, D. Tschirley, and B. Cunguara. 2007. “Market participation by rural households in a low-income country: An asset-based approach applied to Mozambique”. *Faith and economics*, 50(1), 64-101.

Burt, R. S. 2004. “Structural holes and good ideas”. *American journal of sociology,* 110(2), 349-399.

Byrne P.J., Capps O. Jr, Saha A. 1996, “Analysis of Food-Away-from-Home Expenditure Patterns for U.S. Households, 1982-89” *Amer. J. Agr. Econ.*, 78 (August), 614-627.

Cantwell, J. 2005. “Innovation and competitiveness.” *The Oxford handbook of innovation*, 543-567.

Carneiro, A. 2000. “How does knowledge management influence innovation and competitiveness?” *Journal of knowledge management*, *4*(2), 87-98.

Cash, D. W. 2001. “In order to aid in diffusion useful and practical information: agricultural extension and boundary organizations.” *Science, Technology and Human Values* 26, 431–453.

Castellani, D., A. Zanfei, andM. A. Muendler. 2006. “Multinational firms, innovation and productivity.” Cheltenham: Edward Elgar.

Chowdhury, A. H., H .H. Odame, and C. Leeuwis. 2014. “Transforming the Roles of a Public Extension Agency to Strengthen Innovation: Lessons from the National Agricultural Extension Project in Bangladesh.” *The Journal of Agricultural Education and Extension.* Volume 20, Issue 1, 2014.

Clark, J., and K. Guy. 1998. “Innovation and competitiveness: a review: Practitioners' forum.” *Technology Analysis & Strategic Management*, 10(3), 363-395.

Contò F., M. Fiore and P. La Sala. 2013. “The role of innovation in the integrated processes of Integrated Project of Food Chain: the case of cherry cultivation chain in Apulia region”. *Intellectual Economics*, Vol. 7, No. 4(18), p. 467-485, ISSN 1822-8011.

Cooke, P., M. Gomez Uranga, and G. Etxebarria. 1997. “Regional innovation systems: Institutional and organisational dimensions.” *Research policy*, 26(4), 475-491.

Cooke, P. N., M. Heidenreich, and H. J. Braczyk. eds. 2004. “Regional innovation systems: the role of governances in a globalized world.” *Psychology Press*.

Costa, A. I., and W. M. F. Jongen. 2006. “New insights into consumer-led food product development.” *Trends in Food Science & Technology*, 17(8), 457-465.

Christoplos, I. 2010. “Mobilizing the potential of rural and agricultural extension”. Rome: FAO/GFRAS.

Cristiano, S., Proietti, P., and Striano, M. (2014). Farm Advisory Services in knowledge transfer and innovation: which role in Rural Development Programmes (RDPs) 2014-2020.

Cristiano, S., and Proietti, P (2014). Farm Innovation through Rural Development Programmes 2014-2020: an evaluation model of the EIP.

Dalziel, M. 2010. “Why do innovation intermediaries exist.” In 2010 DRUID Conference, London, UK. http://www2. druid. dk/conferences/viewabstract. php.

Dargan, L., & Shucksmith, M. 2008. LEADER and innovation. *Sociologia ruralis*, *48*(3), 27

Davis, J. 2013. “Innovation in the Agri-food System”. *EuroChoices*, 12(1), 3-3.

De Jong, J. P., and P. A. Vermeulen. 2006. “Determinants of Product Innovation in Small Firms A Comparison Across Industries.” *International Small Business Journal*, 24(6), 587-609.

De Rosa, M., Sabbatini, M., & Spigola, M. 2008. Network analyses to catch rural complexity. *Journal on Chain and Network Science*, *8*(1), 75-82.

Dillon, J. L., and J. R. Anderson. 1971. “Allocative efficiency, traditional agriculture, and risk.” *American Journal of Agricultural Economics*, *53*(1), 26-32.

Dosi, G., C. Freeman, R. Nelson, G. Silverberg, and L. L. Soete. 1988. “Technical change and economic theory.”

Eisenhardt, K. M. 1989. Building Theories from Case Study Research. The Academy of Management Review, 14(4), 532-550.

Eisenhardt, K. M., and Graebner, M. E. 2007. Theory Building From Cases: Opportunities And Challenges. Academy of Management Journal, 50(1), 25-32.

Esparcia, J. 2014. Innovation and networks in rural areas. An analysis from European innovative projects. *Journal of rural studies*, *34*, 1-14.

Etzkowitz, H., and L. Leydesdorff. 2000. “The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations.” *Research policy*, 29(2), 109-123.

European Commission. EC 2013. “Draft guidelines on programming for innovation and implementation of the EIP for agriculture productivity and sustainability.” Brussels. [Pdf].

European Commission. EC 2014. “Cohesion policy 2014-2020”. Cohesion policy, March 2014. Brussels: European Commission. [Pdf].

European Network for Rural Development. 2010. Extended Report on Preserving the Innovative Character of Leader, Leader subcommittee Focus Group on Preserving the innovative/experimental character of Leader http://enrd.ec.europa.eu.

European Network for Rural Development. 2013. Knowledge Transfer and Innovation in Rural Development Policy. EU Rural Review N°16

European Network for Rural Development. 2013a. Focus Group on Knowledge Transfer & Innovation. EIP Operational Groups: Lessons and recommendations from from the 2007-2013Rural Development Programmes. Final draft. Bruxelles.

European Network for Rural Development. 2013b. Focus Group on Knowledge Transfer & Innovation. Towards Successful Innovation Brokerage: Insights from the 2007-2013 Rural Development Programmes. Final draft. Bruxelles.

EU SCAR, 2012, Agricultural knowledge and innovation systems in transition – a reflection paper, Brussels

Fagerberg, J., D. C. Mowery, and R.R. Nelson, eds. 2006. “The Oxford handbook of innovation.” *Oxford Handbooks Online*.

Fałkowski, J. 2011. Looking at the LEADER programme from the angle of political accountability: Evidence from Poland.

Fałkowski, J. 2013. Political accountability and governance in rural areas: Some evidence from the Pilot Programme LEADER+ in Poland. *Journal of Rural Studies*, *32*, 70-79.

Fan, S., and C. Chan-Kang. 2005. “Is small beautiful? Farm size, productivity, and poverty in Asian agriculture.” *Agricultural Economics*, *32*(s1), 135-146.

Faure, G., Y. Desjeux and P. Gasselin, 2012. New challenges in agricultural advisory services from a research perspective: a literature review, synthesis and research agenda. The Journal of Agricultural Education and Extension, *18*(5), 461-492.

Feder, G., R. E. Just, and D. Zilberman. 1985. “Adoption of agricultural innovations in developing countries: A survey.” *Economic development and cultural change*, *33*(2), 255-298.

Feder, G., and D. L. Umali. 1993. “The adoption of agricultural innovations: a review.” *Technological forecasting and social change*, 43(3), 215-239.

Fernandez-Cornejo, J., S. Daberkow, and W. D. McBride. 2002. “Decomposing The Size Effect On The Adoption Of Innovations.”

Fichter, K. 2009. “Innovation communities: the role of networks of promotors in Open Innovation.” *R&d Management*, *39*(4), 357-371.

Freeman, C. 1995. “The ‘National System of Innovation’ in historical perspective.” *Cambridge Journal of economics*, *19*(1), 5-24.

Freeman, C. 1991. “Networks of innovators: a synthesis of research issues.” *Research policy*, 20(5), 499-514.

Freeman, H. A., S. K. Ehui,and M. A Jabbar. 1998. “Credit constraints and smallholder dairy production in the East African highlands: application of a switching regression model.” *Agricultural Economics*, *19*(1), 33-44.

Gehlhar, M., and A. Regmi. 2005. “Factors shaping global food markets.” *New directions in global food markets*, 5-17.

Gereffi, G., J. Humphrey, and T. Sturgeon. 2005. “The governance of global value chains.” *Review of international political economy*, *12*(1), 78-104.

Gils, A. V., and P. Zwart. 2004. “Knowledge Acquisition and Learning in Dutch and Belgian SMEs:: The Role of Strategic Alliances.” *European Management Journal*, 22(6), 685-692.

Grieve, J., and Weinspach, U. 2011, February. Capturing impacts of Leader and of measures to improve Quality of Life in rural areas. In *122nd EAAE seminar" Evidence-based agricultural and rural policy making: methodological and empirical challenges of policy evaluation", Ancona*.

Grindley, P., D. C. Mowery,and B. Silverman. 1994. “SEMATECH and collaborative research design: Lessons in the design of high-technology consortia.” *Journal of Policy Analysis and Management,* 13: 723-758.

Gómez, M. I., C. B. Barrett, L. E. Buck, H. De Groote, S. Ferris H. O Gao, and R. Y. Yang. 2011. “Research principles for developing country food value chains.” *Science*, 332(6034), 1154-1155.

Gulati, A., N. Minot, C. Delgado, and S. Bora. 2007. “Growth in High-Value Agriculture in Asia and the Emergence of Vertical Links With.” *Global supply chains, standards and the poor*, 91-108.

Guston, D. H. 1996. “Principal-agent theory and the structure of science policy.” *Science and Public Policy 23*, 229–240.

Hall, A., Bockett, G., Taylor, S., Sivamohan, M.V.K., Clark, N., 2001. Why Research Partnerships Really Matter: Innovation Theory, Institutional Arrangements

and Implications for Developing New Technology for the Poor. World Development 29, 783-797.

Hall, B. H. 2004. "Innovation and diffusion." (No. w10212). National Bureau of Economic Research.

Hall, A.J. 2005. "Capacity Development for Agricultural Biotechnology in Developing Countries: An Innovation Systems View of What It Is and How to Develop It." *Journal of International Development* 19(5): 611-630.

Hall, A.J., Janseen, W., Pehu, E. And Rajalahti, R. 2006. "Enhancing agricultural innovation: how to go beyond the strengthening of research system". Washington DC: World Bank.

Hargadon, A. 1998. "Firms as knowledge brokers: lessons in pursuing continuous innovation." *California Management Review 40,* 209–227.

Hargadon, A. B. 2002. "Brokering knowledge: Linking learning and innovation." *Research in Organizational behavior*, 24, 41-85.

Hartwich, F., and U. Scheidegger. 2010. "Fostering Innovation Networks: the missing piece in rural development." *Rural Development News*, 1(2010), 70-75.

Hartwich, F., and J. Tola. 2007. "Public–private partnerships for agricultural innovation: concepts and experiences from 124 cases in Latin America." *International journal of agricultural resources, governance and ecology*, 6(2), 240-255.

Hazarika, G., and J. Alwang. 2003. "Access to credit, plot size and cost inefficiency among smallholder tobacco cultivators in Malawi." *Agricultural Economics*, 29(1), 99-109.

Heckman, J.J., 1979. Sample selection bias as a specification error. Econometrica: J. Economet. Soc., 153–161.

Hellin, J., M. Lundy, and M. Meijer. 2009. "Farmer organization, collective action and market access in Meso-America." *Food Policy*, 34(1), 16-22.

Hellin, J. 2012. "Agricultural extension, collective action and innovation systems: lessons on network brokering from Peru and Mexico." *The Journal of Agricultural Education and Extension*, *18*(2), 141-159.

Hertog, P.D. 2000. "Knowledge-intensive business services as co-producers of innovation." *International Journal of Innovation Management*, 4(04), 491-528.

High, C., & Nemes, G. (2007). Social learning in LEADER: Exogenous, endogenous and hybrid evaluation in rural development. *Sociologia Ruralis*,*47*(2), 103-119.

Hoffmann, W. H., and R. Schlosser. 2001. “Success factors of strategic alliances in small and medium-sized enterprises—An empirical survey.” *Long range planning*, *34(*3), 357-381.

Howells, J. 2006. “Intermediation and the role of intermediaries in innovation.” *Research policy*, *35(*5), 715-728.

Katona-Kovács, J., High, C., & Nemes, G. 2011. Importance of animation actions in the operation of Hungarian local action groups. *European Countryside*, *3*(4), 227-240.

Key, N., and D. Runsten. 1999. “Contract farming, smallholders, and rural development in Latin America: the organization of agroprocessing firms and the scale of outgrower production.” *World Development*, *27*(2), 381-401.

Kilelu, C.W., L. Klerkx, C. Leeuwis, and A. Hall. 2011. “Beyond knowledge brokering: an exploratory study on innovation intermediaries in an evolving smallholder agricultural system in Kenya.” *Knowledge Management for Development Journal*, *7*(1), 84-108.

Kilelu, C. W., Klerkx, L. and C. Leeuwis, 2013. Unravelling the role of innovation platforms in supporting co-evolution of innovation: contributions and tensions in a smallholder dairy development programme. Agricultural systems, 118, 65-77.

Klerkx, L., and C. Leeuwis. 2008. “Matching demand and supply in the agricultural knowledge infrastructure: Experiences with innovation intermediaries.” *Food Policy*, *33*(3), 260-276.

Klerkx, L., and C. Leeuwis. 2008b. “Balancing multiple interests: Embedding innovation intermediation in the agricultural knowledge infrastructure.”*Technovation*, *28*(6), 364-378.

Klerkx, L., and C. Leeuwis. 2009. “Establishment and embedding of innovation brokers at different innovation system levels: Insights from the Dutch agricultural sector.” *Technological Forecasting and Social Change*, *76*(6), 849-860.

Klerkx, L., and C. Leeuwis. 2009b. “Operationalizing demand-driven agricultural research: institutional influences in a public and private system of research planning in the Netherlands.” *Journal of Agricultural Education and Extension*, *15*(2), 161-175.

Klerkx, L., M. Schut, C. Leeuwis and C. Kilelu, 2012. Advances in knowledge brokering in the agricultural sector: towards innovation system facilitation. IDS Bulletin, 43(5), 53-60.

Klerkx L., van Mierlo B., C., L., 2012b. Evolution of systems approaches to agricultural innovation: concepts, analysis and interventions, in: Darnhofer, D.G., and B. Dedieu (Ed.), Farming Systems Research into the 21st Century: The New Dynamic. Springer Science+Business Media, Dordrecht.

Klerkx, L., Adjei-Nsiah, S., Adu-Acheampong, R., Saïdou, A., Zannou, E., Soumano, L., ... and Nederlof, S. 2013. Looking at agricultural innovation platforms through an innovation champion lens: an analysis of three cases in West Africa. *Outlook on agriculture*, *42*(3), 185-192.

Klijn, E. H., and G. R. Teisman. 2003. "Institutional and Strategic Barriers to Public—Private Partnership: An Analysis of Dutch Cases." *Public money and Management*, *23*(3), 137-146.

Knickel, K., G. Brunori, S. Rand., and J. Proost. 2009. "Towards a better conceptual framework for innovation processes in agriculture and rural development: from linear models to systemic approaches." *Journal of Agricultural Education and Extension*, *15*(2), 131-146.

Knickel, K., Tisenkopfs, T., Peter, S., 2009b. Innovation processes in agriculture and rural development. Results of a cross-national analysis of the situation in seven countries, research gaps and recommendations, INSIGHT Final report.

Kovach, I. (2000). leader, a New Social Order, and the Central-and East-European Countries. *Sociologia Ruralis*, *40*(2), 181-189.

Jayne, T. S., T. Yamano, and J. Nyoro. 2004. "Interlinked credit and farm intensification: Evidence from Kenya." *Agricultural Economics*, *31*(2-3), 209-218.

Johnson, W. H. 2008. "Roles, resources and benefits of intermediate organizations supporting triple helix collaborative R&D: The case of Precarn."*Technovation*, *28*(8), 495-505.

Lam, A. 2004. "Organizational innovation."

Lazzarini, S., Chaddad, F., and Cook, M. 2001. Integrating supply chain and network analyses: the study of netchains. Journal on chain and network science, 1(1), 7-22.

Leeuwis, C. 2000. "Learning to be sustainable. Does the Dutch agrarian knowledge market fail?." *The Journal of Agricultural education and extension*, *7*(2), 79-92.

Leeuwis, C. 2004. From extension to communication for innovation.*Communication for rural innovation rethinking agricultural extension*.

Leeuwis, C., and N. Aarts. 2011. “Rethinking communication in innovation processes: creating space for change in complex systems.” *Journal of Agricultural Education and Extension*, 17(1), 21-36.

Lynn, L.H., N. M. Reddy, J. D. Aram. 1996. “Linking technology and institutions: the innovation community framework.” *Research Policy* 25, 91–106.

Loizou, E., Chatzitheodoridis, F., Michailidis, A., Kontogeorgos, A., & Mattas, K. 2014, August. Leader approach performance assessment in a Greek rural region. In *Poster paper presented at the EAAE 2014 Congress" Agri-Food and Rural Innovations for Healthier Societies" August* (Vol. 26).

Lukesch, R. (2007). The LAG handbook. *Brussels: Leader Observatory*.

Lundvall, B. Å., B. Johnson, E. S. Andersen, and B. Dalum. 2002. “National systems of production, innovation and competence building.” *Research policy*, *31*(2), 213-231.

Madzudzo, E., 2011. Role of Brokerage in Evolving Innovation Systems: A Case of the Fodder Innovation Project in Nigeria. The Journal of Agricultural Education and Extension 17, 195-210.

Malerba, F. 2002. “Sectoral systems of innovation and production.” *Research policy*, 31(2), 247-264.

Mantel, S.J., and G. Rosegger. 1987. “The role of third-parties in the diffusion of innovations: a survey.” *In: Rothwell, R., J. Bessant, eds. Innovation: Adaptation and Growth*. Elsevier, Amsterdam, pp. 123–134.

Markelova, H., R. Meinzen-Dick, J. Hellin, and S. Dohrn. 2009. “Collective action for smallholder market access.” *Food Policy*, 34(1), 1-7.

Materia, V. C., Dries, L., & Pascucci, S. 2014. *Innovation in agro-food supply chains–The EU policy context “* (Vol. 5). COMPETE Working paper.

Materia, V. C., Pascucci, S., & Kolympiris, C. 2015. Understanding the selection processes of public research projects in agriculture: The role of scientific merit. *Food Policy*, *56*, 87-99.

Mazzoleni, R., and R. R. Nelson. 2007. “Public research institutions and economic catch up.” *Research Policy,* 36(10): 1512-1528.

McEvily, B., andA. Zaheer. 1999. “Bridging ties: A source of firm heterogeneity in competitive capabilities.” *Strategic Management Journal,* 20: 1133-1156.

Mian, S. A. 1996. “Assessing value-added contributions of university technology business incubators to tenant firms.” *Research Policy,* 25: 325-335.

Miehlbradt, A. O., M. McVay. 2005. “From BDS to Making Markets Work for the Poor.” *International Labour Organization,* Geneva, Switzerland.

Miles, I., N. Kastrinos, K. Flanagan, R. Bilderbeek, P. Den Hertog, W. Huntink, and M. Bouman. 1995. "Knowledge-intensive business services." *EIMS publication*, (15).

Millar, C. C. J. M., and C. J. Choi. 2003. "Advertising and knowledge intermediaries: managing the ethical challenges of intangibles." *Journal of Business Ethics* 48, 267–277.

Morgan, S. L. 2011. Social learning among organic farmers and the application of the communities of practice framework. *Journal of Agricultural Education and Extension*, *17*(1), 99-112.

Moumouni, I. M., S. D. Vodouhe, and F. Streiffeler. 2009. "What makes small-scale farmers participate in financing agricultural research and extension? Analysis of three case studies from Benin." *Journal of agricultural education and extension*, 15(3), 301-316.

Muyanga, M., and T. S. Jayne. 2008. "Private agricultural extension system in Kenya: practice and policy lessons." *Journal of agricultural education and extension*, *14*(2), 111-124.

Navarro, F. A., Woods, M., & Cejudo, E. 2015. The LEADER Initiative has been a Victim of Its Own Success. The Decline of the Bottom-Up Approach in Rural Development Programmes. The Cases of Wales and Andalusia.*Sociologia Ruralis*.

Nederlof, S., & Wongtschowski, M. 2011. *Putting heads together: agricultural innovation platforms in practice*. F. van der Lee (Ed.). KIT Publishers, KIT Development, Policy & Practice.

Nelson, R. 1993. "National innovation systems: a comparative analysis." *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

Narrod, C., D. Roy, J. Okello, B. Avendaño, K. Rich, and A. Thorat. 2009. "Public–private partnerships and collective action in high value fruit and vegetable supply chains." *Food Policy*, *34*(1), 8-15.

OECD. 2005. "The Measurement of Scientific and Technological Activities Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data." OECD publishing.

OECD. 2009. "Growing Prosperity. Agriculture, Economic Renewal, and Development." *Draft Outcome Document from the Experts Meeting* "Innovating Out of Poverty," OECD, Paris, April 6–7.

Omta, S. W., 2004. Increasing the innovative potential in chains and networks. Journal on Chain and Network Science, 4(2), 75-81.

Oreszczyn, S., Lane, A., & Carr, S. 2010. The role of networks of practice and webs of influencers on farmers' engagement with and learning about agricultural innovations. *Journal of Rural Studies*, *26*(4), 404-417.

Park L.J., Capps O. Jr., 1997. "Demand for prepared meals by U.S. households" *Amer. J. Agr. Econ.,*79, 814-824.

Pascucci, S., Dries, L., Karantininis, K., and G. Martino, 2015. Regulation and organizational change in the governance of agri-food value chains. British Food Journal, Vol. 117(10).

Pemberton, S., & Goodwin, M. 2010. Rethinking the changing structures of rural local government–State power, rural politics and local political strategies?.*Journal of Rural Studies*, *26*(3), 272-283.

Poulton, C., A. Dorward and J. Kydd, 2010. The Future of Small Farms: New Directions for Services, Institutions, and Intermediation. World Development 38, 1413-1428.

Râmniceanu, I., & Ackrill, R. 2007. EU rural development policy in the new member states: Promoting multifunctionality?. *Journal of rural studies*, *23*(4), 416-429.

Ray, C. 2000. Editorial. The EU LEADER programme: rural development laboratory. *Sociologia Ruralis*, *40*(2), 163-171.

Reardon, T., C. B. Barrett, J. A. Berdegué, and J. F. Swinnen. 2009. "Agrifood industry transformation and small farmers in developing countries." *World development*, *37*(11), 1717-1727.

Rivera, W. M. 2000. "The changing nature of agricultural information and the conflictive global developments shaping extension." *The Journal of Agricultural Education and Extension*, *7*(1), 31-42.

Rivera, W.M., Qamar, M.K., Mwandemere, H.K., 2005. Enhancing coordination among AKIS/RD actors: an analytical and comparative review of country studies on Agricultural Knowledge and Information Systems for Rural Development (AKIS/RD). Food and Agriculture Organisation of the United Nations.

Rivera, W. M. 2011. "Public sector agricultural extension system reform and the challenges ahead." *Journal of Agricultural Education and Extension*, *17*(2), 165-180.

Röling, N. 1992. "Extension Science, Increasingly Preoccupied with Knowledge Systems." *Sociologia Ruralis* 4(3-4): 269–290.

Ruitemburg, R. J., F. T. J. M. Fortuin and S. W. F. Omta, 2014. The role of prior experience, intellectual property protection and communication on trust and

performance in innovation alliances. Journal on Chain and Network Science, 14(2), 117-128.

Rujis, A., C. Schweigman, and C. Lutz. 2004. "The impact of transport-and transaction-cost reductions on food markets in developing countries: evidence for tempered expectations for Burkina Faso." *Agricultural Economics*, *31*(2-3), 219-228.

Sánchez-Zamora, P., Gallardo-Cobos, R., & Ceña-Delgado, F. 2014. Rural areas face the economic crisis: Analyzing the determinants of successful territorial dynamics. *Journal of Rural Studies*, *35*, 11-25.

Sarkar, S., and A. I. Costa. 2008. "Dynamics of open innovation in the food industry." *Trends in Food Science & Technology*, *19*(11), 574-580.

Sapsed, J., A. Grantham, and R. DeFillippi. 2007. "A bridge over troubled waters: Bridging organisations and entrepreneurial opportunities in emerging sectors." *Research Policy*, *36*(9), 1314-1334.

Sseguya, H., R. Mazur, E. Abbott, and F. Matsiko. 2012. "Information and communication for rural innovation and development: Context, quality and priorities in southeast Uganda." *The Journal of Agricultural Education and Extension*, *18*(1), 55-70.

Shah, T., B. Van Koppen, D. Merrey, M. de Lange, and M. Samad. 2002. "Institutional Alternatives in African Smallholder Irrigation." *IWMI, Research Report 60.*

Schad, I., Roessler, R., Neef, A., Valle Zarate, A., & Hoffmann, V. (2011). Group-based learning in an authoritarian setting? Novel extension approaches in Vietnam's northern uplands. *Journal of Agricultural Education and Extension*, *17*(1), 85-98.

Shepherd, A. 2007. "Approaches to linking producers to markets" *(Vol. 13). FAO.*

Shiferaw, B. A., J. Okello, and R. V. Reddy. 2009. "Adoption and adaptation of natural resource management innovations in smallholder agriculture: reflections on key lessons and best practices." *Environment, Development and Sustainability*, *11*(3), 601-619.

Shohert, S., and M. Prevezer. 1996. "UK biotechnology: institutional linkages, technology transfer and the role of intermediaries." *R&D Management* 26, 283–298.

Shortall, S. 2008. Are rural development programmes socially inclusive? Social inclusion, civic engagement, participation, and social capital: Exploring the differences. *Journal of Rural Studies*, *24*(4), 450-457.

Smart, P., J. Bessant, and A. Gupta. 2007. “Towards technological rules for designing innovation networks: a dynamic capabilities view.” *International Journal of Operations & Production Management*, *27*(10), 1069-1092.

Smedlund, A. 2006. “The roles of intermediaries in a regional knowledge system.” *Journal of Intellectual Capital*, *7*(2), 204-220.

Spielman, D. J. 2005. “Innovation systems perspectives on developing-country agriculture: a critical review.” *ISNAR Discussion Paper 2*, IFPRI, pp. 1–58. Washington DC.

Spielman, D. J., F. Hartwich, and K. Von Grebmer. 2007. “Public-private partnerships in international agricultural research (pp. 1-6).” *International Food Policy Research Institute*.

Stankiewicz, R., 1995. “The role of the science and technology infrastructure in the development and diffusion of industrial automation in Sweden.” *In: Carlsson, B. ed., “*Technological Systems and Economic Performance: The Case of Factory Automation.” Dordrecht, Kluwer, pp. 165–210.

Sulaiman V, R., A. Hall, N. J. Kalaivani, K. Dorai, nad T. V. Reddy. 2012. “Necessary, but not sufficient: Critiquing the role of information and communication technology in putting knowledge into use.” *The Journal of Agricultural Education and Extension*, *18*(4), 331-346.

Swinnen, J. F. 2009. “Reforms, globalization, and endogenous agricultural structures.” *Agricultural Economics*, *40*(s1), 719-732.

Swinnen, J. F., and A. Vandeplas. 2010. “Market power and rents in global supply chains.” *Agricultural Economics*, *41*(s1), 109-120.

Teilmann, K. 2012. Measuring social capital accumulation in rural development. *Journal of Rural Studies*, *28*(4), 458-465.

Tödtling, F., and M. Trippl. 2005. “One size fits all?: Towards a differentiated regional innovation policy approach.” *Research policy*, *34*(8), 1203-1219.

Van Lente, H., M. Hekkert, R. Smits, and B. Van Waveren. 2003. “Roles of systemic intermediaries in transition processes.” *International Journal of Innovation Management* 7, no. 3: 1–33.

Vagnozzi, A. 2011. La nuova consulenza gioca a tutto campo. *PianetaPSR. it*, (4).

Yen S.T. 1993; “Working wives and food away from home: the box-cox double hurdle model”;
Amer. J. Agr. Econ.; 75: 884.895

Yin, R. K. (2013). *Case study research: Design and methods*. Sage publications.

Watkins, D., G. Horley, 1986. “Transferring technology from large to small firms: the role of intermediaries.” *In: Webb, T., T. Quince, D. Watkins. eds. Small Business Research*. Gower, Aldershot, pp. 215–251.

Wellbrock, W., Roep, D., Mahon, M., Kairyte, E., Nienaber, B., García, M. D. D., ... & Farrell, M. 2013. Arranging public support to unfold collaborative modes of governance in rural areas. *Journal of Rural Studies*, *32*, 420-429.

Wennink, B., & Heemskerk, W. (2006). Farmers' organizations and agricultural innovation: Case studies from Benin, Rwanda and Tanzania. *Bulletin/Development policy and practice*, (374).

Winch, G. M., and R. Courtney. 2007. “The organization of innovation brokers: An international review.” *Technology analysis & strategic management*, *19*(6), 747-763.

Wolgin, J. M. 1975. “Resource allocation and risk: A case study of smallholder agriculture in Kenya.” *American Journal of Agricultural Economics*, *57*(4), 622-630.

World Bank, 2006. “Enhancing agricultural innovation: how to go beyond the strengthening of research systems.” *Washington DC: World Bank. Available from: http://siteresources.worldbank.org/INTARD/Resources/Enhancing_Ag_Innovation.pdf*

World Bank, 2012. “Agricultural innovation system, an investment sourcebook.” Washington, DC: World Bank.

About the Author

Raffaele Dicecca was born in Bari, Italy on 15 July, 1985. He obtained his degree in Development and Environmental Economics from the University of Roma Tre (Italy). During his studies, he was interested in understanding the dynamic related to Agricultural and Knowledge Innovation System, innovation brokering and their linkages with topics related to the development studies. Therefore, in 2012, he joined the Department of Economics at Foggia University as a PhD candidate. Later, in October 2013, he started a visiting period at Management Studies Group at Wageningen University (The Netherlands). Raffaele's interests lay in the general fields agricultural extension and facilitation of innovation. He is specifically interested in analysing the potential of the agro-food supply chain through the introduction of common knowledge and innovation within all the stakeholders involved in local market exchange. Main contribution of his PhD work is the identification of role and functions of different intermediary organizations.

Grazie

Prof. Francesco Contò. Per la guida professionale, didattica e umana; per l'esperienza estremamente formativa. Grazie Prof.
Stefano Pascucci. Per tutte le volte che ho bussato a quella porta, "ti rubo solo 10 minuti", per la supervisione e per l'amicizia, per i momenti difficili, perché non credo sarebbe durata così a lungo senza il tuo aiuto. Per tutto davvero, ci sarebbe molto da scrivere. Grazie Ste.
Valentina Materia. Per essere stata un punto di riferimento nella ricerca; per l'ultimo periodo di supervisione e per i tanti consigli. Grazie amica.

Nicola Faccilongo. Per lo "stupido e maledetto lucerino"; per quella chiamata estiva. Perché sei un amico e ci vogliamo bene.
Tutto il team di ricerca di Unifg. Per Lilla, Paola, Piero, Mariagrazia, Concetta, Miriam, Donatello, Giustina, Claudio, Fedele, Emilia e Raffaele.

I realize that I have been blessed to meet amazing people, colleagues and friends during the period in 'crazy' Wageningen. The Italians, Valentina Materia, Valentina Acierno, Edoardo, Domenico, Carla, Lavinia, Francesco, Danilo, Walter, Alessandro. My lovely housemates, Alexia, Thibeaut and Edo, super big moments, will not forget any single thing, love you. Special thanks also for the mushroom team, Valentina and Erika, you made my stay much easier; my dutch favorite Rob and a lot of other wonderful guys: Eliza, Arie, Dimitris, Costas, Eva, Imi, Elsa, Marcela, Surya, Bruno, I truly appreciated sharing time and life with all of you. Thanks guys!

Alla mia famiglia. Siete praticamente tutto: Felice, Mariella, Francesca, Massimo, Enzo, Valentina, Ludovica. Grazie per avermi accompagnato anche questa volta. Sempre insieme.