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THE ROLE OF NETWORKING IN ENHANCING INNOVATION WITHIN THE AGRICULTURAL SYSTEM

Thesis submitted in fulfilment of the requirements for the degree of Doctor (PhD) of Applied Biological Sciences
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De rol van netwerking in het stimuleren van innovatie in het landbouwsysteem

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This PhD research combines a collection of individual papers that are submitted to or have been accepted for publication in peer-reviewed journals. The PhD has been undertaken within the framework of a national project entitled “Networks as a catalyst for innovation within the agricultural sector”, which was funded by the Flemish Agency for Innovation by Science and Technology (IWT 090918).

The overall objective of this project was to realize a better fit between needs of farmers for networking and the supply of networks, resulting in a better valorisation of knowledge in innovative applications.

This project was coordinated by Ghent University and involved cooperation with ILVO (Institute For Agricultural and Fisheries Research). This PhD dissertation builds on the results of the cases conducted by Ghent University.
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Februari 2016
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List of abbreviations

AIS: Agricultural Innovation System
CAP: Common Agricultural Policy
EC: European Commission
EIP: European Innovation Partnership
EU: European Union
FG: Focus Group
FI: Farmer Interviews
NCI: Network Coordinator Interviews
OI: Open Innovation
R&D: Research and Development
RBV: Resource-Based View
SME: Small and Medium-sized Enterprises
TPB: Theory of Planned Behaviour
Networking is widely accepted as a successful strategy to come to innovations. Despite the fact that much research has been conducted on the relationship between networks and innovation, no consensus has been reached about what actually constitutes the success of innovation through networks. This forms the starting point of this dissertation.

To study this, we focus on the agricultural sector. In this sector, innovation becomes an even greater necessity. On the one hand, there is the challenge of feeding an increasing global population, while the demand for feed and biomass applications will be jeopardized. On the other hand, farmers are confronted with an increased competition and pressure on price levels. Innovations can help to change these challenges into opportunities for individual farms and the sector in general. In this regard, they could benefit from networking. However, farmers are confronted with multiple challenges in the development of network relationships. Farmers do not only face the challenges valid for SMEs in general, but are also subject to the specificities of the agricultural innovation system, such as (1) the traditional development of innovations outside the farms to be adopted with the help of intermediary actors, (2) very limited bargaining power of farmers within the chain and (3) the legacy of the agricultural policy with important focus on income guarantee. This has led to a big dependency of farmers to external stimuli for innovation. Understanding now how networking contributes to innovation within the agricultural system is the objective of this dissertation, which is a compilation of research papers. To study the role of networks in the specific agricultural innovation system, a combination of theories is brought together, namely Innovation Theory, the Industrial Marketing Management literature, Resource-Based View and the Theory of Planned Behaviour.

Data was gathered through primary and secondary data sources in the frame of a national project (IWT 090918). The primary data sources were interviews with farmers, network coordinators and focus group discussions with farmers during the period 2011-2013, reaching 109 respondents. Four specific research objectives are formulated to address the main objective. The first objective is to investigate the different characteristics of partners and relationships in farmers’ network activity for innovation. This objective was realized by applying an existing typology to analyse a relationship’s asymmetry. The results are consistent with the theoretical framework applied, since they show that asymmetric relationships can indeed affect the development of innovations, both positively and negatively. For each characteristic of relationship asymmetry (mutuality, particularity, interpersonal inconsistency, co-operation, intensity, power and dependence), it was investigated how farmers perceive this in their relationships with their different actors and how they think it influences their innovation behaviour. The results revealed that the farmers consult mainly network partners they are familiar with. This could limit the potential for gaining information and knowledge that could be useful for innovation.

Research objective two focuses on the understanding of the role of different network partners depending on the type of innovation and the stage in the innovation process. Our analysis showed that different network partners are consulted for different types of innovation and stages along the innovation process. For product innovations, horizontal collaboration is hardly important, while vertical collaboration with buyers and suppliers is suggested as very important, as well as collaboration with research institutes. For process innovations, the results indicate the importance of vertical as well as horizontal networks, consultants and research institutes. Regarding marketing innovations, the
horizontal collaboration with colleagues and vertical collaboration with buyers is most frequently observed in this study. Concerning the organizational innovations, a combination of networking with horizontal and vertical networks as well as with third parties was found to have a huge influence on the success of the innovations. With regard to the innovation stages, during the initiation phase, a lot of contacts with a heterogeneous group of people are important. The main focus in the analysed cases is on colleagues, both home and abroad. In the course of the development period, fewer partners are involved. Suppliers are observed as important, together with third parties such as financial providers and consultants. For the implementation-termination stage, collaboration with colleagues and buyers was shown as important for the marketing of the products, and with the suppliers to further fine-tune the innovation. The findings indicate that farmers need to pay attention to the importance of partner suitability for the innovation type and stage they are aiming at. The third objective aims at increasing understanding the factors influencing farmers’ network activity for innovation. Expected advantages of network activity mentioned were, for example, that you always learn something, that you know the right people and places when information is needed and that you become aware of things from other sectors which can be useful in your own sector. Expected disadvantages are a.o. low perceived return on investment and lack of objectivity of the information. Influential reference groups approving or disapproving network activity are spouses, colleagues, network coordinators and chain partners. Other barriers observed were difficulties to find partners with whom they can communicate openly and honestly, lack of time and difficulties to leave the farm. The results give rise to the advice for farmers that they should consider the long-term benefits of networking and they should search for strategies that best fit their situation in order to connect with the networks in the most effective and efficient way. Research objective four concerns the identification of network characteristics critical for successful innovations. The findings indicate that to decrease the uncertainty inherent to innovation, the network management via a central coordinator who forms the link between multiple stakeholders is important. Furthermore, a heterogeneous group of people and strong and direct ties were revealed as important. To handle the knowledge intensity, our findings suggest to better aim at effective face-to-face or direct communications, managed through an independent person or management board. To handle the controversial interests involved in an innovation process, horizontal collaboration was found as a key element. Concerning the importance of crossing boundaries to innovate, heterogeneity in membership and willingness to change routines are prerequisites. This PhD dissertation contributes to the “networked innovation” literature by further investigating different aspects of the link between networks and innovation within the agricultural system. The results show that unless the challenges farmers face, they can also enjoy the advantages of being active in numerous networks to be or become innovative. Therefore, reconsidering the own role in the innovation process can be relevant for all type of members. Valuable inputs for farmers, policy makers, network coordinators and other stakeholders that aim at fostering networking for innovation are provided. Finally, a number of topics for future research are highlighted, particularly focusing on (1) an objective measure of successful innovations, (2) increased focus on innovations generated by the farmer and (3) on marketing and organizational innovations, (4) international replication and (5) the influence of social conditions and agency related aspects on innovation success.
Samenvatting

Netwerking wordt gezien als een belangrijke strategie om tot innovatie te komen. Het biedt bedrijven toegang tot middelen die hen kunnen helpen om hun innovatiecapaciteit te verhogen. Ondanks het feit dat er al veel onderzoek werd uitgevoerd naar de relatie tussen netwerken en innovatie, is er nog geen consensus over wat effectief bijdraagt tot succesvolle netwerken voor innovatie. Dit vormt dan ook het startpunt van deze thesis die dit onderwerp verder zal onderzoeken. Om dit te bestuderen, leggen we ons toe op de landbouwsector. In deze sector wordt innovatie steeds belangrijker. Enerzijds is er de uitdaging om een toenemende wereldpopulatie te voeden, in een tijdperk waarin de vraag naar veevoeders en toepassingen voor biomassa toeneemt. Anderzijds worden landbouwers door liberalisering en mondialisering meer en meer geconfronteerd met toenemende concurrentie en druk op de prijzen. Innovaties kunnen helpen om deze uitdagingen om te zetten in opportuniteiten voor het individuele landbouwbedrijf, alsook voor de sector in het algemeen. In dit opzicht kunnen zij gebruik maken van netwerken. Landbouwers ervaren echter heel wat uitdagingen bij het uitbouwen van hun netwerk. Ze worden niet alleen geconfronteerd met de uitdagingen geldig voor kleine ondernemingen in het algemeen, maar zijn daarbovenop nog eens onderhevig aan de specificiteiten van het landbouwinnovatiesysteem, zijnde (1) de traditionele rol van landbouwer als adopter van innovatie, (2) de beperkte marktmacht van landbouwers in de keten en (3) de nasleep van het sterk op inkomensgarantie georiënteerde landbouwbeleid. Dit heeft geleid tot een grote afhankelijkheid van externe stimuli voor innovatie onder de landbouwers. Het objectief van deze thesis is nu om te begrijpen hoe netwerking bijdraagt aan innovatie in het landbouwssysteem. In het kader van dit onderzoek werden verschillende academische theorieën samengebracht: Innovatietheorie, Resource-Based View, Theory of Planned Behaviour en Industriële Marketing Management-theorie.

Inzichten werden verkregen via primaire en secundaire dataverzameling in het kader van een nationaal project (IWT 090918). De primaire data werden verzameld via interviews met landbouwers, netwerkcoördinatoren en focusgroepsgesprekken met landbouwers in de periode 2011-2013, waarbij 109 respondenten werden bereikt. Vier specifieke onderzoeksdoeelstellingen werden geformuleerd om het hoofddoel te bereiken. De eerste doelstelling was om de verschillende kenmerken van landbouwers hun partners en relaties te onderzoeken, via toepassing van een bestaande typologie om asymmetriëen in relaties te onderzoeken. De resultaten zijn consistent met het toegepast theoretisch kader, waarbij ze aantonen dat asymmetrische relaties inderdaad de ontwikkeling van innovaties kunnen beïnvloeden, zowel positief als negatief. Voor elk kenmerk van relatie-asymmetriëen (mutualiteit, bijzonderheid, interpersoonlijke inconsistente, samenwerking, intensiteit, macht en afhankelijkheid) werd nagegaan hoe landbouwers dit element ervaren in de relatie met verschillende actoren en hoe zij denken dat dit een invloed heeft op hun innovatiegedrag. De resultaten tonen aan dat landbouwers hun relaties vaak beperken tot actoren met wie ze vertrouwd zijn. Dit kan echter nadelig zijn gezien dit het potentieel om informatie en kennis in te winnen, die nuttig kan zijn voor innovatie, zou kunnen beperken. De tweede doelstelling focust op inzicht in de rol van verschillende netwerkpartners afhankelijk van het type innovatie en de fase in het innovatieproces. De analyse toonde aan dat verschillende netwerkpartners geconsulteerd worden voor verschillende types innovatie en fases in het innovatieproces. Voor productinnovaties is horizontale samenwerking nauwelijks van belang, terwijl verticale samenwerking met afnemers en leveranciers zeer belangrijk werd bevonden, evenals de samenwerking met onderzoeksinstellingen en consultants. Wat betreft marketing innovaties werd
horizontale samenwerking met collega’s en verticale samenwerking met afnemers meest waargenomen in deze studie. Met betrekking tot de organisatorische innovatie toonde de analyse dat samenwerking met een veelheid aan netwerking met horizontale en verticale partners evenals met derde partijen een grote invloed heeft op het succes van innovaties. Met betrekking tot de innovatiefases, vonden we dat tijdens de initiatiefase heel wat contacten nodig zijn met een heterogene groep. De belangrijkste focus in de geanalyseerde cases lag op collega’s, zowel in binnen- als buitenland. In de loop van de ontwikkelingsfase zijn minder partners betrokken, met de hoofdfocus op leveranciers en derde partijen zoals financiële partners en consultants. Voor de implementatiefase werd samenwerking met collega’s en afnemers als belangrijkst bevonden voor de marketing van de producten, en met de leveranciers om de innovatie verder op punt te stellen. De bevindingen tonen aan dat landbouwers aandacht moeten besteden aan de geschiktheid van partners voor het type innovatie en de fase in het innovatieproces dat wordt beoogd. 

De derde doelstelling beoogde om meer inzicht te verkrijgen in de factoren die de netwerkactiviteit van landbouwers beïnvloeden. Verwachte voordelen van netwerking die bijvoorbeeld vermeld werden, zijn dat je altijd iets leert, dat je de juiste personen kent wanneer je informatie nodig hebt en dat je op de hoogte bent van zaken in andere sectoren die nuttig kunnen zijn voor uw sector. Verwachte nadelen zijn o.a. laag ervaren return op investeringen en gebrek aan objectiviteit van de verschafte informatie. Beïnvloedende groepen die netwerkactiviteit goedkeuren of afkeuren zijn echtgenoten, collega’s, netwerkcoördinatoren en ketenpartners. Andere vastgestelde barrières zijn moeilijkheden om partners te vinden waarmee open en eerlijk kan gecommuniceerd worden, gebrek aan tijd en moeilijkheden om het landbouwbedrijf te verlaten. De resultaten geven aan dat landbouwers meer aandacht moeten schenken aan de voordelen van netwerking op lange termijn en dat ze naar strategieën moeten zoeken die het best aansluiten bij hun situatie om op een effectieve en efficiënte manier te kunnen netwerken. 

Onderzoeksdoelstelling vier betreft de identificatie van netwerkkenmerken die kritisch zijn voor succesvolle innovaties. De bevindingen tonen aan dat, om de onzekerheid die inherent is aan het innovatieproces te reduceren, een centrale coördinator die de link vormt tussen verschillende stakeholders heel belangrijk is. Verder zijn een heterogene groep van actoren en sterke, directe banden belangrijk. Om met de hoge nood aan kennis voor innovatie om te gaan, suggereren onze bevindingen om best te focussen op effectieve face-to-face communicatie, die gemanaged wordt door een onafhankelijk persoon of een directieraad. Om de vaak tegengestelde belangen in een innovatieproces de baas te kunnen, werd horizontale samenwerking als een sleutelelement gevonden. Wat betreft het omgaan met het grensoverschrijdende karakter van innovaties zijn heterogeniteit in leden en bereidheid om routines te veranderen vereist. 

Dit doctoraat draagt bij aan de literatuur van “networked innovation” door verder onderzoek te verrichten naar verschillende aspecten van de link tussen netwerken en innovatie binnen het landbouwsysteem. De resultaten tonen dat landbouwers, ondanks de uitdagingen die ze moeten doorstaan, ook kunnen genieten van de voordelen van netwerking om innovatief te zijn of te worden. Het herzien van de eigen rol in het landbouwsysteem is relevant voor zowel de landbouwer als andere actoren. 

Verder werd ook waardevolle input geformuleerd voor landbouwers, beleidsmakers, netwerkcoördinatoren en andere stakeholders die beogen om innovatie via netwerking te stimuleren. 

Toekomstig onderzoek is aanbevolen, in het bijzonder met focus op (1) een objectief meetinstrument van succesvolle innovatie, (2) ontwikkeling van innovatie door de landbouwer zelf in plaats van adoptie, (3) marketing en organisatorische innovatie, (4) internationale uitbreiding en (5) de invloed van sociale omstandigheden en aspecten die buiten het netwerk plaatsvinden.
5 years of research experiences: from left to right, top to bottom:
1. Tomato sorting (Poland); 2. Orchid company (Poland); 3. Free-range chickens (Netherlands); 4. Focus group (Sint-Niklaas); 5. Teaching (Slovakia); 6. Poster presentation (Poland); 7. Focus group (Geel); 8. Guiding group work (Slovakia); 9. PhD-Symposium (Beauvais, France); 10. Horticultural conference (Gent); 11. Kiwi berry meeting (Sint-Niklaas); 12. FSD Conference (Austria)
Chapter 1

Introduction
1.1 General introduction

Since the mid-1990s, an increasing amount of research has been carried out in relation to networks. Researchers from various fields such as economics, including economic sociology and strategic management, health care services, psychology and communications have been continuously engaged in investigations, either theoretical/conceptual, methodological or empirical (Provan and Kenis, 2007; Hamdouch, 2010; Pascucci, 2011). There is an abundance of studies underpinning the importance of networks for innovation (Lasagni, 2012). A growing number of studies indicate the positive link between the use of external relationships and the innovation capacity of a firm (Pittaway et al., 2004; Amara and Landry, 2005; Zeng et al., 2010; Beckeman et al., 2013). Networking might provide access to resources that can help firms to become more innovative. Despite the increasing number of studies concerning the relationship between networks and innovation, it is acknowledged that this relationship needs to be further researched (Pittaway et al., 2004; Nieto and Santamaria, 2007; Lefebvre, 2014).

This sets the rationale for this dissertation, which is a compilation of research papers which aim to better understand how networking contributes to innovation within the agricultural innovation system.

Focus on the agricultural innovation system

In the agricultural innovation system, innovation is a necessity more than before. First, there is the challenge of feeding an increasing global population, while the demand for feed and biomass applications will be jeopardized. According to the Food and Agriculture Organization, the global food demand will increase by about 50% by 2050. At the same time, the sector is faced with decreasing growth in productivity and environment impacts have to be taken into account, together with the availability of natural resources (OECD, 1997; Meulenberg, 2000). This situation will require an innovative approach to fill this productivity gap.

Second, farmers are confronted with an increased competition and pressure on price levels. The press is full of headlines such as: “Farm crisis highlighted at Stormont and Brussels”, “Urgent matters to address farming crisis”, “Farmers clash with police in Brussels during milk and meat prices protest”, “European farmers fear instability as milk market deregulated”. The farmers have to comply with a series of standards and regulations: product quality, food safety, sustainability, and animal welfare (De Wilt et al., 2001; Hendrikse and Bijman, 2002). Furthermore, until recently, the sector was functioning under a highly protective environment (Common Agricultural Policy support). Nowadays, however, they depend on and are squeezed between the big multinationals (Schelhaas and Bruchem, 2009). Farmers are actually reacting to deregulation trends and to adjustments in legislation. These changes and the globalization trend have reframed the business conditions for farms. Actors who are active in the agricultural system are therefore under considerable pressure to reinvent themselves, to adapt and to react quickly to these new trends towards deregulation.
Innovations can help to change these challenges into opportunities for individual farms and the sector in general (LARA, 2012).

In this regard, there are indications that also the agricultural system could benefit from networking in terms of their innovations (Pannekoek et al., 2005; Vuylsteke and Van Gijselheem, 2010; Pascucci, 2011; Smyth et al., 2014). The European Commission (EC) for example recognizes the central role of Agricultural Innovation Systems (AIS) in improving agricultural productivity and sustainability and the need to reinforce international efforts and cooperation to respond to global challenges such as food security and climate change (e.g. FAO, 2012, World Bank 2006 and 2012). Politicians all over the world have started to support the creation and maintenance of networks to increase the competitiveness of their country or region via innovation (Barnett and Storey, 2000; Kingsley and Malecki, 2004; SCAR, 2012). There are for example actions via the Common Agricultural Policy and the EU Research and Innovation Policy (Horizon 2020) to implement agricultural European Innovation Partnerships (EIP) “Agricultural Productivity and Sustainability” which will help to transfer innovative approaches from science into practice more quickly and to ensure systematic feedback about needs from practice to the scientific community at EU, national and regional level. Nevertheless, and despite these efforts, there is still a long way to go. As a consequence, a good understanding of the relationship between networks and innovations becomes critical.

Yet, only limited innovation studies, with a focus on networks, are based on this sector, even though it has been acknowledged that the agricultural innovation system, or the agricultural knowledge and innovation system (AKIS), is different from other innovation systems (Röling, 2009; OECD, 2013). A specificity of AKIS compared to other innovation systems is that major innovations in farming techniques such as improved seed are generated outside farms, by public R&D organizations and upstream industries. Diffusion of innovation thus often requires intermediary actors such as extension services, before it is adopted by farmers (OECD, 2013). In addition, an important difference between agriculture and other sectors, and the economy in general, is that the sector cannot control production volumes. This is often called the Achilles tendon of the sector. This makes the sector subject to the vagaries of the market. Furthermore, in comparison with other sectors, the agricultural sector is characterized by a heavy state intervention through the Common Agricultural Policy (CAP), which for several decades focused on the guarantee of sufficient and safe food via the protection of farmers’ income. This background has implications for the farmers’ innovation behavior and makes the agricultural innovation system different from other sectors.

The multiple aspects above therefore show that the focus on agricultural innovation system is justified.

In the frame of this dissertation, first the state of the art regarding networking and innovation is presented, followed by the research gaps (section 1.2). Subsequently, the theoretical and conceptual frameworks are developed (section 1.3 and 1.4), followed by the research objectives and associated questions to be answered by this
dissertation (section 1.5). Next, the research method is described (section 1.6), followed by a presentation of the outline of the thesis (section 1.7).

1.2 State of the art and research gaps

_Innovation_ is widely recognized as being an important strategic tool to achieve competitive advantage, not only at company level, but also for the region as a whole (Schumpeter, 1934; Johannessen et al., 1999; Nonaka et al., 2000; Avermaete, 2004; Noronha Vaz et al., 2004). Competitive advantage is the driver for economic growth, which facilitates improvements to the welfare and well-being of society (Avermaete, 2004; Kühne, 2011; SCAR, 2012).

However, innovation includes several challenges relating to today's rapidly changing world (Knowler and Bradshaw, 2007; Nieto and Santamaria, 2007; Kim and Mauborgne, 2009; Gould, 2012). Meeting these challenges has led entrepreneurs, researchers and politicians to take a special interest in the different mechanisms and strategies that help to achieve innovations. It is necessary that innovation remains cost-effective within a dynamic production environment. This requires the continuous integration of new knowledge. However, due to increasing specialization and technology intensification, the quantity and complexity of required knowledge is increasing (Pannell et al., 2006). Plenty of recent studies indicate that the locus of innovation is no longer the individual firm, but increasingly the network within which the firm is embedded (Powell et al., 1996; Omta, 2002; Chesbrough, 2003; Pittaway et al., 2004; Garbade et al., 2013). Networks give SMEs access to complementary resources, skills, capabilities, and knowledge that are not available internally (Pittaway et al., 2004; Døving and Gooderham, 2008). By making contact with different actors, exchanging information and collaborating within networks, firms could acquire ideas and knowledge for new or improved products and processes, new organizational structures, the exploitation of new markets or new ways to access existing markets. Hence, networks are considered a relevant means for obtaining access to knowledge, and other resources important for innovation (Pittaway et al., 2004; Pannekoek et al., 2005; Bertolini and Giovannetti, 2006; Gellynck et al., 2007; Batterink et al., 2010; Oreszcyn et al., 2010; Vuylsteke and Van Gijsen, 2010; Pascucci, 2011). “Systemic” or “open innovation” approaches that consider innovation to be the result of networking and interactive learning among a heterogeneous set of actors (Leeuwis and Van Den Ban, 2004; Hall et al., 2006; Röling, 2009) are increasingly being applied (Lasagni, 2012).

Numerous advantages of networking are mentioned in the literature. Through networking, firms are able to quickly identify and exploit opportunities and to manage their environmental uncertainties (Burt, 1997; Elfring and Hulsink, 2003). In addition, it allows knowledge exchange in a more efficient way. It enables access to new technologies, know-how and resources, vital for developing innovations (Mackinnon et al., 2002; Zahra and George, 2002; Cowan and Jonard, 2004; Omta, 2004; Pittaway et al., 2004; Brennan and Dooley, 2005; Daskalakis and Kauffeld-Monz, 2005; Mu et al., 2008) and hence this allows sustainable growth, a shorter innovation time, an increasing flexibility of operation, reduced transaction costs, the
benefits of economies of scale and sharing risk and uncertainty among network organizations (Håkansson, 1987; Håkansson and Snehota, 1995; Powell et al., 1996; Kale et al., 2000; Leeuwis, 2000; Walter et al., 2001; Omta, 2004; Briz and Felipe, 2007; Lee et al., 2010; Molnár et al., 2011).

Nevertheless, networking for innovation also involves some potential challenges and disadvantages. Firms need to invest time and effort in screening potential partners (Lazzarotti and Manzini, 2009) and finding ways to manage their relationships with parties with different mentalities, and to distribute the advantages resulting from collaborative innovation in an appropriate way amongst all partners (Wallin and Von Krogh, 2010; Giannopoulou et al., 2011; Lefebvre, 2014). Moreover, they have to deal with the risk of technology leakage to rivals and a loss of control over the innovative process itself and the potential results (Mahr et al., 2010; Gould, 2012; Ritala and Hurmelinna-Laukkanen, 2012). The organizations must also have sufficient capability to manage relationships inside and outside the company (Fredberg et al., 2008; Harryson, 2008), and to successfully integrate information obtained from external sources into internal processes and structures (Nonaka, 2007).

These challenges are even more present for small and medium-sized enterprises (SMEs), who often face difficulties when networking (Hoffmann and Schlosser, 2001; Senker and Faulkner, 2001; Kaufmann and Tödtling, 2002; De Groot, 2003; Van Gils and Zwart, 2004; Mcgrath and O'Toole, 2010; Mcgrath and O'Toole, 2013). For example, it is quite frequent for firms — SMEs as well as large firms — to have external relationships with business organizations contributing to their innovation activities (e.g. Fritsch and Lukas, 1997; Sternberg, 1998; Kaufmann and Tödtling, 2000; Kaufmann and Tödtling, 2002). However, when it concerns interaction with knowledge providers, there is a significant difference between large firms and SMEs. SMEs rarely interact with universities, research organizations, technology centres, and training institutes (Cooke et al., 2000; Kaufmann and Tödtling, 2002). An important reason for the lack of relations with innovation partners outside the business sector is the small number of employees in SMEs who are able to act as nodes for establishing and maintaining links to innovation networks. This restricts the potential to search for and collect innovation-related information and to collaborate in innovation projects. There is a lack of experienced employees as well as a lack of time in the case of the few adequately qualified persons due to routine and administrative work (Kaufmann and Tödtling, 2002; Taragola et al., 2004). Furthermore, they often do not see the potential of networks for many reasons, including the lack of physicality or visibility of networks (Mcgrath and O'Toole, 2010; Mcgrath and O'Toole, 2013), and the too dominant focus on the region which can limit the scope of available technical information, technologies and accessible markets (Kaufmann and Tödtling, 2002; Gellynck et al., 2007). There is also the problem of a lack of adequate innovation partners with whom to cooperate due to the limited scope of the region. Moreover, it seems that SMEs often experience difficulties in defining and expressing their demands for information to meet their requirements (Klerkx and Leeuwis, 2008). Conversely, knowledge providers have to be responsive to clients’ needs, i.e. they have to be “demand driven” (Byerlee et al., 2002; Katz and Barandun, 2002). However, researchers are often unaware of SMEs’ innovation needs.
(Caputo et al., 2002; Pannekoek et al., 2005) “Cognitive distance” between the different actors involved may cause coordination and learning problems during innovation processes (Nooteboom, 2000), and different norms and expectations exist with regard to desired output (Beesley, 2003; AWT, 2005).

In order to achieve innovation, a wide range of network partners can be used, each offering significant resources. The figure below (Figure 1) shows how a farm can be embedded within its network of partners. The partners can be divided in three major categories: horizontal and vertical networks as well as collaboration with third parties.

The different categories are indicated on figure 1. The first category represents horizontal networking with competitors or colleagues, within a sector association or a business club. The second category reflects vertical networking with suppliers or buyers and the third category relates to third parties including public administration which concerns entities occupied with laws, regulations and political support, research institutes and universities, consultants and extension services, financial providers and the Innovation Centre.

**Figure 1**: Potential network partners for innovation  
**Source**: Own compilation

Horizontal networks consist of firms belonging to the same industry, thus being primarily competitors or peers. It has become accepted that horizontal collaboration among SMEs can speed up product development (Winch and Bianchi, 2006; Morris et al., 2007). However, it comes at the risk of technology leakage to rivals and a loss of control over the innovation process (Ritala and Hurmelinna-Laukkanen, 2012). From an empirical perspective, some studies have found a positive correlation between horizontal collaboration and innovation (Quintana-Garcia and Benavides-Velasco, 2004; Najib and Kiminami, 2011), while others did not find any evidence that horizontal collaboration was significant in explaining innovation among SMEs (De Propris, 2002; Freel and Harrison, 2006).
Vertical networks are composed of different partners in the chain. The vertical network includes all organizations from the direct chain (supplier, manufacturer, customer) to the extended chain (suppliers of suppliers and customers of customers) (Van Der Vorst, 2000; Mentzer et al., 2001). It allows a firm to gain considerable knowledge about new technologies, markets and process improvements (Whitley, 2002) and has a significant impact on the successful implementation of product innovations (Tether, 2002; Miotti and Sachwald, 2003; Nieto and Santamaria, 2007; Nieto and Santamaria, 2010). A recent study by Lasagni (2012), for example, finds that cooperation with both buyers and suppliers is positively significant in aiding innovation.

Third parties are individuals or entities other than chain members or peers, such as consultants, research institutes, the Innovation Centre for Agricultural and Rural Development (ICARD), financial providers, etc. Consultants, for example, can sensitize companies for possible improvements in existing processes and assist them in identifying weaknesses (Gemünden et al., 1996). Several studies have documented the important role that universities and other research institutions have on innovations for which fundamental scientific knowledge is needed (Bozeman, 2000; Vuola and Hameri, 2006; Robin and Schubert, 2013).

Despite the extensive literature concerning the relationship between networks and innovation, it is acknowledged that further research on this relationship is required on different aspects (Pittaway et al., 2004; Nieto and Santamaria, 2007; Lefebvre, 2014).

First, studies investigating asymmetries, or inequalities between the actors involved in relationships, have been analysed in terms of their impact on innovation. Scholars have so far comprehensively deduced potential advantages and problems resulting from asymmetries in the power and positioning of partners with regard to knowledge sharing in innovation networks (Johnsen and Ford, 2001; Mouzas and Ford, 2004; Johnsen and Ford, 2006). Nonetheless, empirical work unravelling the effects and impacts of asymmetric relationships on innovation from the SMEs’ perspective is still scarce (Colurcio et al., 2012).

Second, there are indications that firms rely on specific partners depending on the type of innovation and stage within the innovation process (Amara and Landry, 2005; Nieto and Santamaria, 2007; Tödtling et al., 2009). However, studies investigating the type of partners upon which firms rely for different types of innovation, or a different stage in the innovation process, are scarce (Howells et al., 2004; De Man and Duysters, 2005; Nieto and Santamaria, 2007; Varis and Littunen, 2010; Chen et al., 2011; Lefebvre et al., 2014), especially where non-technological innovations are concerned.

Third, while plenty of studies explore the underlying motives for firms to engage in dyadic relationships and inter-firm alliances (Ireland et al., 2002; Ozman, 2009), empirical research that focuses on understanding the motives for firms to join innovation networks remains scarce (Lefebvre, 2014).
Fourth, there are still important gaps in understanding how networks operate to facilitate innovation (Provan and Kenis, 2007; Bessant et al., 2012). In the past, collective and social conditions facilitating the ability to see new opportunities and to innovate were investigated based on the perspective of the individual organizations (Kanter, 1988). These investigations answered questions on how firms cope with innovation characteristics. However, this analysis has not yet been done at the network level. This could provide insight into the success factors of innovation networks.

1.3 Theoretical perspectives

In order to study the role of networking within the agricultural innovation system, a combination of theories from innovation, strategic management and industrial marketing literature is used.

1.3.1 Innovation Theory: “innovation systems” and “networked innovation”

Joseph A. Schumpeter is regarded as the founding father of innovation studies. Most economists who study innovations refer to Schumpeter and his pioneering role in introducing innovation into economic studies (Godin, 2008). At the beginning of the 20th century, he already stressed that innovation is a means to achieve competitive advantage and economic growth (Schumpeter, 1934). He also pointed out that innovation is more than just product or process innovation, but also includes new forms of markets or organizations (Edquist, 1997).

In the last decade, more and more scholars have recognized that innovation is not a linear and research-driven process focusing on a new product developed within one company (Tidd et al., 2005; Balconi et al., 2008; Kirner et al., 2009). The general tendency is for innovation management models to become more complex, more interdisciplinary, more integrated and more connected with their surroundings, and thus with more links between organizations.

The linear model of innovation looks at innovation as a linear process along a fixed trajectory. It prioritises scientific research as the basis of innovation, whereby fundamental research is followed by applied research and finally results in the application of the innovation. This process can be started in two ways: technological research may bring innovations to the market place, often called “technology push”. The alternative is when an emerging market need encourages researchers to find solutions (Tidd et al., 2005). In reality, the linear process never occurs in its idealized form because of a number of factors. As a result, the linear process turns into a messy process involving false starts, returns between stages, dead ends, trial and error (Tidd et al., 2005; Van De Ven et al., 2008; Kirner et al., 2009). Schroeder, Van de Ven, Scudder, and Polley (1986; 1989) and Angle and Van de Ven (1989) examined the processes of development among different technical and administrative innovations. By comparing longitudinal case histories on the development of these innovations, they also found that none of the innovations developed in a simple linear sequence of stages or phases of activities over time. However, common elements were
empirically derived and pertain to the initiation, development and implementation or termination period for the innovations.

From the start of the 21st century, “systemic” or “open innovation” (OI) approaches that consider innovation to be the result of networking and interactive learning among a heterogeneous set of actors have increasingly been applied as a reaction to the constant changing economic and environmental setting in which firms operate (Chesbrough, 2003). The mobility of skilled labour, the increasing presence of venture capital, the emergent high-tech start-ups and the role of university research and its linkages with industry are merely some of the factors that led to the systemic innovation approaches (Costello et al., 2007). The national innovation system approach, which was developed by Lundvall (1992) stresses that the flows of technology and information among people, enterprises and institutions are key to the innovative process. Innovation and technology development are the result of a complex set of relationships between actors in the system. This includes enterprises, universities and government research institutes. In this frame, Omta (1995) found for example that the best-performing pharmaceutical firms were characterized by less management concern about the leaking of company information and greater openness to outside information. Omta’s research suggests that the more an organization wants to share its information with the external environment, the more it gets in return. A company that spends most of its energy protecting its own knowledge will be less open to new knowledge from the outside world. Innovative companies are generally those that are constantly on the lookout for new innovative ideas (Fortuin, 2006).

Based on the national innovation system approach, the agricultural innovation system thinking emerged, pioneered by Andy Hall and his colleagues (Hall et al., 2001; Hall et al., 2006). The AIS is defined as “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 the way different agents interact, share, access, exchange and use knowledge within the agricultural sector” (Hall et al., 2006). These kinds of approaches have recently been popularised under the label of “open innovation” (Chesbrough, 2003). Open Innovation started as a notion of the need to open up the innovation process outside the traditional boundaries of a firm. The companies need to look outside the firm for new paths towards innovation, as knowledge mobility makes it impossible to keep all the best talent and relevant knowledge within the companies themselves (Chesbrough, 2003). In the context of OI, the boundaries of the firm become permeable (Lichtenthaler, 2008) and there is a value generating effect from integrating a broad range of external parties such as suppliers, customers, competitors, consultants, research institutes and universities within the innovation process (Bahemia and Squire, 2010). The benefit of OI is not only faster technological development but also how it can stimulate innovation further down the supply chain (Erzurumlu, 2010). Combining specialization and collaboration is obviously advantageous today (Bughin et al., 2008). Companies have understood that they cannot merely rely on in-house capabilities and resources in order to innovate (Giannopoulou et al., 2011). Within the literature, the term open innovation often
focuses on the innovation project itself. To emphasize the networks, the term “networked innovation” is often used (Bergema et al., 2010). As this dissertation focuses on networking, we also talk about “networked innovation”.

1.3.2 Industrial marketing management: “asymmetric relationships”

Industrial marketing, also known as business-to-business (B2B) marketing, is a branch of communications and sales that specializes in providing goods and services to other businesses, rather than to individual customers (Zimmerman and Blythe, 2013; Marketingschools, 2015).

While business-to-consumer sales might focus on one-on-one interactions between two parties, businesses are usually made up of a number of individuals. Before the product appears on the other store’s shelves, the two businesses must reach a deal that will involve the manufacture, purchase, and shipping of thousands of products (Marketingschools, 2015).

Once the client is ready to discuss the details of a contract, the marketing phase is nearly over. At that time, the focus should shift to maintaining a good working relationship.

Within the study of industrial marketing management, the concept of asymmetry in relationships was studied to address the problem of identifying the sets of capabilities or knowledge set (Leonard-Barton, 1992) that may influence the development of more symmetrical relationships. Asymmetry in relationships focuses on inequalities between the actors involved in the relationship. As Mouzas et al. (2004) highlighted, “Asymmetric relationships are those relationships where an imbalance in the resources of one of the companies, or in the way that those resources are used, enable one of the companies to be more able to influence the other, to initiate change in the relationship or to dominate the relationship”. A definition provided by Blomqvist (2002) offers a multifaceted and all-embracing perspective: “Asymmetry in relationships concerns not only partners’ size and power imbalance, but also relevant difference in their managerial systems, culture and values, and capabilities.”

Asymmetry is also a common term in the Transaction Cost Theory. However, in that context, the asymmetry is limited to information asymmetries, referring to transactions where one party has more, or better, information than the other. This also leads to an imbalance of power in transactions.

Of course, these asymmetries in relationships have consequences for the companies involved. “In an asymmetric relationship the stronger party is likely to be able to dominate and influence the conclusion of contracts and, thereby, determine the processes and outcomes of the relationship” (Mouzas and Ford, 2004). In such circumstances, smaller partners can have difficulties in sustaining or developing beneficial relationships due to the asymmetry in the interaction (Håkansson, 1982; Grundlach et al., 1995; Holmlund, 2004). The difficulties are mainly linked to the ability of smaller suppliers to nurture and maintain a set of capabilities for growth, building a competitive position (Day and Nedungadi, 1994; Colurcio, 2009) and creating value (Ulaga and Eggert, 2005; Donada and Nogatchewsky, 2006; Johnsen et al., 2006). However, asymmetry may also impact positively on smaller partners in
the relationship as they can absorb and influence external knowledge and practices by collaborating with larger companies (Blomqvist et al., 2005).

Asymmetry in relationships can thus be considered both as an opportunity for network capability and knowledge development and as a threat to the growth and development of the smaller, and relatively powerless, actors (Johnsen and Ford, 2001; Holmlund, 2004; Fortuin and Omta, 2009). Recently Johnsen and Ford (2008), who applied Mouzas and Ford’s (2004) definition of asymmetry in relationships, proposed a typology to analyse a relationship’s asymmetry, which allows investigation of the different characteristics enabling or inhibiting the development of network relationships aimed at innovation. This typology identifies seven main characteristics of asymmetry. The contribution of Johnsen and Ford can be seen as a successful attempt by longstanding research (Ford and Rosson, 1982; Johnsen and Ford, 2001; Johnsen and Ford, 2008) and is considered a cornerstone in the literature on the topic of asymmetry, since it offers clearer elements with which to define asymmetric relationships and provides a map of relationships’ characteristic typologies (Colurcio et al., 2012). The concepts used are mutuality, particularity, conflict, interpersonal inconsistency, cooperation, intensity and power and dependence.

1.3.3 Resource-Based View and extensions
From the perspective of the Resource-Based View, it has been argued that external networks have the potential to deliver a wide range of ideas, resources and opportunities far beyond the ability of the organization on its own (e.g. Ahuja, 2000; Gulati et al., 2000; Duysters and Lemmens, 2003; Fortuin, 2006).

The origins of the Resource-Based View (RBV), first named by Wernerfelt (1984), can be traced back to earlier research within the field of strategic management. Retrospectively, elements can be found in works by Coase (1937), Penrose (1959), Stigler (1961), Chandler (1962; 1977), and Williamson (1975), where emphasis is placed on the importance of resources and the implications for firm’s performance (Conner, 1991; Mahoney and Pandian, 1992). The theory seeks to understand how competitive advantage is achieved and how that advantage can be sustained over time (e.g. Barney, 1991; Peteraf, 1993; Hart, 1995). In the Resource-Based View, resources at the firm’s disposal (financial, physical, human, technological, organizational, and reputational) have specific characteristics to provide the conditions for firm-level sustained competitive advantage (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984). According to Barney (1991), to transform a short-term competitive advantage into a sustained competitive advantage, these resources need to possess the following four attributes:

**Valuable:** A resource must enable the firm to employ a value-creating strategy, by either outperforming its competitors or reducing its own weaknesses

**Rare:** The firm’s resource is not possessed by large numbers of competitors or potentially competing firms

**Imperfectly imitable:** If a valuable resource is controlled by only one firm it could be the source of a competitive advantage. This advantage could be sustainable if competitors are not able to perfectly duplicate this strategic asset (Peteraf, 1993, p183; Barney, 1986b, p658), because it is socially complex, depending upon unique
historical conditions, or/and is ambiguously related to the firm’s sustained competitive advantage

**Non-substitutable**: The firm’s resource cannot be replaced by another resource that enables the firm to conceive and/or implement the same strategies.

An extension of the RBV is the “dynamic capabilities approach”, which was introduced as a reaction to the lack of efforts that are made in order to understand how and why certain firms are able to build competitive advantage in situations of rapid and unpredictable change. In these markets, where the competitive landscape is shifting, the dynamic capabilities by which firm managers ‘integrate, build, and reconfigure internal and external competencies to address rapidly changing environments’ become the source of sustained competitive advantage (Teece et al., 1997). According to Teece et al. (1997), what firms can do and where they can go is rather constrained by their positions (asset positions) and path. A path not only defines what choices are open to the firm today, but also places restrictions on what its internal repertoire is likely to be in the future (Teece et al., 1997). This path-dependency especially impacts the inter-organizational collaboration level. Asset positions matter and, their assessment before joining a network or entering an alliance might play a key role. Grant (1996) and Teece et al. (1997) define dynamic capabilities as the antecedent organizational and strategic routines by which managers alter their resource base by acquiring resources and integrating and recombining them to generate new value-creation. As such, the dynamic capabilities are the drivers behind the creation, evolution, and recombination of resources into new sources of competitive advantage (Teece et al., 1997). Dynamic capabilities are therefore, the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die (Fortuin, 2006).

Common codes of communication and coordinated research activities are required to further allow companies to learn from each other (Teece et al., 1997). Asset positions change and require new evaluations from time to time, to collect information, to estimate advantages from the exchange and to evaluate their partners’ behaviour. A second purpose of alliance evaluation is to prevent opportunistic behaviour, which is less likely in the start-up period than in the later stages of the network (Deeds and Hill, 1999).

Another extension of the RBV is the knowledge-based view (KBV), in which the competitive advantage of a firm is explained by focusing on knowledge as the key resource to be managed (Kogut and Zander, 1992; Grant, 1996; Decarolis and Deeds, 1999). According to this view, the heterogeneous knowledge bases and capabilities in creating and transferring knowledge between firms are the main determinants of performance differences (Spender, 1994; Grant, 1996).

Still other authors have applied the original formulation of the RBV in inter-organizational settings and extended it theoretically (e.g. Lavie, 2006) into a relational view. This theoretical extension builds on Dyer and Singh (1998) and Gulati (1998) in emphasizing the importance of relationships, rather than resources per se. These recent developments of RBV claim that firms can access external resources via
alliances to create further competitive advantage for the firm by expanding the
resource base and developing resource complementarities (Baraldi et al., 2012). In
this extension of the RBV, the user has a more prominent role than in the original
formulation. Here, a firm’s position in relation to customer markets is equally
important as its position in relation to technology sources and external development
trajectories. The literature on Resource-Based View shows that, in terms of
innovation inputs, firms will look for partners to provide the resources and
capabilities they lack, maximizing firm value by effectively combining the partners’
resources and exploiting complementarities (Kogut, 1988; Gulati, 1995).

In this dissertation, the RBV and its extensions will be used to gain a better
understanding of the potential benefits of networking for innovation (Nooteboom et
al., 2007).

1.3.4 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is a belief-based social cognitive
theory which was the successor to the earlier Theory of Reasoned Action (Fishbein
and Ajzen, 1975). It assumes that people behave rationally, in terms of what they
consider to be the implications of their actions. Both theories apply to situations
involving a choice of behaviour, where reasons can be attributed to the choice made
(Tonglet et al., 2004). The succession was the result of the discovery that behaviour
did not appear to be entirely voluntary and under control, which resulted in the
addition of perceived behavioural control. With this addition, the theory was called
the Theory of Planned Behaviour. Briefly, according to TPB, human behaviour is
guided by three kinds of considerations:

**Behavioural beliefs**: beliefs about the likely consequences or other attributes of the
behaviour. The concept is based on the subjective probability that the behaviour will
produce a given outcome.

**Normative beliefs**: beliefs about the normative expectations of other people, or in
other words an individual’s perception of social normative pressures, or relevant
others’ beliefs that he or she should or should not perform such behaviour.

**Control beliefs**: beliefs about the presence of factors that may support or hinder
performance of the behaviour.

In their respective aggregates, they give rise to the following concepts:

**Attitude toward the behaviour**: an individual’s positive or negative evaluation of
self-performance of the particular behaviour. The concept is the degree to which
performance of the behaviour is positively or negatively valued. It is determined by
the total set of accessible behavioural beliefs linking the behaviour to various
outcomes and other attributes.

**Subjective norm**: an individual’s perception about the particular behaviour, which
is influenced by the judgment of significant others (e.g., parents, spouse, friends,
teachers).

**Perceived behavioural control**: an individual’s perceived ease or difficulty of
performing the particular behaviour. This comprises a person’s self-efficacy (i.e., ease
or difficulty in performing a behaviour) and perceived controllability (i.e., ability to
perform the behaviour)(Ajzen, 2002).
The attitude toward the behaviour, the subjective norm, and the perception of behavioural control are the factors leading to the formation of a behavioural intention. Thus, the more favourable the attitude and the subjective norm, and the greater the perceived control, the stronger the person’s intention to perform the behaviour in question.

Finally, given a sufficient degree of actual control over the behaviour, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behaviour.

Finally, Ajzen’s model includes some background factors which can have an influence on beliefs i.e. age, gender, intelligence, personality traits, etc. These variables only have an indirect influence on behaviour. The following figure (Figure 2) shows all the determinants of behaviour in relation to each other.

The TPB has been widely supported across multiple disciplines. As the model is very powerful and predictive for explaining human behaviour, the health and nutrition fields have often used this model in their research studies. There is an argument that the model is not suitable for evaluating decisions in an organizational context because of the dynamic and intricate nature of decision processes in organizations (Johnston and Lewin, 1996; Thompson and Panayiotopoulos, 1999). However, this argument is not as strong when it comes to small businesses, because their small scale decisions tend to be the domain of a single individual (Southey, 2011). By making use of this theory, we will gain insight into the farmers’ beliefs about networking, and understand their intention to participate in networks. The focus in this dissertation is hence limited to the analysis of beliefs, which is advised to be the first step in the application of the theory.

Figure 2: Theory of Planned Behaviour: determinants of behaviour in relation to each other

Source: Ajzen (2005)
1.4 Conceptual framework and definitions

In this section, the concepts used in this PhD research are presented. This describes the approach applied to investigate how networking contributes to innovation in the agricultural system. It depicts the different components that will be studied, in their mutual relationships. The selection of the components is motivated by the research gaps and the theoretical perspectives previously described. As such, it represents challenging issues in research about the link between networks and innovation. Figure 3 visualises the conceptual framework. The framework consists of four building blocks situated in the agricultural innovation system: innovation at the farm, network, network activity for innovation and influencing factors.

The agricultural innovation system is defined as “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 the way different agents interact, share, access, exchange and use knowledge within the agricultural sector” (Hall et al., 2006).

The farm is embedded within this system. In our study, farms investigated are all situated in Flanders, mainly consisting of micro-sized (<10 employees) and family-owned businesses. For more information about the selected farms, we refer to section 1.6.

To be able to survive, achieve and sustain competitive advantage, the farm has to innovate. According to previous research (Kanter, 1988), innovation processes tends to have four distinctive characteristics.

1. The innovation process is uncertain
The innovation goal may involve little or no knowledge upon which to base forecasts. Expected timetables may prove unrealistic, and schedules may not match the true pace of progress, which means that ultimate results are highly uncertain. Also the source of innovation or the occurrence of opportunity to innovate may be unpredictable (Kanter, 1988). Innovations respond to changes occurring outside the immediate environment of the farm. It can be a breakthrough in technology or methodology (e.g. new planting technology), the development of a new market (e.g. short chains for vegetables) or a shift in demand (e.g. increasing interest in forgotten vegetables). However, the requirements of customers, the occurrence of problems with the current way of working, and changing social expectations with the resulting adjustment in rules or legislation also have an impact on the innovation behaviour of farmers. Hence, for innovators, it is important to watch out for opportunities.

2. The innovation process is knowledge intensive
The innovation process generates new knowledge intensively, relying on individual human intelligence and creativity and involving “interactive learning”. New experiences are accumulated at a fast pace; the learning curve is steep. The knowledge possessed by the participants in the innovation effort is not yet codified or codifiable for transfer to others. Efforts are very vulnerable to turnover because of the loss of this knowledge and experience. There need to be close linkages and fast
communication between all those involved, at every point in the process, or the knowledge erodes.

3. **The innovation process is controversial**

Innovations always involve competition with alternative courses of action. Sometimes, the very existence of a potential innovation poses a threat to vested interests, whether the interest is that of a salesperson receiving high commission on current products, or a retailer unwilling to adopt the innovation.

4. **The innovation process crosses boundaries**

An innovation process is rarely, if ever, contained solely within one unit. First, there is evidence that many of the best ideas are interdisciplinary or inter-functional in origin, or benefit from broader perspectives and information outside the “locus of innovation”. Second, regardless of where innovations originate, they inevitably send out a ripple effect to other organizational units, whose behaviour may be required to change, or whose cooperation is needed if an innovation is to be fully developed or exploited.

As already explained above, the concept of innovation has progressively extended in breadth and depth, which made it increasingly challenging to understand (Damanpour and Aravind, 2011). In response, researchers divided the concept of innovation into specific aspects such as stages (generation, diffusion, adoption, implementation), innovation types (product, process, service, technological, managerial), and consequences (for the firm, industry, economy) and is often limited solely to one unit of analysis (individual, team, organization, industry, economy) (Damanpour and Aravind, 2011).

In the light of the often incremental, non-linear and non-technological nature of innovation, the approach of this thesis stresses its multiform and dynamic character. Innovation is defined as “the ongoing process of learning, searching and exploring, resulting in the introduction of new products, new processes, new forms of organization and new marketing methods” (OECD and Eurostat, 2005, based on Lundvall, 1995). Thereby, two aspects are recognised that will be studied in this dissertation: the type of innovation and the stage in the innovation process.

**Innovation type**: Firstly, a broad scope of innovations is considered in this dissertation. In most research, the focus is on innovation in large companies and high technology industries (Avermaete et al., 2004; Damanpour and Aravind, 2011). However, within the agricultural sector, changes often take place that are of a non-technological nature, and strong reasons exist for applying a comprehensive innovation concept (Pittaway et al., 2004; Edquist, 2006; Van Galen and Verstegen, 2008; Damanpour and Aravind, 2011). Therefore, the analysis of innovation in terms of products, processes, organizational change and marketing choice can provide answers to this sector. The four different types of innovations considered within this study are defined according to the Oslo Manual of OECD (OECD and Eurostat, 2005). **Product** innovation is defined as the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses; **process**
innovation as the implementation of a new or significantly improved production or delivery method; marketing innovation as the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing and, finally, organizational innovation as the implementation of a new organizational method in the firm’s business practices, workplace organization or external relations.

Innovation stage: Secondly, research on innovation historically focused on linear innovations, while recent researchers point to the non-linear character by which most innovations are developed (Kaufmann and Tödtling, 2001; Pittaway et al., 2004; Montalvo, 2006; Sawhney et al., 2006). Innovation needs to be considered as a complex interactive process involving false starts, returns between stages, dead ends, and ongoing trial and error. This dissertation views different moments in the process of innovation. The model of Van de Ven et al (1999) has a number of components that, while not usually occurring in an orderly sequence, take an innovation from initiation through a development period, to implementation or termination.

The initiation phase can be described as the phase in which the idea is generated. Van de Ven et al. (1999) consider this as “divergent behaviour”. During the divergent phase, several directions of development are explored and new ideas, strategies and networks are created. This phase is triggered by the availability of new resources. For instance, if new people come on board with a team, it is likely that new ideas or lines of direction will be developed.

The development phase is the one in which the idea is turned into some tangible product, process or service. In Van de Ven et al. (1999), this is called “convergent
behaviour”. This phase is about integrating the ideas generated in the divergent phase and the focus shifts from exploration to exploiting and testing given directions. The convergent phase is triggered by constraining factors such as external rules imposed by the environment or internal discovery of a preferred course of action.

In the implementation or termination period, the newly developed product, process or service is implemented. This entails supporting the innovation by, for example, preparing customers and marketing activities. Although a phased model is used, Van de Ven et al. (1999) acknowledge that many feedback-loops and cycles take place before progressing through the process. The innovation journey is a repeating cycle of divergent and convergent activities that takes place at different levels, more or less simultaneously.

In order to innovate, the farms are looking for networks to access resources from other actors. Networks are defined differently and acquire different meanings depending on the disciplines and the theoretical perspectives taken (Varamaki and Vesalainen, 2003; Pickernell et al., 2007). The most abstract definition sees a network as a set of nodes (actors) connected by a set of threads (relationships) (Håkansson and Ford, 2002; Borgatti and Foster, 2003; Brass et al., 2004). The threads or ties connecting the nodes may be formal (contractual, institutionalized) or informal (social, trust-based). This definition may refer to many different social interaction patterns. In this dissertation, a network is defined as a set of relationships through which the company acquires, assimilates, transforms and exploits knowledge, thus serving as the medium for the combined transformation of the company’s internal and external resources into an innovation (Zahra and George, 2002; Cowan and Jonard, 2004; Omta, 2004). Each network has its characteristics. It can for example be dense or sparse, centralized or decentralized. Ties can be direct or indirect; they can be restricted to one subsector, a limited number of members, or cross several sectors. Lefebvre et al. (2010) made up an overview with network characteristics. These characteristics are subdivided into a structural and a structuring dimension. The structural dimension of the network refers to the physical characteristics of the network, such as the network configuration, network membership and network ties, while the structuring dimension is related to the policies and activities occurring within the network that prescribe or restrict the behaviour of network members. A broad range of networks exists with varying degrees of formality and coordination. In this thesis, the focus is on networking with colleagues (horizontal networking: competitors or colleagues, sector associations, business clubs), chain partners (vertical networking: suppliers or buyers) and third parties (public administration, research institutes and universities, consultants and extension services, financial providers and Innovation Centres), both through formal networking and through participation in societal activities. Figure 1 (p. 6) shows how the farm can be embedded within its network of partners.

This definition is in line with the broad definition of “national systems of innovation” by Lundvall (1992), including “all parts and aspects of the economic structure and the economic set-up affecting learning, as well as searching and exploring”. Furthermore, this definition is underpinned by the theoretical position that the
absorption of knowledge benefits from crossing the borders with different social systems (e.g. from business to science), whereby the range of sources must be diverse. In order to access resources from the network, the farms must necessarily interact with the network partners belonging to the agricultural innovation system, indicated as \textit{network activity for innovation}, which is also often referred to in this dissertation as networking. The literature suggests that this network activity may be affected by a variety of factors, referred to as the \textit{influencing factors} within the conceptual framework. The influencing factors can be \textit{internal} or \textit{external} to the farm, and are therefore split up in the framework, with one part situated within the farm and the other part outside the farm. Internal factors refer to, for example, age, education level, personal values, attitudes, strategic vision, decision making processes, while external characteristics refer to, for example opportunities and available resources. Both the internal and external influencing factors will be studied by investigating farmers' beliefs about networking.

\section*{1.5 Research objectives and research questions}

The overall objective of this dissertation is to \textit{understand how networking contributes to innovation in the agricultural innovation system}, whereby both the farm perspective and the network perspective are considered. In line with the conceptual framework, four specific research objectives are formulated to address the main objective of this dissertation. Each research objective will subsequently be addressed in the dedicated sections of this dissertation.

\subsection*{1.5.1 Research objective 1: Investigating characteristics of partners and relationships in farmers’ network activity for innovation}

In an international context characterized by increasingly large and powerful firms, farmers are an exception. Most of them are isolated and small compared with other sectors' operators and especially compared with the agri-food concerns (processors, distributors and retailers) that are their major buyers. Their market power is thus very weak and totally disproportionate compared with the huge power of the firms with whom they have commercial relationships (Danau et al., 2011). A strategy to innovate and increase their power could be found in collaboration aimed at managing supply, pooling production or getting involved in processing and distribution in order to gain control over the entire chain (Danau et al., 2011). However, as explained in section 1.2, SMEs, and farmers in particular, are confronted with challenges to the development of relationships (Theuvsen, 2004; Klerkx et al., 2010; Kühne et al., 2013) and their access to external knowledge is often restricted (Pretty, 1995; Chiffoleau, 2005; Eshuis and Stuiver, 2005).

Yet, little attention has been paid to analysing the food innovation network in the context of asymmetric relationships (Colurcio et al., 2012), especially at farm-level perspective. Therefore, this dissertation starts with an investigation of the current situation in terms of partners’ characteristics and relationships within farmers’ network activity for innovation, and looks at the benefits and disadvantages resulting from these relationships with regards to innovation. This research objective raises the question:
RQ1: “How do farmers perceive the asymmetry in their relationships for innovation with their network partners (horizontal and vertical network partners and third parties) and how do they think this fosters or hinders the development of their innovation processes?”

This question will provide insights into the characteristics of relationships that would foster the development of innovation processes within the agricultural sector. The concept of relationship asymmetries focuses on inequalities between the actors involved in the relationship. As Mouzas et al. (2004) highlighted, “Asymmetric relationships are those relationships where an imbalance in the resources of one of the companies, or in the way that those resources are used, enable one of the companies to be more able to influence the other, to initiate change in the relationship or to dominate the relationship.”

This research question is dealt with in chapter 2 by applying the asymmetric relationship typology. The data is gathered through interviews and focus groups with farmers.

1.5.2 Research objective 2: Understanding the role of different network partners depending on the type of innovation and the stage in the innovation process

It is increasingly acknowledged that firms consult other knowledge sources, depending on the type of innovation and stage in the innovation process (Tushman, 1977; Ancona-Gladstein and Caldwell, 1990; Lipparini and Sobrero, 1994; Gruner and Homburg, 2000; Freel, 2003; Pittaway et al., 2004; Nieto and Santamaria, 2007; Tödtling et al., 2009; Simon and Tellier, 2011). However, limited studies concentrate on which types of partners firms rely on in relation to the type of innovation, or stage in the innovation process (Howells et al., 2004; De Man and Duysters, 2005; Nieto and Santamaria, 2007; Varis and Littunen, 2010; Chen et al., 2011; Lefebvre et al., 2014a). In addition, the existing studies in this domain focus much more on technological product and process innovations, rather than on non-technological and intangible ones, i.e. marketing and organizational innovations. However, there are strong motives to use a comprehensive innovation concept and give more attention to non-technological and intangible kinds of innovations (Pittaway et al., 2004; Birkinshaw et al., 2008; Van Galen and Verstegen, 2008; Crossan and Apaydin, 2010; Damanpour and Aravind, 2012). Furthermore, the focus has mainly been on large companies. Empirical evidence about innovation processes in small companies, such as farms, is still scarce (Edwards et al., 2005). We aim to add to previous research by answering the following two research questions:

- RQ2a: How do network partners’ contributions differ for product, process, marketing and organizational innovations?
- RQ2b: How do network partners’ contributions differ along the innovation process (initiation, development and implementation or termination)?

These research questions are addressed in chapter 3. For the first research question, data is collected through interviews with farmers and network coordinators, followed by focus group discussions with farmers. For the second research question, interviews with farmers provide in-depth information about the network partners consulted along the innovation process.
1.5.3 Research objective 3: Understanding factors influencing farmers’ network activity for innovation

It was found that established innovation networks have had varying degrees of success (Huggins, 2000; Burfitt and Macneill, 2008). Scholars suggested that the success of innovation networks lies in understanding the needs and expectations of the participating firms (Ebbekink and Lagendijk, 2013). While plenty of studies explore the underlying motives for firms to engage in dyadic relationships and inter-firm alliances (Ireland et al., 2002; Ozman, 2009), empirical research that focuses on understanding the motives for firms to join innovation networks remains scarce (Lefebvre, 2014). For farmers, this is expected to be slightly different than for SMEs in general due to the specificities of the agricultural innovation system and the often strong individualism of farmers. Hence, in our study, we would like to identify the factors influencing farmers’ network activity for innovation, for which the following question is asked:

RQ3: “What are the factors underlying farmers’ intentions about network activity?”

This question is investigated in chapter 4. The belief components of the Theory of Planned Behaviour are used as a structuring dimension. By interviewing farmers, in-depth information about their behavioural, normative and control beliefs about network activity is provided.

1.5.4 Research objective 4: Identifying the network characteristics critical for successful innovations

Many different designs exist for networks (Bek et al., 2012). They differ, for example, in terms of configuration, membership, ties and management (Pittaway et al., 2004). Despite the fact that much research has been conducted on the nature and forms of networks, there is no consensus about the optimal design for networks to foster innovations (Pittaway et al., 2004; Thorpe et al., 2005; Hanna and Walsh, 2008; Huggins and Johnston, 2009).

Furthermore, concrete anchor points to evaluate the ability of a network to stimulate successful innovation processes are missing. The study of Kanter (1988, see section 1.4 for more information) uses four innovation characteristics to study the structural, collective and social conditions facilitating the ability to see new opportunities and to innovate. This is an assessment of innovation processes conceived from the perspective of the individual company. Similar to this approach, the objective of the present study is to investigate the conditions that facilitate or constrain the ability of networks to cope with the innovation characteristics. Hence, the focus of analysis shifts from the individual organization to the network. This allows for another set of insights to emerge, such as how a network can gain proficiency in coping with innovation characteristics. This raised the question:

RQ4: “How do network characteristics facilitate or constrain the ability to cope with the innovation characteristics?”

This question will be investigated in chapter 5, making use of the structuring and structural dimension of network characteristics, as defined in the work of Lefebvre et al. (2010). Based on insights from both farmers and network coordinators, conclusions will be formulated about the potential influence of network characteristics to cope with innovation characteristics.
1.6 Research method

1.6.1 Research design
Information required to meet the research objectives is gathered from both primary and secondary data sources. Data for this study is collected within the national project “Networks as a catalyst for innovation within the agricultural sector”, which is funded by the Flemish Agency for Innovation by Science and Technology. Although the project approach differs from the approach of the underlying research, the studies are closely interwoven. The research is carried out in three stages. In the first stage, a comprehensive literature review is conducted to gain insight into the existing network types and characteristics and their link with innovation, both for companies in general and for small companies active within the agricultural sector in particular. Furthermore, theories, methods and typologies applicable for the investigation of the relationship between networks and innovation within the agricultural innovation system are identified.

In stage two, exploratory research is undertaken to identify the current status of networked innovation practices in farms active in Flanders, via in-depth interviews with both farmers and network coordinators. Qualitative research techniques are very suitable for relatively unexplored themes and can illustrate underlying motivations and attitudes (Malhotra, 1999, p. 148). Adopting a research design with the focus on the different experiences of multiple individuals from different backgrounds is more likely to lead to insights that are unlikely to emerge from predefined quantitative research methods. Our research objective requires the use of exploratory case studies in order to be able to build on existing findings and to generate new insights at the same time. Case studies are rich empirical descriptions of particular instances of a phenomenon that are typically based on a variety of data sources (Yin, 1994). Case studies are characterised as being selective, strategically sampling a small number of research units, and exploring depth more than breadth (Verschuren and Doorewaard, 1999). The cases were selected based on theoretical sampling, which allows the selection of cases with the highest expected theoretical return (Glaser and Strauss, 1967; Eisenhardt, 1989; Strauss and Corbin, 1998; Eisenhardt and Graebner, 2007). More descriptive information about the selected cases can be found in section 1.6.3. The data generated from this second stage feeds into the third step and is used to conduct focus group discussions with farmers in order to obtain a better understanding of how networking contributes to innovation within the agricultural innovation system. While focus groups can reveal a greater variety of views, opinions and experiences, during in-depth interviews, the interviewer is probing the respondent more deeply to uncover underlying motivations, beliefs, attitudes and feelings on a topic. Hence, with both techniques a broad overview and comparatively rich qualitative data can be assembled (Fein et al., 1997).

1.6.2 Data collection and data sources

1.6.2.1 Interview and focus group discussion guide
The data is collected between June 2011 and March 2013. The interview guide for the farmer (FI) is pilot-tested prior to the interviews and adapted accordingly. The interview guide consists of the following four parts:
(a) Generic section about profile, background and company characteristics
(b) Innovation and innovation capacity
(c) Social relationships and networks
(d) Knowledge for innovation via networks

The focus group discussion guide focused on the same aspects, but in a different order.

Additionally, coordinators of diverse networks are interviewed (Network Coordinator Interviews; NCI), focusing on the characteristics of the networks concerned. This interview guide focuses on the following aspects:

(a) General profile of the network/network coordinator
(b) Network inception
(c) Network evolution and network membership
(d) Network composition and network ties
(e) Network activities
(f) Network management
(g) Network performance

All questions are presented in an open-ended format in order to obtain a broad range of information and to stimulate interaction among participants in case of the focus groups. The complete interview and focus group discussion guides are included in appendices 1 to 3.

1.6.2.2 The Flemish agricultural sector: a brief overview of the empirical setting

1.6.2.2.1 Key economic indicators

In 2013, the Flemish (northern part of Belgium) agricultural sector cultivated 613,860 ha and numbered 24,884 farms. The number of farms continues to decrease. In comparison with 2004, one third of the farms have disappeared, an average decrease of almost 4% per year. It is mainly the smaller farms that quit the sector, which implies an increased scaling-up. Compared to 2004, the average area of cropland per farm increased by 40%, to an area of 25 ha (Platteau et al., 2014). The average annual work units per farm is 2.07 (Statbel, 2013).

From an economic perspective, the Flemish agricultural sector is characterized by a final product value of 5.8 billion euros and a net added value of 1.3 billion euros. In total, 51,583 people are employed within the sector. This equates to 41,141 full time equivalents (Platteau et al., 2014)

In 2011, agricultural products and their derivatives represented 9.8% of all imported products in Belgium and 10.4% of all exported products. The trade surplus of these products amounts to 3.1 billion euros. Belgium has a share of 8% in the European export. Flanders is responsible for the lion’s share (81%) of the Belgian exports. These figures show that an important proportion of the added value in the agricultural sector is export oriented. Consequently, there is only limited room to increase the cost of products, for example to compensate for the quality of the production method and environmental efforts (Platteau et al., 2012).
1.6.2.2 Innovation within the Flemish agricultural sector

Vuylsteke (2012) made a comprehensive study about innovation within the Flemish agricultural sector. This background information enables us to interpret the results of this study within the frame of the Flemish agricultural innovation landscape. She found, among other things, that more than half of the farms have introduced one or more innovations during the last five years. The farmers mainly invest in process innovations, but the importance of marketing and organizational innovations has increased significantly during the last five years, while that of product innovations has slightly diminished. The farmers introducing innovations are generally younger, with larger farms and are more likely to have a successor than the non-innovating farms. The innovations are mostly only new to the farm and not to the sector. The most important reasons observed for innovation are to obtain a higher income (77% of the responding farms), a reduction in the labour force (72%), quality improvement (67%), cost reduction (65%) and expansion in production (47%). An uncertain market (47%) and lack of time (37%) are the most important bottlenecks for innovation, followed by legislation (32%) and lack of funding (30%). The own farm is by far the most important source of innovation: more than 74% of the responding farms found their ideas on their own farm. Given the importance of innovations that are only new to the farm, it is likely that problems and bottlenecks are the basis for improvements. In addition, farmers also gained ideas from their colleague farmers (19%), buyers (18%) and advisors (15%). About 14% of the farms did not collaborate for innovation or did not consult other parties. Farmers who collaborated for innovation mostly had contact with colleague-farmers (48%), suppliers (31%) and research institutes (25%) (Vuylsteke, 2012).

1.6.2.3 Selection of cases

Four agricultural subsectors have been selected: the poultry, fruit, vegetable and ornamental plant sectors. These subsectors all have a final production value between six and twelve percent of the total Flemish agricultural sector: 7.9% (P), 6.35% (F), 11.24 % (V) and 10% (O) respectively (Platteau et al., 2012). Although it is not our aim to conduct a representative study of the agricultural innovation system in Flanders or Europe, these subsectors where selected in order to compare sectors that are characterized by different conditions and cooperative attitudes. The reason for this selection is outlined below.

Poultry sector: The Flemish poultry sector is characterized by numerous vertically integrated networks, which refers to ownership and/or management of two or more successive links in the chain by a single firm, i.e. the feed firms or hatcheries taking over ownership of the farm or farm animals or offering a standard fixed contract guaranteeing sales. According to the literature, vertical integration facilitates the adoption of new technologies and increases production and market efficiency (Rogers, 1992; Martinez, 1999). Furthermore, the sector was, and still is, under constant pressure to innovate due to regulations obliging farmers to invest in new infrastructure to meet animal welfare quality requirements.

Fruit sector: When studying the fruit sector, we focus on the cultivation of the kiwi berry (Actinidia Arguta). This berry is a radical new product innovation, and is considered to be a market opportunity due to its health, convenience and ecological
characteristics. It is a sweet, hairless mini kiwi to be eaten with its skin, like a grape (Debersaques and Mekers, 2013). In Flanders, a producer association was established by a research institute to support the farmers from Flanders and the southern part of the Netherlands who grow this berry. On the one hand, this association focuses on the exchange of knowledge supporting the development and marketing of this radical new product, and on the other hand on the organization of the producers, suppliers and buyers within the chain.

Studying this case will provide us with insights into the characteristics of a network involving several different actors, supporting a radical new product innovation.

Vegetable sector: The Flemish vegetable sector is characterized by a highly cooperative attitude for the supply of products. Flanders, together with the Netherlands, is the region with the highest degree of cooperative concentration for the supply of vegetables and fruit in the European Union (Van Gijsseghem and Gabriëls, 2007). The auction is responsible for marketing the products delivered by grower-members. In Flanders, auctions for vegetables and fruit have a market share of 75 to 80%. Additionally, Flanders is an important region for the production of vegetables for the processing industry. Flanders is the main production location for frozen vegetables, accounting for 46% of European production. This selection therefore enables us to study the research questions in an important agricultural subsector characterized by a cooperative attitude.

Ornamental plant sector: This sector is selected because of its characterization with a historical geographical concentration within Flanders. According to Porter (1998), regionally concentrated networks of actors with complementary activities concerned with common products can lead to innovative clusters. A cluster comprises independent firms operating in the same, or a related, market segment and a shared geographic locality, benefiting from external economies of scale and scope from agglomeration (Brown and Hendry, 1998). A cluster consists of a network of producers, supporting organizations, and a local labour market (Scott, 1992). There are usually major universities located within or close to clusters. The universities train skilled personnel and provide technical and research support to firms in the districts (Inkpen and Tsang, 2005). The ornamental plant sector in Flanders is characterized by just such a concentration in the region of Ghent (Ghent cluster) which formed a good basis for the development of innovation. However, for several decades, this sector was faced with a lot of challenges to maintain its competitive advantage in an increasingly globalized market characterized by increased competition (Taragola, 2003; Van Lierde et al., 2011). This case brings insights into how clusters nowadays contribute, or can contribute, to innovations.

1.6.2.4 Selection of respondents and sample

For the selection of the respondents for the farmer interviews, the steering committee of the research project enabled contact with two farmers for each case selected. For the poultry sector, one farmer is vertically integrated by the hatchery, and another one is working on the spot market. Among the kiwi berry growers, two farmers from another region are selected. Within the vegetable sector, a farmer who is a member of the cooperative, and a non-member are selected. As regards the ornamental plant
sector, one respondent is active within the Ghent cluster and the other one outside the cluster. The following respondents are selected via snowball-sampling. This is applicable when the respondents are difficult to find, reach or approach (De Pelsmaker and Van Kenhove, 2006, p.63). Respondents are contacted by telephone to introduce the aim of the study and to arrange an appointment for a personal interview. When referring to their colleagues who mentioned them as a potential next respondent, they feel less inclined to refuse to contribute. Moreover, this selection procedure leads to a wide diversity of respondents: respondents from different branches or crops within one subsector, farmers functioning under different degrees of integration (from spot market over contracts to full ownership), members and non-members of a cooperative, active within and outside a cluster, characterized by a high or low innovation capacity and network activity.

The interviews with the network coordinators are held with the members of the steering committee who are active as network coordinators, or with network coordinators found interesting by them. All the interviews are conducted at the respondents’ place in order to make them feel at ease. They are all undertaken by the same interviewer in order to exclude interviewer bias. The interviews required one to two hours per respondent. Recruitment and interviewing continued until data saturation is achieved, so until no new or relevant extra information emerged.

For the focus groups, only one branch per case is selected, in order to have homogeneous groups enabling the discussion. For the poultry sector, the subsector of laying hens is chosen because of the European rule forbidding battery hens from the beginning of 2012 (EU-directive 1999/74/EG), obliging farmers to switch to more animal-friendly housing before and during the time frame of this investigation. Hence, this makes it an interesting story within the frame of this project. Within the fruit sector, the focus was similar as for the interviews, with the producers of kiwi berries, as there is a unique collaboration among producers in this sector in Flanders. For the focus groups for the vegetable sector, leek growers are selected because of their high economic relevance (production of 95 million kg per year). For the ornamental plant sector, the subsector of azalea production is selected, because of its high importance in Flemish ornamental plant production.

In each subsector, except in the case of the kiwi berry, two focus group discussions are held. Within the vegetable sector, one group of leek growers is characterized by low network activity (FG1 – see table 1) and another one by high network activity (FG2). The focus groups are organized at the auction in West-Flanders (Reo-veiling). The assignment of leek growers to the different groups is done based on our definition of high and low network activity and the expert knowledge of the production manager for the auction (Reo-veiling). For the case of the kiwi berry, only one focus group is organized, as the group of kiwi berry growers is limited and, additionally, a lot of

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1 High network activity: farmers who attend activities organized by associations or other collaborative initiatives at least once a month and who contacts with colleagues, buyers, suppliers or other parties have at least once a month to exchange knowledge and experiences; Low network activity: farmers who attend activities organized by associations or other collaborative initiatives less than once a month AND who have contacts with colleagues, buyers, suppliers or other parties less than once a month to exchange knowledge and experiences.
information is obtained through the interviews. The search for respondents is facilitated by the coordinator of the producer association. The discussion is organized in Sint-Niklaas, where the farmers meet on a regular basis. For the poultry sector, the intention was also to organize a group with high and low networking individuals. However, the low networking individuals are hard to reach, which changed the strategy. A distinction is made based on the region, with one focus group organized in the province of West-Flanders (FG1) and one in the province of Antwerp (FG2). These are the two most important regions for poultry farming in Flanders. The search for respondents is facilitated by the expert knowledge of the representative of a hatchery and the director of the experimental farm for poultry. The selected azalea growers in the ornamental plant sector are again chosen for their level of network activity (FG1=low networking and FG2=high networking). The assignment of the respondents to the different groups is done with the help of the responsible for azalea growers of the Ghent research institute. The focus groups are organized at the research institute in Merelbeke.

All focus groups are moderated by a well-trained moderator to avoid bias induced by the moderator. Two hours are anticipated for each focus group.

In table 1, an overview is given of the primary data sources and which chapter is based on which data. As shown in this table, 109 respondents are consulted in total. First, 38 farmers are interviewed. Furthermore, 23 interviews are conducted with network coordinators active in the agricultural sector. Afterwards, seven focus groups are organized, reaching 48 respondents. The majority of the network coordinators are exclusive network coordinators, but others are farmers who also act as network coordinators. They are subsequently asked questions from both interview guides. This is indicated between brackets in table 1 with the ‘~’-sign.

In the table below, the blue cells indicate which data sources are used for which chapter. Research question 1 is answered through interviews (FI) and focus groups (FG) with farmers, reaching 86 respondents. For research question 2a, all data is used, both from farmers as network coordinators. This equals 109 respondents. As for research question 2b, a map with the evolution of the full innovation process for the individual farmers is given, the restriction to the individual farmer interviews is evident. Out of the data from the 38 interviews, only 20 allow mapping of the full innovation process, from initiation to termination. In the other interviews, farmer answers are not specific enough or their innovation is not yet at the termination stage. Research question 3, investigating farmers’ beliefs about network activity is answered by the farmer interviews. This section was less detailed in the pilot version of the interview guide, which leads to less data on this topic. Also, this section is not included for the kiwi berry growers. 24 interviews are considered in chapter 4. Research question 4, investigating how network characteristics facilitate or constrain the ability to cope with the innovation characteristics, is answered by consulting all the data sources.
<table>
<thead>
<tr>
<th><strong>Table 1</strong>: Primary data sources consulted per chapter (indicated in blue)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All primary data sources</strong></td>
</tr>
<tr>
<td><strong>Chapter 2</strong></td>
</tr>
<tr>
<td>RQ1</td>
</tr>
<tr>
<td><strong>Poultry sector</strong></td>
</tr>
<tr>
<td>FI1, FI2, FI3, FI4: Reproduction</td>
</tr>
<tr>
<td>FI5, FI6: Broiler</td>
</tr>
<tr>
<td>FI7, FI8, FI9, FI10, FI11: Laying hens</td>
</tr>
<tr>
<td>FG1: 3 x laying hens</td>
</tr>
<tr>
<td>FG2: 9 x laying hens</td>
</tr>
<tr>
<td>NCI1: Feed Firm</td>
</tr>
<tr>
<td>NCI2, NCI3: Representative of hatchery</td>
</tr>
<tr>
<td>NCI4: Representative of research institute</td>
</tr>
<tr>
<td>NCI5, NCI6: Sector association</td>
</tr>
<tr>
<td>NCI7, NCI8, NCI9 (~FI1, FI2, FI6): Board member of sector association</td>
</tr>
<tr>
<td><strong>Fruit sector (Kiwi berry)</strong></td>
</tr>
<tr>
<td>FI1, FI2, FI3: Kiwi berry</td>
</tr>
<tr>
<td>FG1: 9 Kiwi berry growers</td>
</tr>
<tr>
<td>NCI1: Coordinator kiwi berry</td>
</tr>
<tr>
<td><strong>Vegetable sector</strong></td>
</tr>
<tr>
<td>FI1, FI2: Leek and cabbage</td>
</tr>
<tr>
<td>FI3: Tomatoes</td>
</tr>
<tr>
<td>FI4: Paksoi, Mizuna and tomatoes</td>
</tr>
<tr>
<td>FI5, FI6: Chicory</td>
</tr>
<tr>
<td>FI7: Celery, fennel and turnip</td>
</tr>
<tr>
<td>FI8: Beans and spinach</td>
</tr>
<tr>
<td>FI9: Onion</td>
</tr>
<tr>
<td>FI10: Leek</td>
</tr>
<tr>
<td>FG1: 6 leek growers</td>
</tr>
<tr>
<td>FG2: 12 leek growers</td>
</tr>
<tr>
<td>NCI1: Innovation Centre for agriculture and rural development</td>
</tr>
<tr>
<td>NCI2, NCI3, NCI4, NCI5: Research institute</td>
</tr>
<tr>
<td>NCI6: Governmental advisor</td>
</tr>
<tr>
<td>NCI7, NCI8, NCI9: Manager at an auction</td>
</tr>
<tr>
<td>NCI10, NCI11: Sector association</td>
</tr>
<tr>
<td>NCI12: Coordination centre for applied research and extension</td>
</tr>
</tbody>
</table>
In table 2, an overview is given of some background information for the farmers consulted, with respect to farm size and age of the farmer. This data includes approximately 80% of respondents, as not all of them reported their farm size and age. Although it is not the aim of this study to be representative, it is worth mentioning that a large range between the size of the farms and age of the farmers can be identified. This is, with a few exceptions, quite similar to the real situation in Flanders.

The average size of a Flemish poultry farm (broilers and laying hens) equals 24,243 animals (Vuylsteke et al., 2014) compared to 64,167 in our study. For the vegetable sector, the average company size in our sample is 37 ha of cultivated land compared to 30.8 ha for the Flanders’ average (Vuylsteke et al., 2014). Regarding the ornamental plant companies, the average size in our study is 6.23 ha. This includes both horticultural plants in greenhouses and in the open air. Flanders’ averages amount to respectively 1.05 ha and 8.73 ha for greenhouse and horticultural companies (Vuylsteke et al., 2014). As only a small number of Flemish farmers grow kiwi berries, there are no averages available for this case.
Concerning the age of the farmers, the average age of a Flemish farmer is 52 years (Platteau et al., 2014). This is a bit higher than the average in our sample, ranging between 43 and 45, depending on the case.

Table 2: Background information about the responding farmers

<table>
<thead>
<tr>
<th>Cases</th>
<th>Size of farm (range)</th>
<th>Size of farm (average)</th>
<th>Age of farmer (range)</th>
<th>Age of farmer (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>17,000 -140,000 animals</td>
<td>64,167 animals</td>
<td>27 - 52</td>
<td>43</td>
</tr>
<tr>
<td>Kiwi berry</td>
<td>0.3 - 7ha</td>
<td>2.9 ha</td>
<td>33 - 50</td>
<td>45</td>
</tr>
<tr>
<td>Vegetable</td>
<td>10 - 110 ha</td>
<td>37 ha</td>
<td>23 - 59</td>
<td>43</td>
</tr>
<tr>
<td>Ornamental plant</td>
<td>1.6 – 17 ha</td>
<td>6.23 ha</td>
<td>28-55</td>
<td>43</td>
</tr>
</tbody>
</table>

1.6.3 Data analysis

All interviews and focus groups are audio-recorded and transcribed by the interviewer. Subsequently, the full transcripts in Dutch are imported into the Nvivo-10 software for analysis, which is considered a powerful tool for analysing qualitative data (Nvivo, 2006). This allows for coding of fragments using a flexible set of categories. The principle of coding is to structure the materials to make data analysis possible (Mortelmans, 2010). It means labelling the text with the code(s) reflecting their content. Every code contains all available statements about that particular concept.

There are two principles of qualitative coding: codebook coding and grounded theory coding (Mortelmans, 2010). According to the first principle, codes are defined before coding. In the second principle, the codes are created while coding. For this study, chapters 2, 3 and the first part of chapter 5 make use of codebook coding, as we start coding with defined codes. These codes are defined based on the literature review and the insights that emerged while transcribing the interviews. In chapter 4, in which farmers beliefs about networking are identified, the second principle is used, as it is typical for an elicitation study to let the beliefs emerge from the respondents. Also in the second part of chapter 5, the codes are created during the coding process. Afterwards, all the codes relating to the same phenomenon are categorized. The categories used in our study are mentioned in table 3 below.
Table 3: Coding categories in Nvivo

<table>
<thead>
<tr>
<th>Category of nodes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation types</td>
</tr>
<tr>
<td>Innovation stages</td>
</tr>
<tr>
<td>Network partners</td>
</tr>
<tr>
<td>Influencing factors</td>
</tr>
<tr>
<td>Innovation characteristics</td>
</tr>
<tr>
<td>Asymmetric relationship typology</td>
</tr>
<tr>
<td>Network characteristics</td>
</tr>
</tbody>
</table>

Depending on the number of subcategories, different levels of subcategories are created, as shown in figure 4. These codes are discussed with other researchers from the project consortium and further refined into the current analytical categories.

Figure 4: Illustration of categories and subcategories of nodes in Nvivo

Source: Print screen of Nvivo software

Consider the following text fragment of one of the interviews as an example (Figure 5). Next to the text, in the coding stripe pane, it is shown which text fragment has which code. It is possible to select the codes to be shown in the coding stripe pane.
For the analysis, queries can be used to find patterns or relationships in the data. A query can be simple or complex. With a simple coding query, you can look for coded information. In order to analyse, for example, general ideas on behavioural beliefs of farmers, a coding query shows all text fragments coded with the nodes categorized in the behavioural beliefs. Also, by clicking on a node, all the text fragments labelled with this code are shown, together with the sources (who said this) and the number of references, per source and in total. With an advanced coding query, it is possible to select the sources considered in the analysis, for example by limiting this to the interviews or focus groups only or per sector.

The more complex queries are matrix coding queries, resulting in an overview of the number of references in which two categories of codes are coded simultaneously. For example, in figure 6, the coding intersections between some selected network partners consulted and the stage of the innovation process are cross-tabulated for the vegetable sector. The result is a matrix showing how many times the different network partners are coded simultaneously with the different innovation stages. One combination in the matrix shows, for example, how many times “colleagues home” and “implementation-termination” are coded simultaneously. When clicking on this number in the matrix, all the text fragments in which these codes are identified appear simultaneously, together with the different sources (respondents) mentioning them.

<table>
<thead>
<tr>
<th>A: initiation</th>
<th>B: development</th>
<th>C: implementation-termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colleagues home</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Colleagues abroad</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Colleagues other sec...</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 6: Example of the result of a matrix coding query for network partners consulted during innovation process stages
Source: Print screen of Nvivo software

1.7 Thesis outline

The dissertation incorporates 6 chapters, as outlined in figure 7. The first, introductory chapter starts by framing the research and providing an overview of the state of the art and the research gaps. Next, theoretical perspectives and the conceptual framework are presented, followed by the research objectives and questions. Finally, the research method is presented. Chapter 2 to 4 investigate the link between networks and innovation from the perspective of the individual
company. In chapter 2, the current situation about the characteristics of partners and relationships to Flemish farmers’ network activity for innovation is investigated. Chapter 3 investigates the role of different network partners depending on the type of innovation and the stage in the innovation process. Subsequently, in chapter 4, the factors influencing farmers’ network activity for innovation are identified. Chapter 5 shifts to the perspective of the network instead of the individual firm. This chapter investigates which network characteristics are critical for successful innovations. The final chapter, chapter 6, draws general conclusions by answering the research questions and highlighting the main contributions of this dissertation. It ends by presenting the limitations and providing directions for future research.

**Figure 7:** Structure of this dissertation
Chapter 2

Asymmetric relationships in networked agricultural innovation processes

Adapted from:

Abstract:
The purpose of this chapter is to sketch how Flemish farmers perceive the asymmetry in their relationships for innovation and how this fosters or hinders the development of innovation processes of the farmers.
The design is a case study approach. 86 farmers active in four different agricultural subsectors in Flanders are consulted, of which 38 via in-depth interviews and 48 in seven focus groups. Data are analysed using Nvivo.
We observed that the majority of farmers perceive their relationships more as a necessity for the farm to be able to function, than as an opportunity for innovation. If they collaborate for innovation, they often prefer symmetric relationships with similar companies on horizontal level. The ornamental plant growers stand out by being better in coping with asymmetric relationships, and being more open to derive benefits from asymmetric relationships, for example by absorbing external knowledge and practices.
The findings suggest that farmers should take more actions to gain power in the chain and improve their skills with regards to negotiating with their suppliers or buyers. Furthermore, we found which characteristics of asymmetric relationships would foster the development of innovation processes.

Keywords:
Networked innovation, asymmetric relationships, agriculture, Flanders
2.1 Introduction

In the recent years, “networked innovation” has become an important theme within the innovation literature. This literature stream emphasises the interactive and collaborative nature of the innovation process (Powell et al., 1996; Omta, 2002; Pittaway et al., 2004; Swan and Scarbrough, 2005; Chesbrough, 2006), which is defined as the ongoing process of learning, searching and exploring, resulting in new products, new processes, new forms of organization and new marketing methods (OECD and Eurostat, 2005, based on Lundvall, 1995).

This study combines two different theoretical angles with respect to innovation. The first one is the networked innovation approach which regards innovation as the result of interaction between resources and the competencies of companies and their partners, in which relationships are the means by which firms work with other firms to operate within a network setting (Holmlund and Kock, 1996; Holmlund, 2004). The second is based on the literature on asymmetry in business relationships, in which the IMP Group (Industrial Marketing and Purchasing Group) and Johnsen and Ford (2008) play an important role.

In the following sections of the introduction we review the literature on (1) the relational dimension of network interaction and the impact of asymmetries in the relationship, and (2) networked innovation in the agricultural sector. This chapter is further structured as follows: In section two the methodology is described, followed by the results section. Finally, discussion and conclusions are presented.

2.1.1 Asymmetric relationships

For SMEs the management of network relationships is a critical issue, since it involves partners characterised by different features (size, power, resources, etc.). In this context, asymmetric relationships can arise (Holmlund and Kock, 1996; Johnsen and Ford, 2001; Blomqvist et al., 2005).

The concept of asymmetry in relationships focuses on inequalities between the actors involved in the relationship. As Mouzas and Ford (2004) highlighted, “Asymmetric relationships are those relationships where an imbalance in the resources of one of the companies, or in the way that those resources are used, enable one of the companies to be more able to influence the other, to initiate change in the relationship or to dominate the relationship”. A definition provided by Blomqvist (2002), offers a multifaceted and all-embracing perspective: “Asymmetry in relationships concerns not only partners’ size and power imbalance, but also relevant difference in their managerial systems, culture and values, and capabilities.”

Of course, these asymmetries in network relationships have consequences for the companies involved. “In an asymmetric relationship the stronger party is likely to be able to dominate and influence the conclusion of contracts and, thereby, determine the processes and outcomes of the relationship” (Mouzas and Ford, 2004). In such circumstances smaller partners can have difficulties in sustaining or developing
beneficial relationships due to the asymmetry in the interaction (Håkansson, 1982; Grundlach et al., 1995; Holmlund, 2004). The difficulties are mainly linked to the ability of smaller suppliers to nurture and maintain a set of capabilities for growth, building a competitive position (Day and Nedungadi, 1994; Colurcio, 2009) and creating value (Ulaga and Eggert, 2005; Donada and Nagatchewsky, 2006; Johnsen et al., 2006). However, asymmetry may also impact positively on smaller partners in the relationship as they can absorb and influence external knowledge and practices by collaborating with larger companies (Blomqvist et al., 2005).

Asymmetry in network relationships can thus be considered both as an opportunity for network capability and knowledge development and as a threat to the growth and development of the smaller and relatively powerless actors (Johnsen and Ford, 2001; Holmlund, 2004; Fortuin and Omta, 2009). Recently Johnsen and Ford (2008), who applied Mouzas and Ford’s (2004) definition of asymmetry in relationships, proposed a typology to analyse a relationship’s asymmetry, which allows investigation of the different characteristics enabling or inhibiting the development of network relationships aimed at innovation. This typology identifies seven main characteristics of asymmetry (see Table 4).

Table 4: Typology of asymmetry

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutuality</td>
<td>An attitudinal variable, measuring how much a company is prepared to give up its own individual goals to increase benefits for a counterpart and through this its own long-term well-being (Ford et al., 1986).</td>
</tr>
<tr>
<td>Particularity</td>
<td>The direction and uniqueness of interaction in a relationship, when compared to other relationships of the companies, or the extent of standardisation of interaction (Ford et al., 1986).</td>
</tr>
<tr>
<td>Conflict</td>
<td>Conflict is a measure of differences between the parties over the direction of the relationship or over their respective contributions and benefits (Ford et al., 1986).</td>
</tr>
<tr>
<td>Interpersonal inconsistency</td>
<td>Interpersonal inconsistency relates to the personal expectations and individual interests influencing the interaction (Ford et al., 1986).</td>
</tr>
<tr>
<td>Co-operation</td>
<td>Co-operation is a measure of the extent to which companies work together to determine or implement a direction for the relationship (Ford et al., 2003).</td>
</tr>
<tr>
<td>Intensity</td>
<td>The aggregate level of contact and resource exchange between firms in a relationship (Ford and Rosson, 1982).</td>
</tr>
<tr>
<td>Power and dependence</td>
<td>Distinct types of power and dependence exist: technical, knowledge, social, logistic, administrative (Håkansson, 1987). Historic, economic, technological, political dependence will be more or less evident depending on the nature of the organizations’ relationship to each other (Axelrod, 1984).</td>
</tr>
</tbody>
</table>
The contribution of Johnsen and Ford can be seen as a successful attempt by longstanding research (Ford and Rosson, 1982; Johnsen and Ford, 2001; Johnsen and Ford, 2008) and is considered a cornerstone in the literature on the topic of asymmetry since it offers clearer elements with which to define asymmetric relationships and provides a map of relationships’ characteristic typologies (Colurcio et al., 2012).

2.1.2 Networked innovation within the agricultural sector – research gaps
Although networks are considered a relevant means for innovation, not all firms are equally capable of networking (see section 1.2). Farmers in particular, are confronted with such challenges in the development of network relationships aimed at innovation (Theuvsen, 2004; Klerkx et al., 2010; Kühne et al., 2013). As farms are mainly small entities with limited power within the chain, their access to external knowledge for innovation via networks is often restricted (Pretty, 1995; Chiffoleau, 2005; Eshuis and Stuiver, 2005). For farmers, the issue of networked innovation is therefore very real. However, insight into the specific situation of farmers with respect to networked innovation is still limited (Kühne et al., 2013).

Second, studies investigating asymmetries in network relationships have been analysed from their different perspectives and in terms of their impact on innovation. Scholars have so far comprehensively deduced potential advantages and problems resulting from asymmetries in the power and positioning of partners with regard to knowledge sharing in innovation networks (Johnsen and Ford, 2001; Mouzas and Ford, 2004; Johnsen and Ford, 2006). Nonetheless, empirical work unravelling the effects and impacts of asymmetric relationships on innovation from the SME’s perspective is still scarce (Colurcio et al., 2012). Colurcio et al. (2012) investigated this topic within the food sector, but only focused on food processors, while neglecting the farmer and his suppliers.

Both of the aforementioned research gaps will be addressed by investigating the characteristics of partners and relationships in farmers’ network activity for innovation through application of the asymmetric relationship typology.

Given the numerous advantages of networking for innovation, the limited insights about networked innovation and relationship asymmetries within the agricultural innovation system, as well as the difficult market situation, there is a need for research that deepens understanding of how farmers experience their relationship with (asymmetric) partners. Hence, within this chapter, the following research question is tackled:

RQ1: How do farmers perceive the asymmetry in their relationships for innovation with their network partners (Horizontal and vertical network partners and third parties) and how do they think this fosters or hinders the development of their innovation processes?"
2.2 Methodology

2.2.1 Data collection
The research strategy is a case-study design based on different agricultural subsectors, combining in-depth interviews and focus group discussions. The research is conducted between June 2011 and March 2013 within the agricultural sector in Flanders. In total, 86 respondents are consulted in four subsectors. These comprised 38 farmers via interviews and 48 respondents via seven focus groups. See section 1.6.2 for more details on the choice of these subsectors, their description and the selection of respondents.

2.2.2 Data analysis
All interviews and focus groups are audio-recorded and transcribed. The data are sorted and coded using Nvivo. The possible network partners are coded as illustrated in figure 1: colleagues/competitors, sector association, business club, suppliers, buyers, public administration, Innovation Centre for Agricultural and Rural Development (ICARD), research institute/university, consultants/extension services and financial provider.
Second, the main characteristics of relationship asymmetries were coded. Through matrix coding queries, we found which relationship characteristics belong to which group of network partners. This means that all sentences that were coded simultaneously with one of the network partners and one of the relationship asymmetries were searched for by the program, resulting in a matrix with the number of references in which all combinations of the two codes were found. When clicking on this number, all the citations from the text are visible. See section 1.6.3 for more details on the coding and related data analysis.

2.3 Findings: Characteristics of innovation partners and relationships in the agricultural system

In the following paragraphs, the research question is tackled with regard to each network partner. A distinction is made by case, where relevant. The findings show the general trends in the four cases, underpinned by verbatim quotes from the respondents. These are translated from Dutch to English. Although the quotes may have lost some of their original qualities in translation, they do still encapsulate the views given by the respondents. It is difficult to say what percentage of the respondents agree with this general trend, as not all the farmers mention the same topics during the interviews, while they probably do agree with the opinion but did not think about every aspect at the moment of the interview. An advantage of the focus group discussions is that farmers can inspire each other when thinking about the relationship with their network partners. During this process, it is also possible to observe if they agree with their sector mates, and why or why not. In the majority of the focus groups, farmers did agree with each other and complemented each other’s ideas. If clear differences are observed among the farmers’ opinions, both in the interviews and the focus groups, or between the focus groups which were held in three subsectors, this is mentioned. In that case, a possible explanation is added, considering the background of the respondents.
The results are structured according to the three categories of networks: horizontal, vertical and third parties. At the end of each section, an overview of the results is given in a table for each category (Tables 5, 6, 7). These tables are based on the typology of Johnsen and Ford (2008). The relevant relationship characteristics are discussed per case, together with some additional information where appropriate.

2.3.1 Horizontal collaboration for innovation

2.3.1.1 Colleagues/competitors

Competitors or colleagues are frequently stated as important sources for innovation. The majority of the farmers interviewed mention a high level of willingness to work together with their colleagues and to build a long-term relationship based on trust and common interests. They have a strong belief in the advantages of collaboration in terms of learning from each other, and strengthening their position with suppliers and buyers: “You know that you are not alone in the world. […] You often think ‘god damn it’ on your farm, but then you meet colleagues suffering with the same problems, and you can exchange information about how they cope with it” (Focus group vegetable 2). Although there are consistent personal relationships between farmers, it is rare for resources to be exchanged and these relationships are often of low intensity.

Poultry farmers, for example, mentioned that their colleagues are often not open and honest with each other, and are even jealous. Mostly, they “steal more with their eyes” than via discussion with each other (Focus group 1). However, according to the farmers from focus group 2, this situation is changing, and these farmers are really interested in setting up a network with colleagues to exchange information for innovation. Nevertheless, they feel their freedom to organise this kind of network is restricted by their suppliers.

Conversely, we observed that the producers of kiwi berries have quite a good relationship with their colleagues. In terms of the relationship characteristics, we noticed mutual collaboration and a common goal, namely to market the kiwi berry in the best possible way. These producers market all their products via the same channel - a single auction that collaborates closely with the producer association and other auctions where the growers can deliver their products. This situation is unique in Belgium. This relationship is perceived to be of very high intensity. With respect to particularity, or the way in which the farmers manage the relationship, we observe a unique mode of interaction within the producer association. Almost all the Flemish farmers who grow kiwi berries participate in the association. They meet with each other several times a year and share ideas about production and marketing techniques.

Similar characteristics were observed among vegetable farmers who belong to cooperatives that supply via auctions. However, among vegetable farmers who are not members of a cooperative auction and produce for the processing industry, rivalry is noticeable, leading to a lower level of mutuality. “We are here in our region with four farmers who all planted a new crop this year. It is new for all four of us and a difficult crop to raise, but nobody is willing to deliberate about the process. Everybody
developed a method and a machine on his own, and nobody wants to talk about it. [...] Coincidently, we saw another farmer in another region with the same crop and asked if we could have a look at his machine, but the farmer was not willing to show us his machine. That would have been an ideal situation to learn from each other. But he sent us away. [...] This is very sad; people are not willing to help each other” (Interview). This illustrates relationships with a low level of mutuality, particularity and intensity, in which conflict prevails. Furthermore, within focus group 1, there was a high level of willingness to collaborate to control the supply of products in order to achieve better prices, albeit with limited success. “Now, we have too many leeks, and we, as leek growers cannot say: everybody has to plant 10% less. There will be growers listening, but on the other hand, others will plant more leeks as a reaction. And that is the problem. The group of growers is too large, not to farm, but to make agreements” (Focus group 1).

Within the ornamental plant sector, a similar rivalry is observed as to that among the vegetable farmers producing for the processing industry, as the growers active in this sector have only limited opportunities to market their products via cooperative auctions. The ornamental plant growers have to deliver the majority of their plants to wholesalers or exporters, and this places them in direct competition with each other. Nevertheless, we observed some unique collaborative initiatives to develop or market products together, characterised by a high level of particularity. These growers indicate that they mostly work together, not to learn from each other, but to reduce costs, for example, by buying-in-group or sharing the costs for the development of new varieties: “We cannot do this alone, but in a group it is possible. Mostly we work together to reduce costs” (Focus group 1).

2.3.1.2 Sector association

A sector association is an organization founded and funded by a number of people or organizations, operating in the same market, and often in competition with each other, to represent them and provide them with services. These associations exist because they can provide services to their members more efficiently than the members could do individually (Boleat, 1996; NFU, 2011; ABS, 2012; Bioforum, 2012; Boerenbond, 2012). A sector association participates in public relations activities such as advertising, education and lobbying, but its main focus is collaboration between companies. Associations may offer other services, such as conferences, classes or educational materials. Many associations are non-profit organizations directed by officers who are also members of the association. In Flanders, different sector associations are active in the agricultural sector under varying names, such as union branch, producer association, farmer association etc. Views differ greatly on their contribution to innovation and the characteristics of the relationship.

Within the poultry sector, the corresponding department of the biggest farmer association in Flanders organizes courses on an annual basis. These are valued positively by the members of focus group 2. Focus group 1 is less positive about the services of the sector association. This association is a shareholder in different companies trading with the agricultural sector, both suppliers and buyers, which
seems to influence their decisions according to the respondents: “They are involved in all the links in the chain you can imagine. This makes their decisions often not farmer oriented, but rather market oriented” (Focus group 1).

The **kiwi berry growers** have a producer association in which almost all the farmers from Flanders planting the berries participate. They meet each other several times per year and share, among others, ideas about production and marketing techniques. This association also represents the farmers and provides them with services. Alongside this, they can also consult the farmers’ union: “Lastly, I went to a workshop organized by Boerenbond [sector association] about marketing and use of the internet” (Interview).

In the **vegetable sector**, some of the respondents are members of union branches, providing them with some extra information at first hand. The associations “also support us, for example, in the relationship with universities” (Interview).

In the **ornamental plant sector**, there is a sub organization of the biggest farmer association in Flanders. This association ensures for example that growers “know quite quickly what is happening in the research institutes” (Interview). Others say that the added value in terms of innovation is rather limited: “I already said it frequently during meetings: those associations, they have a problem, they have big farms as members, merchants as members, small farms as members. And they can never choose black or white, it is always grey. I often have difficulties with that. They always want to indulge all their members, but that is not working” (Interview). This disadvantage is frequently mentioned, also in the other subsectors. The majority of the farmers mention, for example, that the biggest association in Flanders is involved in all the agricultural and horticultural subsectors, which makes it difficult to represent them all in a good way: “They are occupied with so many subsectors, that they cannot be good for one sector” (Interview).

The role of sector associations in terms of innovation seems to be minor. The associations are better known for their representation of the sector, which can indirectly lead to a higher innovation level. Furthermore, being a member of a sector association often brings you into contact with a wider variety of actors and aspects of farming, thereby increasing the exchange of ideas and market knowledge, which can increase the farmers’ innovation capacity. The relationship with the sector associations is dependent on the role of the farmer within the association. Those who are members of the board of directors generally have a more symmetric relationship than those who are not. In addition, the board of directors has a more intense relationship. For the common members, mutuality and particularity are not very high in these relationships.

**2.3.1.3 Business Club**

A business club is a platform where responsible people or representatives of organizations can meet each other with the aim of enhancing the communication in one, or between different, industrial sectors to strengthen their position. Business clubs are typically initiated and run by a partnership of interested organizations such
as local councils, utility companies, regulators, universities, government, business and technical support organizations with expertise in specific areas of relevance to most members of the business group (Hyde et al., 2002). To attend these meetings, you have to become a member of the club. In Flanders, it was not possible to identify a business club focusing solely on the agricultural sector. However, several business clubs which are active in the general business environment admit members of the agricultural sector and organize activities situated within the domain of the agribusiness complex. Only four respondents in this study are members of a business club, and three of them are active in the ornamental plant sector. Most of the farmers do not see the advantages of collaboration with non-farmers.

Moderator: “Do you often exchange ideas to learn new things with people from outside the sector?”

Respondent 1: “No, those people are not aware of the functioning of a farm.”

Respondent 2: “Indeed, everything evolved so fast. You have to explain everything yourself” (Focus group 1-poultry).

They believe that the membership fee and time spent will outweigh the advantages. Those who are members of a business club indicated that it is very inspiring and supports their business. For example, they learn techniques based on management ways of thinking, such as marketing, outsourcing, fiscal topics, and employment.

Respondent 1: “I am the only horticulturist, but it is way more interesting than with farmers, because we know almost everything there.”

Respondent 2: “Yes, you are 100% right. You’ve got a totally different point of view.”

Respondent 1: “We are all entrepreneurs together […]. You often learn more from other sectors than from your own sector” (Focus group 2-ornamental plant).

**Table 5:** Overview of results per type of network partner and per case for horizontal networking

<table>
<thead>
<tr>
<th></th>
<th>Poultry</th>
<th>Fruit (kiwi berry)</th>
<th>Vegetable</th>
<th>Ornamental plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colleagues/Competitors</strong></td>
<td>Low intensity</td>
<td>High mutuality High intensity</td>
<td>Auction: high mutuality and intensity <em>Processing industry:</em> lower mutuality, particularity and intensity</td>
<td>In general rivalry leading to low mutuality, particularity and intensity; Some unique collaboration initiatives, with high particularity</td>
</tr>
<tr>
<td><strong>Sector association</strong></td>
<td>Courses organized are valued positively</td>
<td>A lot of ideas about production and marketing techniques</td>
<td>Support contact with universities</td>
<td>Difficult to approach a big variety of members</td>
</tr>
<tr>
<td><strong>Business Club</strong></td>
<td>No belief in collaboration with no-farmer</td>
<td>/</td>
<td>/</td>
<td>Interesting, but often difficult to link up</td>
</tr>
</tbody>
</table>
Although these farmers are very positive about the contributions of business clubs, when asked about their relationship with the other members, one of the farmers indicated that it is very difficult to link up with the other members: “I am a chatterbox, but still… You are standing there. This is very difficult. You are standing there on your own at the bar. […] Then, you hope that you’ll meet someone who can form a link, but sometimes, it is like dying. I don’t know, but personally, this is not always easy for me. […] You can’t just say to a stranger, ‘Hi, I am [name] from [company], can you tell me more about the organization of your company’? That does not work this way. You need to know those people, and this takes time. This is quite a task for me” (Interview). The farmers do not mention close partnerships with members of business clubs. Collaborations exist, but mostly they are not mentioned as being embedded within a common strategy as farmers think that conflict and interpersonal inconsistency would be high, and intensity and resource exchange would be low. The limited amount of farmers who are members of a business club, tend not to have a very intense relationship with the other members of the business club.

2.3.2 Vertical collaboration for innovation

2.3.2.1 Suppliers
Suppliers are frequently mentioned as important sources for innovation.

Within the poultry sector, the most important suppliers are the feed firm and the hatchery: “Receiving good feed from the feed firm, and chickens from the hatchery, these are two things which are very important” (Focus group 1). Within this sector, the majority of farmers have a very close relationship with their suppliers, mostly based on contracts. In most situations, the farmers base their decisions on the advice of their suppliers. “It is important to trust the feed firm. This determines your profitability to a large extent. They advise you about what you should feed and when” (Focus group 1). The relationship is often a “love-hate relationship”, which can be explained by the coexistence of the characteristics cooperation and conflict, reflected in the term interpersonal inconsistency. The farmers are often largely dependent on the suppliers for advice and their income. However, they are also bounded by a contract, which reduces their bargaining power. There are different kinds of coordination structure, ranging from the spot market, over hybrid structures to vertical integration. The more on the side of the spot market the farmers are, the more freedom and bargaining power they possess, and they are proud of this. The farmers operating on the other side of the spectrum often do not dare to admit their binding agreement with the suppliers, which they need as a guarantee to receive funding from the bank. In focus group 1, the attendance of two farmers active on the side of the spot market and one who was situated near to the end of full integration, hence led to a somewhat uncomfortable situation when discussing the relationship with suppliers.

In general, farmers have the feeling that they are kept in ignorance by suppliers and they do not always trust them, but they have to obey them, “for example in case you can’t pay for your feed, the supplier will lend you the money for a month, but I’m sure that they reduce the quality of the feed delivered” (Focus group 2). To improve the relationship, some farmers mention that trust can be built up through good
husbandry. “If you have bad luck, they know that you are doing your best, will be understanding and not punish you. On the contrary, if you are not, the relationship will be worse as this is also bad publicity for the feed firm or the hatchery” (Focus group 1). In addition, to build trust, farmers indicate that “it is very important that the representatives are not broadcasting your problems around on other farms” (Focus group 1).

In the case of **kiwi berry** production, collaboration between farmers and suppliers is often via the producer association. The coordinator of the association, in collaboration with all the members, seeks for interesting suppliers of for example, pollen, packaging materials and equipment. By working together, they can negotiate better prices.

In the **vegetable and ornamental plant sector**, the most important suppliers are those of phyto-products, plants and equipment or infrastructure. The suppliers of phyto-products and plants have representatives who visit the farmers on a regular basis to present their plant varieties and products. According to the farmers, the quality of the relationship depends on the quality of the products: “The better the product, the better the relationship”; “If they ever sell a bad product, the relationship often weakens” (Focus group 2). They give advice with respect to which varieties to plant and how to cultivate them, which herbicides to use and when. This is highly appreciated by the farmers, as these representatives also visit their colleagues’ fields, and are therefore aware, at an early stage, of possible problems with diseases, and which products are better suited to different types of ground, farmer, region and season. Furthermore, they also have a global overview of the sector, and “can inform us about contraction or expansion in the sector” (Focus group 2). However, a negative point mentioned is their commercial character: “For seed houses and phyto-suppliers, their sales are important. And this is logical, they have to make profit” (Focus group 1). The majority of the relationships with suppliers are thus based on the transaction of selling and buying, accompanied by some advice from the representatives promoting their products. Therefore, the relationship is often based on indispensability: “We just need them” (Focus group 2). However, we also observe examples in which farmers work closely with their suppliers. For example, a vegetable grower who developed his machine together with the supplier, or an ornamental plant grower who gives advice to his supplier of young plants about market information, trends and colours. “For us, this is an important supplier, and we are his most important buyer. Together, we market the product in a strong way, and it is an advantage that he has the power to steer the production” (Interview).

Generally speaking, the relationship with suppliers is characterised by a strong degree of mutuality, cooperation, and particularity, as the representatives try to help the farmers on an individual basis, depending on their situation. However, in one of the focus groups, the added value of the relationship was not highly rated: “Eventually, all of those representatives, they go round from one farm to the other, and spread the same news everywhere” (Focus group 1). With regard to power and dependence characteristics, suppliers very often have higher power but conflict is smoothed over through cooperation, as farmers are convinced that a good relationship may ensure long-term well-being for all.
2.3.2.2 Buyers
The majority of the respondents tended to describe the relationship with buyers as exhibiting a lot of asymmetry. Farmers are, to a large extent, dependent on buyers for their incomes and this limits their negotiating power.

Within the poultry sector, due to integration, the buyer often constitutes the same partner as the supplier. Farmers in this sector describe the situation as follows: “Everybody, within all sectors calculates his costs to set a price. But this is not the case in agriculture; buyers say what they are willing to give us. There is friction” (Focus group 1).

Among growers of kiwi berries, the auction sets the selling price. The growers indicated that they are afraid that if buyers gained the opportunity to buy berries directly from farmers, or to determine prices themselves, profitability would be substantially reduced. They now have power through the producer association, and hope that this situation will remain stable in the future.

The vegetable farmers who produce for the processing industry draw up a contract at the beginning of the season. The quantity that is to be traded is identified within these contracts. If farmers suffer from misfortune and have a bad harvest, they have to pay a fee. In contrast, if they experience oversupply, the processor is not willing to pay for the surplus produce. When drawing up the contracts, the processors visit the farmers and seek out those who are willing to produce for the lowest price, which, according to the respondents, often results in problematic situations. One of the farmers mentions the following: “I remember a farmer having the opportunity to draw up a contract, but he did not agree to the proposed price. His neighbour, however, accepted the offer. This is the negative side” (Focus group 1). Furthermore, “the problem is that the number of buyers is limited. If there are only three or four buyers, they can say ‘Look, this is what we offer you, and nothing more.’” (Focus group 1). The relationship with wholesalers is also not very good. “If you deliver directly to a wholesaler, you have to deliver exactly what they ask. And they always know much better than the farmer if the retail price is going to increase or decrease. If retail prices are going to increase, he says: bring all that you can! And the other way round, if prices are decreasing, they don’t need your product” (Focus group 1). For vegetable farmers sending their products to the auction, the auction plays an intermediary role between farmers and buyers. However, the buyers communicate their requirements to the auction:
Respondent 1: “They want products with fewer residues, in a particular type of box, fulfilling these and these requirements.”
Respondent 2: “They always want the best quality and the lowest prices.”
Respondent 3: “They think they can squeeze us dry” (Focus group 2).

The number of buyers also appears to be decreasing, which places them in a stronger bargaining position: “The buyers have the power, they push the prices down” (Focus group). The farmers would “appreciate it if the auction tried harder to make them stronger during negotiations” (Focus group 2).
Within the ornamental plant sector, we observe a similar relationship with wholesalers: “If the wholesalers would collaborate in a fair manner... But usually, this is not the case” (Interview).

Despite all these examples of asymmetric relationships with buyers, some positive examples are also observed, particularly among the high networking ornamental plant growers:

Respondent 1: “You can learn a lot from your buyers, and you have to listen carefully to what they want, their needs and try to fulfil them.”

Respondent 2: “Indeed, we have to listen to the consumers if they still want our products; and how much they are prepared to spend on them” (Focus group 2).

To summarise, we can state that, in general, the mutuality and the cooperative aspects of the relationship with buyers are not well developed, since the power of buyers is very strong. The intensity of the relationship is not shown to be high in the analysis of the interviews and focus groups. Conflict is high, especially with regard to the requirements of buyers. From a farmer perspective, the dynamic between power and dependence clearly benefits the buyers.

**Table 6:** Overview of results per network partner and per case for vertical networking

<table>
<thead>
<tr>
<th>Suppliers</th>
<th>Poultry</th>
<th>Fruit (kiwi berry)</th>
<th>Vegetable</th>
<th>Ornamental plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close relationships based on contracts</td>
<td>Collaboration with suppliers is often via the producer association</td>
<td>The majority of the relationships with suppliers is based on the transaction of selling and buying, accompanied by some advice of the representatives promoting their products.</td>
<td>The majority of the relationships with suppliers is based on the transaction of selling and buying, accompanied by some advice of the representatives promoting their products.</td>
<td></td>
</tr>
<tr>
<td>Coexistence of cooperation and conflict Trust is important factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Buyers**

<table>
<thead>
<tr>
<th></th>
<th>Poultry</th>
<th>Fruit (kiwi berry)</th>
<th>Vegetable</th>
<th>Ornamental plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyers</td>
<td>Buyers are often the same partner as the supplier</td>
<td>Growers have the power</td>
<td>The buyers have the power</td>
<td>No fair collaboration</td>
</tr>
</tbody>
</table>

### 2.3.3 Third parties

**2.3.3.1 Public administration**

We observe that the relationship with public administration is not perceived as very positive.

_Poultry farmers_ inform us that “government is often wearing two hats” and that the requirements are becoming “increasingly stringent”. “You always have to ask for new permits, not only for new stables. If I would like to innovate and put in place a heat
exchanger, I would need a permit. For the majority of innovative ideas, you need a permit. It becomes increasingly difficult and has a paralyzing influence. Additionally, if you have more than 85,000 animals, you need an environmental effect report, and this is tough, first because it costs a lot of money, more than €10,000, and second because it prolongs the permission procedure by a year” (Interview). Also during the focus groups, the poultry farmers mentioned that government requirements are often too stringent. “Of course there have to be requirements and of course this should be controlled, but the measures are often too drastic” (Focus group 2).

In the case of the kiwi berry, the farmers, especially the Dutch members, also struggle with regulations. “No pesticides can be used because our cultivation is not yet recognized; pest control has to be in the organic way” (Interview).

This is similar in the vegetable sector, where rules about fertilization, for example, are becoming increasingly stringent and infeasible:
Respondent 1: “It’s a sad situation, we are hardly allowed to fertilize.”
Respondent 2: “Indeed! But if we don’t fertilize, we don’t have products” (Focus group 2).
The farmers mentioned the following: “The people from the government, they do not live among the farmers anymore and they do not exactly know what is good and what is bad” (Focus group 2).

Also within the ornamental plant sector, it is mentioned that there “is a big gap between government and practice” (Focus group 2). Farmers have to comply with laws and regulations, even if they are not convinced about the consequences: “Willingly or unwillingly, we have to adapt. For example with respect to the water treatment, we end up in a situation for which I do not see the advantages, but we made the investments” (Focus group 2).

The high networking people in the ornamental plant sector say that they have close contact with the ministry of agriculture. They mention that “if measures dictated by society are taken, it is important that feasible solutions are presented by governments, and in a manner of speaking no unachievable things” (Focus group 2).

We can hence conclude that these relationships are characterized by a low level of mutuality since the power of public administration is very strong and therefore the dependence of farmers is important. Also particularity and intensity seem to be low.

2.3.3.2 Innovation Centre for Agricultural and Rural Development (ICARD)
With respect to the innovation centre for agricultural and rural development, we observe that the quality of the relationship depends on the subsector.

Among the poultry farmers, the innovation centre is rather unknown and received little positive feedback: “They often lack the necessary knowledge themselves” (Interview).

Among growers of the kiwi berry, the innovation centre is only consulted by one of the growers, and he was positive about the services.
In the **vegetable sector**, respondents also give some positive comments: “I know a lot of colleagues who went to the innovation centre with their ideas, and who received the necessary support. If I had an innovative idea, I would certainly consult them as well” (Interview). However, we also discover some negative reactions: “I followed some seminars organized by them, but according to me, their subjects are always a bit too far from the farmer. They organized for example visits to big companies, probably very interesting, but the common farmer from Flanders is not prepared to drive to Brabant to visit a farm. […] I don’t know any farmer who realized something great thanks to ICARD. […] They organized some round table discussions, that I liked, with for example wholesalers, retailers, representatives of the auction. Those activities were good” (Interview).

For the **ornamental plant sector**, the majority of the respondents know ICARD or have already made use of their services in the past. “I went to the innovation day in Torhout. If I see how interesting this was, than you really should attend that, or you missed something” (Interview). However, one of the respondents mentioned that they are still too little known: “Often I hear colleagues having a problem and I ask: ‘Have you already been to the Innovation centre?’ And then they say: ‘Do they know that? Is that for free?’ But those services are offered to us as we are members of AVBS [sector association]. I think they should announce their services and activities more properly” (Interview).

As you see, only a limited number of farmers have an intense relationship with employees of ICARD. Those having ICARD as a partner in their network are mainly the ornamental plant growers. The particularity in the majority of the relationships is rather low, as activities are mostly organized to serve as many growers as possible. However, some farmers referred to colleagues having relationships characterized by high mutuality and particularity, which are rather intense, via personal guidance.

### 2.3.3.3 Research institute/university

Concerning the research institutes and universities, we generally observe a relationship where the quality improves over the years. Research institutes make an effort to better align their services with the needs of the farmers, and to decrease the threshold. For example technical committees are set up consisting of representatives of the sector, research institutes and governments to brainstorm and formulate advice for the direction of future research.

However, within the **poultry sector**, there is still a long way to go according to the respondents, as they are not that positive about their contact with research institutes, as illustrated below:

“Currently, we are doing water research. In fact, you have to contact people without commercial purposes, who are independent. Therefore, we collaborate with a Flemish research institute and a Dutch one, as they are further developed in that domain” (Interview).

This sector also has similar technical committees, but the average farmer is not aware of their existence.
Poultry farmers indicate that interest in research results is often limited and that they often have some difficulties in understanding and interpreting results:

“We once collaborated in a research project, and the results were presented to us. For them, it was interesting, but we did not grasp much from it” (Interview).

“The research institute in Geel does a lot of research and frequently organizes study afternoons, tries to stimulate discussion, compares their results with practical results. But way too little farmers attend these afternoons, and I don’t know why” (Interview).

A very positive attitude toward the research institutes is observed among growers of the kiwi berry. The contact person and coordinator of the producer association is affiliated to a research institute. In terms of the berry’s development, this is a very important person, who is passionate about it and who is always available for the growers. “If you have a question, you just call him” (Interview). The researchers also set up tests at the farms, so growers have frequent, sometimes daily, contact with the coordinator. Furthermore, the results are presented during the grower meetings and pruning demonstrations, which are attended by all the berry growers. The intensity of relationships is rather high, as cooperation is intense and the exchange of knowledge very important.

Within the vegetable sector, a similar situation to that for the poultry sector is observed, in which contact with research institutes and universities is limited and feedback about performance is not always very positive. “In the chicory sector, we rely on information from [research institute], and this is often a little bit outdated, or a huge bit, and the national research institute for chicory is a complete museum. It is really sad, if you compare the means spent on research with the outcomes” (Interview). However, some positive collaboration initiatives are also observed, in which innovative projects are tested on farms such as reuse of washing water for leeks.

Within the ornamental plant sector, the attitude toward research institutes and universities is mainly positive, as illustrated below.

Moderator: “And your relationship with research institutes, how would you describe that?”

Respondent 1: “I think if you would ask the reverse question to the research institute, that they would be less positive than we are. Research institutes would prefer to have more contact with us.[...]”

Respondent 2: “According to me, this works very well.”

Moderator: “Do you have a lot of contact with them?”

Respondent 2: “I do, yes.”

Respondent 1: “Let’s say, I have more contact than I used to have. We are looking to investigate what we can mean for each other and how we can solve a problem.”

Moderator: “And you [respondent 3], how do you think about the relationship?”

Respondent 3: “I think the relationship improved. Their services used to be the same for everyone, but nowadays, the support is more company specific.”

Respondent 4: “Indeed, and the threshold decreases, the distance becomes smaller. There is also a technical committee where current problems can be presented. I think that goes well, and it is well structured” (Focus group 2).
During the interviews, we also observe the same trend: “If you talk about products and refinement, we collaborate frequently with ILVO and PCS [research institutes] for research, or research ideas. This is kind of our soundboard for innovation” (Interview). “We are lucky that here in Flanders, universities, as well as PCS and ILVO, feel affection for the sector. The responsible people have close contact with the sector. Imagine that technicians without feeling for the sector take over the lead, one would start to think too fundamentally, too far away from the sector” (Interview). However, it is also mentioned that there are still a lot of growers who don’t know how to approach the research institutes. “The threshold still has to be lowered for a couple of people, because we already know the way, but there are a lot of people who don’t know this. That is important” (Interview).

In conclusion, particularity in the relationships with research institutes and universities is often low, as research is conducted within the frame of projects that try to serve as many farmers as possible. Some farmers take the opportunity to write, together with a research institute, a research proposal based on their own, specific needs. If these projects are accepted, the intensity of relationships is often high, but limited to the durations of the projects.

2.3.3.4 Consultants/ Extension services

Within the poultry sector, the use of private consultants is limited. There, they often make use of the services of a veterinarian or technician, but this person is often related to the feed supplier.

In the case of the kiwi berry, we observe that almost all the knowledge is obtained via the producer association. Other people or institutions do not have enough knowledge at the moment. However, they are working on this for the future.

Within the vegetable sector, some subsectors often call upon the services of a consultant for advice to enable innovation and process improvement on their farm. These relationships are on a contractual basis, and farmers have to pay for them. In return, they can make use of the expertise: “He visits a lot of farmers, exchanges information, and if a disease pops up, he will be one of the first ones diagnosing this, and informing all his clients” (Focus group 2). The relationship is described as very positive and highly valued. Consultants complement the advice of suppliers, which is often less objective. “The suppliers only want to sell. In contrast, TACO [private consultancy agency] looks at your product and advises you how to get the best result with the minimum of means” (Focus group 1).

This is similar within the ornamental plant sector, where one of the farmers describes it as follows: “For me, this is one of the most important things. You really learn a lot, especially in terms of production techniques. Every two weeks, they come for two hours to take some samples and to give advice. Besides, we also talk about more general trends in the sector” (Focus group 1).

We can conclude that these relationships are characterized by high mutuality and particularity. Their interests are likely to be the same, and the intensity is quite high,
as the consultants come at least once every two weeks, and continuously inform farmers about important evolutions in the sector.

2.3.3.5 Financial provider
The financial provider is frequently identified as the most important player: “If you don’t have the money, you cannot start with your innovation” (Focus group). Banks have their customer relationship managers who are active in the agricultural sector giving advice to farmers.

We observed that banks have preferences for funding specific subsectors and that the poultry sector is not their favourite one:
Respondent 1: “The poultry sector is step motherly treated by the majority of banks. I hear that they are often not willing to fund poultry farmers, even though the business plan looks good.”
Respondent 2: “Yes, it is absurd. And so, they drive you into the hands of the feed farm or the hatchery. They say: ‘No problem, we can help you!’ But automatically, you are bound to them for a couple of years. Thus if the feed firm is helping you, you are sure that they will deliver your feed for several years, and they will increase the price, to have some interest on the money. If it is the hatchery, you know that your eggs [consumption eggs] will be sold via them” (Focus group 1).

In the kiwi berry project, financial providers’ willingness to invest also seems to be low, but this is due to the novelty of the product. “The bank was not pleased with the data I got from our coordinator. The data had to be from an extension centre or experimental garden, and not from Ghent University. Hence, Ghent University dictated the data to an extension centre, which signed the document and this was ok for the bank. And after consideration, they decided ‘No Go’, as they were not familiar with the product. Nowadays, they know the kiwi berry, and there would be a chance of acceptance. But three years ago, they had better informed us in advance that they would not be willing to pay, as I had to pay a lot for the business plan” (Interview).

The vegetable farmers do not complain about difficulties obtaining loans, although their relationship with the banks is not very mutual, particular or intense and the interpersonal inconsistency is often high. During the focus groups, respondents mentioned the following, for example:
Respondent 1: “I would say: Do not listen too much to the advice of the banks. Do what you think is the best.”
Respondent 2: “If the bank is not willing to invest, you cannot force them. But you can go to another bank, there are enough possibilities, and you can play them off against each other” (Focus group 1).

The ornamental plant growers indicate that “over time, the relationship with financial providers changed. For us, getting money is relatively easy as the bank knows us. For young starters, it has become very difficult, because banks are not bursting to fund such big investments. When I started, and asked for 250,000 EUR, they would say ‘take 500,000 EURO’, but now, it is the other way round” (Interview).
The relationships with the customer relationship manager from the bank are in the majority of cases not characterized by high mutuality and particularity. Also, the intensity is not very high, and is limited to the services that banks deliver, namely the calculation of feasibility studies.

In the cases where suppliers or family cofinances the innovative project, the situation is totally different. Financing by suppliers means that more power is attributed to them.

**Table 7:** Overview of results per type of network partner and per case for third parties

<table>
<thead>
<tr>
<th>Network Partner</th>
<th>Poultry</th>
<th>Fruit (kiwi berry)</th>
<th>Vegetable</th>
<th>Ornamental plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public administration</td>
<td>Too stringent, hindrance for innovation</td>
<td>Positive attitude but often a hindrance for innovation</td>
<td>Government does not live among the farmers</td>
<td>Big gap between government and practice Try to influence their decisions</td>
</tr>
<tr>
<td>ICARD</td>
<td>ICARD is relatively unknown</td>
<td>Positive attitude</td>
<td>Positive attitude, but often too far from the farmer</td>
<td>ICARD is well-known and a lot of growers consulted it</td>
</tr>
<tr>
<td>Research institute/University</td>
<td>Farmers have limited interest in collaboration</td>
<td>High intensity</td>
<td>Limited contact, but some collaborative innovative projects</td>
<td>Positive attitude</td>
</tr>
<tr>
<td>Consultants/Extension services</td>
<td>Limited use of consultant, except the veterinarian</td>
<td>Consultants don’t have the required knowledge</td>
<td>Extensive use of private consultants</td>
<td>Extensive use of private consultants</td>
</tr>
<tr>
<td>Financial provider</td>
<td>Low particularity and mutuality with bank, driven into hands of other funders (buyers and suppliers)</td>
<td>/</td>
<td>Low mutuality and particularity, High interpersonal inconsistency</td>
<td>Low mutuality and particularity for young starters</td>
</tr>
</tbody>
</table>
2.4 Discussion and conclusions

The findings from our study contribute to the innovation literature, in particular by combining the asymmetric typologies framework of Johnsen and Ford (2008) with the concept of networked innovation within the agricultural sector. The application of this combined framework is quite unique, particularly in the agricultural sector (Colurcio et al., 2012; Colurcio and Russo-Spena, 2013). By using this approach, a deeper understanding is gained as to how farmers experience the asymmetry in their relationships for innovation, thereby enabling improvements to the innovation capacity of farmers via networking.

The findings are consistent with our theoretical framework, since they show that asymmetric relationships can indeed affect the development of innovations, both positively and negatively. Furthermore, this exercise provides insights into the characteristics of asymmetric relationships that would foster the development of innovation processes within the agricultural sector.

The majority of the relationships are observed as being characterised by low mutuality. Most of the actors are completely self-interested. Only a few examples of high mutuality are found, particularly with the suppliers, consultants and also some examples with colleagues. The farmers who collaborate in mutual relationships are found to have established the most innovative projects. This demonstrates that relationships in which both partners are willing to give up their own individual goals to increase the benefits for their counterpart and, as a result, the long-term wellbeing of both parties, are more suitable for innovation. Within the food sector, Colurcio et al. (2012) similarly found that the degree of mutuality is strong in relationships where the innovation goal is a shared objective. In our study, good examples are observed within the vegetable and ornamental plant sector, where the majority of farmers have a relationship with paid consultants, and this is characterized by high mutuality. They possess both knowledge about the product and the production process, and about the market and the expected future demand. Other striking examples of high mutuality are the producer association for the kiwi berry, the establishment of a horizontal network to promote products together, or the development of a new machine together with a supplier.

In terms of the relationship with buyers, it is found that farmers often have to give up their own goals, in the interests of the buyers.

As regards particularity, the findings indicate that the majority of farmers prefer particular relationships, with personal contacts over standardised contracts. For example, they enjoy a chat with their suppliers or consultants. This can provide considerable new knowledge for innovation. However, when farmers restrict their relationships to these particular, personal contacts, because they are used to them and have a good feeling about them, there is a chance of missing interesting information for innovation. Similarly, Håkansson and Snehota (1998) found in their study about the impact of size asymmetry in buyer-supplier relationships that particular relationships may preclude the involvement of other parties, and that the commitment of resources to these relationships may make it infeasible to pursue others. Thus, particularity may appear an attractive proposition for farms to improve
their innovation capacity. However, farmers should also make sure that they are aware of opportunities for other relationships too, such as colleagues from other sectors via business clubs, people from public administration, or research institutes.

In terms of conflict, Johnsen and Ford (2001) found that for SMEs active in the textile industry, a certain level of conflict between the different actors in the relationship maintains the competitive driving force and creativity of the relationship. In our study, it is observed that there seemed to be frequent instances of conflict in many of the relationships investigated. As conflict is perceived by the majority of farmers as a destructive force for networked innovation, they avoid relationships in which they expect conflict to be high such as the one with buyers, members of a business club, public administration and financial providers. In the relationships with colleagues and suppliers, conflict is mostly resolved by cooperation, as farmers are convinced that collaboration will ensure long-term well-being for all. Conflict with the buyers, however, is difficult to address. Only some of the biggest farms are able to influence these relationships. This often leads to learning and innovation.

The findings about interpersonal inconsistency suggest that farmers mostly prefer personal and consistent relationships. They mostly prefer to talk with actors they already know, active in the same subsector and the same region, and who have similar expectations of the relationships. However, this might limit conversations with unfamiliar people who could be very interesting from an innovation viewpoint (Colurcio et al., 2012). It is observed that the development of the relationship with buyers, is often unilaterally influenced by their personal expectations, potentially limiting the farmers’ input and involvement. This is in contrast to the relationships with third parties, in which farmers can often influence the relationships themselves, except for the relationship with public administration and financial providers.

When considering co-operation, the cases show that in the vertical relationships, buyers mostly influence the timing and details of co-operation. Within the horizontal relationships also, farmers often face difficulties in giving direction to the relationship, unless a person or group of people is assigned to managing it. Farmers therefore seem to have some difficulties in cooperating. This might restrict the process of triggering the knowledge creation that leads to learning and innovation.

As regards intensity, we see that the established pattern of interaction is often influenced by longstanding involvement and commonly understood patterns of contact, contributing to a reduction in ambiguity and misunderstandings. However, some farmers experience a lack of contact with customers and the wishes of the end-consumer. Similarly, the resource exchange with colleague-farmers, as well as with suppliers, is regularly perceived as limited and farmers are found to be insufficiently aware of the possibilities for strengthening the intensity of their relationship with third parties. Intensifying relationships with both vertical and horizontal partners is therefore considered as a necessary investment for the future. The latter was also found by Colurcio et al. in the food sector (2012).
Power and dependence is found to be the most difficult characteristic to address in the relationship with public administration, financial providers and especially with buyers, since their power is significant. The findings indicate that when farmers possess a high level of expertise concerning a specific niche product (technical power), customers are much more interested in cooperation, similar to the findings of Ragatz, Handfield and Petersen (2002). Furthermore, farmers who are more involved in networking often possess greater knowledge and power. This extra power enables them to gain greater influence in their relationships and to establish contacts that are important for innovation. This is in line with the findings of SMEs active in the textile industry within the UK (Johnsen and Ford, 2008).

Implications

Managerial implications
Overall, the study reveals that a lot of farmers consider the management of relationships to be the concern of the other party and spend little effort on changing their position within the relationship. Very often, the farmers studied restrict their relationships to partners with whom they are familiar, preferably from their own region and subsector. Furthermore, we noticed that the majority want to invest only in relationships that bring a return in the short term. Investing in relationships with, for example, members of a business club seems of little interest to them, as they believe that the membership fee and time spent will outweigh the advantages. However, farmers that put effort into changing their position within the relationship, and think more for the long term, seem to have a greater potential for gaining information and knowledge that could be useful for innovation. It is therefore important that farmers are willing to leave their comfort zone and discover potentially interesting contacts for further establishment and innovation on their farm. Visiting and talking with colleague farmers can, for example, open the farmer’s eyes, and give him ideas about how to further develop his farm, which paves the way to innovation. Also, the importance of vertical relationships should not be neglected, as it is important to understand market demand and to be able to respond to this in the most effective way. Farmers with a rather symmetric relationship with their buyers are seen to be better aware of market needs and can put effort into fulfilling those needs. Furthermore, attention should be paid to the importance of the relationships with third parties, as it is important to have access to first-hand information, new knowledge, the necessary money to innovate, and to be able to influence the creation of new rules, for example by having a good dialogue with public administration.

Farmers would therefore benefit from taking more action to gain power within the chain. They can, for example, join forces with colleagues to obtain critical economies of scale, easier access to information and a stronger role in negotiations. Furthermore, by acting as a single group, they become a larger entity with greater bargaining power. In contrast to the other agricultural sub-sectors investigated, the ornamental plant farmers are less resistant to asymmetrical relationships, and are more open to deriving benefits from asymmetric relationships, for example, by absorbing external knowledge and practices (Blomqvist et al., 2005). They see networking more as an opportunity to use synergies, enhance their market position
and become innovative more efficiently, which shows that there are possibilities. Within the network, it is important to get to know each other’s expectations and to agree on what information to share. Besides, it is important that the farmers take on responsibility and actively engage in the networks, instead of waiting for the input of others.

**Policy implications**

The chances of success for an innovation are not only related to the networking capabilities of farmers, but can also be influenced by the current institutional arrangements. Sector associations, research centres, and others organizations could help to overcome two important barriers for farmers to innovate: 1) farmers are not aware of the existence of possible network partners, because they are afraid of leaving their comfort zone, and 2) it is observed that the responding farmers often wait for innovative ideas to come from their relationships within the network. However, it is important that farmers themselves are also included in the development process. Solutions could be project-based innovation processes and involve the organization of events on relevant topics to bring together the partners that are necessary for a successful innovation project. This should not be restricted to farmers and farmers’ unions or local authorities, but chain partners should also be included. The government could stimulate this process via financial support.

**Limitations**

A limitation of our work is that our data has been collected from the agricultural sector in Flanders, and is therefore only valid for this region. Since this is the first study of its kind applying the asymmetric relationship typology to the agricultural innovation system, we invite future researchers to analyse the perspectives of farmers in other geographical regions and to compare the results.
Chapter 3

The role of different network partners depending on innovation type and stage in the innovation process

Adapted from:

Abstract:
The locus of innovation is increasingly the network within which the farm is embedded. This chapter aims at investigating the relations between network partners and innovation (types and stages in the process) in the agricultural innovation system, which is unique in this field. In addition, innovation studies mainly concentrate on product and process innovations, while this study also includes marketing and organizational innovations.
This study is based on in-depth interviews and focus group discussions with farmers. The findings provide useful research-related and managerial implications which enable farmers as well as network coordinators to improve the innovation capacity in the agricultural sector via networking. The main conclusion is that depending on the stage in the innovation process and the type of innovation, different resources and hence partners are needed. Therefore, farmers must be aware of the importance of partner suitability and network heterogeneity related to the type of innovation and stage in their innovation process.

Keywords:
Farmers, innovation process, innovation type, networking, Flanders, product, process, marketing and organizational innovation
3.1 Introduction

For farmers, as for entrepreneurs in general, innovation is widely recognized as an important strategic tool to increase the competitive advantage of their companies (Diederen et al., 2003; Knudson et al., 2004; Gellynck et al., 2007), resulting in a better financial, as well as sustainable, performance.

The challenge of innovation is becoming increasingly important in today’s rapidly changing world (Barnett and Clark, 1998; Avermaete, 2004; Nieto and Santamaria, 2007). An important strategy for innovation is collaboration with network partners (Omta, 2004; Pittaway et al., 2004; Lasagni, 2012). The scarcity of resources and the complex entrepreneurial environment make it necessary for SMEs to actively select appropriate network partners. However, there are few recent studies investigating the appropriateness of network partners in relation to different innovation types and stages in the innovation process and need much more research on this (Howells et al., 2004; De Man and Duysters, 2005; Varis and Littunen, 2010). We will tackle this research gap by focusing on the agricultural innovation system, given its specific recent challenges. Thereby, we will include all four types of innovation, as there are strong reasons to pay more attention to non-technological and intangible kinds of innovation in the agri-food sector (Pittaway et al., 2004; Birkinshaw et al., 2008; Van Galen and Verstegen, 2008; Crossan and Apaydin, 2010; Damanpour and Aravind, 2012). The objective of this chapter is therefore, to investigate which innovation partners are important for the different stages in the innovation process as well as with regard to the four different types of innovation.

A review of the literature on collaboration with network partners as a tool for innovation, including the different types of network partners identified and their potential role in the innovation process, is given in section 1.2 on page 3. In the following part of the introduction, the gaps are identified relating to the difficulties for SMEs in identifying the appropriate network partners to gain access to the required inputs in the innovation process. Furthermore, in section two, a short theory section is provided with regard to innovation process models and the applied framework of the Resource-Based View, followed by the formulation of the research questions. In the third section, the research methodology is described, and in section 3.4, the results are presented. Next, section 3.5 provides a discussion of the results, and finally, we end with the formulation of conclusions and the identification of research-related and managerial implications and potential areas for future research.

Gaps in literature

It is increasingly acknowledged that, depending on the type of innovation and stage in the innovation process, firms consult different knowledge sources and partners (Tushman, 1977; Ancona-Gladstein and Caldwell, 1990; Lippa and Sobrero, 1994; Gruner and Homburg, 2000; Freel, 2003; Pittaway et al., 2004; Nieto and Santamaria, 2007; Tödtling et al., 2009; Simon and Tellier, 2011). However, few studies have actually investigated what types of partner firms rely on in relation to the type of innovation, or the stage in the innovation process (Howells et al., 2004;
Chapter 3: The role of different network partners depending on innovation type and stage in the innovation process

De Man and Duysters, 2005; Nieto and Santamaria, 2007; Varis and Littunen, 2010; Chen et al., 2011; Lefebvre et al., 2014a). In addition, the existing studies in this domain focus much more on technological process and product innovations than on marketing and organizational innovations. However, more attention should be paid to this latter category (Pittaway et al., 2004; Birkinshaw et al., 2008; Van Galen and Verstegen, 2008; Crossan and Apaydin, 2010; Damanpour and Aravind, 2012). Furthermore, the focus has mainly been on large companies. Empirical evidence about innovation processes in small companies, such as the majority of farms, is still scarce (Edwards et al., 2005). With this chapter, we aim to add to previous research in tackling this research gap by examining network activities depending on the type of innovation and the stage in the innovation process within the agricultural innovation system.

3.2 Theory and research questions

Firms look for partners to provide the resources they lack during their innovation process. To study the link between the resources needed and the innovation types and stages, we combined the theory about the innovation process models with the Resource-Based View, within this chapter.

3.2.1 Innovation process models

To obtain insight into the different stages in the innovation process, we review literature on innovation process models. In the last decade, more and more scholars have recognized that innovation is not a linear and research-driven process that focuses on a new product developed within one company, but that it needs to be considered as a complex interactive process involving false starts, returns between stages, dead ends, and ongoing trial and error (Tidd et al., 2005; Balconi et al., 2008; Kirner et al., 2009). The innovation management models have generally tended to become more complex, more interdisciplinary, more integrated and more connected with their surroundings, thus with more links between organizations. A study by Eveleens (2010) reviews twelve literature sources in which models of four innovation processes have been proposed (see Table 8). The study aims to provide an overview of the models for innovation processes and the contextual factors that indirectly influence the process. Main summarizing phases identified are: idea generation, selection, developing and prototyping, implementing/launch, post-launch and learning/evaluation. The majority of the models include contextual components, such as strategy, culture, leadership, organizational structure, resources/skills and links outside the organization.

In our study, the model by Van de Ven et al. (1999), called the innovation journey approach, is applied for different reasons. To be able to fulfil the aim of our study, we select (marked grey in Table 8) the process models which are not restricted to product and process innovations. Second, we select the models that explicitly include components relating to links outside the organization, e.g. networking. Two models fulfil both criteria: Van de Ven et al. (1999), and Tidd et al. (2005). We follow Van de Ven et al, as the contextual components fit best with the scope of our study, by focusing solely on links outside the organization. The concepts of “Leadership” and
“Organizational structure” which are also included in the model by Tidd et al., are not applicable to our study. The model by Van de Ven et al (1999) has a number of components that, while not usually occurring in an orderly sequence, take an innovation from its initiation through a development period, to implementation or termination.

Table 8: Overview of innovation process models

| Source: Based on Eveleens (2010) |

<table>
<thead>
<tr>
<th>Innovation process models</th>
<th>Innovation types considered</th>
<th>Contextual factors considered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Product</td>
<td>Process</td>
</tr>
<tr>
<td>Rogers (1962)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cooper (1986)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Rothwell (1994)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Van de Ven et al. (1999)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Nooteboom (2001)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Mulgan and Albury (2003)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Verloop (2004)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cormican and O’Sullivan (2004)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Tidd et al. (2005)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Andrew and Sirkin (2006)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Hansen and Birkinshaw (2007)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Jacobs and Snijders (2008)</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Marked in grey: process models not restricted to product and process innovations and focus on links outside organization

The initiation phase can be described as the phase in which the idea is generated. Van de Ven et al. (1999) consider this as divergent behaviour. During the divergent phase, several directions of development are explored and new ideas, strategies and networks are created. This phase is triggered by the availability of new resources. For instance, if new people come on board with a team, it is likely that new ideas or lines of direction will be developed.

The development phase is the one in which the idea is turned into some tangible product, process or service. According to Van de Ven et al. (1999), this is called “convergent behaviour”. During this phase, it is about integrating the ideas generated in the divergent phase and the focus shifts from exploration to exploiting and testing given directions. The convergent phase is triggered by constraining factors, such as
external rules imposed by the environment or the internal discovery of a preferred course of action.

In the *implementation or termination period*, the newly developed product, process or service is implemented. This entails supporting the innovation by, for example, preparing customers and marketing activities. Although a phased model is used, Van de Ven et al. (1999) acknowledge that many feedback loops and cycles take place while progressing through the process. The innovation journey is a repeating cycle of divergent and convergent activities that take place at different levels, more or less simultaneously.

### 3.2.2 Resource-Based View

In the Resource-Based View (RBV), resources at the firm’s disposal have specific characteristics to provide the conditions for firm-level, sustained competitive advantage (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984). Transform a short-term competitive advantage into a sustained competitive advantage requires that these resources are heterogeneous in nature and not perfectly mobile (Peteraf, 1993). The original RBV formulation relies on the independent firm instead of considering the firm as part of an interacting network. However, other authors have applied the original formulation of the RBV in inter-organizational settings and extended it theoretically (Lavie, 2006). For more information about the underlying theory, we refer to section 1.3.3. This literature shows that, in terms of innovation inputs, firms will look for partners to provide the resources and capabilities they lack during their innovation process, maximizing firm value by effectively combining the partners’ resources and exploiting complementarities (Kogut, 1988; Gulati, 1995).

### 3.2.3 Research questions

In line with our objective and the theoretical background, we formulate the following two research questions:

**RQ 2a**: How do network partners’ contributions differ for product, process, marketing and organizational innovations?

**RQ 2b**: How do network partners’ contributions differ along the innovation process (initiation, development and implementation or termination)?

### 3.3 Methodology

#### 3.3.1 Data collection and data sources

In-depth interviews and focus group discussions are conducted. First, interviews with farmers are undertaken. They are asked open ended questions with regard to the innovations implemented over the last five years and which partners they consulted to realize these projects (section 2 and 4 of interview guide for farmers). Second, coordinators of diverse networks are interviewed, focusing on the type of innovations and knowledge exchange they support. Third, focus groups with farmers are conducted. For in the interviews with farmers, the focus is more on innovations, during the focus groups, the main point of interest is the networks, and how they contribute to innovations. However, both focus on the relationship between networks and innovation.
In total, 38 farmers are interviewed. Furthermore, 23 interviews are conducted with network coordinators active in the agricultural sector. In addition, seven focus groups are organized, reaching 48 respondents. In total, 109 respondents are consulted. For more details about the data collection and data sources, see section 1.6.2.

3.3.2 Data analysis
All interviews and focus groups are audio-recorded and transcribed. At the start, a visualisation of the innovation processes discussed during the farmer interviews is made through a timeline, with the help of MSVisio. Second, the interviews are sorted and coded using Nvivo. The innovations implemented are categorized by product, process, marketing or organizational innovations. However, it is worth mentioning that assigning an innovation to the right category is not always straightforward. Some innovations show characteristics of several types of innovation. For example, a company that introduces a new product often needs to redevelop the process, or the introduction of a new process can lead to a new organizational method. Innovations can be seen, at first, as product innovations, for example, while in the later stages, when it becomes widespread among the farmers, it is probably seen as a process innovation than a product innovation.

The innovation phases in the 20 selected interviews for research question 2b are coded initiation, development and implementation/termination, according to the innovation process model by Van de Ven et al. (1999). The potential partners are coded as described in figure 1 (p. 6): horizontal networking with competitors or colleagues, sector association and business club, vertical networking with suppliers or buyers and networking with third parties including public administration, research institutes and universities, consultants and extension services, financial providers and ICARD. Using matrix coding queries, we identify the network partners consulted depending on the innovation type and the stage in the innovation process (for more information, see section 1.6.3).

3.4 Findings
The findings are constructed from three sections. In the first section, four innovation processes are described in detail, through the illustrative timeline incorporating all activities and partners consulted along the journey. In sections two and three, the results analysed by Nvivo are presented for research question 2a and 2b respectively. The results are summarized per question, in a table, and illustrated with verbatim quotes from the participants, which are translated from Dutch to English. Although the quotes may have lost some of their original qualities in the process, they do give the respondents’ views.

3.4.1 Innovation journey
In this section, four detailed innovation processes, or journeys, are presented. The selection of these innovation processes ensures a detailed look at the innovation process for four different types of innovation, each one from another subsector. They were chosen at random.
Case 1: Product innovation: Introduction of the kiwi berry

Initiation
In 2008, the farmer started looking to grow kiwi berries, a new product on the Belgian market. This is a kiwi that can be eaten with the skin, as with a grape. The farmer grows already tomatoes since 1997, using hydroponic cultivation on an area of 12,000 m². He had 7,000 m² left untouched. As it was a very bad time for tomatoes, he did not want to expand tomato cultivation. “In 2008, I heard for the first time about the kiwi berry [see Figure 8]. It was during a football game that friends asked me if I had already heard the story of the kiwi berry. At that time, I had never heard about it, but I started looking for information in the specialist literature. There, I found the first article, which looked interesting and incited me to look for extra information about the requirements of the plant and the possibilities for growing the plant. [...] In the beginning it was really difficult to find extra information. Indirectly, I came into contact with the auction involved in the development project for the kiwi berry. They referred me to Filip [the researcher and coordinator for the kiwi berry producer association, which is affiliated to Ghent University]. This man presented to me, in an honest way, the possibilities, advantages and disadvantages of cultivation.”

Development
Once the farmer had digested the information, his interest in planting kiwi berry plants increased and he went to the bank to seek funding opportunities. However, the bank was not enthusiastic about supporting the project as they were not familiar with the product. “They required a business plan. Therefore, I contacted a consultancy agency and the expertise of Ghent University. [...] Even with the positive business plan, they refused to lend me money. I had to discover other funding possibilities and we approached our family.”

Implementation/Termination
In 2009, he decided to cultivate the plant, with money from his wife’s family. At that time, they became members of the producer association for the kiwi berry. This association is coordinated by Ghent University and aims to bring this radical new product to the market by supporting growers at different levels, ranging from production to marketing techniques. “Since then, we have attended all grower meetings and pruning demonstrations organized by the association.[...] There, we regularly meet our colleagues and they all share knowledge and experiences about the berry. This is very important, as this is the only place where knowledge is available about the plant and its cultivation. [...] For some subjects, we stay in contact for several weeks. [...] Next to that, the association informs us monthly via a newsletter about recent developments and tasks to do.”

In August 2010, the first Belgian berries were sold in the supermarket, but sales were not that good because the fruit was still unknown. In 2011, the kiwi berry was available in huge amounts in the supermarkets for the first year, and for this farmer this was also the first huge harvest. The sales were already better, “but I am still uncertain about the possible return on my investment. I hope it will evolve in the right direction.” According to the farmer, the success of the product and the association largely depends on the coordinator. As the cultivation of kiwi berries in Belgium is a
radical innovation, there is still very little knowledge available and a lot of support is necessary. Therefore, the farmer makes use of the services offered by the producer association: monthly newsletters with advice and grower meetings where the results of research and the experiences of other farmers and the auction are shared in order to improve product placement.

**Figure 8: Innovation process for product innovation: introduction of kiwi berry**

*Source: Own compilation*

**Case 2: Process innovation: Expansion of farm with free-range chickens**

*Initiation*

In 2003, the farmer established a farm with 12,000 free-range chickens (see Figure 9). Therefore, he looked up information and had frequent contact with the representative of the hatchery, who taught him the process of holding free-range laying hens. At that time, alongside to his job as farmer, he was also working in a factory. He explained why he became interested in expanding his farm. “I became more interested in the entrepreneurial and self-employed aspects of being a farmer and looked for possibilities to become a full-time farmer and hence to expand. […] Due to the European rule forbidding battery hens from the beginning of 2012 (EU-directive 1999/74/EG), I was interested in holding more free-range chickens and to expand to a farm with 30,000 chickens on the vast amount of land I had available.”

*Development*

In December 2008, the farmer decided to start with the development of his idea and to look for funds. “A lot of banks were interested in making an offer for the investment and made an appointment with us. My accountant drew up a business plan. For the banks, this was a very interesting project, they said. The only thing they required was 30% own capital, but this is impossible! Hence, I had to look for a contract.” He needed a contract with a hatchery, feed supplier or an egg trader as a guarantee for the bank. This contract is a form of vertical integration, as the contractor/integrator owns of the animals and makes the necessary decisions. “I contacted three different parties for this. Only the hatchery I already worked with was interested. Hence, I decided to continue and expand the collaboration with them. […] Afterwards, I started to contact suppliers of installations and stables, invited for invoices and arranged the necessary papers for the bank and required permits. Therefore, I called upon the services of a
consultancy agency and my accountant. [...] Soon after, I went to the owner of the land I rented. There, we discovered a problem. The owner was not willing to further lease out his land. The only possibility for me to expand was to buy the land and this was financially not that interesting, because I had to take out a bigger loan and paying off the debts for the land and the new stable was impossible with the income from 30,000 chickens. That’s why eventually I decided to expand to the maximum size allowed without needing an environmental report, i.e. 60,000 chickens. As I had already 12,000 chickens, I could build a new stable for 48,000 chickens. [...] During 2009, I attended numerous open farm days and exhibitions to learn about the various existing systems. In January, I visited Agriflanders [the agricultural exhibition in Ghent]. There, together with the hatchery, I consulted different poultry related stallholders and asked for information from three different suppliers of installations. One of them reacted immediately and made an appointment to visit some installed systems together. The other two did not seem interested. Even after the exhibition, I called them six times to receive extra information about the use and price of their installation, but they hardly answered. [...] Finally, they accompanied me to some companies, but I already had a bad feeling about them as they did not react immediately on my request, and in addition, it seemed that they had less experience than the first one as they were not able to show me installations that had already been in use for several years. During 2009, I visited almost every month a company in the Netherlands to become aware of the different existing systems. I did this because the hatchery inclined to advise one particular system, in which they have their own interest. The information I received from the hatchery was very unidirectional and as a farmer, you have to work in a system fulfilling your needs, and not fulfilling the needs of the hatchery. [...] Next to that, I visited three different farms in the neighbourhood to work with their system, and to obtain extra insight in the for me most interesting systems. [...] Then I started comparing offers, taking into account the characteristics of the different systems, the experience of the installers, the price, and the location of the installer and the desires of animal rights organizations.”

Implementation/ Termination

“I decided to work together with the most experienced installer of my favourite system, as I do not want to face the disadvantages of being the first-mover, although this was not the cheapest option. Another reason to choose this installer was that he is situated very close to our farm, which is interesting in case of problems. [...] As customers attach more and more value to animal friendly products, I decided to work with the most animal friendly system, although this is not the easiest solution for me.” During March 2010, the construction started and on October 15th 2010, the first animals were delivered. At that time, an open day was organized and everybody could visit the company.
Figure 9: Innovation process for process innovation: expansion of farm with free-range chicken

Source: Own compilation

Case 3: Marketing innovation: Looking for new markets for the organic sector

Initiation
The farmer started in 1988 as an organic farmer (see Figure 10), delivering to a wholesaler. As there were several organic farmers like him working in his region, he decided to found a logistic company to collect products from the different farmers and deliver them to the location required by the wholesaler. After a while, the farmers discovered problems with this wholesaler. “From the moment products deviated a little bit from the perfect product, they were not accepted anymore.” At the same time, the bargaining power of the farmers was limited as most of their sales were for the same buyer. “At that time, I preferred to have several small clients above one big one and I started looking for other markets and began my own wholesaling activities.”

Development
Over time, the market with the wholesaler became less interesting and the collaborating farmers started looking together for other markets. A good opportunity appeared to be market vendors. “They were more accepting of variation in the product than the wholesaler and this was interesting for us.”

Implementation/Termination
The farmers continued to search for other markets, alongside this new market based on market vendors. The farmer in question gradually increased the number of niches he supplies. “As by today, a big part of my products are for market vendors, the northern part of France, vegetable packs [subscriptions by consumers for a weekly amount of various vegetables available at a pick-up point], and to a smaller extent supermarkets and the better restaurants.”
Figure 10: Innovation process for marketing innovation: new market for organic sector
Source: Own compilation

Case 4: Organizational innovation: Reorganization of operational method for chicory growing and harvesting

Initiation

This case concerns an individually owned family farm with chicory growing as its primary activity. The starting point for the innovation was in 1995 (see Figure 11). The farmer was working at maximum capacity in the chicory branch. “When working with East-European seasonal labourers was allowed [2001], we decided to do this, as it was very difficult to find enough labour. […] Since East-European people want to work continuously when they are in Belgium, we decided to hire an extra farm. By doing this, capacity increased and we could ensure that the labourers could work full time. This was kind of a compromise for five years. During that period, we realised that it would be difficult to further expand with the current organizational method. We decided to get rid of the other branch we were still working on (cattle breeding) and to fully focus on chicory. [2002]” During the period 2003 to 2008, the farmer undertook extensive research on the sector. He talked with colleagues, suppliers, extensionists, researchers etc. “I visited a lot of companies abroad. I went to Spain, France, Germany, the Netherlands and Switzerland. I was always looking for contacts and trying to have a look at other companies. When I saw something interesting in the specialist literature, I tried to get into contact with that company. […] By being a member of several associations, I have a lot of contacts and we got the opportunity to attend multiple study tours. […] Also via a supplier of roots, I came into contact with an extensionist who is active all over the world and who brought me into contact with some modern companies abroad.” The seed merchant and the designer of some of his machines also enabled some contacts with other companies. “When visiting companies abroad, I saw a lot of things and gathered a lot of knowledge and information which inspired me for the elaboration of our own project.”

Development

First, they went to the bank with a business plan drawn up by a consultancy agency. “They considered the project positively and agreed to fund it. […] With my ideas, I went to a Belgian designer who had no experience at all in automatisation in our sector. All
the experienced companies are situated in the Netherlands or in France, and this is not interesting when you have problems. If they have to come to repair something, it takes a long time and it is very expensive." Because of this, the farmer decided to go to a Belgian designer and was obliged to invest a lot of his own efforts in the development of the installation.

Implementation/ Termination
Together with the designer, he developed the ideas into a real innovative unique project (2007-2008). “Everything that could be automated was automated. [...] Personnel can keep on working and interruptions are minimized. We also paid a lot of attention to ergonomics. We considered how the work could be done most easily and in a comfortable way without having to make a lot of effort or movements. This was such a huge investment that a large-scale operation was the only opportunity to earn the installation back.” They planned to process 60 hectares to earn back the investment, but as the capacity of the installation was higher, they decided to grow to 100 - 120 hectare over the recent years. To do this, they had to install some extra fridges, and this was undertaken during 2011.

Figure 11: Innovation process for organizational innovation: reorganization of operational method for chicory growing and harvesting
Source: Own compilation

3.4.2 Research Question 2a: How do network partners’ contributions differ for product, process, marketing and organizational innovations?
Following on from the four detailed innovation processes presented in the previous section, this section provides a summary of the results from research question 2a, based on all the data sources available. First, in table 9, an overview is given of the network partners consulted for the four different innovation types. A cross appears in the table for all the network partners consulted who were coded simultaneously with an innovation type. The results are discussed, in the text following on from the table.
Table 9: Consulted network partners per innovation type, Ntotal=109  
**Source:** Own compilation

<table>
<thead>
<tr>
<th>Innovation type</th>
<th>Product</th>
<th>Process</th>
<th>Marketing</th>
<th>Organizational</th>
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<tbody>
<tr>
<td><strong>Consulted partner</strong></td>
<td>P</td>
<td>F</td>
<td>V</td>
<td>O</td>
</tr>
<tr>
<td>Competitors/colleagues</td>
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<tr>
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<td></td>
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<tr>
<td>Abroad</td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>Other sector</td>
<td></td>
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<td>x</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>Business club</td>
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<td>x</td>
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<td>Suppliers</td>
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<td>x</td>
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<td>x</td>
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<tr>
<td>Infrastructure</td>
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<td>x</td>
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<tr>
<td>Seeds/young plants</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Phyto-products + fertilizer</td>
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<tr>
<td>Feed merchant</td>
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<td></td>
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<tr>
<td>Hatchery</td>
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<td>x</td>
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<tr>
<td>Packaging</td>
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<td>x</td>
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<tr>
<td>Buyers</td>
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<td>x</td>
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<td>Processing</td>
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<tr>
<td>Buyer industry</td>
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<tr>
<td>Auction</td>
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<td>x</td>
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<tr>
<td>Egg merchant/slaughterhouse</td>
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<tr>
<td>Wholesaler</td>
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<td>x</td>
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<tr>
<td>Exporter</td>
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<tr>
<td>End-consumer</td>
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<td>x</td>
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<tr>
<td>Public Administration</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Research institute, university</td>
<td></td>
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<td></td>
<td>x</td>
</tr>
<tr>
<td>Consultants and extension</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>ICARD</td>
<td></td>
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<td>x</td>
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<tr>
<td>Financial provider</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>

P: Poultry sector; F: Fruit sector; V: Vegetable sector; O: Ornamental plant sector

3.4.2.1 Product innovation
With regards to product innovation (overview see Table 9), we observe that vertical networks, including suppliers and buyers, are the most frequently mentioned parties, together with research institutes (see also case 1).
The suppliers of the products, i.e. seeds or young plants for vegetables, the ornamental and fruit sector and the hatchery for the poultry sector, inform farmers about new varieties, their characteristics and their advantages or disadvantages and the experiences of other farmers. This helps in making decisions about which varieties to use.

“A representative of the hatchery came to us and tried to persuade us to change over from breeding turkeys to free-range chickens” (Poultry farmer).

“The seed merchants inform us about their new varieties” (Vegetable grower).

“We are constantly looking for new varieties. In fact, that is not our task, the supplier does this. Every year, they try 1000 new races, of which 4 or 5 are good to try on a small scale in their company. After several years of trying, they look for growers who are willing to grow products on a larger scale. We often try them and if they are ok, next year, they are in their catalogue” (Ornamental plant grower).

With respect to the buyers, within the vegetable sector, the processing industry often plays a role in product choice. Farmers negotiate contracts with the processing industry; “it is searching for a product in which both the farmer and the industry are interested” (Vegetable grower). The auction also helps with the implementation of product innovations on farms. They facilitate research for the development of new products which the market is looking for, and try to find growers who are willing to grow the products on a larger scale: “Now, we are looking for purple sprouts. We contacted a seed merchant and now, we are doing a pilot test. Two growers planted purple sprouts. They have another colour and taste different” (Manager at auction). Also the wholesaler has an influence on the implementation of product innovations: “as a wholesaler, I’m continuously looking for market needs, and I look for growers willing to fulfil the needs” (Vegetable grower-wholesaler – case 3).

In the poultry sector, buyers such as slaughterhouses and egg merchants play a less crucial role in the innovation process. Contracts for sale of the product are mostly negotiated with the suppliers, who guarantee that the products will be sold. For the ornamental plant sector, the most important buyers are wholesalers, exporters and end-consumers. They play a crucial role in farmers’ decision making about product innovation:

“One of the buyers told me that there was a huge demand for chrysanthemums in a large pot, but that supply was not enough. He asked me if I would be willing to grow that. That was a huge success. Later on, we started growing chrysanthemums with three colours. That was also a question from one of the buyers who said that consumers were looking for that. This was a success as well. Mostly, wholesalers ask me to grow new products” (Ornamental plant grower).

“Every month, I stand at the fair to meet the exporters and their clients, to stay in close contact with the market and its needs” (Ornamental plant grower).

We observe that the research institutes are frequently mentioned in the vegetable, ornamental plant and fruit sector. “When talking about product innovations and improvement of cultivars, we mostly collaborate with research centres such as ILVO and PCS” (Ornamental plant grower).
3.4.2.2 Process innovation

For process innovations, similar to product innovations, the vertical networks and research institutes are observed to be very important (see Table 9). However, the type of suppliers consulted is somewhat different than for product innovations. In contrast to the product innovations, suppliers of infrastructure, phyto-products, fertilizers and feed merchants are also involved.

“The feed merchants, they have employees to give advice regarding manure processing, animal related stuff, new stables and infrastructure, etc.” (Poultry farmer).

“We sat together several times with the installers of the potting machine. We were discussing and puzzling a lot” (Ornamental plant grower).

Alongside these partners, competitors or colleagues are also frequently consulted about process innovations.

Moderator: “Where did you get your information from to implement this [process innovation]?”
Respondent: “Company visits, have a look at farms of colleagues” (Poultry farmer).
Moderator: “How can you achieve that [introduction of more efficient process]?”
Respondent: “By looking at colleagues’ farms, get inspired” (Vegetable grower).

Furthermore, consultants are also frequently mentioned as fruitful in the innovation process. They raise farmers’ awareness about potential improvements to existing processes and identify weaknesses e.g. by benchmarking against other farms.

“It offers you added value. They also visit colleagues’ firms and they exchange their information” (Vegetable grower).

For information and help regarding the application of a building permit, farmers also approach consultants: “For the building permit, we consulted DLV, a consultancy agency which continuously guides farmers with applications for permits, administration for the manure bank, etc. I frequently make use of their services” (Poultry farmer).

In addition, public administration which concerns entities occupied with laws, regulations and political support, has an important influencing role in the implementation of process innovations:

Respondent 1: “Especially the environment laws, these are the big pillars controlling our business in the last decade [...] This hinders us in implementing other innovations, because we first have to comply with regulations, which often costs a lot of money.”
Respondent 2: “And often wasted money! We installed a lake with reeds and that was ok, but suddenly, we had to change everything. It had to be a closed lake with a film” (Ornamental plant growers).

In this domain, we identify that laws and regulations often bring about a hindrance or delay for innovation:

“In 1995, there was a building stop in our sector. We had to wait till 2008 for an amendment to the law to be able to build our third stable” (Poultry farmer). Besides, “Problems with respect to permissions increase. First of all because the requirements of governments become more strict and second because we [farmers] are decreasingly accepted in society” (Poultry farmer).
3.4.2.3 Marketing innovations
In our study, the introduction and success of marketing innovations is largely determined by the networking intensity with colleagues, especially in the ornamental plant sector. For example, an ornamental plant grower introduced a self-service field with cut-flowers. He “discovered the idea with a colleague who offers similar services” (Ornamental plant grower). To obtain more information, he went to Germany, where a colleague-farmer owns several fields. “He gives advice with respect to technical topics and selection of varieties” (Ornamental plant grower). Furthermore, several collaborative initiatives have been set up to market the plants. There is for example “BE.plants”, a collaboration between five Belgian growers of garden plants: “We complement each other well so that we can offer a good mix of plants, can assure delivery continuity, and the collaboration enables the exhibition of our products at fairs as we can share the exhibition costs” (Ornamental plant grower). This gives the growers access to each other’s networks, makes the group more visible and leads to competitive advantage for all the members. In the fruit and vegetable sector, only some occasional examples of horizontal networks for marketing innovations are observed, while in the poultry sector, no marketing innovations are detected, explaining the empty column in table 9.

Furthermore, the vertical networks, mainly buyers, can also provide new ideas for farmers which can be transformed into marketing innovations. “Going and listening to buyers is very important, asking whether they see or expect changes” (Ornamental plant grower). Additionally, different buyers can have different requirements, which they report to the farmer. “Supermarkets, for example, demand homogeneous products, while the customers in France prefer unsorted products, small and large products mixed” (Vegetable grower – case 3). The auction also assists in the implementation of marketing innovations. “They look at supermarkets to see what packages consumers prefer and they inform us, the growers, about this” (Fruit grower and vegetable grower). Suppliers could have a positive influence on the innovation by providing the packaging, but none of the respondents mentioned suppliers as instrumental in the development of ideas.

For the kiwi berry, research institutes also assist farmers and their association with the investigation of possibilities at the package level. They investigate, together with the auction, ideas provided by growers and customers.

In the ornamental plant sector, almost all farms call upon the services of consultants, which guide the farmers at all levels. “I go to customers of my clients inland and abroad to identify their requirements with respect to packages, pot sizes, varieties and to follow up market evolutions” (Consultant in ornamental plant sector).

3.4.2.4 Organizational innovation
As organizational innovation often concerns several domains in the company and a lot of decisions have to be made. For this reason, it is very important to have the required knowledge with respect to the different domains. A combination of networking with horizontal and vertical networks, as well as with third parties, seems to have a huge influence on the success of organizational innovations (see also case
Chapter 3: The role of different network partners depending on innovation type and stage in the innovation process

4). People with a lot of contacts, have a larger knowledge base (Pittaway et al., 2004). It is observed that contacts with colleagues from abroad often play a much more important role in organizational innovations than for the other types of innovation. “I spent several years on the development of my project [organizational innovation], for which I went abroad several times. Finally, we developed a completely new design, together with the installer. […] We get inspiration from several places, followed by puzzling the ideas into one project” (Vegetable grower – case 4).

Furthermore, networking with people from outside the sector is perceived, by some growers, to be much more important than with people from within the sector. “I learn much more from companies outside the sector, although you don’t immediately see the link with our activities, but on the level of generic business and management such as marketing, financial and business planning, logistics, I never consult our own sector” (Ornamental plant grower). Hence, alongside the traditional networks in the agricultural sector, cross-sectoral networks, such as business clubs where entrepreneurs of different sectors can meet each other play a significant role in this type of innovation. The network with consultants such as accountants, notaries and insurers are also important sources of learning for general business management.

3.4.3 Research Question 2b: How do network partners’ contributions differ along the innovation process (initiation, development and implementation or termination)?

Table 10 gives an overview of the findings relating to research question 2b, based on twenty innovation journeys investigated. The column entitled “references” is the frequency with which network partners were referred to during a specific innovation stage. The column entitled sources indicates the number of interviews in which the network partner is mentioned in combination with the particular innovation stage. In addition to the table, the results are discussed through citations.

3.4.3.1 Initiation

During the initiation period, mainly horizontal and vertical network partners are mentioned. In 16 out of 20 interviews, the horizontal relationships with colleagues were stated. Mostly, colleagues from the same subsector and the home country were consulted, but colleagues from other subsectors and abroad were also referred to. “Through contacts with colleagues, you often obtain new ideas” (Poultry farmer).

“Here in our region, colleagues are very open-hearted. We learn a lot from each other. During winter time, we sit together weekly, or every other week” (Ornamental plant grower).

“I spent several years on the development of my project for which I went abroad several times to visit chicory farms and other companies” (Vegetable farmer – case 4).

“Sometimes, it is just sound to talk with other people, from other subsectors. You sometimes hear things which function well in their sector and then you start thinking: Why didn’t we think about that, to implement this in our sector as well?” (Ornamental plant grower).

Within the category of vertical relationships, contact with suppliers is the most important (12 sources), but the buyers are also not negligible (8 sources). The suppliers mostly contacted for innovations are those involved with infrastructure.
“We said to our installer of fridges: the energy costs are continuously increasing, can’t you do something about that?” (Vegetable grower).

“Together with the supplier of installations, I went to the Netherlands to visit several operational systems” (Poultry farmer – case 2).

Furthermore, in the poultry sector, input suppliers, especially feed merchants and hatcheries are frequently consulted.

“A representative of the hatchery came to us and tried to persuade us to change over from breeding turkeys to free-range chickens” (Poultry farmer).

“Together with the hatchery and the feed merchant, we visited several operational companies in the region. Furthermore, the installer also informed us about the different installations” (Poultry farmer).

**Table 10:** Network partners consulted along the three stages of the innovation process, Nvivo-results, Ntotal = 20

**Source:** Own compilation

<table>
<thead>
<tr>
<th>Innovation stage</th>
<th>Initiation</th>
<th>Development</th>
<th>Implementation-termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consulted partner</td>
<td>references</td>
<td>sources</td>
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</tr>
<tr>
<td><strong>Horizontal network</strong></td>
<td></td>
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<tr>
<td>Colleagues/Competitors</td>
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<td>32</td>
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<tr>
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<td>6</td>
<td>2</td>
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<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>Business club</td>
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<td>0</td>
</tr>
<tr>
<td><strong>Vertical network</strong></td>
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<tr>
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<tr>
<td>Home</td>
<td>21</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Abroad</td>
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<td>1</td>
<td>0</td>
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<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seeds/young plant</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Phyto-products +</td>
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<tr>
<td>fertilizer</td>
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<tr>
<td>Feed merchant</td>
<td>4</td>
<td>3</td>
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<td>3</td>
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<tr>
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<td>1</td>
<td>1</td>
</tr>
<tr>
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<tr>
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<tr>
<td>Research institute,</td>
<td>11</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>university</td>
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<tr>
<td>Consultants and</td>
<td>12</td>
<td>9</td>
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<tr>
<td>extension</td>
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<td>ICARD</td>
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<td>2</td>
<td>0</td>
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<tr>
<td>Financial provider</td>
<td>2</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>
Chapter 3: The role of different network partners depending on innovation type and stage in the innovation process

In general, during the initiation phase, the third parties are less frequently mentioned. The most important partners in this category are research institutes or universities and the consultants and extension services. “The research institute was looking for companies to collaborate in a pilot project. The auction referred to us, and so this was the first time we came into contact with the idea” (Vegetable grower).
“The idea grew during several meetings organized by the research institutes such as ILVO, PCS” (Ornamental plant grower).

3.4.3.2 Development
During the development phase, less network partners are consulted than in the initiation phase. The categories cited most often are the third parties and vertical relationships with suppliers.
With respect to third parties, we observe that they play the most important role during the development phase, in comparison with the initiation and implementation phases. Ten sources called upon the services of the financial providers, eight made use of the services of a consultant, seven consulted the research institute and two mentioned public administration (see Table 10).
A very important player in the development phase is thus the financial provider. Without the necessary funding, the innovation cannot be developed.
“We sat together with the customer relationship manager of the bank to look at the financial feasibility” (Vegetable grower).
“At the bank, we had a good contact man to support us with the financial matters” (Ornamental plant grower).
Private consultants can offer the necessary support during the development of innovations by advising the farmers.
“When we started with the cultivation of head cabbages, we consulted TACO. They made up a cultivation scheme to have approximately the same amount continuously, because there are fast and slow growing varieties, and you have to take that into account for the storage. During the growing period, they visited us monthly to have a look at possible illnesses or insects, and to give advice with respect to fertilization” (Vegetable grower).
Research institutes can offer similar techniques:
“We switched over to a smaller cabbage. But you will not earn more for a smaller one. So we had to look for an increase in the number of cabbages per hectare. Inagro [research institute] helped us with these calculations and the decision on the function of the variety and the harvest period” (Vegetable grower).
Finally, public administration can, for example, help during the development of an innovation by lending a building permit or by giving financial support.
“It is good that the government agency offered us the opportunity to start up our project in collaboration with ILVO [research institute]. You can say ‘We will innovate’, but it’s a difficult time. You need a financial buffer. But as a starter, all the money you have is put into the company. With the research projects funded by the Flemish agency, we were a step further. If these project proposals were not approved, we couldn’t have done our research. We would have been working too long to build up the necessary buffer” (Ornamental plant grower).
“For me, the subsidies were very important. The new stable is built with governmental subsidies” (Poultry farmer).
In the category of vertical relationships, suppliers are very important players, especially the suppliers of infrastructure, but the input suppliers also have a contribution.

“In the past, I collaborated frequently with the supplier of feed infrastructure. Often, they do a pilot test at our farm for a year or something, to see whether their product functions well” (Poultry farmer).

“We were thinking and talking a lot during the development phase with the suppliers, about all kind of things” (Ornamental plant grower).

“The seed supplier brought me into contact with companies that had already installed the system” (Vegetable grower).

In contrast to the important role of suppliers, buyers are barely mentioned during the development phase. One exception is cited below:

“We have very good contact with our buyers. It is not all roses, and they have to inform us about bad things, so that we can improve our products. We take our new product to the buyer, and show them what we are planning to introduce. They can then tell us what they think about it, what price they want to pay for it […]” (Ornamental plant grower).

Horizontal networks were mentioned as influential during the development phase, in only six of the 20 sources and this mainly involved colleagues (home, abroad and other sectors), but this was also limited.

“Once we had the idea of installing a sorting machine for cabbages, we went to visit four farms in the Netherlands that use a sorting machine, to get ideas” (Vegetable grower).

“I had an objective that I wanted to realize. That’s why I visited different companies in Spain, France, Switzerland…” (Vegetable grower- case 4).

3.4.3.3 Implementation – termination

During the third phase, the implementation-termination period, which entails supporting the innovation by, for example, the formulation of a strategy for approaching customers and marketing activities, we see that the vertical relationships, with both buyers and suppliers, play the most important role. Thus the most important category is the vertical relationship with buyers and suppliers. The most frequently mentioned subcategory is suppliers of infrastructure and input. Furthermore, we observed that the suppliers are most frequently cited in the poultry sector.

“Once installed, the hatchery taught us how to grow the free-range chickens” (Poultry farmer).

“We obtain a lot of information and support via the representative of the hatchery. We trust him and often ask for advice. As he visits a lot of poultry farmers, and he had already been active in the sector for several years, he knows a lot” (Poultry farmer).

“We frequently sat together with the designer of the machine, trying to improve the harvesting, to be able to better remove the soil from the leeks” (Vegetable grower).
The interaction with buyers also seems to be crucial during this phase. We discovered that buyers in the ornamental plant sector, in particular, had an important role during the implementation-termination period.

“I don’t have problems with spending a couple of days on an exhibition while not writing down any orders. It is often difficult to estimate the return. But just the fact that you are there, and that you see your buyers, is already something” (Ornamental plant grower).

“It is not only about what you are producing, but also about what happens with your products. In this way, you can be innovative. When you see problems, you can react to them, and try to search for a solution” (Ornamental plant grower).

“After the season, or during the season, I often visit the buyers to see how the plants are growing at their place, because we don’t see the flowers here. They can inform us than about which flowers they prefer for which period. We do that yearly” (Ornamental plant grower).

Horizontal network partners mentioned mostly refer to colleagues.

“In fact, farmers always need farmers, because a lot of techniques are not put into practice because we don’t work together” (Vegetable grower).

“Every year, we [all farmers from a certain region] have a meeting with the suppliers of the plants, to evaluate the delivered products. We all learn from it; the suppliers can improve their products based on our comments, and we know better the characteristics of the plant, and can decide whether or not to cultivate the plant in the future" (Ornamental plant grower).

In general, we observed that most network partners were consulted during the initiation period. It is mainly horizontal and vertical contacts that are important, but also research institutes and universities were frequently mentioned during this first phase. During the development phase, the third parties play the most important role, followed by the vertical relationships with suppliers. During the implementation phase, the vertical network partners, both buyers and suppliers, have the upper hand.

3.5 Discussion

In the following two sections, the findings of both consecutive research questions are respectively related to the literature for comparison and to enable better understanding.

3.5.1 Network partners’ contributions for product, process, marketing and organizational innovations

The analysis of research question 2a showed that different network partners are needed for different types of innovation. These findings are in line with the assertion by Gemünden et al. (1996) that different network patterns are suited to pursuing different innovation aims. Our study contributes to these findings by investigating which partners are suitable for which type of innovation. Although small differences are observable between the different subsectors studied, it was possible to identify a general trend in the results.
For product innovations, horizontal collaboration is of little importance. This finding follows the path of earlier studies involving Spanish industrial firms that showed that this type of collaboration does not seem to be the most appropriate mechanism to achieve product innovations (Bayona et al., 2001; Nieto and Santamaria, 2007). Furthermore, our study shows that vertical collaboration (with buyers and suppliers) is very important for product innovations. Fritsch and Lukas (2001) also found in their study of 1800 German manufacturing enterprises that innovative efforts targeted at achieving product innovations are associated with buyer collaboration and Miotti and Sachwald (2003) found that this can have a significant impact on the successful implementation of product innovations in European R&D consortia. Indeed, there is strong evidence that obtaining more market information from buyers and, in some cases, direct involvement between buyers and firms leads to more successful new product development. Furthermore collaboration with suppliers could enable a firm to reduce the risks and lead times for product development, while enhancing flexibility, product quality and market adaptability, which was also found in a Korean study in the automobile and electronics industry (Chung and Kim, 2003). Research institutes also seem to have a positive influence on product innovations. The important role that universities and other research institutes have on innovations for which fundamental scientific knowledge is needed, was also documented in several other studies investigating technological innovations (Bozeman, 2000; Vuola and Hameri, 2006; Robin and Schubert, 2013).

With regard to the process innovations, the vertical network also plays an important role. Suppliers actively bring new ideas or provide equipment to the farms to develop better production facilities, reduce production costs or decrease processing time. Next to the vertical network, farmers frequently consult horizontal networks during the development of process innovations, unless collaboration with colleagues increases suspicious or distrust because of the potential for competitive behaviour. However, collaboration with colleagues-competitors does not need to be (directly) competitive. Farmers collaborate when they face common problems, and especially when these problems are seen as being outside the realms of competition and/or when by collaborating they can influence the nature of the regulatory environment, which is an important influencing factor for process innovations. Farmers also often collaborate with each other when they are not direct competitors. For example, where they produce different crops or varieties, but make use of similar techniques. Alternatively, consultants are mentioned in two subsectors as sources of information and knowledge for process innovation. Consultants can provide fundamental scientific or technological knowledge, but more commonly they provide applied knowledge, specialist skills and information. As Gemünden et al. (1996) found, consultants sensitise companies to potential improvements in existing processes and assist them in identifying weaknesses. Furthermore, research institutes and universities were identified as partners for process innovations. The applied research centres, which mostly focus on short-term results, are preferred by the Flemish farmers. The universities, which focus on basic and long-term research, are used less for process innovations than for product innovations.
For the limited amount of marketing innovations introduced, horizontal collaboration with colleagues and vertical collaboration with buyers is most frequently observed in this study. This is in line with findings for small businesses, where it was found that collaboration with other entrepreneurs can be instrumental in gaining insights into the tendencies and needs of consumers and that this can help with the development of promotional campaigns (Lister, 2013). Regarding the buyers, literature also shows that they can usefully support innovators by identifying market opportunities and likely market potential (Pittaway et al., 2004). By studying other literature, we see that the importance of lead customers in helping to define innovations and, therefore, reduce the risk associated with market introduction, has been recognised since at least the 1970s (Rothwell, 1977; Von Hippel, 1978; Gardiner and Rothwell, 1985; Quinn, 1985; Kline and Rosenberg, 1986; Von Hippel, 1988). Cooperating with buyers in the development of technological innovations is likely to be most common when the market for the innovation is poorly defined (Tether, 2002).

Regarding organizational innovations, according to our study, a combination of networking with horizontal and vertical networks, as well as with third parties seems to have a huge influence on the success of the innovations. This seems to be evident as organizational innovation concerns several company domains and hence a lot of decisions have to be made for which knowledge is required and is only present among a variety of partners. Pittaway et al. (2004) also found that more complex innovation processes benefit from engagement with a diverse range of partners which allows for the integration of different knowledge bases, behaviours and habits of thought.

### 3.5.2 Network partners’ contributions along the innovation process

We see that in the initiation phase, a lot of contacts with a heterogeneous group of people are important. In this phase, several directions of development are explored and new ideas, strategies and networks are created. “By being a member of several associations, I have a lot of contacts and we got the opportunity to attend multiple study tours.” By making contact with new people, it is likely that new ideas will be developed. “When visiting companies abroad, I saw a lot of things and gathered a lot of knowledge and information which inspired me for the elaboration of our own project.” According to Van de Ven et al. (2008), this is formulated as divergent behaviour. The main focus in the cases analysed is on colleagues and suppliers, both at home and abroad. In the context of Spanish manufacturing firms introducing product innovations, Nieto and Santamaria (2007) also found that listening to suppliers and buyers, at early stages of product development seems to deliver innovation results more quickly. Furthermore, it is advised that farmers do not restrict their contacts to partners from their own sector. Ideas from other sectors can be very fruitful.

During the development phase, the suppliers are observed as important network partners. Furthermore, third parties are consulted, such as financial providers and consultants writing a business plan. Buyers seem to be more important in the other two phases of the innovation process. This is in line with the findings of Gruner and Homburg (2000), which encourage firms to interact with buyers specifically in the early and late stages of the innovation process. Nevertheless, it might be useful to stay in contact with buyers during the development phase as well, as this keeps the
buyers informed on the progress of the innovation process and facilitates further contact for the implementation phase (Gruner and Homburg, 2000). In terms of Van de Ven et al. (2008), this phase is rather dominated by convergent behaviour. Fewer partners are involved as a preferred course of action is discovered during the initiation phase. At the stage of executing the ideas, when the farmer has worked out the full concept, he is able to use the contacts made and the ideas collected during the initiation phase to connect to appropriate partners. Furthermore, identifying those partners is less difficult as most of the providers of services and products, necessary at this stage, are advertising their businesses. Farmers can easily contact them and compare their offers.

With regard to the implementation-termination period observed in our case studies, the grower association and its collaboration with the auction are found to be very important. A lot of marketing activities are set up to promote the new product. Furthermore, the farmers still work closely with their suppliers, to fine-tune their innovation.

3.6 Conclusions and implications

In the current competitive environment, the achievement of innovations is becoming increasingly important to enhance competitive advantage. This chapter begins with the statement that the driver of innovation is no longer the individual farm, but increasingly the network of partners within which the farm is embedded (Powell et al., 1996; Omta, 2002; Pittaway et al., 2004). In the literature, there are indications that appropriate network partners differ depending on the type of innovation and on the stage in the innovation process. However, research in this area is limited. The majority of the research undertaken focuses solely on product and process innovations, and is restricted to high-tech companies functioning with R&D units. This chapter contributes to these research gaps by analysing the agricultural sector. Our study applies the Resource-Based View (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984; Dyer and Singh, 1998; Lavie, 2006) as a background. At the general level, our findings provide support for the basic tenet of the Resource-Based View. In terms of innovation inputs, firms will look for partners to provide the resources and capabilities they lack, and maximize firm value by effectively combining the partners’ resources and exploiting complementarities. While existing literature concerning the network partner interaction for innovations provides some general statements, our study yields more specific insights. By mapping the dynamics during the innovation process for different types of innovation, we could answer the two formulated research questions.

The analysis shows a different contribution by network partners depending on the four different types of innovation. For product innovation, suppliers and buyers are frequently consulted, together with research institutes, while for process innovations, peers are important network partners, next to suppliers and buyers. For marketing innovations, contact with colleagues and buyers, such as wholesalers and consumers, is very important. For organizational innovations, a more heterogeneous set of network partners is consulted, within and particularly outside the sector.
Furthermore, our results clearly indicate that network partners’ contributions differ between the different stages of the innovation process. With more diverse partners needed during the initiation and implementation phases and more specific partners needed during the development phase.

Managerial implications for farmers can be formulated as follows. Farmers need to pay attention to the importance of partner suitability and network heterogeneity for the innovation type and stage to which they are aiming. In addition, as there are small differences between the four subsectors studied with respect to the network partners used, the different sectors could learn from each other and improve their innovation capacity, in particular for marketing and organizational innovations. Furthermore, for successful innovations, a lot of similarities with other sectors regarding the selected network partners are observed. In addition, efficient networking is not the optimisation of single relationships independently of each other, but instead the management of synergies and the coordination of all relationships in an efficient way. Additionally, network coordinators should establish a clear strategy and communicate about which innovations their network can advise and help the farmer.

**3.7 Limitations and future research**

In spite of the great care taken at every stage of this research, there are several limitations to our study. First, our results show a difference in innovation partners depending on the type of innovation and stage in the innovation process. Also, slight differences are observable between the different sectors. When studying the partners for each innovation type, all stages in the process were included, and likewise when studying the partners consulted in the different innovation stages, all the innovation types were taken into account. This might therefore include interference with the results. A more detailed analysis could be undertaken, in which the different stages are considered for each innovation type, possibly split up per subsector.

Second, in this study, innovation includes both the adoption of an existing innovation on the farm and the generation of innovation by the farm. Considering both together may have an influence on the results. For example, the network partners consulted for the adoption of a product innovation are probably different than for the generation of a product innovation. For future research, it would be an interesting idea to limit the focus to the generation of innovation by the farmer, as this kind of innovation will gain in significance in the liberalized agricultural innovation system.

Third, by choosing to focus on a limited set of agricultural subsectors, the results do not consider innovations in other subsectors. It is therefore advisable, in future research, to include more subsectors within this kind of study in order to draw more general conclusions for the agricultural sector.

Fourth, the sample is farm-specific and extensions to other, non-agricultural sectors must be made carefully due to the special characteristics of the agricultural
innovation system, where farms have limited power in the chain and innovations are mostly developed by companies and organizations external to the agricultural sector. This can have an influence on their network behaviour.

In addition, although in the design of the study no aspects were incorporated that are specific to Flanders, an international replication study could yield interesting insights induced by, for example, cultural differences, such as other countries or regions that are characterized by other traditions with respect to doing business and negotiating, other ways to collaborate with each other or to interact with the environment.

Furthermore, we notice that although the network partners consulted for product and process innovations are similar to those for the majority of European countries, little support can be found in the scarce literature on network partners for marketing and organizational innovations. Hence, other researchers are encouraged to focus on the network partners consulted for marketing and organizational innovations and to investigate whether the results of this study can be supported by other regions in Europe and the world.
Factors underlying farmers’ intentions about network activity

Adapted from:

Abstract:
The objective of this elicitation study is to provide insights into farmers’ beliefs which influence their intention to network to enable the enhancement of network activity. A set of facilitating and impeding factors was obtained. Participants identified (a) 13 categories of behavioural beliefs (e.g. “You learn something” and “Low perceived return on investment”), (b) 4 groups of normative beliefs (influence of colleagues, spouses, network coordinators and chain partners) and (c) 11 control beliefs (facilitators or barriers related to, for example, “Network skills”, “No time” and “Perceived restraint by farmers in communicating openly and honestly”).

Keywords:
Farmer, decision making, network activity, innovation, Flanders
4.1 Introduction

It is generally agreed that network activity can be beneficial to the competitiveness of individual farms and firms (Gellynck et al., 2006). However, empirical studies show that farmers’ network activity is often limited (Deimel and Theuvsen, 2011). However, there is relatively little information regarding factors that influence farmers’ network activity within the agricultural sector. The objective of this chapter, therefore, is to provide a better understanding of the motivations and intentions of farmers to be active or otherwise in networks, by eliciting the beliefs farmers hold about network activity. By addressing the salient beliefs, network managers are better able to improve or maintain network activity by farmers. In other words, underlying factors that positively or negatively influence farmers’ intentions or motivations to network within the agricultural sector in Flanders (northern Belgium) are identified. The research question tackled in this chapter is RQ3: What are the factors underlying farmers’ intentions about network activity?

The next section provides a short literature review with regard to the salient beliefs in the context of the Theory of Planned Behaviour. The applied methodology is then described, and the results are presented. Afterwards, conclusions are drawn and potential future research challenges are identified.

Salient beliefs in the context of the Theory of Planned Behaviour

Insights into the motivations and intentions of farmers’ network activity can be obtained by identifying their most noticeable beliefs, termed salient beliefs. In order to do this systematically, the Theory of Planned Behaviour (TPB) (Ajzen, 1991) is used as a theoretical approach. The TPB is a belief-based social cognitive theory which was developed from the earlier Theory of Reasoned Action (Fishbein and Ajzen, 1975) and assumes that people behave rationally, in terms of what they consider to be the implications of their actions. Both theories apply to situations involving a choice of behaviour, where reasons can be attributed to the choice made (Tonglet et al., 2004). The TPB has been widely supported across multiple disciplines as the model is very powerful and predictive for explaining human behaviour. For more information about the theory, we refer to section 1.3.4. The TPB assumes that people’s expectations and values about engaging in a particular behaviour form their behavioural, normative, and control beliefs. The beliefs are formed by weighing up all available information and influences from personal instinct, policy, advisory services, the media, family, friends and peers. These beliefs in turn, influence people’s attitudes, subjective norms, and perceived behavioural control towards their intention, and ultimately, their behaviour. This chapter will focus specifically on analysing farmers’ salient behavioural, normative, and control beliefs, which is called elicitation study. In spite of the importance accorded by the developers of the TPB to this first step when applying the theory, the elicitation stage has generally received little research attention to date (Symons Downs and Hausenblas, 2005). However, this type of study is important because it provides researchers with valuable information concerning people’s motivations and intentions towards performing a particular behaviour (Symons Downs and Hausenblas, 2005). This step should then be followed by a questionnaire to assess the strength of each item that has emerged from the analysis.
Chapter 4: Factors underlying farmers’ intentions about network activity

The relevance of using the TPB to understand farmers’ salient beliefs about network activity can be derived from other studies. An application of the theory was noted for the prediction of science communication behaviour (Van Der Auweraert, 2008). This communication behaviour can be compared, to some extent, with network behaviour, in which the interaction between people is a central aspect. Furthermore, reviews of the TPB showed that each of its constructs is highly applicable to agricultural research (Jackson et al., 2006). For example in the elicitation study by Wells et al. (2011), it was found that behavioural, normative and control beliefs all contribute to farmers’ intentions to change practices in response to societal concerns about farm animal welfare. Also, the results of studies that are not limited to the elicitation phase and, investigate farmer’s intentions towards adopting changes in on-farm practices for environmental reasons (e.g. Lynne et al., 1995; Beedell and Rehman, 2000; Zubair and Garforth, 2006; Mattison and Norris, 2009), show that attitudes, subjective norms and perceived behavioural control all appear to be important for intentions towards adopting change. Nevertheless, agribusiness-related studies based on this theory are sparse (Jackson et al., 2006).

4.2 Methodology

4.2.1 Case study

The research strategy is a case-study design. For an elicitation study, qualitative research techniques are suggested (Ajzen, 2002). To determine a population’s salient beliefs, Ajzen and Fishbein (1980) recommended that researchers: (a) conduct an elicitation study with open-ended questions to assess a population’s behavioural, normative, and control beliefs; (b) perform a content analysis to rank-order the beliefs; and (c) determine the 5–10 most salient beliefs. They suggested that the simplest procedure to elicit a person’s most salient beliefs about performing a particular behaviour is to ask that person directly about his beliefs. Thus, in the present study, in-depth interviews are conducted with farmers (owners and managers of farms) in Flanders, to allow an open discussion of their own ideas and beliefs regarding activity in networks that are important for knowledge exchange and innovation. During the interviews, respondents provide information with regard to their own farm, as well as what they observe from their peers, partners in their chain, or network, or the sector in general. They are asked open-ended questions with regard to their behavioural, normative and control beliefs about network activity and the estimated influence on their innovativeness. The applied definitions of these categories are presented in the table below (Table 11).
Table 11: Selected definitions of Theory of Planned Behaviour: components applied to network activity

**Source:** Ajzen (1991)

<table>
<thead>
<tr>
<th>Beliefs</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Behavioural</td>
<td>Beliefs that network activity leads to certain consequences with regard to innovativeness</td>
</tr>
<tr>
<td>Normative</td>
<td>Beliefs identifying significant other persons who think farmers should or should not be active in networks</td>
</tr>
<tr>
<td>Control</td>
<td>Beliefs identifying the facilitators or barriers for network activity</td>
</tr>
</tbody>
</table>

4.2.2 Recruitment

Respondents from three different agricultural subsectors are selected so that beliefs can be identified for a variety of populations and network types. These subsectors comprise the poultry, vegetable and ornamental plant sectors. In each of the three subsectors, two initial respondents are identified via the members of the steering committee for the project. The other respondents are selected via snowball-sampling. The first contacts are asked to nominate talkative colleague-farmers who would be willing to participate in such a research project. This involves a bias towards a high level of network participation among the respondents. Respondents can thus be seen as ‘prime witnesses’, i.e. people who are particularly interesting because of their specific socio-demographic, attitudinal or behavioural profile. It can be assumed that due to a higher awareness and involvement in network activities, more information can be obtained through these prime witnesses. For more information on the recruitment and data sources, see section 1.6. New respondents are contacted until data saturation is achieved, resulting in 24 interviews. This is similar to the sample size of 25 recommended for an elicitation study by Godin and Kok (1996). The 24 respondents live in Flanders, with the majority in the province of West-Flanders (15) as this is an important region in the Belgian agricultural sector, particularly for the vegetable and poultry sectors. Different branches, or crops, within each subsector are included (see Table 1).

4.2.3 Analysis and interpretations

The topic guide comprises four parts as discussed in section 1.6 (see also appendix 1). The focus of this chapter relates to the third part: “Social relationships and networks”. This part is developed using the different belief components of the Theory of Planned Behaviour (TPB) and contains open-ended questions to elicit behavioural, normative and control beliefs in accordance with the theory. Also, questions that are not directly linked to the TPB but which provide insights into those aspects are included in the analysis. As this study is limited to the elicitation phase of the TPB, this is not a full application of the Theory of Planned Behaviour. The purpose of an elicitation study is to determine the behavioural, normative, and control beliefs of a population, and to obtain substantive information about the cognitive foundation of people’s behaviour (Ajzen & Fishbein, 1980).

To obtain as much information as possible, additional sub-questions are asked. Projective techniques are also used. Projective techniques may be classified as a
structured indirect way of investigating the why’s of situations (Webb, 1992 :125). They are not used to measure, but to uncover, among other things, beliefs and motivations which respondents find difficult to articulate (Gordon and Langmaid, 1988 :90; Webb, 1992 :125-126). An example of such a question is: “Why do you think that other farmers don’t participate in networks?”

All interviews are recorded and transcribed. The data are sorted and coded using Nvivo. The beliefs are coded as behavioural, normative and control according to the TPB. Consequently, for each node, different subcategories were coded as illustrated in tables 9, 10 and 11. The first-level subcategories for behavioural beliefs are “advantages” and “disadvantages”, for normative beliefs “approval” and “disapproval” and for control beliefs “facilitators” and “barriers” (see Fig. 4 for overview of codes). The last two categories were further refined into “internal” and “external” factors. Internal characteristics refer to, for example, skills, abilities and emotions, while external characteristics of the respondents refer to, for example, opportunities and available resources. The codes for the lowest sublevel were based on common similar words, concepts or themes. These codes are discussed with other researchers on the project consortium and further refined into the current analytical categories.

Consequently they are rank-ordered, and the five-to-ten most frequently mentioned items are selected as the salient set, as recommended by Ajzen and Fishbein (1980).

4.3 Findings

As this study is an elicitation of salient beliefs, the result section comprises three parts, in accordance with the three categories: behavioural, normative and control beliefs and a final part about the determination of the most salient beliefs.

4.3.1 Behavioural beliefs about network activity

Beliefs associated with knowledge exchange and innovation are identified, leading to 13 analytical categories of behavioural beliefs (Table 12). Advantages as well as disadvantages are explored. The higher frequency of advantages can be related to the sampling bias. The most frequently identified advantage with regard to network activity is: “You learn something”. Other advantages given are very diverse and vary from “Reduce distance between sector and policymakers” to “More bargaining power”. The most frequently mentioned disadvantages are “Low perceived return on investment” and “Information obtained is not objective”. These two disadvantages are related, given that respondents identified the need to attend meetings on the same topic but with different organizers in order to obtain objective information, and this is time-consuming.

Farmers indicate that to increase the perceived return on investment, a programme must be attractive. According to the respondents, important factors which make the programme attractive are the subject, the approach and the speaker. Organizers of an activity mostly seek to put on a programme which is interesting for a broad audience. However, as farmers’ problems, and hence the information and knowledge they require, are very company specific, they spend a lot of time listening to less
relevant information. Respondents have a preference for activities with a practical orientation over theoretical meetings. They also emphasise the importance of appetisers, refreshments and drinks, as these are linked to the social part of a meeting and the opportunity to network. The invited speaker is often perceived as not being objective and acting for his own interests. For example, the speakers often work for a specific company and promote the company’s products, systems or services, which prejudices the information provided. Respondents further emphasised the importance of the speaker’s experience, because sometimes the farmers are more experienced than the speakers. In such cases farmers feel that their time has been wasted, as the speaker is not able to respond to their specific and practical questions.

Table 12: Identified behavioural beliefs, illustrated with quotes and frequency of appearance from the interviews

<table>
<thead>
<tr>
<th>Expected outcomes (advantages and disadvantages) of network activity</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADVANTAGES</td>
<td></td>
</tr>
<tr>
<td>You learn something</td>
<td>7</td>
</tr>
<tr>
<td>“You always learn something when participating in a network activity and small things can make a big difference [for the farm].”</td>
<td></td>
</tr>
<tr>
<td>“When you see or hear a lot, you can implement some things in your company.”</td>
<td></td>
</tr>
<tr>
<td>Reduce distance between sector and policymakers</td>
<td>5</td>
</tr>
<tr>
<td>“If you have a problem and need changes from above (policy), it is always more easy if you know them.”</td>
<td></td>
</tr>
<tr>
<td>“To keep policy makers awake and to inform them about producer issues.”</td>
<td></td>
</tr>
<tr>
<td>Prevent from isolation</td>
<td>5</td>
</tr>
<tr>
<td>“When not networking, you live on your island and you are not or only one-sided informed so you miss crucial information for your company.”</td>
<td></td>
</tr>
<tr>
<td>“A lot of farmers work 12-14 hours each day, they go home, have a good diner, are tired and go to bed, but they aren’t aware of what happens in their sector. The next day, it is the same, and on some farms even on Sundays. But not the ones who work most earn most. You need social contact to know what you are working on.”</td>
<td></td>
</tr>
<tr>
<td>Know the right people/place when information is needed</td>
<td>5</td>
</tr>
<tr>
<td>“Once you built up your personal network, you know which question you can ask to whom. Also when you have for example the same feed supplier, you can ask the other if he noticed this or that. We have a lot of people which we contact regularly, via phone or mail.”</td>
<td></td>
</tr>
<tr>
<td>Information from outside the sector (management thinking)</td>
<td>5</td>
</tr>
<tr>
<td>“People from outside the agricultural sector [...] , you learn something about management thinking, outsourcing, tax system. [...] , also employment.”</td>
<td></td>
</tr>
<tr>
<td>Exchange of knowledge with colleagues</td>
<td>4</td>
</tr>
<tr>
<td>“To exchange knowledge with colleagues. [...] From the moment you mobilise people and can bring farmers together, one can speak about knowledge exchange.”</td>
<td></td>
</tr>
<tr>
<td>“If all the farmers would exchange their experiences and problems with each other, I think we could learn a lot from each other.”</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 4: Factors underlying farmers’ intentions about network activity

<table>
<thead>
<tr>
<th>Higher awareness of things that happen/ new trends</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>“To be more aware of the things that happen, about products, about quality, which is necessary to make the right decisions for the farm.”</td>
<td></td>
</tr>
<tr>
<td>“In our sector, it is important to be active in networks to be able to obtain something, to anticipate on market demand by continuous changes.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creation of better image for sector as well as personal</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“To know how people think about you, and to be able to fit in the society.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>More bargaining power</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Indirectly, networking gives you more bargaining power. If salesmen know that you are well informed and that they can’t fool you, you have more power.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creation of ideas</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I am a member of the board of the cooperative and yearly, we organize a study trip. [...] This created a lot of ideas for me.”</td>
<td></td>
</tr>
</tbody>
</table>

**DISADVANTAGES**

<table>
<thead>
<tr>
<th>Low perceived return on investment</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>“All those hours, that is unpaid!”</td>
<td></td>
</tr>
<tr>
<td>“I only want to spend time on it if is relevant for my company.”</td>
<td></td>
</tr>
<tr>
<td>“Often, it is just boring and difficult to stay awake.”</td>
<td></td>
</tr>
<tr>
<td>“The problem of organized networking activities is that you spend there two hours, and for your company in specific, only 15 minutes are interesting.”</td>
<td></td>
</tr>
<tr>
<td>“If a young student is standing there in front and telling how the vegetables have to be cultivated to someone with 20 years of experience, of course [...] And if they are telling all things which you already know, farmers say: Do we really have to spend our time on such activities?”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Obtained information is not objective (one-sided)</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Speakers coming to tell something about their products, this is also too one-sided. You need a speaker who can speak about anything, who doesn’t have to take into account others when he is saying something, for example someone of a university. Mostly those are interesting speakers. They are not linked to a company. [...] The truth is not always that beautiful.”</td>
<td></td>
</tr>
<tr>
<td>“Some farmers will make, or already made mistakes by just following the advice of the integrator.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>You receive a lot of negative attention</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>“When being active in a lot of networks, you become more well-known, and more people aim at you.”</td>
<td></td>
</tr>
</tbody>
</table>

**4.3.2 Normative beliefs about network activity**

Normative beliefs refer to the perceived behavioural expectations of important individuals, leaders, groups or colleagues. While none of the interviewees explicitly state that their decision to participate in network activities is influenced by the opinions of other individuals or groups, some of them refer to four categories of influential reference groups (Table 13). This suggests there might be normative influences on their decision whether or not to participate in network activities to improve knowledge exchange and innovation. The identified reference group categories are: colleagues, spouses, network coordinators and chain partners. It is noted that spouses and colleagues are the most important reference group within
this sample and that they are seen by some farmers as approving participation in networks and as disapproving by other farmers. An important disapproving category, which is only observed within the poultry sector, is the integrator. In the view of the farmers, integrators seem to prohibit them from coming together to exchange knowledge and data.

**Table 13:** Identified normative beliefs, illustrated with quotes and frequency appearance from the interviews

<table>
<thead>
<tr>
<th>Influential reference groups</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROVAL</strong></td>
<td></td>
</tr>
<tr>
<td>Network coordinator</td>
<td>2</td>
</tr>
<tr>
<td>“The sector representative calls us to inform us about organized network activities and asks us why we would not attend the meeting.”</td>
<td></td>
</tr>
<tr>
<td>“We probably do not participate enough in networks, but for this network, it is different. We are invited personally by the coordinator, who reminds us regularly and writes newsletters and invites us to be creative.”</td>
<td></td>
</tr>
<tr>
<td>Colleague</td>
<td>2</td>
</tr>
<tr>
<td>“According to me, he should more participate in networks, and I already said it to him too.”</td>
<td></td>
</tr>
<tr>
<td>Chain partner (supplier)</td>
<td>1</td>
</tr>
<tr>
<td>“He [supplier] said to me: ‘You should attend this study day, it will be interesting!’”</td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td>1</td>
</tr>
<tr>
<td>“I already manage to convince him to come outdoors once.”</td>
<td></td>
</tr>
<tr>
<td><strong>DISAPPROVAL</strong></td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td>5</td>
</tr>
<tr>
<td>“My husband is member of different unions. For a while, he was also member of the board of management of the strawberry union, but I obliged him to choose. It was not feasible anymore. He was never at home.”</td>
<td></td>
</tr>
<tr>
<td>“My woman always says: ‘... the time you spend on it [network activities], you would earn much more money if you would stay at home.”</td>
<td></td>
</tr>
<tr>
<td>Colleagues/ competitors</td>
<td>3</td>
</tr>
<tr>
<td>“I have 29,000 laying hens, some have 60,000 or even 100,000 and then they ask me: what are you doing all day? They look a bit down on us.”</td>
<td></td>
</tr>
<tr>
<td>“When we started with our activity, the other farmers were tread on their toes. [...] For us, it is difficult to find access to the networks.”</td>
<td></td>
</tr>
<tr>
<td>Chain partners (integrators)</td>
<td>2</td>
</tr>
<tr>
<td>“In my contract is mentioned that I am not allowed to exchange data of the company with colleague farmers.”</td>
<td></td>
</tr>
<tr>
<td>“We once took the initiative with some farmers to organize a network activity and to invite some independent speakers. The integrators did not agree with that and took over the organization in order that they could decide what information would be communicated with us. They want to keep us ignorant.”</td>
<td></td>
</tr>
</tbody>
</table>
4.3.3 Control beliefs about network activity

Respondents report several facilitators or barriers for being active in networks, which represent the perceived behavioural control component of TPB. These facilitators or barriers relate to personal or internal characteristics (e.g. skills, abilities, emotions), as well as to environmental or external characteristics of the respondent (e.g. opportunities, available resources). Eleven categories of control beliefs are identified (Table 14). The majority of the categories identified are barriers. Three facilitators are observed. The internal facilitators are “Network skills” and “Different people on the same farm who are able to manage the business.” If more than one person is able to manage the business, one of them can leave the farm for some hours and spend time on networking. One external facilitator identified is a “quiet period”, during which the farmer is able to leave his farm for a while.

With regard to the internal barriers, two categories constitute the direct opposite of the internal facilitators namely “Only one person on the farm who can manage the business” and “No network skills”. In addition, one other category is identified: “Not willing to share information”. According to the respondents in this study, most of the other farmers only want to gain information and knowledge, but they are not willing to share information, knowledge or their own experiences. However, in accordance with the sampling bias, the majority of the respondents in this study declare that they are open to share knowledge, information and their experiences with others. Some even pretend that they would share everything they know, while others would prefer to share only a limited amount of knowledge. The external barriers observed are “Farmers’ restraint in communicating openly and honestly”, “No time”, “Not aware of activities”, “Difficulties finding connections with others” and “Dependency on weather”. With regard to the farmers’ restraint in communicating openly and honestly, we can refer to the internal barrier “Not willing to share information”. Almost all the respondents perceive that Flemish farmers are not open enough to be able to work together and to share information, experiences and knowledge. According to them, they are rather reserved in the presence of colleagues (or competitors, as they often call them). Farmers who are willing to work together face difficulties finding like-minded farmers with whom they can communicate in an open and honest way without having to fear moral hazard. Discussions about performance, economics and processes appear to be particularly difficult. Respondents indicate that farmers almost always try to put a gloss on farm results. In relation to the second barrier “No time”, it is observed that this is principally the case in the vegetable sector where there is a continuing need to expand to be able to survive. Also the increasing amount of administration requires a lot of time. As a result of this development, there is hardly any time left to participate in networks. The farmers further state that they need some free time for relaxation and for their family. Some respondents indicate that they are not aware of organized network activities. According to them, these are insufficiently or not properly publicised.
Table 14: Identified control beliefs, illustrated with quotes and frequency appearance from the interviews

<table>
<thead>
<tr>
<th>Facilitators or barriers for network activities</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FACILITATORS</strong></td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>Different people on the same farm who are able to manage the business</td>
<td>3</td>
</tr>
<tr>
<td>“She is rarely at the farm [due to the attendance of network activities], but they can manage it, because her husband is the manager.”</td>
<td></td>
</tr>
<tr>
<td>“We always look within the company. Who will attend the network activity? Who can join him/her? Who has time? For who would it be interesting?”</td>
<td></td>
</tr>
<tr>
<td>Network skills</td>
<td>3</td>
</tr>
<tr>
<td>“He loves to explain things. He would talk to everybody. In that field, he is much more social than me.”</td>
<td></td>
</tr>
<tr>
<td><strong>External</strong></td>
<td></td>
</tr>
<tr>
<td>Calm period</td>
<td>2</td>
</tr>
<tr>
<td>“For our company, it was a rather calm period so I was able to spend the day on the [network] event.”</td>
<td></td>
</tr>
<tr>
<td><strong>BARRIERS</strong></td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>Only one person on the farm who can manage the business</td>
<td>5</td>
</tr>
<tr>
<td>“If I am not here, they can’t do anything without me.”</td>
<td></td>
</tr>
<tr>
<td>“If I leave my farm, every time something happens. I need to be in the neighbourhood.”</td>
<td></td>
</tr>
<tr>
<td>Not willing to share information</td>
<td>3</td>
</tr>
<tr>
<td>“We do not always say everything.”</td>
<td></td>
</tr>
<tr>
<td>“If your results are bad, than you are discouraged to come outside and share your problems.”</td>
<td></td>
</tr>
<tr>
<td>No network skills</td>
<td>3</td>
</tr>
<tr>
<td>“I have difficulties in taking initiatives in making contacts.”</td>
<td></td>
</tr>
<tr>
<td>“Some feel uncomfortable in big groups and don’t dare to ask questions. A successful colleague sometimes says to me: I have this question, but can you pose it for me?”</td>
<td></td>
</tr>
<tr>
<td><strong>External</strong></td>
<td></td>
</tr>
<tr>
<td>Perceived restraint of farmers to communicate open and honestly</td>
<td>15</td>
</tr>
<tr>
<td>“When asking a farmer how he is performing, everything is always good. Few farmers would share their problems.”</td>
<td></td>
</tr>
<tr>
<td>“When asking a farmer how many ‘ground-eggs’ he has, he always say: almost none. If you hear it via another channel, you hear that it is not like that. People don’t dare to share that.”</td>
<td></td>
</tr>
</tbody>
</table>
| “We are here in our region with four farmers who all planted a new crop this year. It is new for all four of us and a difficult crop to raise, but nobody is willing to deliberate about the process. Everybody developed on his own a method and a machine, and nobody wants to talk about it. [...] Coincidently, we saw another farmer in another region with the same crop and asked if we could have a look at his machine, but the farmer was not
prepared to show his machine. That would be an ideal situation to learn from each other. But he sent us away. [...] This is very sad, people are not willing to help each other.”

“Colleague-competitors become more and more competitors. They often can’t stand the sight of one another.”

<table>
<thead>
<tr>
<th>No time</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>“All companies are becoming so big, too big. Ours is also becoming too big. But we have to grow to survive. We also have the administration. Every evening, I am sitting there on my desk for some hours. [...] And also on family level, there is much more work. [...] Society expects more of people and you don’t want that your children have fewer opportunities than others because they are growing up on a farm.”</td>
<td></td>
</tr>
<tr>
<td>“I am attending less network activities than I’m used to, because it also takes a lot of time.”</td>
<td></td>
</tr>
<tr>
<td>“No, I don’t have time for that!”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Not aware of activities</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I think they should announce the network activities more and better. If we are not aware of it, we cannot join.”</td>
<td></td>
</tr>
<tr>
<td>“A lot of my colleagues are not aware of the services offered by Innovatiesteunpunt [ICARD)]. [...] I think they should put themselves more in the spotlight.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difficulties to find connections with others</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I am a chatterbox, but still… You are standing there. This is very difficult. You are standing there on your own at the bar. [...] Then, you hope that you’ll meet someone who can form a link, but sometimes, it is like dying. I don’t know, but personally, this is not always easy for me.”</td>
<td></td>
</tr>
<tr>
<td>“You need connections, the barrier to attend a meeting or network activity is always bigger if you don’t know anyone than if it is here on the corner of the street where you know everybody.”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependency on the weather</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>“If we want to finish a job and the day after rain is forecasted, we will continue and skip the network activity.”</td>
<td></td>
</tr>
</tbody>
</table>

**4.3.4 Determination of the most salient beliefs**

As prescribed by Ajzen and Fishbein (1980), in this study firstly beliefs about the consequences of the behaviour, beliefs about social norms and beliefs about facilitators and barriers that are important in the farmers’ decision making process are elicited. This is followed by an analysis to rank-order the beliefs, which is based on how many times they are mentioned. The strength of the belief is not taken into account because this often differs depending on the respondent. For each belief, some citations from the respondents are included as examples, to illustrate what exactly is meant and in which circumstances the beliefs are mentioned.

Similar beliefs are observed in the three different subsectors, which could indicate that they are not specific to each subsector but valid across them all. In this part, the third stage of the procedure is executed: the determination of the 5 to 10 most salient beliefs. The following paragraphs present a summary of the most salient beliefs for each category.
With regard to behavioural beliefs, participants report that the expected outcomes of network activity are generally advantageous: to learn something, to reduce the distance between the sector and policymakers, to prevent isolation, to know the right people/place when information is needed and to obtain information from outside the sector. Further advantages mentioned are the opportunity to exchange knowledge with colleagues and increased awareness of things that are happening and new trends. Most of these advantages are also identified in network literature (e.g. Omta, 2004; Pittaway et al., 2004). The belief “prevent isolation” is rather typical for the agricultural sector. Perceived disadvantages are: low return on investment, lack of objectivity of the information and the fact that active farmers receive more negative attention. In relation to the normative beliefs, it is noted that spouses are an important reference group in terms of the decision whether or not to participate in a network. In this study, spouses are mostly seen as disapproving. Colleagues and chain partners are seen as approving by some and disapproving by others. Another reference group are the network coordinators, who convince farmers to attend the activities.

Lastly, we explore internal and external control beliefs. Most of the categories identified constitute external barriers. Farmers indicate, for example, that it is very difficult to find partners with whom they can communicate openly and honestly; and networking with people who are withholding information or lying makes no sense. Another factor is the lack of time. Furthermore, farmers are not aware of organized activities and experience difficulties in finding connections with others. Internal factors pertain to the structure of the farm (number of people who can manage the business), unwillingness to share information and experiences, and the skills to network. The latter confirms earlier findings (Van Der Auweraert, 2008). In addition, one external facilitator is mentioned, namely a quiet period.

4.4 Discussion and conclusion

A first observation is that when asking farmers about their beliefs about networking for innovation, they mostly think in terms of organized network activities, such as study events. Only the most progressive farmers have a slightly wider perspective and immediately also mention other aspects of networking. These expectations are probably created through past habits of the past in which network activities were often set up by practical research centres trying to increase the productivity of farms in the context of the previous CAP, or by suppliers or integrators promoting their products. Farmers also think less in the direction of buyers, as sales and a minimum price were assured in the past by policy support.

When considering the findings, it should be stressed that the strength of the beliefs is not assessed among a group of respondents. This involves that results should be interpreted with great care, due to a potential bias, among others in the sampling procedure.

During the interviews, it was observed that a lot of farmers are aware of the possible advantages of networking in terms of innovation. Advantages mentioned are, for example, that “you always learn something”, that “you know the right people and
places when information is needed” and that “you become aware of things from other sectors which can be useful in your own sector”. Unless farmers are aware of the existence and possible advantages of networks, their intention to participate is often influenced by factors such as low perceived return on investment, lack of objectivity of the information and the fact that active farmers receive more negative attention. The low perceived return on investment can probably be explained by the fact that SMEs focus more on the region than large firms, as far as external relations in the innovation process are concerned (Kaufmann and Tödtling, 2002; Gellynck et al., 2007). The dominant focus on the region could limit the scope of available technical information, technologies, and accessible markets, resulting in a low perceived return on investment. Furthermore, because of the increasingly heterogeneous market for agricultural R&D, service value can barely be discerned and is difficult to identify (Klerkx and Leeuwis, 2008), often leading to a low perceived added value. Furthermore, it seems that SMEs, in general, often experience difficulties in defining and expressing their demands to obtain information that meets their requirements (Klerkx and Leeuwis, 2008). This results in services that fail to meet their needs, and hence a low perceived return on investment. A possible explanation regarding the lack of objectivity, could be the fact that farmers mostly interact with their business relations, such as suppliers, who want to sell their product, and less with external knowledge providers, such as research institutes and universities (Cooke et al., 2000; Kaufmann and Tödtling, 2002), who deliver more objective knowledge.

Furthermore, we find that farmers’ intentions to network can be hampered by some reference groups of actors, such as spouses, colleagues and chain partners. Danckaert et al. (2011) also observed that farmers are influenced by colleague-farmers in their decision-making process.

Other barriers observed were difficulties to find partners with whom they can communicate openly and honestly. This corresponds with farmer individualism often being strong (ABS, 2005; Rijn and Rienks, 2007; Vilt, 2011; Boerderij, 2012). Another factor is the lack of time. This was also an observed impediment in the study by Van der Auweraert (2008) and in the study by Kaufmann and Tödtling (2002). Another barrier relates to the management of the farm, i.e. the limited number of people who can manage the farm, and the skills of the employees. This is also in line with the finding of Kaufmann et al. (2002) that SMEs face a lack of experienced employees as well as a lack of time, in cases where there are few adequately qualified individuals, to establish relationships with innovation partners. In general, it can hence be said that the majority of influencing factors are also valid for SMEs in general. However, some issues are specific to the agricultural sector. For example, farmers are used to the development of innovations outside the farms for adoption on the farm with the help of other actors, such as suppliers or applied research centres. This probably often has an influence on the perceived return on investment, as they still expect everything to be organized for them. Also, farmers are often unaware of the potential services provided by third parties, as they are used to the standard services. Furthermore, it seems to be a habit from the past that farmers are often very individualistic and not always honest in their communication about their company-related processes or results. Respondents mentioned that this situation is improving,
but that farmers in the past never dared to admit if something had gone wrong or if they had made a wrong decision.

4.4.1 Managerial implications
Based on the findings, some implications for network coordinators, as well as for farmers can be formulated in terms of increasing the intention of farmers to be active in networks.

For network coordinators
First, based on the behavioural beliefs, intention to become more active in networks can be changed by improving the return on investment and decreasing their subjective character. According to farmers, the following issues are critical for organizing successful network events: They stated a preference for interesting meetings that cover varied topics in brief, are to the point and focused on a specific audience. According to them, only the most important and relevant issues should be included, and details should be provided as to where they can find more information about the different topics which are relevant to them. From the interviews, there appears to be interest in network activities relating to market trends and other commercial topics. Furthermore, respondents indicate a preference for practical and applied knowledge over theoretical explanations. In addition, according to the responding farmers, network activities are very much more appealing if they include an opportunity to socialise with appetisers, refreshments and drinks. Furthermore, they emphasise the importance of a neutral and experienced teacher or speaker. Hence, network coordinators should take these factors into account when organizing network activities in order to stimulate network activity by farmers. Besides, it would be interesting for network coordinators to actively monitor knowledge within the agricultural sector to detect specific themes and skills in which (latent) interest exists. In addition, as farmers mainly think in terms of organized network activities and the social aspects, a shift is needed in their thinking about network activities. Farmers should become more familiar with other networking formats such as collaboration within the chain to produce a market-oriented product, or with colleagues to share knowledge or to market products together. This could be done by discussing real-life best practices that inspire the farmers and hence change their beliefs.

Furthermore, the elicited normative beliefs show that network coordinators putting pressure on the members to join organized activities has a positive influence on attendance. For network coordinators of a vertical integrated network, (termed integrators), who, according to our respondents, appear to disapprove of networking, it is advised that they seek open communication with the farmers and do not leave them feeling ignorant. Another important issue for network coordinators to bear in mind is the fact that colleagues and spouses are major influencing factors in farmers’ decisions with respect to their attendance at a network activity. Network coordinators could therefore encourage farmers to inform colleagues about upcoming activities and to convince them to join. As spouses are mostly disapproving, respondents suggest that a line of thinking for network coordinators would be to organize social activities to which farmers as well as their spouses and/or children are invited, and these may also include a company visit. In this way, farmers will not have to leave
their family to attend a network activity. The spouses can enjoy the social activity and might also pick up some information and become better acquainted with activities and understand their importance. From the interviews, this appeared to be a good alternative to the standard activities. When such an activity is organized, a high attendance is noted.

In terms of the control beliefs, as farmers indicate that they are often unaware of network activities, network coordinators need to publicise activities early enough and via appropriately selected channels. According to the respondents, this could be done through specialist newspapers, magazines, websites frequently used by farmers (e.g. auction websites, sector organizations, etc.), email, or just by distributing information brochures to farmers.

For farmers
In terms of the behavioural beliefs, farmers are advised to consider the long-term benefits of networking for all innovation processes. Those long-term benefits relate to achieving competitive advantage and survival in the long term.

Regarding the control beliefs, according to the respondents, farmers experience difficulties in communicating openly and honestly with colleagues. They indicate that Dutch farmers are more open than Belgian farmers. In the Netherlands, amongst others, multiple successful study clubs exist, whereas in Belgium, if someone takes the initiative to develop such a network, it mostly fails as the farmers are not willing to share their farm-specific information. If Flemish farmers were to change their beliefs towards the benefits of open and honest communication, taking the Dutch as an example of best practice, they would be able to improve their individual situation as well as that for their sector. Secondly, as most of the smaller farmers indicate that they cannot leave their farms during operational periods, one option could be for farmers to revisit their organization and management strategy. To benefit from networking, farms need to be structured in such a way that the managers or employees are able to leave the farm to attend a network activity.

With regard to the farms’ network management approach, the farmers should search for strategies that best fit their situation in order to connect with networks in the most effective and efficient way. This strategy includes an understanding of their-own knowledge needs and what is available in the networks. From this perspective, it is important that farmers communicate their needs to the network coordinators clearly with regard to networking and innovation.

4.4.2 Concluding remarks
To conclude, in order to maintain and improve network activity by farmers, a better understanding of the underlying factors that positively or negatively influence farmers’ network activity within the agricultural sector is needed. Up to now, research examining farmers’ salient beliefs about network activity has been limited (Jackson et al., 2006). This study tackles this gap by analysing Flemish farmers’ salient behavioural, normative and control beliefs with regard to their activity in networks that are important for knowledge exchange and innovation. Although reviews of the
TPB show that each of its constructs is highly applicable to agricultural research, agribusiness-related studies based on this theory are sparse (Jackson et al., 2006). Moreover, most of the available studies do not include an elicitation phase. Yet elicitation studies are important because they provide researchers with valuable in-depth information concerning people’s thoughts and feelings about a behaviour (Symons Downs and Hausenblas, 2005). An important strength of this study is thus the qualitative exploration of salient beliefs among the farmers, with regard to activity in networks that are important for knowledge exchange and innovation. The subject and the approach of this study are quite unique in the agricultural sector and deliver valuable insights and implications for network coordinators and farmers, as outlined in the previous paragraphs.

4.4.3 Limitations and future research
Since this elicitation study provides results from respondents limited to so-called prime witnesses, due to the recruitment process, this study involves a bias toward a high level of network activity among the participants. This has enabled more detailed and in-depth information to be obtained about the topic, but does not provide representative farmers’ perceptions.

The list of beliefs forms the basis for a quantitative study to be conducted among a representative sample of Flemish farmers. With respect to each salient behavioural outcome, items should be formulated to assess the strength of the behavioural beliefs and the evaluation of the outcome. With respect to each salient normative referent, items have to be formulated to assess the strength of the normative belief and, on the one hand, the identification with the referent individual or group, and on the other hand, the motivation to comply with the referent individual or group. With respect to each salient control factor, items have to be formulated to assess the likelihood that the factor will be present and the factor’s power to facilitate or impede performance of the behaviour.
This will allow validation of the factors influencing farmers decisions about participation in networks, by exploring the extent to which the identified TPB components quantitatively influence their network activity.
Success factors of innovation networks

Adapted from:

Abstract:
The objective of this chapter is to identify the network characteristics critical for successful innovations within the agricultural innovation system. This study is based on in-depth interviews with farmers and network coordinators and focus group discussions with farmers. The findings are useful for academics, network coordinators and network members, possibly leading to a higher innovation performance via networking. The results help to gain insight into the success factors of innovation networks active in the agricultural system. Factors particularly helpful for success include: numerous contacts, integration of knowledge providers in the network structure, face to face communication, a self-initiated coalition and surpassing innovation at the agricultural level.

Keywords:
Innovation, networks, agriculture, Flanders, success factors
5.1 Introduction

Advantages of networks for innovations mentioned in the literature are manifold (see section 1.2). The relationship between innovation and networks has traditionally been viewed from the perspective of the individual firm, for whom networks are a tool to improve their innovation capacity. This means that a firm’s innovation capacity is determined by the way in which it can take advantage of being active in the network. As an alternative to the focus on innovations by an individual firm, it is possible to focus on the networks that collectively build, share and validate knowledge for innovation. Given the current available networks, the mere firm-level focus cannot always be scaled up for a group of firms. For example, certain networks are already established which makes it difficult for new members to join. Next, some social or economic challenges require the establishment of a new network, in which members are able to go through the full process from the beginning to the end. This leads us to shift the analytical focus in this chapter from the individual firm to the level of the network. Innovation is hence observed from the point of view of the network. The innovation capacity is seen as the way in which the network can bring the innovation to a successful outcome, which requires a change of perspective. The question is about how the network, through its characteristics, can increase the likelihood of successful innovations for its members as a group. This creates a new role for innovation networks. They are no longer a competitive arena for individual needs (farm needs) in which the member who networks in the best way, has the greatest advantages. In contrast, networks become the catalyst for a favourable innovation environment for a group of members. A network can therefore take a format that helps the members to come to innovations, without overburdening their regular management processes.

Despite the increasing number of studies focusing on the relationship between networks and innovation, there is still considerable ambiguity and debate regarding appropriate network characteristics for successful innovations (Pittaway et al., 2004; Nieto and Santamaria, 2007). There has been little empirical evidence on success factors in networks, and no comparison of success factors in networks with different objectives (Sherer, 2003). Furthermore, concrete anchor points to evaluate the ability of a network to stimulate successful innovation processes are missing. In the literature, we found a study (Kanter, 1988) that identified characteristics of innovations that seem to be important for each innovation process. In that study, the assessment of innovation processes is conceived from the perspective of the individual organization, asking the question of how individual firms cope with these characteristics of innovation, being uncertain, knowledge intensive, controversial and crossing boundaries.

Similarly, in this chapter, we will study the way in which existing and emerging networks deal with these innovation characteristics. Shifting the unit of analysis from the organization to the network allows for another set of insights to emerge, leading to the research question: How do network characteristics facilitate or constrain the ability to cope with the innovation characteristics? The focus on the network
characteristics is justified by the fact that there is still no consensus about appropriate network characteristics for successful innovations, unless the abundance of literature (Pittaway et al., 2004; Nieto and Santamaria, 2007).

**Network characteristics and their potential influence on innovation capacity**

In terms of network characteristics, a structural and structuring dimension have been identified, based on the work by Lefebvre et al. (2010). The structural dimension of the network refers to its physical characteristics.

Three broad types of elements relating to the structural dimension of networks were identified in their study: network configuration, network membership and network ties. Network configuration relates to the pattern of linkages between network members. Network membership relates to the composition of the network, such as the number and type of members. Network ties refers to the characteristics of the relationships between network members, such as the frequency and intensity of interaction.

The structuring dimension includes the management and governance of the network. The network management refers to, for example, the way in which conflicts between the network members are dealt with, the development of shared goals and a network culture. Network governance involves the use of institutions and structures of authority and collaboration to direct, administer, and control joint actions across the whole network. Networks can, for example, be governed by the members themselves, by a single participating member, or by outsiders. Additional components of network governance include formal or informal network governance mechanisms, such as the use of contractual arrangements or trust-based relationships.

There are plenty of studies focusing on network characteristics and their potential influence on innovation capacity. For example, findings about network configuration show that sparse networks have the ability to generate more new information and offer more diverse knowledge bases than dense networks (Lazzarini et al., 2001). However, there are also others who claim the opposite (Omta, 2002; Pittaway et al., 2004). Findings about ties’ patterns show that direct ties provide immediate access to other members’ knowledge. They are found most effective when they help units deal with difficult transfer situations, which probably involve noncodifiable knowledge (Hansen, 2002). For knowledge easy to transfer, the maintenance costs of direct ties are too high (Inkpen and Tsang, 2005). Centrality, or the extent to which a network revolves around one single firm in the network, is negatively associated with intracorporate knowledge sharing (Tsai, 2002). In terms of network membership, so the number and type of members, it was observed that the smaller the number of participants involved in a network initiative, the higher the chances are of achieving sustainability and strong ties, leading to knowledge exchange and innovation (Huggins, 2000). The type of network members in terms of size, industry, chain partners, colleagues, resources, past experience, geographical situation, innovativeness, legal status, etc. can all play a role. Heterogeneity of network members has a positive influence on innovation (Beckman and Haunschild, 2002). When considering the network ties, it is found that strong ties lead to the creation of trust, making the ties a perfect channel for knowledge exchange (Larson, 1991; Coles
et al., 2003). The way in which a network is managed and governed also plays a
crucial role in the effectiveness and capacity to contribute to the innovation process
(Coles et al., 2003; Pittaway et al., 2004).

The chapter is structured as follows: First, the methodology section is provided,
followed by the empirical findings, to come to the discussion and concluding remarks
and, finally, to ideas for future research.

5.2 Methodology

As described in the introduction, Kanter (1988) identified that every innovation
process is characterized by four elements:
- The innovation process is uncertain
- The innovation process is knowledge intensive
- The innovation process is controversial
- The innovation process crosses boundaries
For more information about these elements or characteristics, see section 1.4.

Taking into account these four characteristics, Kanter investigated the structural,
collective and social conditions facilitating the ability to see new opportunities and to
innovate. Kanter's assessment of innovation processes is conceived from the
perspective of the individual organization, asking the question - how do individual
firms cope with these characteristics of innovation? In accordance with the study by
Kanter, this chapter studies the way in which existing and emerging networks deal
with these innovation characteristics. This shifts the unit of analysis from the
organisation to the network. The characteristics of the network are considered as a
basis to investigate the conditions that facilitate innovation. This forms the link
between the innovation characteristics and network characteristics, which is the
focus of this chapter. This link is illustrated in figure 12.

![Figure 12: Linking innovation characteristics with network characteristics](image)

Source: Own compilation

For this chapter, all the data sources consulted have been included (see Table 1).
This means that 38 farmers and 23 network coordinators were reached via in-depth
interviews, and 48 farmers via focus groups, leading to the consultation of 109
respondents in total. For the interview and focus group discussion guide used, we
again refer to the appendices 1 to 3.

All interviews and focus groups were audio-recorded and transcribed, followed by
coding in Nvivo. The coding is limited to the fragments focussing on the networks
Chapter 5: Success factors of innovation networks

with a central role in the selected cases (see section 1.6.2 for more information), being:
- the strong vertically integrated supply chain in the poultry sector
- the collaboration within the producer association for the kiwi berry
- the cooperative supply of products via auctions in the vegetable sector and
- the concentration of growers, researchers, wholesalers and retailers in a cluster for the ornamental plant sector.

This means that, for example, the collaboration initiatives among vegetable farmers not producing for an auction are not considered for coding in this chapter. Within these fragments, the text relating to how networks cope with the four characteristics of an innovation process are first coded: “in.char 1”, “in.char 2”, “in.char 3” and “in.char 4”. Second, all the text related to the network characteristics (structural and structuring dimensions) are coded: “structural” or “structuring”, depending on their content.

Afterwards, a series of advanced coding queries are run consecutively for each case (see section 1.6.3 for more information about coding queries). The first query results, for example, in all text fragments relating to innovation characteristic 1 in the poultry sector. Similarly, this query is run for the other innovation characteristics and the other cases. To form the link with the network characteristics, within these fragments the text fragments coded “structural” and “structuring” were looked at, via the coding stripe pane (see section 1.6.3 for more information about the coding stripe pane). Furthermore, as not all the information about the network characteristics is included in the coded text fragments about the innovation characteristics, another series of queries is run for each case, providing all the text fragments coded “structural” or “structuring”. The information from all these queries is used for step 1 of the findings. In this step, per case, a description is given of how the network copes with the innovation characteristics, by including the relevant information about the network characteristics and the necessary background information to grasp the context.

In step 2 of the findings, the network characteristics facilitating successful innovation processes are studied at a more detailed level across the four cases. This analysis is done manually, as it would be much more time consuming in Nvivo. The results of step 1 are printed and laid next to each other. Characteristics such as “central coordinator, heterogeneity, formal, independent person, direct ties, self-initiated, strong ties and horizontal network partners” are attributed to the text fragments. While doing this, common network characteristics are sought across the cases, or network characteristics of certain cases that could be inspiring for other cases.

5.3 Findings

Step 1
The results are presented per case, with the specific associated network type as a focus. They are illustrated with verbatim quotes from the participants.
Poultry sector – Strong vertically integrated supply chain

Characteristic 1: Uncertain
As a result of his multiple direct ties with suppliers, farmers, and buyers the integrator is immediately aware of changes occurring in the market. In principle, this information could be directly dispersed among the integrated farmers, reducing the uncertainty of their innovation process. However, we noticed that vertically integrated farmers take only limited innovative steps. They focus foremost on fulfilling defined tasks and rarely look for new techniques or opportunities to innovate. One integrator employee supports farmers in their daily management, and farmers demonstrate their trust in this particular person. The source of knowledge is thus often limited to this person and hence very unidirectional. This is illustrated by the following citation: “We obtain a lot of information and support via the representative of the hatchery. We trust him and often ask for advice. As he visits a lot of poultry farmers, and he has already been active in the sector for several years, he knows a lot” (Farmer interview).

We can contrast this farmers with farmers on the spot market. They seem to be in need of information that exceeds technical knowledge. They have to be aware of all the trends and evolutions to make the necessary decisions, e.g. which markets are appropriate to buy and to sell their products or to invest in machinery. Since their earnings are dependent on their performance, they have to be aware of every aspect relating to their business and even beyond, and hence need an extended, heterogeneous network to decrease uncertainty.

Characteristic 2: Knowledge intensive
The farmers who are part of an integration are only indirectly bound to each other. The ties between integrator and farmer are strong, and involve more than just the contract. Additional services are present such as knowledge exchange. To improve farmers’ performance, representatives of the feed firms and the hatcheries visit the farms on a regular basis to present the newest developments. In order to guide the farmers in the right direction, integrators try to obtain as much information as possible and are continuously involved in, or conducting, research projects. In this way, they make use of the knowledge gained from their own employees, such as the representatives, experts in building stables, manure processing, veterinarians, etc. They have mutual contacts, but they also have contact with other parties such as wholesalers and retailers and they attend policy-related meetings. From time to time, the integrators organize a meeting where all clients are invited, and certain topics are considered and presented. Integrators are also present at agricultural fairs, to which they invite their clients and they help with the organization of open farm days where new stables are presented. The farmers obtain personal guidance from their integrator. A relationship characterized by trust often develops through this personal guidance.

Characteristic 3: Controversial
By offering contracts and funding, integrators offer farmers the opportunity to implement their innovative ideas. However, the interests of both parties are not always in line. Both strive for profit maximisation at their level. Other striking remarks are that, within this setting, farmers have only sparse networks and hence
limited contact to exchange knowledge. Although they have contact with each other, these contacts are not used for the organization of the production process within the vertical chain, for example group buying of products, or communication about sales. The majority of the farmers do not have a structural deliberation on these subjects. However, from our study, we noticed a pertinent need for horizontal collaboration.

**Characteristic 4: Crossing boundaries**

Here, the tension between productivity increase and market-oriented innovation is observable. The actors within the innovation system are used to routines in which the farmer is considered as the adopter of productivity-increasing innovations. The relationships between the different organizational units is thus characterised by the strict division of boundaries.

**Fruit sector - Strong collaboration within a producer association**

**Characteristic 1: Uncertain**

In 2010, the first Belgian berries were sold in the supermarket, but sales were not that good because the fruit was still unknown to consumers. In 2011, the kiwi berry was available in large amounts in the supermarkets for the first year, and this was also, for one interviewed farmer, the first large harvest. He indicated that he was “**still uncertain about the possible return on investment. I hope it will evolve in the right direction**” (Farmer interview). According to farmers, the success of the product largely depends on the coordinator. The coordinator of the producer association forms the link between several stakeholders - researchers, growers, the auction, suppliers - which ensures that the network members are rapidly aware of changes. For example if a problem occurs with cultivation techniques, a quick consultation can take place with the research institute, and solutions can be rolled out through the network in a timely and effective manner. A further example is when a good technique is developed for fertilizing the plants as a result of collaboration between the research institute and a pollen supplier, and this can be shared and implemented very quickly.

**Characteristic 2: Knowledge intensive**

Within the network, there is a continuous exchange of experiences among different types of network members. Newsletters and a website are provided, pruning demonstrations and growers meetings are organized where all members interact with each other. The coordinator plays an important role here, by bringing the different stakeholders together on a regular basis. “**Furthermore, he is always approachable for all the members, with all kinds of questions**” (Farmer interview). “**From the start-up of the network, he was involved, which leads to extra stability**” (Focus group).

**Characteristic 3: Controversial**

An additional advantage is that the coordinator is associated with a neutral institution. In this way, no conflicts of interest are involved such as making profit, which is often the case within other networks. However, we noticed that the interests of growers and the auction sometimes differ in relation to product support and expansion. The auction, for example, is not prepared to market the largest berries, as they do not possess the right packaging.
Characteristic 4: Crossing boundaries
Concerning the fourth innovation characteristic, we observed that the network is a young network, focusing on radical new product development. This ensures that the members are not yet rooted in expectations and routines, which could hinder innovation. Furthermore, collaboration between different auctions to market the product is a unique construct in Belgium. This involves growers delivering their berries to different auctions spread across Flanders, although all the products are marketed via one and the same auction.

Vegetable sector - Highly cooperative attitude for the supply of products
Characteristics 1: Uncertain
To decrease uncertainty intrinsic to an innovation process, the auctions have a commercial cell that is “observing the consumer needs and the opportunities to respond to those needs” (Focus group 2). The management board of the auction, which is characterized by a high centrality, is connected to the farmers via consultation with grower groups. In this way, “there is always close contact with the needs of the market and the possibilities to fulfil those needs, enabling the presence of the necessary knowledge to innovate” (Interview with network coordinator).

Characteristic 2: Knowledge intensive
The management board of the auctions has frequent contact with the members to inform them about new knowledge via newsletters, intranet and extension activities. Farmers as well as the management board of the auction, frequently indicated that attention to research and a good relationship with researchers is very important. This enables the auction to come into contact with people with other knowledge and previous experience, which facilitates the exchange of knowledge and innovation. In addition, the coordinating role of the management team for the auction is extremely important. This team ensures, in agreement with the members and the research centres, that everything functions well and that information and research results are shared and communicated efficiently. A negative point mentioned is that the news available to the management board, “is not always timely and sufficiently communicated with the members who are not appointed to the board or in a supporting growers’ group” (Focus group 1). Farmer-members mention, for example, that when there are special market demands, the auction does not always inform everyone, “only the most active farmers are aware of those opportunities in a timely way” (Farmer interview).

Characteristic 3: Controversial
Farmers delivering their products to an auction, often experience some difficulties distinguishing themselves from their colleagues, as the products are sold in bulk. Some farmers indicate that they “produce products of higher quality, or more uniform, but we do not earn something in return” (Farmer interview). Few farmers are therefore looking for opportunities to distinguish themselves within the cooperative. For this, a horizontal coalition between several farmers might be required, for example, by a group of farmers differentiating themselves from the others via an extra quality label.
Characteristic 4: Crossing boundaries
The auction is relatively attached to the routines and structures that were developed in the past. The cooperative structure is still based on quite a rigid division between the growers and the management board. This partly hinders the ongoing reorganization from purely producer-oriented services towards more marketing and buyer-oriented activities. This organizational inertia is exemplified by the emergence of groups of farmers distinguishing themselves in terms of quality while at the same time using the same channels as their ‘undifferentiated’ colleagues.

Ornamental plant sector – collaborative initiatives set up due to geographical concentration of different players

Characteristic 1: Uncertain
As ornamental plant production is subject to trends and consumers are keen on new products and product varieties, product innovation is necessary and hence an important type of innovation. However, these market characteristics often make it difficult for the growers. If they are revolutionary and develop new products, they face the risk of investing a lot of time and money in a product which is difficult to grow, or in which consumers are not interested. Respondents indicate that bringing a totally new product to the market is not straightforward, and that this often takes several years. For this reason, a lot of growers are quite reluctant to introduce product innovations. To reduce this uncertainty, several collaborative initiatives have been established involving different types of network members, for example, with a consultancy agency, a coordinator for the purchase of flower pots, a sales coordinator and a research institute to improve or develop new cultivars. The products developed within this group can only be sold by the members of the group, and are labelled with the name of the association, which gives the members the opportunity to differentiate themselves from other growers. Furthermore, in this way, the cost of developing new products is shared. Yet, among the respondents from this study, collaboration with colleagues for the development and improvement of products is quite rare. However, it is worth mentioning that for both azaleas and ornamental trees, two important horticultural plants in Belgium, a Flemish collaborative initiative has been established between producers and a research institute to improve or develop new cultivars.

Within the chain, we observed the trend towards eliminating several intermediary links, which brings the plant grower closer to the end-consumer. In this way, the grower is better aware of market needs because of his closer contact with the end-consumer. Another observed opportunity or better awareness of market needs is close collaboration with the vertical chain partners.

Characteristic 2: Knowledge intensive
To innovate, knowledge is needed and should be communicated in an effective way. In our study, we observed a network established and coordinated by a research institute (ILVO) with the aim of improving the translation and transfer of research results to the sector. A great deal of knowledge and other resources important for innovation within the ornamental plant sector are centralized within the Ghent area. To remain competitive, Flanders therefore holds the trump card for a technological
lead. Flemish research institutes are after all active in front-rank research and have access to scientific literature worldwide. However, the translation of knowledge to the sector seemed to be difficult. Hence, a network, called Sietinet, was established to overcome this. “They organize workshops, courses and answer questions from individual ornamental plant growers” (Farmer interview). The coordinating research institute collaborates with eight other Flemish research institutions to support innovation within the sector. Only the 60 members in the network can make use of the services offered. Moreover, this network brings multiple growers together, which offers numerous opportunities for horizontal networking. Simultaneously, “this network brought about the lowering of the threshold to research institutes” (Farmer interview), increasing the strength of the ties and the network density. In addition, the role of consultancy agencies in ornamental plant production is significant. Formerly, research was organized for all growers. As the ornamental plant production sector is characterized by very diverse players, questions are specific per subsector, and many of these questions could not be answered. Besides, as the knowledge is accessible to all the growers, growers perceive the resources as less valuable and expect less innovative results, and less competitive advantage. They are used working on their own, are characterized by a strong individualism and are seeking information which gives them the opportunity to differentiate themselves. Hence, there came an evolution in the direction of private consultancy. When they pay for expert information, they are not willing to share this information, limiting the exchange of knowledge between growers. However, some consultants frequently organize a meeting for all their clients. This increases the connectedness between growers, offering the opportunity for horizontal networking which enables the exchange of ideas with colleagues. Other network activities for entrepreneurs in general are also often consulted by ornamental plant growers. Here, they can meet colleagues from outside the sector.

**Characteristic 3: Controversial**

If new products are developed, they have to be promoted. Retailers and end-consumers should be open to the new product. Direct contact with end-consumers is an important factor for introducing product and market innovations. In this way, producers of end-products face fewer difficulties in distinguishing themselves with labels, packages, etc. Another alternative observed was the collaboration between growers to promote their novelties. “We complement each other well so that we can offer a good mix of plants, can assure delivery continuity, and the collaboration enables the exhibition of our products at fairs, as we can share the exhibition costs” (Farmer interview). This gives the growers access to each other’s networks, makes the group more visible and leads to competitive advantage for all the members.

**Characteristic 4: Crossing boundaries**

More than in the other studied cases, networking with people from outside the sector is perceived as much more important than with people from within the sector. Alongside the traditional networks in the agricultural sector, cross-sectoral networks, such as business clubs where employers of different sectors can meet each other, play a significant role within the ornamental plant sector. Those contacts and conversations are “fruitful and inspiring for issues related to generic business and
management, such as marketing, financial and business planning, which are frequently better developed in other sectors than within the agricultural sector” (Farmer interview).

**Step 2**
In this second step, as described in the methodology section, it is discussed how network characteristics can be understood in terms of dealing with innovation characteristics. A distinction is made between structural and structuring elements.

To decrease the **uncertainty** inherent to innovation, in terms of the **structural dimension**, the importance of close contact with a heterogeneous group of people such as farmers, suppliers, buyers, and researchers is observed in all four cases. Also our findings suggest that more **centralized and large networks** constrain an equal dispersion of innovative potentialities that result from the anticipation of external knowledge acquisition. For instance, most growers participating in the auction do not have direct contact with the knowledge actors with whom the management board interacts. Only the most active network participants take part in the knowledge sharing activities. Another example is the case of the poultry sector where farmers have a tendency to shift the acquisition of knowledge to the level of their integrators, the non-farm actors, instead of looking for concrete opportunities to innovate themselves. On the contrary, **smaller and more connected networks**, such as the case of the kiwi berry, suggest that a stepwise accumulation of common expertise enables the network to more fully adopt external information.

In addition, the four cases reveal the importance of **strong and direct ties** to decrease uncertainty. For example, in the case of the vegetable sector, there is close contact with the producers via consultation with grower groups and with the market via the commercial cell. Also, in the case of the kiwi berry, strong and direct ties are evident between the producers and the market.

Regarding the **structuring** dimension, it is observed in all cases that governance via a **central coordinator** who forms the link between multiple stakeholders is very important. This can be fulfilled in different network settings. In the case of the poultry sector, the integrator has a connection with suppliers, farmers and buyers. Among the producers of the kiwi berry, the network manager, who is affiliated to the university, takes the lead in connecting and informing the different stakeholders. In the vegetable sector, this role is fulfilled by the management board of the auction which is connected to the farmers, research institutes and via the commercial cell with the market players. Within the ornamental plant sector, a similar construct is, for example, seen in the Sietinet network, in which a research institute coordinates contact between the associated farmers and with the eight other collaborating Flemish research institutes.

As the innovation process is **knowledge intensive**, communication and innovation in communication is important. To arrange this communication, the networks **structured** around a **central contact** person who is occupied with a multitude of tasks and who, therefore, possesses a lot of knowledge, is shown to play an important role in the selected cases. For example, the integrator in the poultry sector, the
coordinator in the kiwi berry case and the consultants in the ornamental plant sector fulfil this role.

Additionally, a close link between research and practice has a positive impact on the knowledge transfer. The management board in the vegetable auction and the project manager in the producer association for the kiwi berry fulfil this role, by providing connection between research institutes and the farmers.

Regarding the *structuring* dimension, it is found that distant one-way communication which is very *formalised* and impersonal and directed at a large group hinders creativity. This can be illustrated by, for example, the difficulty in translating the knowledge available in research centres to the sector. According to our findings, an innovation-oriented network better aims at effective face-to-face, or *direct* communication. This allows for a more adequate interaction between the different agents involved in the process of innovation. The producer meetings in the case of the kiwi berry form a perfect example here. Direct communication can be *governed* through logistical support and the organization of knowledge transfer processes by appointing an independent person or management board who can arrange regular meetings, draw up the agenda, guide the discussion, send out newsletters, etc. and by providing an inspiring and professional environment in which network members can communicate.

The third challenge for an innovation network is to handle the different, often *controversial*, interests that are involved in an innovation process. Concerning the *structural* dimension, the question as to whether or not the interests of the network members are *homogeneous* or *heterogeneous* is an important issue to take into account. For networks with different, opposing interests, it is often hard to find a good balance between the different needs of the network members. In the case of the poultry sector, this seems to have resulted in a displacement of innovation, outside the locus of the farm. Other networks focus on the strengthening of shared interests, which is, for example, the case in the ornamental plant sector in which buyers collaborate to promote their novelties and the kiwi berry association where everybody wants to improve the production process and increase sales. Thereby, horizontal collaboration to promote innovation was observed as a key element, complemented by the importance of the coalition being *self-initiated*. However, in reference to the *structuring* dimension, again the role of an *independent coordinator* was expressed in terms of government. His task is only to facilitate, not to establish the network.

To facilitate the *crossing of boundaries* to achieve innovations, in terms of the *structural* characteristics of a network, heterogeneous network members are found to be crucial. It is vital that a network provides the means to meet a range of several expertise and experience, for example, by organizing a study trip, a workshop, network meetings, etc. and hence meet people from different backgrounds, for example from another sector. However, the required *heterogeneity* in the membership is not the only prerequisite. Network members should also be *willing to change their routines*. This is exemplified by the construct in the kiwi berry case where growers deliver their berries to different auctions spread across Flanders, but marketing of the berries is arranged via one single auction. Another example involves the
ornamental plant growers attending cross-sectoral networks to become inspired about generic issues relating to business and management. The *structuring* dimension shows the importance of different network members taking on an active role in contacting people and organizations beyond the contacts with whom they are familiar, to be able to realize their innovative idea. This managerial task leads to the development of a network culture with shared goals.

5.4 Discussion

5.4.1 Innovation and network characteristics
The present chapter offers insight into the network characteristics observed as particularly helpful for successful innovation processes. In this section, the findings are discussed and confronted with findings from the literature, structured according to the four innovation characteristics.

First, to decrease the **uncertainty** inherent in an innovation process, numerous contacts are seen as particularly helpful, especially via a central person who coordinates the links with the different stakeholders. This will increase the chance of discovering crucial opportunities. In the literature, this concept is often referred to as “innovation broker”, whose main purpose is to build appropriate linkages in innovation systems and facilitate multi-stakeholder interaction in innovation. Similarly, the role of connecting people was found to be important by Koopmans et al. (2011) within organic farming. Furthermore, the importance of close contact with a heterogeneous group of people is observed. Other literature confirms that firms in networks composed of partners with heterogeneous experiences will be in a better position to benefit from the present experiences than firms in networks composed of partners with homogeneous experiences, and they will therefore make better decisions (Kanter, 1988; Beckman and Haunschild, 2002; Koopmans et al., 2011). Everybody has his own vision of the challenge and possible solutions. Kanter (1988) found that multiple contacts lead to a higher chance of discovering new things, reducing the uncertainty. However, the difference between the members may not be too great, in order that they can still understand each other (Heyman and Walls, 2002). Also the role of strong ties is found to be important, which leads, according to the literature, to the creation of trust, making the network ties a perfect channel for knowledge exchange (Larson, 1991; Coles et al., 2003), reducing the uncertainty. Kanter (1988) found that potential innovators benefit from being linked directly to the market, to gain a fuller personal appreciation for what users need, as well as from being connected with those functions inside the organization that manage the interface with the outside. These contacts ensure that ideas generated or opportunities encountered have a chance of success, both on the level of profitability and market potential (Kanter, 1988).

Second, to cope with the **knowledge intensive** character of an innovation process, a central coordinator of a network possessing knowledge relating to a multitude of aspects, seems to be very fruitful. However, it should be noted that this could also involve high risk in terms of the success of the innovation network as if this person leaves, expertise concerning the different topics will be lost from the network. This is
also valid for subsidized innovation projects, in terms of losing the subsidies and hence often the coordinator of the project and his expertise. Second, a network better aims to achieve effective face-to-face, or direct communication. In other studies, direct ties are also found to be instrumental in providing immediate access to other members’ knowledge and are especially helpful for knowledge which is difficult to transfer (Hansen, 2002). Another positive network characteristic is a close link between research and practice. Despite the continued generation of knowledge through scientific projects, research results are still often insufficiently exploited and taken up in practice, and innovative ideas from practice are not captured and dispersed (EC, 2014). These findings are in line with the evolution from the linear innovation model in which an innovation is developed within a research institute and communicated to the sector, towards the more interactive approaches considering innovation as the result of networking and interactive learning among a heterogeneous set of actors (Chesbrough, 2003; Leeuwis and Van Den Ban, 2004; Hall et al., 2006; Röling, 2009). In these approaches, the members and coordinators play a significantly different role and have more specific tasks to fulfil. They have to care for optimal conditions in the search for solutions (Koopmans et al., 2011).

To handle the controversial aspects present in an innovation process, the importance of self-initiated coalitions is identified. In the poultry sector, for example, only limited horizontal networks are available. Although personal relationships exist among the farmers, these relationships are only seldom used to form a coalition and become more innovative. Although a lot of these tasks are fulfilled by sector associations, two important remarks should be made in this frame. First, these associations are structured around a hierarchical model which results in a minority of the members effectively collaborating on a horizontal level. Second, these associations focus on an aggregate of interests (different sectors, feed firms, farming infrastructure, etc.), often resulting in difficult support for specific innovation projects.

Also, the literature shows that the success of an innovation often depends more on the determinants of the quality of a coalition, than on the technical-economic aspects (Kanter, 1988; Leeuwis and Van Den Ban, 2004). Thereby, the promotion, defence and presentation of the innovation and the establishment of a network around the innovation are key elements.

To ensure that an innovation is boundary crossing, the network is required to be heterogeneous and farmers should be willing to surpass innovation at the agricultural level. Reconsidering their own role in the innovation process can be relevant for all types of members: the farmers, policy makers, researchers, extensionists, consumers and suppliers. Long-term relationships are very strong and often result in homogeneity, leading to less diversity of experiences (Beckman and Haunschild, 2002), as is the case in the poultry sector, in which relationships are particularly based on routines. These routines from the past have become institutionalized within the network structure, yet they are unsuitable for integrating new ideas, motivations and approaches from the various actors involved. Also, in the literature, it is found that in uncertain situations, actors are inclined to collaborate with commercial contacts or partners with equal status (Podolny, 1994). A success
factor in this frame is hence found in the function of establishing a collaboration dynamic, without falling back on existing relationships.

5.4.2 Transferability
The rigorous selection process regarding the cases generated several interesting results. Although some findings regarding network characteristics for successful innovations are found that are valid for all the cases, the translation to the specific cases was different. The four cases reveal that there is no one single best solution to cope with innovation characteristics, but they show elements relating to the network characteristics that can be important for achieving successful innovations, and interesting ways to fulfil them within the network. The way in which the different cases fulfill important network characteristics can serve as inspiration for other emerging networks.

5.5 Concluding remarks
The aim of this chapter is to add to previous research on networked innovation by investigating the research question: How do network characteristics facilitate or constrain the ability to cope with innovation characteristics? The findings are useful for academics, network coordinators and network members, potentially leading to a higher innovation performance via networking. The results help to gain insight into the success factors of innovation networks active in the agricultural system. They reveal that the following factors are particularly helpful for success: numerous contacts, integration of knowledge providers within the network structure, face to face communication, a self-initiated coalition and surpassing innovation at the agricultural level.

A second novelty of this chapter comes from a methodological viewpoint, namely the combination of existing studies on innovation characteristics and network characteristics. Kanter, who defined the innovation characteristics (Kanter, 1988), investigated the conditions facilitating innovations. Her study was set up from the perspective of an individual firm and investigated the structural, collective and social conditions. In contrast, our study is conceived from the perspective of the network itself. The innovation characteristics form the basis for linking innovation behaviour with network characteristics. To the best of our knowledge, this has not been done so far.

In addition, by studying the link between networks and innovation within the agricultural system, which has been acknowledged to be different from other sectors with regard to its innovation system, this chapter contributes to empirical research.

5.6 Future research
The network characteristics are used as a basis for investigating the success factors of innovation networks. However, alongside network characteristics, other factors such as social conditions (Kanter, 1988) and agency-related aspects (Emirbayer and Goodwin, 1994; Mehra et al., 2001) can also influence the success of innovations. These aspects refer to the importance of the characteristics of nodes and motivations external to the network as well considering innovative action. In future research, a
more detailed focus on social conditions and agency-related aspects could be applied, possibly combined with interaction with network characteristics.

Furthermore, Kanter found that some of the conditions facilitating innovations are more important at some points in the innovation process than at others. Future research could, therefore, focus on the conditions for innovation by dividing the innovation process into its major tasks.

Another direction for future research would be to develop and use an objective measure for successful innovation. This measure could be used as a basis to compare network characteristics of networks that supported the introduction of successful and less successful innovations, instead of their own interpretation of how a network is able to cope with the four innovation characteristics.

In addition, it could be interesting to study the network characteristics of successful innovation networks at home and abroad, to compare and validate the results relating to the four innovation characteristics.
Chapter 6

Conclusions
The overall objective of this dissertation is to understand how networking contributes to innovation within the agricultural system. As outlined in the introductory chapter, this dissertation revolves around 4 research objectives that have been developed in line with the conceptual framework (Figure 3). In each of the chapters, one objective was addressed. In this chapter, the research objectives and their associated research questions are revisited (6.1). In section 6.2, the main conclusions are presented, followed by the contributions of this dissertation, both on a scientific level and a practical level in section 6.3. Section 6.4 acknowledges the limitations of this doctoral research, and based on the findings of the previous chapters, directions for future research are formulated.

6.1 Research objectives revisited and research questions answered

6.1.1 Research objective 1: Investigating characteristics of partners and relationships in farmers’ network activity for innovation

As already indicated, most of the farms are isolated and small compared with other sectors’ operators and especially compared with the agri-food concerns with which they have a commercial relationship with. This results in low and disproportionate market power. Asymmetry in network relationships can be considered both as an opportunity for network capability and knowledge development and as a threat to the growth and development of the smaller and relatively powerless actors (Johnsen and Ford, 2001; Holmlund, 2004; Fortuin and Omta, 2009). As there are few studies investigating the asymmetric relationships between farmers and both commercial and non-commercial organisations, the first research objective of this dissertation aims to investigate the different characteristics enabling or inhibiting the development of network relationships aimed at innovation within the agricultural system. This objective is realized by applying the typology that has recently been developed by Johnson and Ford (2008) to analyse a relationship’s asymmetry. This typology identifies seven main characteristics of asymmetry (i.e. mutuality, particularity, conflict, interpersonal inconsistency, intensity, power and dependence), leading to the formulation of the first research question:

RQ1: How do farmers perceive the asymmetry in their relationships for innovation with their network partners and how do they think this fosters or hinders the development of their innovation processes?

In order to answer research question 1, data is gathered through interviews and focus group discussions reaching 86 farmers from four agricultural subsectors in Flanders.

The results in chapter 2 are consistent with the theoretical framework applied, since they show that asymmetric relationships can indeed affect the development of innovations, both positively and negatively. For each characteristic of relationship asymmetry, it was investigated how farmers perceive this element in their relationships with the different actors and how they think it influences their innovation behaviour.
The majority of the relationships are found to be characterised by low mutuality. Most of the actors are completely self-interested. Only a few examples of high mutuality are found, particularly with the suppliers, consultants and also some examples with colleagues. The farmers who collaborate in mutual relationships are found to have established the most innovative projects. This demonstrates that relationships in which both partners are willing to give up their own individual goals to increase the benefits for their counterpart and, as a result, the long-term wellbeing of both parties, are more suitable for innovation. In terms of the relationship with buyers, it is found that farmers often have to give up their own goals, in the interests of the buyers.

As regards particularity, the findings indicate that farmers prefer particular relationships, with personal contacts, over standardised contracts. For example, they enjoy a chat with their suppliers or consultants. This can provide considerable new knowledge for innovation. However, when farmers restrict their relationships to these particular, personal contacts, because they are used to them and have a good feeling about them, there is a chance of missing interesting information for innovation. Particularity may appear to be an attractive proposition for farms to improve their innovation capacity. However, farmers should also make sure that they are aware of opportunities for other relationships, such as colleagues from other sectors via business clubs, people from public administration, or research institutes.

In terms of conflict, it is observed that frequent instances of conflict seem to occur in many of the relationships investigated. As conflict is perceived by the majority of farmers as a destructive force for networked innovation, they avoid relationships in which they expect conflict to be high, such as the one with buyers, members of a business club, public administration and financial providers. In the relationships with colleagues and suppliers, conflict is mostly resolved by cooperation, as farmers are convinced that collaboration will ensure long-term well-being for all. Conflict with the buyers, however, is difficult to address. Only some of the biggest farms are able to influence these relationships. This often leads to learning and innovation, as a certain level of conflict between the different actors maintains the competitive driving force and creativity of the relationship.

The findings about interpersonal inconsistency suggest that farmers mostly prefer personal and consistent relationships. They mostly prefer to talk with actors they already know, who are active in the same subsector and the same region, and who have similar expectations of the relationships. However, this might limit conversations with unfamiliar people who could be very interesting from an innovation viewpoint (Colurcio et al., 2012). Regarding the development of the relationship with buyers, it is found that this is often unilaterally influenced by their personal expectations, potentially limiting the farmers’ input and involvement. This contrasts with the relationships with third parties, in which farmers can often influence the relationships themselves, except for the relationship with public administration and financial providers.

When considering co-operation, the cases show that in the vertical relationships, buyers mostly influence the timing and details of co-operation. Also, within the
horizontal relationships, farmers often face difficulties in giving direction to the relationship, unless an individual or group of people is assigned to a management or governing role. Farmers therefore seem to have some difficulties in cooperating. This might restrict the process of triggering knowledge creation that leads to learning and innovation.

As regards intensity, it is observed that the established pattern of interaction is often influenced by longstanding involvement and commonly understood patterns of contact, contributing to a reduction in ambiguity and misunderstandings. However, some farmers experience a lack of contact with customers and the wishes of the end-consumer. Similarly, the resource exchange with colleague-farmers, as well as with suppliers, is regularly perceived as limited and farmers were found to be insufficiently aware of the opportunities to strengthen the intensity of their relationships with third parties. Intensifying relationships with both vertical and horizontal partners is therefore considered as a necessary investment for the future.

Power and dependence is the most difficult characteristic to address when considering the relationship with public administration, financial providers and especially with the buyers, since their power is significant. The findings indicate that when farmers possess a high level of expertise concerning a specific niche product (technical power), customers are much more interested in cooperation, confirming the findings of Ragatz, Handfield and Petersen (2002). Furthermore, farmers who are more involved in networking often possess greater knowledge and power. This extra power enables them to gain greater influence in their relationships and to establish contacts that are important for innovation. This is in line with the findings of Johnsen and Ford (2008).

6.1.2 Research objective 2: Understanding the role of different network partners depending on the type of innovation and the stage in the innovation process
To address the identified research gap about which partners farmers rely on in relation to the type of innovation and stage in the innovation process, research objective 2 is formulated in chapter 3. The four innovation types according to OECD and Eurostat (2005) are adopted (i.e. product, process, marketing and organizational innovation). For the innovation stages, the model of Van de Ven et al. (1999) is used, including an initiation, development and implementation or termination stage. Due to the complexity of these two aspects, two research questions were formulated.

RQ2a: How do network partners’ contributions differ for product, process, marketing and organizational innovations?
Research question 2a is addressed through interviews with both farmers and network coordinators, followed by focus group discussions with farmers. In total, 109 respondents are reached across the four agricultural subsectors in Flanders. The answer is structured according to the four innovation types.

The findings in chapter 3 are in line with the postulation of Gemünden et al. (1996) that different network patterns are suited to pursuing different innovation aims, as our analysis of research question 2a shows that different network partners are
consulted for different types of innovation. Although small differences are observable between the different subsectors studied, it is possible to identify a general trend in the results.

For **product innovations**, horizontal collaboration is of little importance. Furthermore, our study shows that vertical collaboration (with buyers and suppliers) is very important for product innovations. Indeed, there is strong evidence that getting more market information from buyers and, in some cases, direct involvement between buyers and firms, leads to greater success in terms of new product development. Furthermore, collaboration with suppliers could enable a firm to reduce the risks and lead times for product development, while enhancing flexibility, product quality and market adaptability. Research institutes also seem to have a positive influence on product innovations.

With regard to **process innovations**, the vertical network also plays an important role. Suppliers actively bring new ideas or provide equipment to the farms to develop better production facilities, reduce production costs or decrease processing time. Alongside the vertical network, farmers frequently consult horizontal networks during the development of process innovations, unless collaboration with colleagues raises suspicious because of the potential for competitive behaviour. However, collaboration with colleagues-competsitors need not be (directly) competitive. Farmers can collaborate when they face common problems, and especially where these problems are seen as being outside the realms of competition and/or when by collaborating they can influence the nature of the regulatory environment, which is an important influencing factor for process innovations. Farmers often collaborate with each other when they are not direct competitors. For example, where they produce different crops, but make use of similar techniques. Alternative partners identified as sources of information and knowledge for process innovation include consultants. These can provide fundamental scientific or technological knowledge, but more commonly provide applied knowledge, specialist skills and information. Furthermore, research institutes and universities are observed as partners for process innovations. The practical research centres, which mostly focus on short-term results, are preferred by the Flemish farmers. The universities, which tend to focus on basic and long-term research, are used less for process innovations than for product innovations.

For the limited amount of **marketing innovations** introduced, horizontal collaboration with colleagues and vertical collaboration with buyers is most frequently observed in this study. This can be instrumental in gaining insights into tendencies and consumer needs and can help with the development of promotional campaigns.

Regarding **organizational innovations**, according to our study, a combination of networking with horizontal and vertical networks, as well as with third parties, seems to have a huge influence on the success of the innovations. This seems to be evident as organizational innovation concerns several company domains and hence a lot of decisions have to be made for which knowledge is required and this can only be gained from a variety of partners.
RQ2b: *How do network partners’ contributions differ along the innovation process?*

The answer to research question 2b is based on twenty farmer interviews and is structured according to the three innovation stages.

In the **initiation phase**, a lot of contacts with a heterogeneous group of people are important. In this phase, several directions of development are explored and new ideas, strategies and networks are created. The main focus in the cases analysed is on colleagues and suppliers, both at home and abroad. Furthermore, it is advised that farmers do not restrict contacts to partners from their own sector. Ideas from other sectors can be very fruitful.

During the **development phase**, the suppliers are observed as important network partners. Furthermore, third parties are consulted, such as financial providers and consultants, in writing a business plan. Buyers seem to be more important in the other two phases of the innovation process. Fewer partners are involved as a preferred course of action is discovered during the initiation phase. At the stage of executing the ideas, the development phase, the farmer has worked out the full concept and is able to use the contacts made and the ideas collected during the initiation phase to connect to appropriate partners. Furthermore, identifying those partners is less difficult, as most of the providers of services and products, necessary at this stage, advertise their businesses. Farmers can easily contact them and compare their offers.

With regard to the **implementation-termination** period observed in the cases studied, the producer association for the kiwi berry and its collaboration with the auction are found to be very important. A lot of marketing activities have been undertaken to promote the new product. Furthermore, the farmers still work closely together with their suppliers, to fine-tune their innovation.

**6.1.3 Research objective 3: Understanding factors influencing farmers’ network activity for innovation**

In chapter 4, research objective 3 is formulated to tackle the research gap concerning the scarcity of empirical research that focuses on understanding the motives for farms to join networks. In order to do this systematically, the Theory of Planned Behaviour (TPB) (Ajzen, 1991) is used as a theoretical approach. The TPB assumes that people’s expectations and values about engaging in a particular behaviour form their behavioural, normative, and control beliefs. The beliefs are formed by weighing up all available information and influences from personal instinct, policy, advisory services, the media, family, friends and peers. These beliefs in turn, ultimately influence their behaviour.

RQ3: *What are the factors underlying farmers’ intentions about network activity?*

The answer to research question 3 is investigated through 24 in-depth interviews with farmers from three Flemish agricultural subsectors. The findings are structured according to the three categories of beliefs, as defined by the TPB. First, there are the behavioural beliefs including expected advantages and disadvantages of being active in networks. Second, there are the normative beliefs, or the influential reference groups that approve or disapprove of the behaviour. The third category is the control
beliefs, or the facilitators or barriers for network activity which can be internal or external to the farm.

**Behavioural beliefs: Expected advantages and disadvantages**
The expected advantages mentioned were, for example, that “you always learn something”, that “you know the right people and places when information is needed” and that “you become aware of things from other sectors which can be useful in your own sector”. Unless farmers are aware of the existence and possible advantages of networks, they often do not participate actively. Factors holding them back include low perceived return on investment, lack of objectivity of the information and the fact that active farmers receive more negative attention.

**Normative beliefs: influential reference groups approving or disapproving**
Furthermore, it is observed that the decision to network can be hampered or facilitated by some reference groups of actors, such as spouses, colleagues, network coordinators and chain partners.

**Control beliefs: facilitators or barriers**
Other barriers observed were difficulties in finding partners with whom they can communicate openly and honestly. Furthermore, lack of time is frequently mentioned as a hindering factor. Another barrier relates to the management of the farm, i.e. the limited number of people who can manage the farm and the skills of the employees.

**6.1.4 Research objective 4: Identifying the network characteristics critical for successful innovations**
In chapter 5, the objective is to identify the network characteristics that are critical for successful innovations. In the past, the structural, collective and social conditions of an individual firm that facilitate the ability to innovate have already been observed, taking into account the four innovation characteristics as defined by Kanter (Uncertain, knowledge intensive, controversial and crossing boundaries). Within this chapter, the unit of analysis shifts from the individual organization to the network. The facilitating factors are determined by making use of the structuring and structural dimensions of network characteristics.

**RQ4: How do network characteristics facilitate or constrain the ability to cope with the innovation characteristics?**
The answer to this research question is based on insights from the full data-set obtained in the project, including 109 respondents (farmers and network coordinators) spread over four agricultural sectors in Flanders. The answer is structured according to the four innovation characteristics.

To reduce the uncertainty inherent to innovation, it is observed that management via a central coordinator who forms the link between multiple stakeholders is very important. Furthermore, the importance of close contact with a heterogeneous group of people, such as farmers, suppliers, buyers, researchers is observed in all four cases.
Also, the findings suggest that more centralized and large networks constrain the equal dispersion of innovative potentialities that result from the anticipation of external knowledge acquisition. Furthermore, uncertainties and changes in the agri-food environment are often perceived as structural and not as concrete opportunities upon which to hinge innovations. In addition, the four cases reveal the importance of strong and direct ties to reduce uncertainty.

As the innovation process is knowledge intensive, communication and innovation in communication is important. Distant one-way communication which is very formalised and impersonal and directed at a large group hinders creativity. According to our findings, an innovation oriented network better aims at effective face-to-face, or direct communication. This allows for a more productive interaction between the different agents involved in the innovation process. Direct communication can be managed through the logistical support and organization of knowledge transfer processes by appointing an independent person or management board which can arrange regular meetings, draw up the agenda, guide the discussion, send out newsletters, etc. and by providing an inspiring and professional environment in which network members can communicate. Additionally, a close link between research and practice has a positive impact on knowledge transfer.

The third challenge for an innovation network is to handle the different, often controversial, interests which are involved in an innovation process. The question as to whether or not the interests of the network members are homogeneous or heterogeneous is an important issue to take into account. For networks with different, opposing interests, it is often hard to find a good balance between the different needs of the network members. In general, the success of an innovation more often depends on the determinants of the quality of a coalition, than on the technical-economic aspects (Kanter, 1988; Leeuwis and Van Den Ban, 2004). Therefore, the promotion, defence and presentation of the innovation and the development of a network around the innovation are key elements. In the four cases studied, horizontal collaboration to promote innovation was observed as a key element. Therefore, it is important that the coalition is self-initiated. However, once again, the need for an independent coordinator role for management of the network was expressed. His task is only to facilitate, not to set up the network.

Concerning the importance of crossing boundaries to innovate, it is vital that a network provides the means to meet various expertise and experience, for example by organizing a study trip, a workshop, network meetings, etc. and hence meet people from different backgrounds, for example from another sector. However, the required heterogeneity in the membership is not the only prerequisite. Network members should also be willing to change their routines. Reconsidering their own role in the innovation process can be relevant for all types of members: the farmers, policy makers, researchers, extensionists, consumers and suppliers. This is also related to the strength of the network ties.
6.2 Main conclusions

As expected, the networking activity of the majority of farmers and their expectations from networking are different than is the case for entrepreneurs in other, non-agricultural sectors, due to the specificities of the agricultural innovation system. The results showed many farmers consider the management of relationships to be the concern of the other party and spend little effort on changing their position within the relationship. Although they have very limited bargaining power and would benefit from taking more action to gain power, they do not really make much effort to increase this power. Very often, the farmers studied restrict their relationships to partners with whom they are familiar, preferably from their own region and subsector. Many of the farmers interviewed expect network activities to be relevant in the short term, with the provision of practical and applied knowledge. They mostly think along the lines of organized network activities, for example, by their suppliers or research centres, focusing on product and process innovations. These expectations and characteristics are probably a legacy of the Common Agricultural Policy. Via state interventions, the agricultural sector was supported to secure food provision. Through governmental institutions, a huge amount of money was invested in increasing farmers’ technical knowledge, leading to an increase in productivity, and hence production volumes. Recently, when these objectives were achieved, the market started to liberalize, reducing the market and price interventions, and also the minimum income of farmers. These developments force today’s farmers to reconsider their actual role within the innovation system. Routines from the past have often become institutionalized within the structure of the network relationships, yet they are unsuitable for integrating new ideas, motivations and approaches from the various actors involved.

Some farmers are perfectly able to reinvent themselves and to adapt to this changed situation. They are active in several networks, such as business clubs, make contact themselves with network partners to work out the problems they face, exchange information with their clients to understand their needs and seek opportunities to market their products, or to differentiate themselves. Others have more difficulties taking this more active role in networking and becoming more innovative. For example, they do not seek for sustainable relationships with their buyers to ensure their sales. In contrast, they try to compensate for this by working harder, even during the weekends, through a better infrastructure and by delivering superior quality. This attitude reduces their contact with the market, and means that they do not have time to network.

When comparing the network activity of the most successful farmers in our sample with the findings in the literature, we can observe important similarities. This could be explained by the market conditions for the agricultural sector becoming increasingly similar to other sectors functioning in a free market. The implications formulated in this dissertation are directed at the group of farmers experiencing more difficulties adapting to this new situation, or having limited insights into how to network intelligently to become more innovative. However, the small category within
this group which is not open for innovation, often called laggards, falls outside the scope of this thesis.

6.3 Contributions

The motivation for writing a dissertation is to conduct research that contributes to the knowledge base in a specific scientific discipline on the one hand, and to apply that knowledge to professional practice on the other hand. This section describes the scientific contribution and the practical relevance of this PhD research.

6.3.1 Scientific

This dissertation primarily makes a number of contributions to the literature of “networked innovation”. The current scientific literature has been replicated or extended in a number of ways.

Theoretically, this doctoral dissertation develops a research framework to better understand the relationships between networks and innovation. Existing studies on “networked innovation” are supplemented by investigating the “how” and “why” aspects of the relationship. Elements of different theoretical perspectives (Innovation theory, Industrial Marketing Management, Resource based View and Theory of Planned Behaviour) are combined to shed light on this relationship both at the level of the individual farm and the network.

By combining the asymmetric typologies framework of Johnsen and Ford (2008) with the concept of networked innovation within the agricultural system, this dissertation contributes to existing theories. By using this approach, a deeper understanding is gained as to how farmers experience the asymmetry in their relationships for innovation and how they think these relationships hinder or foster innovations.

Also, the combination of the Theory of Planned Behaviour with networked innovation is unique and contributes to insights into the underexplored factors influencing farmers’ network activity for innovation.

In addition, this dissertation adds to the limited literature on the relationship between network partners and the innovation type or innovation stage targeted (Howells et al., 2004; De Man and Duysters, 2005; Varis and Littunen, 2010; Lefebvre, 2014) as well as to the literature investigating the success factors of innovation networks at the network level. Hereby, the concept of innovation characteristics, which was developed in the context of the individual organization, has been applied to networked innovation.

Furthermore, this research also contributes to the existing literature by stressing the multiform and dynamic character of innovation, i.e. its often incremental, non-linear and non-technological character. This contrasts with the majority of studies that only focus on radical, linear and technological innovations.

From a methodological viewpoint, this doctoral dissertation combines generally accepted practices. Although each of the methodologies has its limitations, the use of a combination of methods can compensate for weaknesses that stem from a singular approach. The combination of methodologies has yielded a rich set of
complementary data, providing a more in depth view on the relationship between networks and innovation within the agricultural system.

The empirical contribution of this research relates to the understanding of the relationship between networks and innovation within the Flemish agricultural system, which can be seen as an innovative empirical setting. Innovation studies, including studies on networked innovation, have generally focused on large high-tech and multinational companies, functioning with R&D units. Furthermore, the Theory of Planned Behaviour has been widely used to evaluate a range of consumer behaviours. By applying this theory in strategic decision making within the small business field, this study contributes, in an empirical way, to the existing literature.

**6.3.2 Managerial and policy implications**

The novel perspectives that this PhD brings to the relationship between networks and innovation is beneficial for farmers, policy makers, network coordinators and other stakeholders who aim to foster networking for innovation within the agricultural system. Currently, innovation is at the core of many policy actions aimed at enhancing competitiveness. All over the world, food security is one of the most important challenges for the coming decades, together with the adequate supply of materials for biomass applications. Against this challenge, however, a slowdown in productivity growth is noted, together with an increasing pressure on the environment and natural resources. The challenge for agriculture is not only to produce more, but also to produce in a sustainable way. To tackle these challenges, the role of agricultural innovation systems is recognised at international level (World Bank, 2006; Fao, 2012; World Bank, 2012). To stimulate the formation of innovation through networking, the findings of this study definitely play an important role. Based on the findings, managerial and policy implications are formulated to enhance the innovation capacity of farmers through networking.

In table 15, an overview is given of the most important implications for each target group.

First, for **farmers**, our research reveals that it is important to understand the possible advantages of networks and to investigate which network could offer the greatest benefits. Therefore, it is important to obtain insight into the landscape of networks, their vision and strategy, the farm’s needs and the needs of the other network members, together with what your farm can offer to the network.

During this process, it is important not to restrict the expectations to short-term benefits, but to also consider the potential long-term benefits, such as achieving competitive advantage and survival in the long term. Also, it is essential to communicate clearly about the needs and expectations from each other within the network, to not end up disappointed.
### Table 15: Implications per target group

**Source:** Own compilation

<table>
<thead>
<tr>
<th>Target group</th>
<th>Implications</th>
</tr>
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| **Farmers**           | **Understand possible advantages of networks**  
|                       |   Explore the landscape of networks  
|                       |   Look at what the network can offer you  
|                       |   Think about what you can offer the network  
|                       |   Understand own needs and each other's needs and communicate about this  
|                       |   Look beyond short-term benefits  
|                       | **Pay attention to partner suitability**  
|                       |   Depending on type of innovation or stage in innovation process, other network partners should be consulted  
|                       | **Do not restrict relationships to familiar partners and structures**  
|                       |   Include relationships with horizontal, vertical and third parties to discover potentially interesting contacts  
|                       |   Reconsider actual role within innovation system  
|                       | **Take more action to understand and respond to market needs and to gain power within the chain**  
|                       |   Look for sustainable relationships with buyers and suppliers  
|                       | **Agree on what information to share**  
|                       |   Change beliefs towards the benefits of open and honest communication  
|                       |   Make sure there are clear agreements  
|                       | **Feel responsibility and engagement in the networks**  
|                       | **Policy/ Governmental institutions**  
|                       |   Stress the importance of networking and market oriented agriculture  
|                       |   Support project-based innovation processes by bringing together the partners that are necessary for a successful innovation project  
|                       |   Educate farmers in elementary entrepreneurial skills needed to possess the necessary innovation power  
|                       |   Monitor knowledge in order to detect skills or themes for which (latent) interest exists  
|                       | **Network coordinator**  
|                       |   Establish a clear network vision and strategy  
|                       |   A central, neutral coordinator should take care of the management and governance of the network and supports the interest of all the members  
|                       | **Key points for organized network events:**  
|                       |   Deal with various topics in brief, to the point; directed at a specific audience; focus on market trends and commercial topics; comply with preferences for practical and applied knowledge; provide opportunities to socialise; invite neutral and experienced speakers; invite members personally; publicise early enough via appropriately selected channels  

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Second, the results indicate that farmers should pay attention to the importance of partner suitability for the innovation type and stage at which they are aiming. This means that depending on the type of innovation, or the stage in the innovation process, other network partners should be consulted.

Third, it is important for farmers not to restrict their relationships to partners with whom they are familiar, as this could limit the potential for gaining information and knowledge that could be useful for innovation. It is therefore important that farmers are willing to discover potentially interesting contacts for further establishment and innovation on their farm. Visiting and talking with colleague-farmers can, for example, open the farmer’s eyes, and give him ideas about how to further develop his farm, which opens the way to innovation. Also, the importance of the vertical relationships should not be neglected, as it is important to understand market demand and to be able to respond to this in the most effective way.

Furthermore, attention should be paid to the importance of the relationships with third parties, as it is key to have access to first-hand information, new knowledge, the necessary funding to innovate, and to be able to influence the creation of new rules, for example by having a good dialogue with public administration. It is observed that routines from the past have often become institutionalized within the structure of the network relationships, yet they are not suitable for integrating new ideas, motivations and approaches from the various actors involved. Therefore, it is advised that farmers reconsider their actual role within the innovation system.

Related to this topic, it can also be stated that farmers should not only wait for information for innovation provided by other, often external people or situations. They should take an active role in several networks and look proactively for information about market needs, opportunities to market products and gain power within the chain, in order to become more innovative. Instead of limiting the focus to working harder and more efficiently while improving quality, farmers should look for sustainable and balanced relationships with chain partners to ensure sales with an added value for the customer.

Furthermore, when setting up a network, it is important for the members to agree on what information to share. In an environment with competitors, farmers often experience difficulties in communicating openly and honestly. They are afraid that their knowledge will be used without them gaining something in return. As research indicates that the advantages of networking are often higher than the disadvantages of competition, farmers are advised to change their beliefs towards the benefits of open and honest communication. This would increase their ability to improve their individual situation, as well as that of their sector. For this, clear agreements are necessary to create trust within the group.

The chance of success for a network is also related to the responsibility and engagement of the members. If everyone is waiting for the actions and input of others, nothing will happen. In this frame, an important role is reserved for the coordinator or facilitator of the network, possibly a farmer.
Also the governmental institutions can influence the networking activity of farmers to enhance innovation. First, the importance of networking should be stressed by governmental institutions, to make sure that farmers are sufficiently aware of its possible advantages. They can, for example, inspire farmers by providing insight into possible network activities or network structures and sharing best practice. While doing this, the focus on networking for the production of market-oriented products should be stressed. Furthermore, to lower the threshold for networking, they can support project-based innovation processes by bringing together the partners that are necessary for a successful innovation project. Hereby, the important role of the farmer in the development process of the innovation should be emphasized, to avoid a situation where the translation of social expectations into rules or concrete applications result in forced innovations from farmers’ viewpoint. However, the stakeholders should not be restricted to farmers and farmers’ unions or local authorities, but chain partners should also be invited. Furthermore, through innovation programmes, governmental institutions can educate farmers in the elementary entrepreneurial skills needed to possess the necessary innovation power. This is especially important for themes not included in the tasks of the average farmer, such as marketing. In this frame, they can make increasing efforts to monitor knowledge in order to detect skills or themes for which (latent) interest exists. If certain skills need further development, they can be supported through research programs.

For network coordinators of established networks, our research revealed the importance of establishing a clear vision and strategy and communicating about the innovations for which their network can advise and assist the farmer. This can help the farmer in his selection of networks.

For network coordinators of new or emerging networks, the appointment of a central, neutral facilitator for the management and governance of the network is crucial. His role is to connect multiple stakeholders, to draw up an agenda and to maintain and record meeting reports. This task can also be divided among a board, based on the competences of the members. It is best if this role is fulfilled by an actor who can understand and support the interests of the different members.

In addition, a series of reasons for attending or ignoring organized network activities has been identified, which give rise to implications for network coordinators in terms of increasing network activity. It concerns, for example, sector associations, auctions, feed merchants, consultants, innovation centres and banks who want to organize an event to share information with their clients or members. Farmers state a preference for meetings that cover varied topics in brief, are to the point and focused on a specific audience. According to them, only the most important and relevant issues should be included, and details should be provided as to where they can find more information about the different topics which are relevant to them. From the interviews, there appears to be interest in network activities relating to market trends and other commercial topics. Furthermore, respondents indicate a preference for practical and applied knowledge over theoretical explanations. In addition, according to the responding farmers, network activities are very much more appealing if they include...
an opportunity to socialise with appetisers, refreshments and drinks. Furthermore, they emphasise the importance of a neutral and experienced teacher or speaker. Hence, network coordinators should take these factors into account when organizing network activities in order to stimulate network activity by farmers. Furthermore, the normative beliefs elicited show that network coordinators putting pressure on members to join organized activities has a positive influence on the intention to join a network activity. Additionally, as farmers indicate that they are often unaware of network activities, network coordinators need to publicise activities early enough and via appropriately selected channels. According to the respondents, this could be done through specialist newspapers, magazines, websites frequently consulted by farmers (e.g. auction websites, sector organizations, etc.), email, or just by distributing informational brochures to farmers.

6.4 Limitations and directions for future research

Every research study is based on a specific research design and applies a certain methodology and analysis techniques. This choice imposes some limitations which need to be acknowledged and which can also provide opportunities for future research.

First, in this dissertation, several aspects of the link between networks and innovation are analysed. This is based on innovations which, according to the farmers, have been implemented successfully. The use of a self-reported measure can be seen as a limitation of this study. It would be useful to develop or apply an objective quantitative measurement tool for the success rate of an implemented innovation. This would, for example, enable us to compare the network partners consulted for the different innovation types and stages within the innovation process for farms introducing successful and less successful innovations. Furthermore, the perceived relationship asymmetries and beliefs about networking could be compared between farmers introducing successful and less successful innovations, as well as the network characteristics of networks that supported the introduction of successful and less successful innovations, instead of relying on their own interpretation of how a network is able to cope with the four innovation characteristics. Another possibility for an objective measurement tool could be the innovation capacity of the farm or of the network within which the farm is embedded. Efforts to set up such a measure have already been made by Vermeire (2009) and Kühne (2011). However, additional research would be needed to implement this. This could therefore provide an opportunity for future research.

Second, in this study, innovation is defined as “the ongoing process of learning, searching and exploring, resulting in the introduction of new products, new processes, new forms of organization and new marketing methods”. This includes both the adoption of an existing innovation on the farm and the generation of innovation by the farm. Considering both together may have an influence on the results. For example, in chapter 3, the network partners consulted are studied in relation to the type of innovation or stage in the innovation process. Presumably, the network partners consulted for the adoption of a product innovation are different
than for the generation of a product innovation, although both are put in the same category. This may also be the case for other results. For future research, an interesting idea would therefore be to limit the focus to the generation of innovation by the farmer, as this kind of innovation will gain in significance in the liberalized agricultural innovation system.

Third, the results show a difference in innovation partners depending on the type of innovation and stage in the innovation process. When studying the partners depending on the innovation type, all stages in the process were included, and likewise when studying the partners consulted in the different innovation stages, all the innovation types were taken into account. This might therefore include interference in the results. A more detailed analysis could be set up, in which the different stages are considered per innovation type, possibly further divided per subsector.

Fourth, when comparing our findings about the consulted network partners for marketing and organizational innovation with existing studies from other sectors, we noticed that little support can be found in the scarce literature on this topic. Hence, we would encourage other researchers to focus on these two types of innovations in the context of networking, especially because these two types of innovations have become more important within the agricultural sector. Farmers are expected to work in more market oriented ways and to implement new organizational methods, while they often face the greatest difficulties in these directions. Future research in this direction would therefore be interesting, to investigate whether our results can be supported by other regions in Europe and the world.

Fifth, in chapter four, the TPB was used to elicit the beliefs of farmers about networking. In future research, the degree to which attitude, subjective norms or perceived behavioural control influence network activity should be considered through a quantitative study. This would allow the development and validation of an instrument that can be used to examine theoretical constructs of the TPB for the network activity of farmers.

Sixth, chapter five investigates success factors of innovation networks by using the network characteristics as a basis. However, alongside network characteristics, other factors such as social conditions (Kanter, 1988) and agency-related aspects can also influence the success of innovations. In future research, a more detailed focus on these aspects, possibly combined with the interaction with network characteristics, could be applied. In addition, future research could focus on the conditions facilitating innovation depending on the point in the innovation process. Additionally, it could be interesting to study the network characteristics of high performing innovation networks at home and abroad, to compare and validate our results relating to the four innovation characteristics.

Also, although in the design of the study no aspects were incorporated that are specific to Flanders, an international replication study could yield interesting insights induced by, for example, cultural differences such as other traditions with respect to
doing business and negotiating, other ways to collaborate with each other or to interact with the environment.

Finally, presenting the analyses as a series of papers leads to a great deal of repetition. I have sought to reduce the repetition by formulating the common parts of the introduction, methodology and the theoretical perspectives used for the different papers in the introductory chapter of this dissertation. However, some repetition is unavoidable, as well as frequent references to the first chapter.
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Appendix 1: Interview guide farmers – Chapters 2-5

Inleiding

Goeiedag, mijn naam is… en ik voer dit interview uit in naam van…. Samen met … voeren wij een vier jaar durend onderzoek uit rond netwerken en innovatie dat tot doel heeft bij te dragen tot een betere afstemming tussen de behoefte van de landbouwers en het aanbod aan netwerken, resulterend in een verbeterde valorisatie van kennis in innovatieve toepassingen.

Het onderzoek wordt uitgewerkt aan de hand van acht cases (varkenssector, pluimveesector, groenteteelt, biolandbouw, verbrede landbouw, de kiwibes, sierteelt en transitiearena’s). Het doel van deze interviews is om beter inzicht te krijgen in welke groepen er bestaan in de relatie tussen netwerken en innovatie per case.

Concreet betekent dit dat we per case naar een aantal kenmerken proberen te kijken en om dan in onze volgende stappen op een relevante wijze focusgroepen te kunnen indelen.

Door u te interviewen, zouden we graag wat meer inzicht verkrijgen in uw ervaringen i.v.m. welke netwerkkenmerken voor u bijdragen aan innovatie.

Jullie zullen worden geïnformeerd over de resultaten van jullie deelname en van het project in zijn geheel. Dit zal jullie worden toegezonden. Indien jullie dit wensen kunnen jullie ook de persberichten ontvangen.

Dit interview omvat verschillende onderdelen. Er zullen vragen gesteld worden over innovatie en over netwerken. Wees vrij om te antwoorden wat u wil, juiste of foute antwoorden zijn er niet.

Het interview zal ongeveer een uur in beslag nemen.

[Binnen dit onderzoek wordt innovatie aanzien als een aanhoudend proces van leren, zoeken en verkennen, wat resulteert in nieuwe producten, processen, markten en vormen van organisatie.

Voorbeelden van productinnovaties zijn nieuwe of verbeterde rassen en cultivars, genetisch gewijzigde gewassen, nieuwe toepassingen van bestaande teelten.

Voorbeelden van procesinnovaties zijn een plukrobot in de fruitteelt, gebruik van gps systemen, automatisch snoeien.

Voorbeelden van marktinnovatie (aanboren nieuwe markten of herpositionering op bestaande markten) zijn thuisverkoop van hoeveproducten, verkoop van hoeveproducten op boerenmarkten.

Voorbeelden van organisatorische innovatie zijn een nieuwe juridische structuur, nieuwe samenwerkingsverbanden, nieuwe routines en procedures om het werk te organiseren.]

Profiel van de respondent en bedrijfsgegevens

• KUNT U KORT UW BEDRIJF EN UZELF EENS INTRODUCEREN?
  
  (Naam, locatie, sector, aantal werknemers, omzet, leeftijd en opleiding respondent)

1. Innoveren

• ALS JE TERUGDENKT AAN 5 JAAR GELEDEN, WAT IS ER SINDS DAN ALLEMAAL VERANDERD?
  
  (in uw bedrijf en sector, als bedrijfsleider, sociale omgeving…)

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(product: nieuwe rassen, teelten, verbreding, ...; proces: techniek, automatisering, bedrijfsinrichting, ...; markt: directe verkoop, eigen verwerking, ...; organisatie: 3- weken systeem*, aanbod en afzet, verhogen van zelfstandigheid*, vertegenwoordiging en belangenverdediging, organisatie in netwerken, integraal ketenbeheer, ....)

• Zijn er dingen die je hier al eens gedaan hebt, die u nog nooit elders heeft gezien?

2. Innovatiecapaciteit

• OP BASIS VAN DIT, WAT BESCHOUWT U ALS INNOVATIE BINNEN DE LAND- EN TUINBOUW?

• IN HOEVERRE ZIET U UZELF ALS INNOVATIEVE LANDBOUWER?

• WAAROM INNOVEERT U? OF WAAROM INNOVEERT U NIET?
  (kwaliteitsverbetering, kostenbesparing, uitbreiden productie, hoger inkomens halen, nieuwe producten / markten, verbrede activiteiten, afstemming binnen de keten, wet- en regelgeving, financiële steun, ...)

  • Als u gaat innoveren, ervaart u dan bepaalde barrières, indien ja, dewelke?

• WAT ZIJN DE ASPECTEN/ INBRENG DIE U NODIG HEEFT OM DE VERANDERINGEN DOOR TE VOEREN?

  • Hoe heeft u de opgenoemde veranderingen van de laatste 5 jaar kunnen realiseren?
  • Waar had je kennis nodig? Wie heeft deze kennis gebracht?
  • Hangt de plaats waar u op zoek gaat naar innovatieve ideeën volgens u af van het type innovatie? Hoe?
  • Wat zijn de financiële investeringen die u nodig heeft voor een innovatie, en waar haalt u die? Is dit vast gebudgetteerd?
  • Hoe draagt u zelf en uw mensen bij aan innovatie (menselijke inbreng)? Hoeveel tijd spendeert u aan het zoeken naar en het uitwerken van innovatieve ideeën?
  • Hoe vaak zoekt u naar andere kennisbronnen?
    (nooit, eenmaal per jaar, om de 6 maand, om de 3 maand, maandelijks, wekelijks, meermaals per week)
  • Kunt u een aantal voorbeelden geven van de investeringen die u heeft moeten doen om succesvol te innoveren?
  • Waar zoekt u deze verschillende middelen?
  • Van wie krijgt u hulp in het implementeren? Is dit via de keten/veiling...?

3. Sociale relaties / Netwerken + Netwerksamenstelling

• ALS ER WORDT GESPROKEN OVER NETWERKEN, WAT HOUDT DAT IN VOOR U?
• AAN WELKE NETWERKEN NEEMT U DEEL?
• WAAROM KIEST U VOOR DEZE, EN GEEN ANDERE?
• Zijn er bepaalde personen die een invloed hebben op uw netwerkkeuze (zowel aanmoedigend of afkeurend)? Zo ja, welke?

• WAT HOOPT U ER UIT TE HALEN? WELKE ACTIVITEITEN WOONT U BIJ?

• Wat waren de doelstellingen? Zijn deze doelstellingen nog steeds dezelfde?
• Aan welke netwerkactiviteiten nemen jullie deel?
• Wie van jullie bedrijf neemt actief deel aan netwerken?
• Heeft jullie deelname aan netwerken tot nieuwe kennis geleid? Op welke manier?
• Ervaren jullie ook nadelen van netwerking? Zo ja, welke?
• Hoe draagt deze kennis in jullie bedrijf bij aan innovatie?
• Zijn er bepaalde innovaties die u niet had kunnen doen zonder uw netwerk / sociale contacten? Waarom wel/ niet?
• Wie zijn volgens u de meest relevante partners binnen uw netwerk?
• Heeft u makkelijk toegang tot “de relevante partners” binnen uw netwerk?
• Tot welk type partner heeft u nu moeilijk toegang / zit nu niet in uw netwerk? Waarom denkt u dat deze op dit moment niet aanwezig is? Zijn hier ook andere landbouwers tussen?
• Vindt u uw partners een veilige omgeving om ideeën, resultaten enzovoort mee te delen?
• Hebben bepaalde veranderingen die door jullie werden doorgevoerd invloed gehad op het netwerk of zijn jullie hierdoor in andere netwerken terecht gekomen?

• VINDT U NETWERKING BELANGRIJK?

• Welke factoren en situaties vergemakkelijken of vermoeilijken uw netwerkdeelname?

• HOE ZOU U DE RELATIE MET Anderen IN HET NETWERK BESCHRIJVEN?

• Hoe zou u de relatie met de anderen in het netwerk in het algemeen beschrijven? (vrienden, zakenpartners…)
• Hoe sterk zijn deze relaties? Wat betekent sterk/zwak voor u?
• Wat zijn volgens u de voor-/nadelen van deze mate van intensiteit van de banden?
• Zijn er bepaalde leden die een centrale rol spelen in de netwerken?
• Wat zijn volgens u de voor-/nadelen van een centrale actor?
• Heeft u het gevoel dat u ook een bewustzijn of waarden deelt met de mensen waar u vaak mee samenwerkt, innoveert?

• HOE IS HET NETWERK GEORGANISEERD?

(Frequentie en locatie van samenkomsten, voorzitter, verslaggeving…)

• Zijn deze relaties formeel of niet? (informeel, contracten, eigenaarschap)
• Wat zijn volgens u de voor-/nadelen van deze mate van formaliteit?
• Wat zijn de risico’s verbonden met het lidmaatschap in het netwerk? (vb. op relationeel gebied, op gebied van prestaties)?
• Maken jullie gebruik van bepaalde methodes om jullie belangen te beschermen overeenkomsten)?
• IN WELKE MATE BENT U AL DAN NIET TEVREDEN VAN DE NETWERKEN? MET WELKE ASPECTEN ZIJN JULLIE MEEST/NIET TEVREDEN? HOE EVALUEREN JE TEVREDENHEID VAN EEN NETWERK?
  • In welke mate vindt u dat de doelstellingen die u had ten opzichte van deelname in het netwerk bereikt worden?
  • Worden de voordelen eerlijk verdeeld tussen de netwerkleden? Waarom denk je dat dit mogelijk/onmogelijk is?
  • Wordt het netwerk op een effectieve manier gemanaged?
  • Heeft het netwerk in het verleden invloed gehad op beslissingen om al dan niet veranderingen door te voeren op uw bedrijf?
  • Is het voor jullie bedrijf en de prestaties ervan belangrijk dat het netwerk mogelijkheden biedt voor relaties met andere netwerken?
  • Hoe is jullie relatie met andere netwerkleden veranderd over de tijd heen? Waarom?
  • Vanuit ervaringen met netwerking, zou je netwerking dan meer of minder aanraden dan voorheen? Staat jullie bedrijf nu meer open voor netwerking dan voorheen?

4. Kennis voor innovatie via netwerken

• VIA WELKE MANIEREN KOMT U AAN NIEUWE INFORMATIE?
  (eventueel terugkoppelen naar vraag omtrent veranderingen in laatste vijf jaar)

• HOE BELANGRIJK ZIJN DEZE? WAAR, EN BIJ WIE ZOEKT U ZELF PROACTIEF NAAR NIEUWE INFORMATIE?
  (intern: praktijkervaring, werknemers, familieleden; extern: leveranciers afnemers, gelijkardige bedrijven, sectororganisaties, beurzen, vakliteratuur, publieke voorlichtingsdiensten, consulent, onderzoeksinstitutie, innovatiestepunt, ...)
  • Welke zijn de belangrijkste plaatsen/momenten om nieuwe ideeën op te doen? Wie zit daar aan tafel? (klassieke vormingen, zelfstudie, seminaries, veldwerk, ...)
  • Hoe komt u er toe om nieuwe dingen te proberen?
  • Welke stappen zet u?
  • Wie zet u aan tot het ontwikkelen van innovaties en hoe belangrijk zijn deze bronnen voor u?
  • Zijn er partners in de keten die u aansporen om te gaan innoveren?
  • Heeft u het gevoel dat er kennis weerhouden wordt voor u?
  • In hoeverre draagt u zelf bij aan (innovatieve) kennis? Komen anderen bij u voor kennis en advies? Wie? Is dit via de keten?* Zijn hier landbouwers bij?
  • Is er kennis die u liever niet deelt?

Visie over de toekomst

• HOE DENKT U DAT UW BEDRIJF ZICH IN DE (NABIJE) TOEKOMST ZAL ONTWIKKelen?
  (continuïteit, marktaandeel vergroten, productassortiment uitbreiden, herstructureren, overleven, stopzetten, ethisch ondernemen...)

• HOE ZOU U WILLEN DAT HET ONTWIKKelt?
Appendix 2: Interview guide network coordinator – Chapter 3 and 5

Inleiding

Goeiedag, mijn naam is Evelien Lambrecht en ik voer dit interview uit in naam van Universiteit Gent. Samen met ILVO voeren wij een vier jaar durend onderzoek uit dat tot doel heeft bij te dragen tot een betere afstemming tussen de behoefte van de landbouwers en het aanbod aan netwerken, resulterend in een verbeterde valorisatie van kennis in innovatieve toepassingen.

Het onderzoek wordt uitgewerkt aan de hand van acht cases (varkenssector, pluimveesector, groenteteelt, biolandbouw, verbrede landbouw, de kiwibes, sierteelt en transitie-arena’s). Deze interviews zijn één van de eerste stappen in het project. Het doel ervan is om inzicht te verwerven in het totale aanbod van netwerkvormen die belangrijk zijn voor de doorstroming van kennis naar Vlaamse land- en tuinbouwbedrijven. Concreet betekent dit dat we per case een overzicht gaan maken van de netwerkvormen en netwerkkenmerken die belangrijk zijn binnen die case.

Door u te interviewen, zouden we willen leren hoe jullie netwerk functioneert en hoe het bijdraagt aan innovatie in de land- en tuinbouwsector.

Jullie zullen worden geïnformeerd over de resultaten van jullie deelname en van het project in zijn geheel. Indien jullie dit wensen kunnen jullie ook de persberichten ontvangen.

Dit interview omvat verschillende onderdelen. Er zullen vragen gesteld worden over het algemeen profiel van het netwerk, over hoe het netwerk is opgestart en hoe het geëvolueerd is, hoe het gestructureerd en beheerd wordt, welke activiteiten er worden georganiseerd en hoe in welke mate het tot nu toe reeds heeft bijgedragen aan innovatie.

Het interview zal ongeveer een klein uurtje in beslag nemen.

<table>
<thead>
<tr>
<th>Sectie 1</th>
<th>Algemeen profiel van het netwerk</th>
</tr>
</thead>
</table>

1.1. HOE ZOU U JULLIE NETWERK OMSCHRIJVEN?

Probeer om zoveel mogelijk informatie te verzamelen over het netwerk voor het interview (bv. geografische locatie, scope (regionaal, nationaal, wereldwijd...), wettelijke status, sector focus, aantal bedienden, rekening, logo, etc.

<table>
<thead>
<tr>
<th>Sectie 2</th>
<th>Netwerkoorsprong</th>
</tr>
</thead>
</table>

2.1. HOE IS HET NETWERK ONSTAAN EN WAT WAREN DE DOELSTELLINGEN?

2.1.1. Wanneer werd het netwerk opgericht en wie heeft het initiatief genomen om het netwerk te ontwikkelen (opinieleiders, bedrijven, instituties, tussenpersonen zoals consultants) en wat was hun respectievelijke rol?

2.1.2. Was er financiële hulp bij de opstart van het netwerk? Indien ja, van wie?

2.1.3. Welke middelen (activiteiten, vaardigheden, kennis, ...) als er al zijn, hebben de leden ingebracht in het netwerk?
2.1.4. Wat waren de hoofdobjectieven van het netwerk bij de aanvang *(bv. de mate waarin leren en innovatie belangrijk waren; heerst er een lange termijn visie; is duurzaamheid belangrijk)*? Kunt u het proces beschrijven waarop deze objectieven werden gedefinieerd.

2.1.5. Welke voordeelen beogen jullie voor de verschillende leden?

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### Sectie 3 | Netwerkevolutie en netwerklidmaatschap

#### 3.1. Hoe is het netwerk geevolueerd in termen van objectieven, leden, financiering sinds de aanvang?

1. Zijn de doelstellingen en objectieven van het netwerk veranderd sinds de aanvang van het netwerk? Indien ja, hoe? Wie heeft deze verandering teweeg gebracht?
2. Hoeveel leden hebben jullie momenteel in het netwerk. Hoe is het aantal netwerkleden in de tijd geëvolueerd? Hoe denkt u dat in de toekomst zal veranderen? Waarom (selectiecriteria, uitsluiting door sancties)?
3. Hoe lang blijven de leden in het netwerk *(lange termijn of korte termijn deelname)*?
4. Tot welke hoofdcategorie behoren de netwerkleden *(vb onderzoeksinstellingen, grote/kleine landbouwbedrijven, publieke organisaties)*? Is er een verandering waarneembaar in het type netwerkleden?
5. Hoe wordt het netwerk tegenwoordig gefinancierd (publiek vs privaat)? Zijn er veranderingen waarneembaar op gebied van financiering? Indien toepasbaar, hadden deze veranderingen een impact op het netwerk? In welke mate? Is het network financieel duurzaam?

---

### Sectie 4 | Netwerksamenstelling en netwerkbanden

#### 4.1. Hoe zou u de vorm van het netwerk beschrijven?

1. Zijn er veel banden tussen de netwerkleden? *(densiteit)*?
2. Spelen bepaalde leden een centrale rol in het netwerk *(centraliteit)*? Welke? Waarom?
3. Hebben jullie connecties met andere netwerken? Wat zijn de kenmerken van deze netwerken *(nationaal, internationaal, globaal, andere sector)*? Hoe zou u de relatie met deze netwerken beschrijven?

#### 4.2. Wat zijn de kenmerken van de banden tussen de verschillende netwerkleden?

1. Hoe sterk zijn deze relaties? Wat betekent sterk/zwak voor u?
2. Wat zijn de belangrijkste vormen van relaties tussen de verschillende leden *(contracten, verticale integratie, samenwerkingsverbanden)*? *Wat zijn de kenmerken van deze netwerken* *(bv. nationaal, internationaal, netwerken in andere sectoren)*

---

### Sectie 5 | Netwerkactiviteit

#### 5.1. Welke activiteiten biedt het netwerk aan? Wie neemt er aan deel?

1. Welke activiteiten gericht op leren worden door het netwerk aangeboden?
2. Welke activiteiten gericht op innovatie worden door het netwerk aangeboden?
5.1.3. Wie neemt het initiatief in deze activiteiten? *Hoe worden de activiteiten gemanaged?*
5.1.4. Stimuleert het netwerk de leden om over grenzen van het bedrijf heen te kijken?
5.1.5. Nemen land- of tuinbouwers deel aan de activiteiten gericht op innovatie?
5.1.6. Welk type land- of tuinbouwers nemen meestal deel aan de activiteiten gericht op innovatie?

5.2. WAAROM WERDEN DEZE ACTIVITEITEN GEKOZEN EN GEEN ANDERE?

6.1. HOE WORDEN LAND- EN TUINBOUWBEDRIJVEN AANGETROKKEN OM LID TE WORDEN VAN HET NETWERK? *Hoe worden ze aangemoedigd om deel te nemen aan activiteiten?*

6.2. HOE WORDEN HET NETWERK, DE ACTIVITEITEN EN DE RELATIES TUSSEN DE VERSCHILLENDE LEDEN GEMANAGED?

6.2.1. Hoe ziet de beheersstructuur van jullie netwerk er uit (vb management door leden zelf, management door één lid van het netwerk, management door een externe administratieve entiteit)?
6.2.2. Indien toepasbaar, wat zijn de kenmerken van het bestuur (bv. grootte, verandering van samenstelling, verschil in achtergrond/competentie, frequentie van samenkomen)

6.3. HOE WORDEN DE LINKS TUSSEN DE LEDEN GEMANAGED?

6.3.1. Hoe gebeurt communicatie/kennisuitwisseling binnen het netwerk?
6.3.2. Welke communicatiestructuur gebruiken jullie? Wat waren belangrijke veranderingen om snelheid en efficiëntie in communicatie te verhogen?
6.3.3. Welke stromen bestaan er in het netwerk? En hoe worden deze gemanaged? Door wie? (flows) (managed) (bv. ICT) (bv. geldstromen, mensen, gestructureerd bijhouden van kennis, intellectuele eigendom)
6.3.4. Wat zijn de risico’s op netwerkniveau? (bv. opportunistic behavior resulting e.g. in conflicts and eventually in firms dropping out of the network) En hoe worden deze gemanaged? (bv. risk management process)?
6.3.5. Hoe worden kwesties als ‘vertrouwelijkheid’, ‘eerlijke verdeling’ en ‘opportunisme’ aangepakt? (confidentiality, fairness, opportunism) (bv. trust and reputation, behavior/process control, output control, incentives to encourage transparency and discourage free-riding)
6.3.6. Hoe worden kwaliteitsvolle relaties ontwikkeld en onderhouden in het netwerk? (quality relationships) (bv. trust, shared goals, network culture, commitment, ethical decision making, satisfaction, power)

6.4. HOE WORDEN DE LINKS MET ANDERE NETWERKEN GEMANAGED?

7.1. IN WELKE MATE HEEFT HET NETWERK BIJGEDRAGEN AAN DE ONTWIKKELING VAN INNOVATIE SINDS DE OPSTART ERVAN?
7.1.1. **Aan welke vormen van innovatie draagt het netwerk bij** (incrementeel vs radicaal; product, proces, markt, organisatorisch; mislukkingen)?

7.1.2. **Welke impact heeft het netwerk op zijn leden ten aanzien van de volgende aspecten van innovatie:**
   - Ontwikkelingskosten
   - Sociaal kapitaal (contacten, verwijzingen, etc.)
   - Type innovatie
   - Snelheid van het doorvoeren van innovatie (time to market)
   - Slaagpercentage
   - Balans tussen distributiekosten en voordelen (balance of distribution costs and benefits)
   - Capaciteit tot innoveren in het algemeen
   - Concurrentiekracht

7.2. **WELKE IMPACT HEEFT HET NETWERK OP DE SECTOR?**
   - Competitiviteit
   - Prestaties
   - Structuur
   - Andere

7.3. **ZIJN ER BEPAALDE PROBLEMEN (BOTTLE-BECKS) OPGEDOKEN DIE EEN INVLOED HADDEN/HEBBEN OP DE PRESTATIES VAN HET NETWERK?**

7.4. **HOE ZORGEN JULLIE DAT JULLIE IDEEËN (VB. ONTSTAAN IN WERKGROEPEN) IN DE PRAKTIJK (KENNISINSTELLINGEN, BELEID, SECTOR) WORDEN OPGEPIKT?**

7.5. **BIEDT LIDMAATSCHAP IN HET NETWERK VOORDELEN NAAR DE BUITENWERELD TOE?**

7.6. **HOE WORDEN DE PRESTATIES VAN HET NETWERK GEMETEN?**

7.7. **IN WELKE MATE WORDEN DE DOELSTELLINGEN VAN HET NETWERK EN DE DOELSTELLINGEN VAN LEDEN BEREIKT? WELKE ZIJN DE VERBETERPUNTEN?**
   7.7.1. Zijn de doelstellingen van het netwerk en zijn leden gelijklopend?
   7.7.2. Hoe tevreden bent u over de prestaties van het netwerk?
   7.7.3. Hoe tevreden zijn de leden volgens u met het netwerk?

7.8. **HOE BELANGRIJK ZIJN RELATIES MET ANDERE NETWERKEN VOOR DE PRESTATIES VAN HET NETWERK? WAAROM?**
   7.8.1. Hoe gaan jullie om met onverwachte wendingen/onzekerheden in het omringende klimaat zoals bv. nieuwe wetgeving, een nieuwe technologische ontwikkeling die van belang is, een verandering in het lastenboek,…?
   7.8.2. Hebben jullie als het ware een ‘radarsysteem’ om nieuwigheden/onzekerheden zo goed mogelijk op te vangen?

Slot

Bedankt voor uw tijd en deelname aan deze studie.
Appendix 3: Focus group discussion guide farmers – Chapters 3 and 5

1. Inleiding

Zoals weergegeven in bovenstaande figuur ligt innovatie aan de basis van competitiviteit en groei van een bedrijf, wat leidt tot welvaart, en uiteindelijk tot welzijn. Om te innoveren is naast interne kennis en onderzoek ook een netwerk nodig om ideeën op te doen en deze snel en accuraat om te zetten in innovaties. Als een bedrijf bijvoorbeeld is aangesloten bij een ondernemers-, branche- of beroepsorganisatie, vergroot dit de kans op een competitief bedrijf. Dat komt omdat dit soort organisaties de ondernemer mogelijkheden biedt om contacten te onderhouden met medeondernemers. Daarnaast bieden ze de ondernemer mogelijkheden om op de hoogte te blijven van relevante ontwikkelingen. Beide zaken vergroten de kans op innovatie en dus het voortbestaan van een bedrijf. Een op de twee startende ondernemers heeft buiten de normale bedrijfscontacten contact met medeondernemers in netwerken, zoals bij een sportvereniging, een plaatselijke ondernemersvereniging, de Rotary-club etc. (Kennissite MKB en Ondernemerschap). In de land- en tuinbouwsector is dit aantal veel lager. We zouden graag inzicht verwerven in de achterliggende redenen in het netwerkgedrag, in wat binnen deze sector zo specifiek is en in hoe dit zou kunnen veranderd worden.

2. Verwelkoming + voorstelronde

Wij zijn hier samen in het kader van een onderzoek met de titel: “Netwerken als katalysator voor innovatie in de land- en tuinbouwsector”. Dit is een vier jaar durend onderzoek dat uitgevoerd wordt door de Universiteit van Gent in samenwerking met ILVO (Instituut voor Landbouw- en visserijonderzoek).

Het doel van deze focusgroepsgesprekken is om beter inzicht te krijgen in de behoefte van landbouwers aan netwerken en hun gedrag ten opzichte van netwerken en samenwerkingsverbanden en hun bijhorende netwerkkenmerken, en om de invloed hiervan op de innovatiecapaciteit van de landbouwer na te gaan.

De focusgroepen omvatten verschillende onderdelen. Er zullen vragen gesteld worden over innovatie en over netwerken. Wees vrij om te antwoorden wat u wil, juiste of foute antwoorden zijn er niet.
We zouden graag willen dat iedereen in de discussies wordt betrokken. Jullie kunnen vragen stellen aan elkaar, en reageren op iedereen zijn mening.

We zouden willen vragen dat jullie duidelijk jullie mening formuleren, en niet door elkaar praten.

3. Sociale relaties en netwerken

3A: NETWERKEN ALGEMEEN

50 minuten

- ALS ER WORDT GESPROKEN OVER NETWERKEN, WAT HOUDT DAT IN VOOR JULLIE?

10 minuten

Vergelijking met onze definitie: Een verzameling van actoren die verbonden zijn met elkaar door een aantal herhaalde interacties van formele en/of informele banden. Deze actoren kunnen ondernemingen (concurrenten, afnemers, klanten, hulporganisaties), kenniscentra (universiteiten, onderzoeksinstellingen) en andere actoren (netwerkorganisaties, overheid, belangengroepen (vb BB, ABS)) zijn. De banden zijn de relaties tussen de actoren. Deze kunnen formeel zijn (contractueel, geïnstitutionaliseerd) of informeel (sociaal, op vertrouwen gebaseerd). (projecteren)

- (Na het zien van deze definitie:) Aan welke netwerken nemen jullie dan deel?

- TEKEN ALLE PARTIJEN (PERSONEN/Bedrijven/Instellingen) WAARMEE U, ALS LANDBOUWER, CONTACT HEEFT DIE EEN INVLOED HEBBEN OP UW BEDRIJFSVOERING? (FLIP CHART) (OVERLEG)

11 minuten

- Als je de relatie als positief ervaart, zet dan een +, als negatief, zet dan een – en geef wat bijkomende uitleg (overleg - netwerkkenmerken)

- WAAROM HEEFT U DEZE CONTACTEN EN GEEN ANDERE? (Uitgaand van de voorbeelden, waarom vinden ze bepaalde activiteiten, netwerken aantrekkelijker dan andere?)

10 minuten

- In welke activiteiten bent u bereid om tijd en moeite te investeren?
- Geef aan met welke u het meest contact heeft?
- Hoe moet een netwerk er uit zien om het aantrekkelijk te maken?

- WAT HOOPT U ER UIT TE HALLEN?

6 minuten

- WAT IS UW PERCEPTIE VAN NETWERKING IN HET ALGEMEEN?

4 minuten

- (Eventueel confrontatie met bevindingen: Tot nu toe vonden we dat de meesten daar positief tot heel positief tegenover staan, maar toch is er iets wat hen weerhoudt om effectief deel te nemen.)
- Hoe belangrijk denkt u dat netwerking in het algemeen is?
• WELKE FACTOREN ZIJN VOLGENS JULLIE VAAK EEN BELEMMERING VOOR DEELNAME AAN NETWERKEN?
  
  9 minuten
  o Hoe komt het volgens jullie dat heel weinig landbouwers samenwerken en kennis en ervaringen uitwisselen met elkaar?
  o Indien landbouwers meer vrije tijd zouden hebben, zouden ze dan volgens jullie meer bereid zijn om netwerkactiviteiten bij te wonen?
  o Welke andere factoren beïnvloeden volgens jullie het netwerkgedrag van landbouwers?

• DENKT U ZELF INVLOED TE KUNNEN UITOEFENEN OP NETWERKEN?
  
  o Welke veranderingen zouden kunnen worden ingevoerd om uw invloed te verhogen?

3B: SPECIFIEK NETWERK

Verticale integratie
• WAAROM KIEST U VOOR VERTICALE INTEGRATIE/ CONTRACTTEELT?
  
  10 minuten
  o Heeft dit naast risicovermindering nog andere voordelen?
  o Wat zijn de nadelen van verticale integratie/ contractteelt?

• HOE ZOU U DE RELATIE MET DE INTEGRATOR BESCHRIJVEN?
  
  10 minuten
  o Zijn dit sterke banden? Wat betekent sterk, zwak voor u?
  o Hoe vaak hebben jullie contact met de integrator?
  o Hoe vaak hebben jullie contact met de andere partijen in de keten?

Coöperatie
• WAAROM KIEST U VOOR LIDMAATSCHAP IN DE VEILING?
  
  10 minuten
  o Wat zijn de voor- en nadelen van lidmaatschap in de veiling?

• HOE ZOU U HET CONTACT MET DE ANDERE LEDEN VAN DE COÖPERATIE OMSCHRIJVEN?
  
  10 minuten
  o Is de coöperatie volgens u een aantrekkelijk netwerk?

Cluster
• HEBBEN JULLIE ER BEWUST VOOR GEKOZEN OM BINNEN DE GENTSE REGIO ACTIEF TE ZIJN?
  
  10 minuten
  o Ervaren jullie voordelen/nadelen doordat jullie bedrijf zich binnen de cluster bevindt?
  o Als u opnieuw de locatie van uw bedrijf mocht kiezen, waar zou u zich dan vestigen?

• HOE ZOU U DE RELATIE MET DE ANDERE TUINBOUWERS/ PROEFCENTRA/ ONDERZOEKSSCHINNELLINGEN ZICH BINNEN DE CLUSTER BEVINDEN OMSCHRIJVEN?
  
  10 minuten
Zijn dit sterke banden?
Hoe vaak hebben jullie met hen contact?

4. Innovatie + innovatiecapaciteit

ALS ER WORDT GESPROKEN OVER INNOVATIE, WAT HOUDT DAT IN VOOR JULLIE?

Ik zou hen eerst laten antwoorden op de vraag en dan pas vergelijken met de definitie.
Definitie: Innovatie is elke aanpassing/verandering in het bedrijf die een beduidende invloed heeft gehad op het bedrijfsresultaat of de ruimere maatschappelijke omgeving. We denken aan zowel economische, ecologische als sociale innovaties. Ook aanpassingen of veranderingen die minder succesvol waren of onmogelijk te realiseren waren. We denken hierbij niet enkel aan nieuwe of vernieuwde producten of processen, maar ook aan vernieuwing in de markten (afzetkanaal) waarvoor wordt geproduceerd, en innovatie in de organisatie van het bedrijf zoals samenwerking met andere leveranciers of afnemers, of met vertegenwoordigers van de natuurbeweging, innovatieve sociale acties of samenwerking met doelgroepen.

Op basis van deze definitie, wat beschouw je dan als innovatie in de landbouwsector?
Welke innovaties (economisch/ecologisch/sociaal) zou u willen realiseren op uw bedrijf en bij uitbreiding in de maatschappij?
Als je terugdenkt aan de laatste vijf jaar, wat zijn de vernieuwingen die jullie hebben doorgevoerd? En waarom?
Hoeveel waren er al dan niet succesvol?

ALS U TERUGDENKT AAN DEZE INNOVATIES, VIA WELKE MANIEREN KWAM U DAN AAN DE NODIGE INFORMATIE? HOE BELANGRIJK ZIJN DEZE?

Welke zijn de belangrijkste plaatsen om nieuwe ideeën op te doen?
Hangt de plaats waar u op zoek gaat naar innovatieve ideeën volgens u af van het type innovatie?
Duid op de tekening aan welke partijen het belangrijkst zijn naar kennisoverdracht en innovatie toe/ wie betrokken is in het innovatieproces.

VOLDOET DE HUIDIGE INFORMATIE/KENNISOVERDRACHT AAN UW NODEN?
Welke informatie/kennis heeft u nodig om te innoveren?
Hoe wordt deze informatie/kennis het best overgebracht? Bvb. schriftelijk, mondeling, in groep, face-to-face, ...
Voldoet het huidige onderzoek aan uw noden?

ZORGT EEN CLUSTER/ VERTICAAL GEINTEGREERD NETWERK/ COOPERATIE VOOR DE OVERDRACHT VAN ANDERE HULPBRONNEN (GELD, ANDERE MATERIALEN) VOOR INNOVATIE WAARTOE JULLIE ANDERS GEEN TOEGANG ZOUDEN HEBBEN?
• HET FEIT DAT UW BEDRIJF INNOVEERT, DOET U DAAROM MEER AAN NETWERKING?

Vinden andere actoren u attractiever?

5 minuten

5. kennis voor innovatie via netwerken

• ZORGT EEN CLUSTER/ VERTICAAL GEINTEGREERD NETWERK/ COOPERATIE VOOR DE OVERDRACHT VAN KENNIS WAARVAN JULLIE ANDERS NIET OP DE HOOGTE ZOUDEN ZIJN?

6 minuten

• ZORGT EEN CLUSTER/ VERTICAAL GEINTEGREERD NETWERK/ COOPERATIE OOK SOMS VOOR BEPERKINGEN VOOR DE INNOVATIECAPACITEIT?

6 minuten

• DENKT U DAT DEELNAME IN NETWERKEN EN SOCIALE CONTACTEN IN HET ALGEMEEN TOT NIEUWE KENNIS LEIDT DIE IN HET BEDRIJF BIJDRAAGT AAN INNOVATIE? WAAROM WEL/NIET?

Indien Ja :

6 minuten

 o Kunt u specifiek op uw bedrijf een voorbeeld geven?
 o Zijn er bepaalde innovaties die u niet had kunnen doen zonder uw netwerk / sociale contacten? Waarom wel/ niet?
 o Zijn er bepaalde innovaties die u niet hebt kunnen doen door lidmaatschap in een netwerk/ sociale contacten? Waarom wel/ niet?

Indien Nee:

 o Kan deelname in netwerken (of het bestaan van netwerken in het algemeen) innovaties verhinderen.
 o Indien ja: Welke netwerken kunnen beter vermeden worden als je wil innoveren?

• ZIJN ER ANDERE ELEMENTEN OF INFORMATIEBRONNEN DIE BELANGRIJK ZIJN?

4 minuten

6. Einde: bedankt

Bedankt voor uw tijd en deelname aan deze studie. Jullie zullen worden geïnformeerd over de resultaten van jullie deelname en van het project in zijn geheel. Het verslag zal jullie worden toegezonden. Indien jullie dit wensen kunnen jullie ook de persberichten ontvangen. We hopen dat deze discussie en het verslag ook voor jullie interessante inzichten heeft bijgebracht.
+ formulier reiskosten invullen.
Curriculum Vitae

**Personal information**

First name: Evelien  
Last name: Lambrecht  
Address: Drogenbroodstraat 25  
8740 Egem  
Date of birth: January 18, 1987  
Place of birth: Tielt  
Nationality: Belgian  
Sex: Female  
Marital status: Married  
GSM: 0032472257094  
E-mail: Evelien.Lambrecht@Ugent.be

**Education**

_Instituut Klein Seminarie_ (1999-2005)  
Latin and Mathematics  
Sciences and Mathematics

_Ghent University (Faculty of Economics and Business Administration)_ (2005-2010)  
Bachelor degree in Business Engineering  
Master degree in Business Engineering; option Operations Management (cum laude)  
Dissertation: Application of lean-agility in the construction sector, Promotor: Prof. Luc Chalmet

**Additional education**

2010: Methods Engineering and work measurement (Faculty of Civil Engineering, Ghent University)  
2011: Advanced Academic English writing skills

**Career**

_Ghent University (Faculty of Bioscience Engineering – Department Agricultural Economics_ (2010-2015)

_Scientific researcher_

- Netwerken als katalysator voor innovatie in de landbouwsector: Realize a better fit between needs of farmers for networking and the supply of networks, resulting in a better valorisation of knowledge in innovative applications (Funding IWT-Landbouwonderzoek 090918; 01/10/2010-30/09/2014)
- IMS-food: support implementation of lean management in Flemish food processing companies (Funding IWT ERANET-Cornet; 01/11/2009-31/10/2011
– CAMPOUL: Evaluation of organic acids and antimicrobial components produced by lactic acid bacteria to reduce Campylobacter jejuni colonisation and excretion by broilers; responsible for cost-benefit analysis of campylobacter reducing techniques (Funding: Federal public service for health, food chain safety and environment; 01/2009 – 12/2012)
– Welltrans: Develop a protocol for welfare assessment of broilers during transport, and to use this protocol to assess the current transport practices in Belgium. Responsible for inventory of the state of the art of transport conditions of poultry in Flanders + cost-benefit analysis of higher welfare measures (Funding: Federal public service for health, food chain safety and environment; 01/02/2013-31/09/2016)
– Slim innoveren in de landbouw: Hoe netwerken? Action research to realize a better fit between needs of farmers for networking and the supply of networks (Funding IWT-Landbouwtraject 135090; 01/10/2014-30/09/2015)
– Inventory of costs caused by government and regulations in the Belgian veal sector (funding PBK (Promotie Belgisch Kalfsvlees); 2014-2015)

VEPEK – Verbond voor Pluimvee, Eieren en Konijnen (March 2012- June 2013)

Secretary
– Bookkeeping
– Draw up business plan for reorganization
– Organization and coordination of stand on the world’s n° 1 food exhibition (SIAL Paris) for slaughterhouses active in poultry and rabbit sector
– Representative in board of directors of Belplume, animalhealthfund and different working groups active in the agricultural sector (reduction of antibiotics, Salmonella, promotion, quality,...)
– Support contact and negotiations of poultry, egg and rabbit sector with policy makers
– Draw up overview of technical performance parameters of Flemish poultry farmers
– Organization of press conferences

Evelien Lambrecht was born in Tielt, Belgium, on January 18, 1987 and obtained her secondary school degree in Sciences and Mathematics at Instituut Klein Seminarie Roeselare in 2005. She obtained a university degree in Business Economics, option Operations Management, at the Faculty of Economics and Business Administration, Ghent University in 2010. In October 2010, she started working as a doctoral researcher at the Department of Agricultural Economics at Ghent University (Faculty of Bioscience Engineering). During a four-year period, she was working on the IWT-funded project “Netwerken als katalysator voor innovatie in de land- en tuinbouwsector” (IWT-Landbouwonderzoek 090918). Besides, she was also involved in several other projects within the agribusiness sector, such as the project “Innovative Management System for a sustainable food industry” (IMS-food) to support implementation of lean management in Flemish food processing companies (Funding IWT ERANET-Cornet), Campoul, in which she was responsible for the cost-benefit analysis of campylobacter reducing techniques in the poultry sector (Funding: Federal public service for health, food chain safety and environment) and Welltrans, in which she made an inventory of the state of the art of transport conditions of poultry in Flanders (Funding: Federal public service for health, food chain safety and environment). Currently, she is doing action research to set up 2 innovation networks in Flanders in the frame of an IWT-funded project “Slim innoveren in de landbouw: Hoe netwerken?”(IWT-Landbouwtraject 135090). She participated in many international scientific conferences and seminars with oral contributions.
LIST OF PUBLICATIONS

**Articles in international peer-reviewed journals included in the Science Citation Index (A1)**


**Articles in international peer-reviewed journals not included in the Science Citation Index (A2)**


**Papers and presentations at international and national conferences/meetings**


Kühne, B., Lambrecht, E., Gellynck, X. (2011). Inventory of network types and their role in knowledge exchange and innovation in the agribusiness sector, XIIIth Congress of the European Association of Agricultural Economists, ETH Zurich, Switzerland - August 30 - September 2, 2011.


Gellynck, X.; Lambrecht, E. (2014). Changing market conditions for livestock production in Middle East & Northern Africa - recent advances in animal nutrition and health - Kemin expert panel meeting Middle East, Izmir, Turkey, March 31 - April 2, 2014.


Taragola, N., Lambrecht, E. (2014). Innoveren in de sierteelt, Sierteelt & Groenvoorziening 13, 14, 15


**Book as co-author**


**Book chapter as co-author**

Kühne, B., **Lambrecht, E., Gellynck, X. (2011).** Inventory of network types and their role in knowledge exchange and innovation in the agribusiness sector