The Influence of Multi-Stakeholder Platforms on Farmer Innovation and Rural Development in Emerging Economies: Examples from Uganda

Carlos L. Barzola Iza

Propositions

- Multi-stakeholder platforms provide a co-designing space to align technical and social dimensions of innovation, which are both important in the agri-food sector.
  (this thesis)

- In Multi-Stakeholder Platforms, intermediary outcomes and the processes to achieve them play an important and undervalued role towards agricultural innovation.
  (this thesis)

- The emergence of a more interactive and resource-efficient organizational format for academic conferences could foster knowledge-sharing among researchers.

- Researchers can be excellent in doing exactly what they are required to do, however, this does not imply that they are doing anything truly useful for society.

- There is a persisting communication gap between academics and practitioners, which a new generation of applied researchers could bridge and build upon.

- Zooming out, and thus seeing the whole and putting things into perspective, is important to see the glass half-full instead of half-empty.

Propositions belonging to the PhD thesis entitled "The Influence of Multi-Stakeholder Platforms on Farmer Innovation and Rural Development in Emerging Economies: Examples from Uganda".

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Wageningen, 25 of October 2019

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This research was conducted under the auspices of the Wageningen School of Social Sciences (WASS).

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Thesis
submitted in fulfilment of the requirements for the degree of doctor
at Wageningen University
by the authority of the Rector Magnificus,
Prof. Dr A.P.J Mol,
in presence of the
Thesis Committee appointed by the Academic Board
to be defended in public
on Friday 25 October 2019
at 11:00 a.m. in the Aula.

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The Influence of Multi-Stakeholder Platforms on Farmer Innovation and Rural Development in Emerging Economies: Examples from Uganda, 228 pages.

PhD thesis, Wageningen University, Wageningen, the Netherlands (2019)
With references, with summary in English

ISBN: 978-94-6395-147-0
DOI: https://doi.org/10.18174/501801

Preface and Acknowledgements

Multi-stakeholder platforms in the agricultural sector, represent a new stage or a new era for rural development, particularly in emerging economies. It has been a long time since practitioners and academics have recognized that traditional approaches for rural development have significant limitations addressing agricultural difficulties.

The establishment of these platforms gives farmers; and other actors of the value chain; a space to interact, communicate and co-create knowledge that will hopefully resolve context-specific agricultural problems. I am happy to provide a piece of work that allows us to understand a little bit more on one hand, how these new approaches for rural development programs function and influence farmer innovation. On the other hand, how farmer characteristics such as their entrepreneurial orientation and their value network might influence how farmers innovate.

The execution of my Ph.D. research was a long journey, rather than smooth, it was a bumpy ride. However, it was a wonderful experience from which I have grown not only as a researcher but also as a person. Any of these would not have been possible without the support of many people that I would like to acknowledge.

I would like to express my sincere gratitude to my supervisor Dr. Domenico Dentoni for the continuous support during my Ph.D. research, for his patience, motivation, and immense knowledge. His guidance helped me throughout my research and writing of this thesis. I could not have imagined having a better advisor and mentor for my Ph.D. research. I would like to thank you for

encouraging my research, believing in the relevance of my research topic and for opening the doors of your research team. Your advice on both research as well as on my career have been invaluable. Thanks.

I would like to thank my promotor Dr. Onno Omta who provided me with the opportunity to join the MST/BMO research group and for his encouragement and valuable insights through the whole research process. Also, to my Ph.D. committee for their insightful comments and for evaluating my thesis.

I would like to thank all the BMO academic and support staff, for the stimulating academic discussions and more personal conversations. To Ina, Liesbeth, Marloes, Linnete, Maria Annosi, Geoffrey, Jos, Jaques, Valentina, Emiel, Rob, Sophia. Their precious support and the nice environment that they provided, made this journey more enjoyable. A special thanks to my friends and paranymphs Francisco and Jasmina. It was a pleasure to share many moments in and out of the office.

This Ph.D. thesis would have not been possible without the collaboration, support, and guidance from the WASS office, my gratitude to Esther, Marcella, Heleen, and Fennie. It was a pleasure to work closer to all of you during my participation in the WASS Ph.D. council.

Finally, I would like to thank my family: My partner Jan for supporting and encouraging me throughout this experience. To my family in Ecuador, my family in law in Germany. To all my friends in Wageningen, The Netherlands, in Ecuador and all around the globe for supporting me always throughout writing this thesis and my life in general.

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Chapter 1. General Introduction

1.1. Introduction

This thesis investigates how agricultural Multi-Stakeholder Platforms (MSPs) influence farmer innovation and rural development in emerging economies, using the context of Uganda as an empirical example. MSPs are widely recognized in development, policy, and management arenas as organizational forms with potential to foster agricultural innovation and rural development through knowledge-sharing, network-building, social learning, and co-designing innovation activities among multiple stakeholders in agricultural innovation systems. This thesis combines qualitative and quantitative research methods to study agricultural MSPs organized in the Manafwa district located in the Eastern region of Uganda.

In this first chapter, I introduce to the role of MSPs and the current challenges in the agri-food system with a special emphasis on emerging economies. In the sections that follow, I present the theoretical framework, research methods, and finally the outline of this thesis.

1.2. Challenges in agri-food systems and the role of Multi-Stakeholder Platforms

1.2.1. Challenges in local and global agri-food systems

Alarming facts about the recent dynamics of food insecurity, rural poverty, climate change, desertification, and biodiversity loss have mobilized the global community of stakeholders – including civil society, businesses, policy makers, and scientists – to develop innovative and collective actions to mitigate or reverse the trends. For example, while the world population has increased from 6 billion in 2000 to 7,5 billion in 2020, land availability for

farming has declined (Gödecke, Stein, & Qaim, 2018). In Africa, the number of people living in extreme poverty increased by more than 100 million between 1990 and 2012 (Beegle, Christiaensen, Dabalen, & Gaddis, 2016). As a reaction to these alarming facts, in the 2030 Agenda for Sustainable Development adopted in 2015, the global community of stakeholders agreed to meet seventeen globally relevant Sustainable Development Goals (SDGs) and 169 targets by 2030 (HLPF, 2017). These goals include no poverty (SDG1), zero hunger (SDG 2), decent work and economic growth (SDG8) and climate action (SDG13), which are all directly relevant for agri-food systems (HLPF, 2017).

The innovative, collective actions spurred by the SDGs have been often referred to as "multi-stakeholder", especially from the start of the new millennium, when the 2002 World Summit on Sustainable Development in Johannesburg (Bäckstrand, 2006). As the term suggests, 'multi-stakeholder' refers to the involvement of several societal groups with diverse and sometimes conflicting interests, goals, and values (Freeman, 2010; Hemmati, 2012). The United Nations' High-level Political Forum (HLPF) on Sustainable Development recognized that multi-stakeholder actions will play such a critical role in achieving the SDGs that a specific objective, SDG17 or 'partnerships for the goals') was created to explicitly support them on the path to 2030 (HLPF, 2017).

Far from being a linear and unambiguous task, these multi-stakeholder actions operate at the nexus of multiple sub-systems, including food and agricultural sub-systems among many others – such as natural, social, technological, education, financial, and political sub-systems (Dentoni, Waddell, & Waddock, 2017; Waddell et al., 2015). Food and agriculture represent the sub-

systems that involve perhaps the largest number of multi-stakeholder actions operating across different scales, time horizons, objectives, and mechanisms (Brouwer, Woodhill, Hemmati, Verhoosel, & van Vugt, 2016; Dentoni & Peterson, 2011). For example, at a global scale, the Roundtable for Sustainable Palm Oil seeks to build long-term resilience of landscapes through multi-stakeholder deliberation, decision-making, standardization, and enforcement (Williams, Whiteman, & Kennedy, 2019). Or, at a local scale, the Ghanaian soybean and cassava Innovation Platforms seek to facilitate, in the short run, the diffusion of agricultural innovations through multi-stakeholder knowledge-sharing and dialogue (Osei-Amponsah, van Paassen, & Klerkx, 2018).

1.2.2. Multi-stakeholder processes for agricultural innovation and rural development

Multi-stakeholder actions undertaken by the global community of stakeholders have also been referred to as 'processes' or 'engagements' because of the inherently complex nature and scale of the problems that they seek to address (Batie, 2008; Dentoni, Hospes, & Ross, 2012). For example, issues of food insecurity and rural poverty evolve over time and in unexpected ways; their causes and consequences are difficult if not impossible to assess univocally, and finding solutions involves mediating conflicting values among stakeholders (Dentoni, Bitzer, & Schouten, 2018). To cope with these complex issues, multi-stakeholder endeavors need to evolve accordingly into a sequence of actions – i.e., 'processes' – that involve continuous experimentation, reflexivity and change in the relationships between stakeholders (Ferraro, Etzion, & Gehman, 2015).

Because of the complexity of agricultural and food system issues, the multi-stakeholder processes that address them involve co-designing innovation among stakeholders (Biermann, Man-san Chan, & Pattberg, 2007) rather than unilateral knowledge transfer from some to others (Botha, Klerkx, Small, & Turner, 2014). As such, agricultural innovation is usually the goal and outcome of socially constructed multi-stakeholder processes because stakeholders collaboratively deliberate which innovations are more adapted to different contexts and times (Babbie, 1937; Schut, Klerkx, Kamanda, Sartas, & Leeuwis, 2018). Ultimately, the co-evolution of these multi-stakeholder processes through the co-designing of agricultural innovation aims to support transitions towards rural development and, more broadly, towards more sustainable local and global agricultural and food systems that align with the SDGs (HLPF, 2017).

Nevertheless, multi-stakeholder processes supporting agricultural innovation and rural development do not evolve by default but require careful and adaptive co-designing. As such, Multi-Stakeholder Platforms (MSPs) represent an example of governance mechanism, i.e., a complex set of formal and informal rules that shape and co-evolve with the multi-stakeholder process, that acts as a co-design tool for the stakeholders involved. Similar to other governance mechanisms (Williamson, 2000), MSPs do not operate in a vacuum but are in turn influenced by the broader institutional framework (North, 2008) in which they are embedded (Osei-Amponsah et al., 2018). The rest of this introduction and thesis will zoom in on the notion and impact of MSPs on agricultural innovation and rural development.

1.3. Multi-Stakeholder Platforms in agri-food systems

Given the nature of the local and global multi-stakeholder processes seeking to address, among others, complex issues of food insecurity and rural poverty, MSPs provide a governance mechanism to support agricultural innovation and rural development in agri-food systems. Generally speaking, MSPs can be defined as physical and/or virtual interfaces (Boogaard et al., 2013) that connect several diverse actors, purposively facilitating and strengthening their interaction, collaboration, coordination, and learning to reach commonly established objectives (Adekunle, Fatunbi, Kefasi, & Baidu-Forson, 2016). Physical interfaces of MSPs can be, for example, organized spaces for multi-stakeholder meetings and networking, which are sometimes experimental (e.g., trade fairs or crop field demonstrations) (Adekunle & Fatunbi, 2012). Virtual interfaces may include, for example, online forums or mailing lists when available, or, more often, mobile phone systems for accessing information about weather or markets (Adekunle & Fatunbi, 2012).

Relative to the broader trend of multi-stakeholder processes, MSPs act especially at sub-national (i.e., local or district) and national scales (Hermans, Sartas, Van Schagen, Van Asten, & Schut, 2017), and more rarely at an international (i.e., regional) scale (Dentoni & Veldhuizen, 2012). The primary goal of MSPs entails stimulating agricultural innovation and, through it, contributing to rural development in order to achieve the SDGs (Breeman, Dijkman, & Termeer, 2015). Since then, a large body of the literature has studied MSPs' organization, activities, and influence (see Chapter 2). Given the critical importance placed on agricultural innovation, they have been also referred to as 'Innovation Platforms' (IPs) (Kilelu, Klerkx, & Leeuwis, 2013; Schut, Klerkx, et al., 2016). This thesis, though, will refer to them as MSPs to

highlight the role played by multiple stakeholders in shaping and embedding agricultural innovations in a system.

As governance mechanisms co-evolve with the multi-stakeholder processes in agricultural and food systems, a large body of the literature celebrates MSPs for enacting participatory approaches towards agricultural innovation (A. Adekunle & Fatunbi, 2012; Badibanga, Ragasa, & Ulimwengu, 2013). The 'participatory' feature of MSPs arises from the notion that all actors involved, including the ones with fewer resources at hand, engage with each other and share knowledge and complementary resources in the pursuit of common innovation goals (Badibanga et al., 2013). Nevertheless, MSPs have also been criticized for their unbalanced stakeholder representation and power relationships in decision-making (N Faysse, 2006; Warner, 2006a). These issues often relate to the organizations that sponsor or bear the initial costs of organizing and sustaining the MSPs (N Faysse, 2006). All in all, the risk of unbalanced relationships in MSPs may affect the influence of MSPs on agricultural innovation and rural development (see Chapter 2).

Because of their aspiration to achieve the SDGs most directly related to agricultural and food systems and the variety of organizational approaches that they employ, MSPs represent a societally relevant topic under wide discussion that sits at the junction of several scientific disciplines. For example, agricultural scientists recently studied MSPs in relation to the nature of the agricultural practices diffused through them (Abate et al., 2011; Swaans et al., 2014); economists assessed MSPs' impact on farmers' livelihoods and their adoption of innovation (Pamuk, Bulte, & Adekunle, 2014; Pamuk, Bulte, Adekunle, & Diagne, 2015); political scientists zoomed into the dynamics linking MSPs to their institutional and political arenas (Saint Ville, Hickey, &

Phillip, 2017); and innovation system scholars focused on how MSPs and their members are influenced by the broader social networks they are embedded in (Kilelu et al., 2013). Generally speaking, these studies recognize MSPs as having the potential to address complex issues such as rural poverty and food insecurity (Dentoni & Ross, 2013; Schut, Kamanda, et al., 2018; Warner, 2006b). Nevertheless, as we discuss in the next section, the existing literature does not agree on *how* MSPs influence agricultural innovation and, more broadly, rural development and thus the achievement of the SDGs (Nicolas Faysse, 2006; Sartas, Schut, Hermans, Van Asten, & Leeuwis, 2018). Hence, the societal relevance of MSPs, coupled with their scientific divisiveness in terms of desirability, viability, and measurability of the expected outcomes, justify the choice of this thesis to focus on the study of the influence of MSPs on agricultural innovation and rural development.

1.3.1. The impact of Multi-Stakeholder Platforms on agricultural innovation

One of the main expected outcomes of MSPs involves agricultural innovation, which, generally speaking, can be defined as the introduction of novel resources, practices, and processes in farming and farm-related activities (Knudson, Wysocki, Champagne, & Peterson, 2004; Sunding, Zilberman, & Hall, 2001). Similarly, farmer innovation refers to the process through which individuals or groups engage in new ways of managing available resources in or around their farm (Amede et al., 2013). In particular, this thesis will consider three typologies of agricultural innovation (Leeuwis & Van den Ban, 2004): product innovation, process innovation, and market innovation. Product innovation involves engaging in novel farming practices (Schipmann & Qaim, 2010); process innovation entails experimenting with new ways of organizing

with peers (Sunding et al., 2001); and market innovation refers to linking to new market channels (Devaux et al., 2009). Ultimately, agricultural innovation is expected to support rural development and, on a larger scale, viable transitions toward the achievement of the SDGs (Schut, van Asten, et al., 2016; Scoones & Thompson, 2009). This does not mean that all agricultural innovations necessarily lead to rural development. In fact, some innovations may even lead to dynamics of socio-economic exclusion (Brooks & Loevinsohn, 2011).

Traditionally, agricultural innovation has been studied as the "Transfer of Technology" (ToT) in order to draw implications on the impact of extension services (van den Ban, 1999; Anderson & Feder, 2004; Leeuwis, 2008). ToT services are often oriented toward smallholder farmers, especially when policies are focused on promoting rural development through the enhancement of small-scale agriculture. Another established branch of literature refers to 'agricultural innovation systems' (AIS), and frames innovation as a complex and dynamic process leading to simultaneous effects (van den Ban, 1999) that co-evolve across multiple spheres, including scientific, technological, organizational, commercial, institutional, and policy spheres (Cullen et al., 2014; Klerkx et al., 2013; Materia et al. 2014). As such, within the AIS approach, innovation is perceived to enact socio-technical transitions that combine technological change (e.g. cultivars, fertilizer, agronomic practices) and non-technological change (e.g. social practices such as labor organization or institutional settings such as land-tenure arrangements) (Klerkx, Aarts, & Leeuwis, 2010; Klerkx, Van Mierlo, & Leeuwis, 2012).

Because of the importance of agricultural innovation for rural development and the achievement of the SDGs, a large number of studies has recently zoomed

into the impacts of MSPs on agricultural innovation. Several dimensions of MSPs' influence on agricultural innovation have been considered. Several studies have zoomed into MSPs from an AIS perspective, seeking to explain the influence of MSPs on agricultural innovation as an evolutionary process of network development and adaptive co-management among stakeholders (Hermans et al., 2017; Hounkonnou et al., 2012; Kilelu et al., 2013; Schut, Klerkx, et al., 2016). Other studies have sought to assess the impact of MSPs on agricultural innovation through processes of learning across stakeholders (Nederlof, Wongtschowski, & Lee, 2011; Thiele et al., 2011) and within stakeholders' organizations (Dentoni, Bitzer, & Pascucci, 2016). Studies with a predominantly economic background have focused on the direct impacts of MSPs on farmers' market innovation (Devaux et al., 2009), product innovation (Pamuk et al., 2014), household livelihoods (Pamuk et al. 2014b), and sometimes more specifically on farmers integration in the value chain (Devaux et al., 2009). Finally, other studies –predominantly those with a public policy perspective – have looked at how MSPs influence, and in turn are shaped by, the institutional and policy framework they are embedded in (Breeman et al., 2015; Ragasa, Badibanga, & Ulimwengu, 2016).

To contribute to this thriving strand of literature, this thesis will seek to address two specific issues that so far have arguably been limiting the ability of the extant literature to effectively inform decision-makers (e.g., funders, policy-makers, or leading stakeholders) in MSPs. First, *the extant literature on the impact of MSPs on agricultural innovation and, more broadly, rural development remains scattered* despite remarkable attempts to synthesize it across multiple cases (Schut, Kamanda, et al., 2018; Schut, Klerkx, et al., 2016). Therefore, it does not lead to conclusive results on if, when and how agricultural innovation has been impacted. As a result, decision-makers in

MSPs do not have a clear guidance from the literature on how their activities and expected outcomes may result in intended or unintended impacts on agricultural innovation and rural development. Second, *the extant literature rarely distinguishes how MSPs may influence agricultural innovation depending on the heterogeneous characteristics of the farmers involved* (e.g., demographics, resource access, position in their networks, or psychological traits). We have known for a long time that it is challenging to assess impacts on farmers, as well as any other pattern or trend, without differentiating between their wide heterogeneity (Leeuwis, 2008, 2013). Indeed, farmers' heterogeneity, when ignored or not recognized, may limit the ability of analysts to explain why innovation-support initiatives such as MSPs may struggle to achieve impact at scale (Leeuwis, 1989).

1.4. Research objectives and research questions

Given this background on the existing studies on the impact of MSPs on agricultural innovation and rural development, the two key objectives of this thesis seek to address two key limitations noted in the extant literature (see section 1.3). First, since the literature does not agree on how MSPs impact (or *should* influence) agricultural innovation, this thesis will aim:

A. To provide an overview on what MSPs are and how they influence farmer innovation in emerging economies.

Accordingly, Chapter 2 of this thesis will conceptually address the following two questions:

- *What is the current state of research on the influence of MSPs on farmer innovation?*
- *Overall, how do MSPs influence farmer innovation, according to the existing literature?*

Second, since the literature does not take into account how MSPs may impact agricultural innovations of different farmers depending on their personal characteristics, this thesis will aim:

B. To assess how farmers' heterogeneity, in terms of entrepreneurial orientation and value network embeddedness, influences agricultural innovation in the context of one MSP.

Accordingly, the next section (see section 1.5) will define entrepreneurial orientation and value network embeddedness and explain why they may play a significant role in determining the influence of MSPs on agricultural innovation. Building upon these concepts, Chapters 3 and 4 of this thesis will empirically address the following research questions:

- *How does the heterogeneous entrepreneurial orientation of farmers participating to the same MSP influence their agricultural innovation?*

- *How does the heterogeneous value network embeddedness of farmers participating to the same MSP influence their agricultural innovation?*

In relation to objective B, the empirical context of the study will consist of one MSP in the Ugandan coffee sector, which we will introduce in section 1.7.

1.5. Theoretical Framework of the thesis

1.5.1. Multi-Stakeholder Platforms and agricultural innovation

As stated in section 1.2, this study refers to MSPs as physical and/or virtual interfaces that connect several diverse actors, purposively facilitating and strengthening their interaction, collaboration, coordination, and learning to reach commonly established objectives (Adewale Adekunle et al., 2016; Boogaard et al., 2013). On the basis of the existing literature, this study

assumes that MSPs have the potential to shape agricultural innovation through a variety of activities, expected outcomes, and pathways that will be unpacked in Chapter 2. Activities and expected outcomes take place within the organizational boundaries of MSPs; they are therefore represented as key MSP dimensions in Figure 2.8.

Furthermore, as discussed in section 1.3, agricultural innovation is understood as the introduction of novel resources, practices, and processes in farming and farm-related activities (Knudson et al., 2004; Sunding et al., 2001). The rest of this thesis will refer to three specific dimensions of agricultural innovation, namely product, process, and market innovation (see section 1.3). In Chapter 3, these dimensions of agricultural innovation will be assessed quantiatively (Johne, 1999; Wu & Pretty, 2004; Yang, 2013), while in Chapter 4 they will be assessed qualitatively on the basis of their definitions (Devaux et al., 2009; Schipmann & Qaim, 2010; Sunding et al., 2001) (see section 1.3). It is known that many other environmental factors (e.g., policy, institutional, social, ecological, or market conditions), value chain factors (e.g., transaction-specificity of the technology, buyer-seller relationships, or commodity trends) and demographic factors (e.g., education, age, gender, farm size, or location) may influence agricultural innovation along with MSPs' activities and expected outcomes. These factors are not included in the theoretical framework because, while they play a role on agricultural innovation, their analysis lay beyond the scope of this study. That said, some of them are used as control variables when neccessary (e.g., the study in Chapter 2 considers environmental factors as moderators of MSPs' impact pathways, and the study in Chapter 3 considers demographics as moderators in the relationship between farmers' entrepreneurial orientation and agricultural innovation).

In terms of factors that may shape the influence of MSPs on agricultural innovation, this study focuses specifcially on two of them: farmers' entrepreneurial orientation and their value network embeddedness. In the next section, we will explain what these factors are, how they may relate to agricultural innovation in the context of MSPs, and how bringing them into the theoretical framework (Figure 1.1) may help address some remarkable limitations of the extant literature on MSPs.

1.5.2. Farmers' Entrepreneurial Orientation

In the context of farming, farmers' entrepreneurial orientation (EO) refers to a farmer's intentional bias towards experimenting, taking risks, and being proactive (Gellynck, Cárdenas, Pieniak, & Verbeke, 2015; Matsuno, Mentzer, & Özsomer, 2002; Verhees, Kuipers, & Klopcic, 2011). In particular, proactiveness, innovativeness, risk-taking, and entrepreneurial intentions can be considered as dimensions of EO (see Chapter 3 and Figure 3.1). A large body of the literature on entrepreneurship (Academy, Jan, Lumpkin, & Dess, 1996; Lumpkin & Dess, 1996; Robinson, Stimpson, Huefner, & Hunt, 1991) has considered EO as a psychological trait (Frese & Gielnik, 2014; Johnson et al., 2017; Krauss, Frese, Friedrich, & Unger, 2005; A. Rauch & Frese, 2007; Andreas Rauch & Frese, 2007) that partially explains why some people may engage in innovation and new venture development while others do not (Robinson et al., 1991). While many see EO as a psychological trait which is difficult to mold in the short run, recent literature has added that EO, and specifically its dimension of proactiveness, may be triggered purposively, for example through tailored training activities (Campos et al., 2017).

Given this definition, this study hypothesizes that farmers' entrepreneurial orientation may play an important role in explaining why some farmers may innovate more than others even when participating to the same MSP. Only one recent study suggests that the relationship between farmers' EO and agricultural innovation may be significant (Etriya Etriya, Scholten, Wubben, Kemp, & Omta, 2018), yet it was done in a different geographical context and outside the scope of MSPs. As such, assessing the relationships between farmers' EO and agricultural innovation in the context of one MSP addresses a current knowledge gap in the MSP literature, that is, how an important psychological trait may explain the heterogeneity of the influence s MSPs have on agricultural innovation in different farmers.

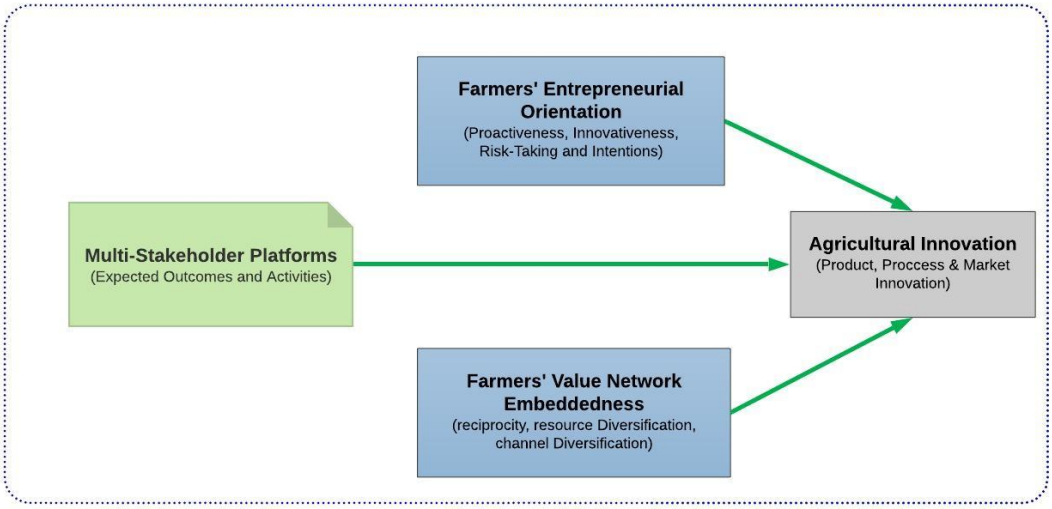
1.5.3. Farmers' Value Network Embeddedness

Farmers' value network embeddedness represents a second factor that may explain why some farmers may innovate more than others while participating to the same MSP. Value network embeddedness has been defined as the whole set of interactions that a person, group, or organization has established with others in a system in relation to the valuable resources taken, given, exchanged, or pooled throughout each of these relationships (Allee, 2009). As such, farmers' value network embeddedness dictates the extent to which a farmer may be able to access more or fewer resources compared to others due to their position in a network. Therefore, this study explores and refines the hypothesis that farmers' value network embeddedness may strengthen the influence of MSPs on agricultural innovation; in other words, more value network-embedded farmers may innovate more than less value network-embedded ones. From an empirical standpoint (see Chapter 4), farmers' value network embeddedness can be assessed in terms of *reciprocity* (i.e., the extent to which

an actor shares resources bi-directionally with other actors in his or her network), *resource diversification* (i.e., the heterogeneity of the resources an actor provides to or receives from other actors), and *channel diversification* (i.e., the number of channels through which an actor's resources are shared with others).

On the basis of this definition, farmers' value network embeddedness may play an important role in understanding when and how MSPs achieve influence on agricultural innovation and rural development. For example, MSPs where only the most value network-embedded farmers are able to innovate may (perhaps unwittingly) trigger dynamics of socio-economic exclusion (Dentoni, Klerkx, & Krussmann, 2019); they may support only (or mostly) farmers that were already initially more networked than others. Furthermore, assessing the role of farmers' value network embeddedness provides a way to bring the underexplored issue of power unbalances among farmers in MSPs to the core of the literature debate (Bitzer, Van Wijk, Helmsing, & Van Der Linden, 2012; N Faysse, 2006). This is because, as resource dependence theory suggests (Pfeffer & Salancik, 1978, 2003), more value network-embedded actors have inherently stronger access to resources and thus have more power (Casciaro & Piskorski, 2005; Hillman, Withers, & Collins, 2009).

Figure 1.1 The overarching theoretical framework of the thesis



Legend: The full arrows represent the key relationships validated (either conceptually, quantitatively, or qualitatively) within this thesis. The dotted arrows represent the key implications drawn for the decision-makers in MSPs based on the findings in this thesis. The boxes represent the key concepts of the theoretical framework, and the key dimensions of each concept are displayed in parenthesis within each box.

1.6. Research methods

To address the research objectives and questions outlined above and thus contribute to the literature on the impacts of MSPs on agricultural innovation, this thesis employs a wide variety of research methods, outlined as follows:

1.6.1. Systematic literature review

The next chapter of this thesis (Chapter 2) will be conceptual as it is grounded on a systematic literature review (SLR). A SLR involves screening a body of literature by progressively and iteratively defining its contours through the support of academic search engines (e.g., Scopus or Wed of Science), doing an initial screening of the abstracts, and then performing a deeper analysis of the

published articles' full-texts (Gough, Oliver, & Thomas, 2012, 2017). Through the process of identifying a specific body of literature, a SLR helps researchers to understand the trends in a specific (sub-)field of study and to build its taxonomy or, in other words, to map the key patterns (e.g., key concepts, as well as their dimensions and relationships) that emerge from the multiplicity of studies that compose it (Gough et al., 2012). Undertaking a SLR seems particularly fruitful for mapping the literature on the influence of MSPs on agricultural innovation because, as anticipated (see Section 1.2), several strands in this (sub-)field of study have flourished, albeit in a scattered way. Therefore, by employing a SLR, Chapter 2 of this thesis builds a taxonomy on how MSPs influence agricultural innovation.

1.6.2. Cross-sectional study

The following chapter (Chapter 3) is a cross-sectional study grounded on a quantitative data collection. The collected data were then analyzed through the use of multi-variate statistics (Hair, Black, Babin, & Anderson, 2010), namely Confirmatory Factor Analysis (CFA) (Gerbing & Anderson, 1988) and Partial Least Squares (PLS) (Hair, Hult, Ringle, & Sarstedt, 2016). Generally speaking, multi-variate statistics encompass the simultaneous observation and analysis of more than one outcome variable (Hair et al., 2010). In particular, CFA helps to test the measurement model of latent factors, that is, intangible and multi-faceted concepts whose meaning can be fully comprehended only through a variety of statements (Gerbing & Anderson, 1988). For example, in Chapter 3, CFA was employed to test the measurement model of EO in the empirical context of the study (i.e., farmers participating to one MSP in Uganda; see Section 1.7). In this context, and through a set of indices that will be discussed in depth in Chapter 3, CFA allowed us to assess

whether an initial set of questionnaire items fit the concept of EO. After a CFA, PLS was used to test the complex relationships among the multiple dimensions of EO that were measurable in the chosen empirical context (i.e., innovativeness, proactiveness, and entrepreneurial intentions), the multiple dimensions of agricultural innovation (i.e., product, process and market innovation) and a set of chosen control variables (i.e., farm size, education, gender, age, and access to resources). PLS was chosen because of its ability to simultaneously assess several relationships without requiring a large sample size (Hair et al., 2016), which in this empirical case was limited to 152 farmers participating to one MSP. Hence, by employing CFA and PLS, Chapter 3 of this thesis uses cross-sectional study to quantitatively explore how farmers' EO relate to agricultural innovation in the context of MSPs.

1.6.3. Case study for theory development

The following chapter (Chapter 4) is based on a case study, with in-depth qualitative data stemming from two rounds of interviews with 27 farmers taking place first in 2015 and then in 2018. Within the wide variety of qualitative approaches available, this study predominantly seeks patterns of causality among variables (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) or, as Langley et al. (2013) would say, it follows a variance-based approach. This means that starting from a purposive sample in the empirical context (Yin, 2017), the researcher iteratively seeks patterns, such as "X" has an influence on or relationship with "Y" (Eisenhardt, 1989). Consistent with this approach (Eisenhardt, 1989; Eisenhardt & Graebner, 2007), less focus is put on the process of *how* "X" turns into "Y". For example, in the empirical context of this study (see Section 1.7), the qualitative analysis focused on identifying the (causal) relationships linking farmers' value network embeddedness and

agricultural innovation. In line with the process of theoretical sampling (Yin, 2017), the samples (i.e., farmers) were first grouped into typologies on the basis of their most striking differences (i.e., demographics, farm location, and value network embeddedness). Afterwards, patterns of farmers' value network embeddedness were systematically compared and contrasted with their agricultural innovation outcomes. Therefore, by employing qualitative methods close to a variance-based approach (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Langley et al., 2013), Chapter 4 of this thesis explores how farmers' value network embeddedness influences agricultural innovation in the context of MSPs.

1.7. The context of Sub-Saharan Africa and Uganda

The Republic of Uganda is located in the Eastern part of the African continent. Uganda is a landlocked country occupying a total area of 241 550 km^2. Blessed with valuable natural resources including ample fertile land, regular rainfall, and mineral deposits, 37.8 percent of the country is arable land and 18 percent is open inland waters and wetlands (FAO, 2015).

Agriculture in Uganda contributes to about 23% of the country's Gross Domestic Product (GDP) with 60 percent of the population engaged in agriculture, forestry, and fishing. Out of 3.95 million agricultural households in Uganda, 28.1% of the households are found in the Eastern region. Uganda's key agricultural products can be divided into cash crops, food crops, and horticultural produce. Uganda's most important traditional cash crops are coffee, tea, cotton, tobacco, and cocoa (FAO, 2015; World Bank, 2017).

1.7.1. Multi-stakeholder platforms in Sub-Saharan Africa

Sub-Saharan Africa plays a pivotal role in the current transformation of global agricultural and food systems. On one hand, Sub-Saharan Africa remains plagued with the most serious issues of rural poverty, food insecurity, and effects of climate change. For example, much of global poverty is concentrated in rural sub-Saharan Africa, which was home to approximately 413 million poor people in its rural areas in 2015. At 41%, the poverty rate in rural areas is notably higher than in all other regions of the world (UNDESA, 2015). These data on rural poverty are particularly worrisome because 60% of the African population was living in rural areas as of 2015. Because of this poverty, though, urbanization has rapidly increased, with rural population set to decline to 44% by 2050 (UNDESA, 2015). Rural poverty issues are tightly entangled with problems of food insecurity. In 2016, for example, 333.2 million people, 27,4% of the overall population, were affected by severe food insecurity in Sub-Saharan Africa (FAO, IFAD, UNICEF, WFP, & WHO, 2017). Oftentimes, armed conflicts and socio-political instability also exacerbates food insecurity and hunger, affecting about 37 million individuals in 11 African countries (FAO et al., 2017). Environmental challenges such as deforestation, drought, erosion, and desertification are also interrelated with rural poverty and food insecurity. Approximately 32 million people in 16 countries were affected by food crises directly related to extreme climate and weather conditions in 2017. In the case of Uganda, for example, the country faced food insecurity that year due to a drought that had occurred in 2016 followed by an influx of refugees (FSIN, 2018).

On the other hand, while Sub-Saharan Africa is plagued with rural poverty, food insecurity, and the effects of climate change, it is also one of the fastest

growing regions of the world and receiving an increasing number of foreign direct investments. After stagnation in the 1980s and earlier, the average growth rate of GDP rose by 0.7% in 1995-2002, an average of 6.7% in 2002-2007, and 4.4% in 2008-2015 before slowing down to 1.97% between 2016 and 2017 (World Bank, 2017). The average economic growth per capita from the 1990s up to now proceeded hand in hand with an increase in Foreign Direct Investments (FDI), including in the food and agricultural sector. Global inward FDI flows multiplied by almost nine, going from an annual average of 200 USD million to 1,760 USD million between 1990 and 2016 (UNDESA, 2018; World Bank, 2017). This tremendous increase in FDI is related to the rapid advances in technology, especially in transport and communication, as well as the need for many Western and Eastern economies outside Sub-Saharan Africa to expand both their raw resource base (especially agricultural and non-agricultural basic commodities) and their global markets (Marandu, Mburu, & Amanze, 2019). For these reasons, dynamics around agricultural innovation may play a critical role in the future of Sub-Saharan Africa (Juma, 2015).

Because of the paradox of persisting issues of rural poverty and food insecurity during a prolonged period of economic and investment growth, many stakeholders in the agricultural and food sector agree that stronger coordination of the innovation systems surrounding farmers in Sub-Saharan Africa is urgently needed (Barasa, Knoben, Vermeulen, Kimuyu, & Kinyanjui, 2017). From this perspective, MSPs have increasingly been considered as novel organizational forms that can combine rural development and agribusiness management goals (Schut, Klerkx, et al., 2016; Schut, van Asten, et al., 2016; van Rooyen, Ramshaw, Moyo, Stirzaker, & Bjornlund, 2017). Although empirical results on the long-term impacts of MSPs are still limited, some studies found that MSPs in Africa show promise for enhancing trust among

multiple stakeholders in the agricultural ecosystems, sharing critical knowledge, and creating links between multiple governance levels and a wide variety of actors including farmers, policy-makers, and scientists (Acosta et al., 2019).

1.7.2. Innovation in the coffee sector of Uganda and the role of Multi-stakeholder platforms

With approximately 4.60 million kilograms exported in 2016/2017 and a revenue equal to 545 USD million (UNCTAD, 2018), Uganda is one of Africa's major coffee exporters. One out of every ten coffee farms is located in Uganda (Bunn, Lundy, Läderach, Fernández-Kolb, & Castro-Llanos, 2019). Their exports have boomed in recent years; in 2015/2016 they totaled 3.30 million kilograms, generating a revenue of 326 USD million (UNCTAD, 2018). Nevertheless, Uganda's coffee sector remains highly dependent on the production of approximately 500,000 smallholder farmers (Chiputwa et al. 2015), who usually grow coffee on small plots (0.25ha) intercropped with banana and other food crops (Bunn et al., 2019). About 77% of annual production is Robusta coffee produced in Central Uganda while the Arabica variety is produced in Eastern Uganda, where the empirical studies of this thesis took place (Bunn et al. 2019).

Because of the importance of coffee exports and the role played by smallholders, coffee production and marketing is a vital resource in Uganda that may be used to address issues of rural poverty and food insecurity. In the past decade, despite the growth of other non-agricultural industries, coffee production continued to generate 5% of rural GDP and 1.2% of the national GDP across all economic sectors (Bunn et al., 2019). Furthermore, the

processing of coffee adds another 0.8% of the national GDP (Bunn et al., 2019). Between 1.2 and 1.7 million families - one household out of every five - in Uganda produced coffee in 2018 (Bunn et al., 2019). In addition to farmers, an unknown number of workers and traders also base their livelihoods on coffee production and processing.

Despite the remarkable importance of coffee in Uganda's economy and society, the recent negative effects of climate change seriously threaten to jeopardize the future of the sector, requiring the Ugandan coffee industry to innovate to adapt and survive. Temperatures are expected to increase, on average, by 1.7°-1.8° Celsius every year from now to 2050 (Bunn et al. 2019), with peaks of increasing temperatures in the Mount Elgon region where this thesis study is based. At the same time, total annual precipitation is expected to substantially increase – causing floods and damages to coffee production - up to +6.8 % (in the South-East, where Mount Elgon is located) and up to +11.5% (South-East). These changes are putting pressure on coffee farmers and call for rapid adaptation in agricultural practices (Bunn et al., 2019).

To adapt to these climatic change conditions, and to address issues of persisting rural poverty and food insecurity, Ugandan coffee farmers and their stakeholders are pushed to engage in product, process, and market innovation. In this rapidly changing context, many actors in the Ugandan coffee sector are coordinating through MSPs. For example, a wide array of coffee value chain actors, policy-makers, and international organizations used MSPs to introduce the Sustainability Assessments of Food and Agriculture Systems. Stakeholders in the coffee value chain in particular prioritized themes of sustainability in terms of relevance and feasibility and subsequently identified relevant sub-themes, all through local MSPs (Ssebunya et al. 2017). MSPs

have also revealed the challenges of shifting coffee production in Uganda towards more sustainable practices. Many of the challenges are due to the social and structural heterogeneity of smallholder production systems which complicate cooperation among coffee farmers in peer groups (Ssebunya et al., 2017). At a more macro-level, the impact of MSPs on agricultural innovations in the Ugandan coffee sector was found to also depend on the political–economic context (Wedig & Wiegratz, 2018). Coffee farmer cooperatives in particular struggle to support the effectiveness of MSPs on agricultural innovation in Uganda, those farmer groups already supported by large trading and manufacturing corporations or state elites notwithstanding (Wedig & Wiegratz, 2018).

Along with the challenges of organizing within farmer groups, scholars recently argued that the organization of MSPs matters for agricultural innovation specifically in the Ugandan coffee sector (Damalie Babirye Magala, Najjingo Mangheni, & Miiro, 2019). Qualitative studies on MSPs in other districts of Western Uganda (Ntungamo and Bushenyi) and Southern Uganda (Luwero and Rakai) found persisting challenges taking place in MSPs. Those challenges involve, among others, limited coordination and commitment between actors, struggles to define the rules of engagement as well as the division of tasks and activities, and finding global incentives (Damalie Babirye Magala et al., 2019). The scholars who published those studies recommend MSPs to develop a new generation of trained leaders that are capable of aligning incentives, developing rules of engagement, and coordinating knowledge flows among multiple diverse stakeholders (Damalie Babirye Magala et al., 2019). While the research on MSPs in the Ugandan coffee sector did not focus specifically on agricultural innovation, this study suggests that how MSPs are organized in terms of goals and activities may

influence how farmers apply novel information and knowledge to inputs, agronomic practices, processing, and marketing in ways that ultimately support their attempt to improve their livelihoods and sustainable practices, thus reducing rural poverty, food insecurity, and the negative effects of climate change.

1.8. Thesis Outline

As explained in the previous sections, this thesis is structured in the following five chapters.

1.8.1. Chapter 1: General Introduction

In this first chapter, we introduce the role of MSPs in the agri-food sector and the challenges that agriculture is currently facing. We also present the importance of studying the influence of MSPs on farmer innovation and the research efforts made to try to understand and measure their influence. In this chapter, the reader will also find the theoretical framework of this thesis, followed by the research design and outline which act as a guide for the chapters that follow.

1.8.2. Chapter 2: The influence of Multi-stakeholder platforms on small farmers' innovation: A systematic literature review

This chapter provides an integrative view of the available research on MSPs and their influence on farmer innovation. In particular, the paper bases its findings on a systematic literature review in order to describe the current state of the research in this domain and then critically review and synthesize it to

draw managerial, policy, and theoretical implications. The two guiding questions of this systematic literature review are: 1) *What is the current state of research on the influence of MSPs on farmer innovation?* 2) *Overall, how do MSPs influence farmer innovation, according to the existing literature?*

1.8.3. Chapter 3: The Role of Farmers' Entrepreneurial Orientation on agricultural Innovations in Ugandan Multi-Stakeholder Platforms

This chapter explores the roles of key dimensions of farmers' entrepreneurial orientation (EO) namely, proactiveness, risk-taking, innovativeness, and intention as drivers of product, process, and market innovation in the context of one coffee MSP in Uganda. Empirical data from 152 Ugandan coffee farmers located in the Manafwa district in Eastern Uganda was analyzed via confirmatory factor analysis and partial least square multi-variate statistics. This chapter shows the relationships between farmers' EO and their product, process, and market innovation. In the empirical context of the Ugandan coffee sector, *product innovation* refers to the use of new farm inputs, transformation of resources into new products, or production according to a new standard of quality. *Process innovation* involves the adoption of new farm practices and ways of organizing with other farmers and/or other value chain actors. Finally, *market innovation* entails opening new market channels for agricultural products, either temporarily or permanently, with value chain actors. To explore these relationships, a measurement model for farmer's EO adapted to the context of rural Uganda was tested. Afterward, the complex relationships linking the multiple dimensions of farmers' EO and innovation were assessed via multi-variate statistics through PLS.

1.8.4. Chapter 4: Assessing farmers' embeddedness in coffee value networks in Ugandan Multi-Stakeholder Platforms

In this chapter, we explore the network conditions that may support or undermine agricultural innovation. More specifically, we try to understand the power unbalances that cause different farmers to innovate to very different extents. We use the theoretical perspective of value networks to explain why farmers participating in the same MSPs may innovate to different extents, thus potentially generating dynamics of exclusion in MSPs. The study is built from empirical data from 27 coffee farmers participating to the same MSP in rural Eastern Uganda. Those studies reveal that farmers experience remarkable differences in their socio-economic status, value network embeddedness, and levels of product, process, and market innovation. In particular, farmers' value network embeddedness both drives and is enhanced by agricultural innovation, thus generating virtuous circles for farmers who can afford to innovate and vicious circles for those who cannot. These findings connect agricultural innovation systems and resource dependence theories through the notion of value network embeddedness, and they also lead to managerial and policy implications for MSPs, which should take both a tailored and transversal approach toward supporting farmers' network development and trainings on a combination of technical and social skills.

1.8.5. Chapter 5: Implications for Decision-Makers in and around Multi-Stakeholder Platforms

This last chapter begins with a synthesis of the thesis, emphasizing the premises in the studies on MSPs and their influence on farmer innovation and rural development, mostly in emerging economies. The synthesis is followed by an overview of the research methods and key findings of the four chapters

presented in this thesis. From these findings stems the discussion and the points of the thesis' contribution to the literature and theories of agricultural innovation and organizational studies as well as the implications for stakeholders in and out of MSPs. The chapter concludes with recommendations for researchers, policy makers, and practitioners linked to the study of MSPs.

Chapter 2. The influence of Multi-Stakeholder Platforms on farmer innovation and rural development in emerging economies: A systematic literature review

An earlier version of this chapter has been published as:

Barzola Iza, CL., Dentoni, D., Omta, S.W.F. (2019). The influence of Multi-Stakeholder Platforms on farmers' innovation and rural development in emerging economies: A systematic literature review. Journal of Agribusiness in Developing and Emerging Economies. In press.

2.1. Introduction

Governments, development agencies and other actors involved in agricultural value chains have progressively established and engaged in Multi-Stakeholder Platforms (MSPs) over the latest two decades (Lundy, Gottret, & Ashby, 2005; Nederlof et al., 2011; Van Paassen, Klerkx, Adu-Acheampong, Adjei-Nsiah, & Zannoue, 2014). Broadly speaking, MSPs are meant to facilitate the development, exchange, and dissemination of knowledge, services, and resources in agricultural innovation systems (Klerkx, Van Mierlo, et al., 2012; Leeuwis & Van den Ban, 2004). Advocates of MSPs argue that they represent a promising vehicle for increasing and sustaining the impact of agricultural research (Kilelu et al., 2013; Schut, Cadilhon, Misiko, & Dror, 2015) to effectively promote and enhance innovation processes across agri-food value chains, particularly in emerging economies. From a broader perspective, MSPs can be considered as a specific form of 'polycentric governance' (Ostrom, 2010) or, in other words, an institutional arrangement governing a common and specific pool of resources (e.g., information, knowledge, technology) at multiple scales (e.g., international, national, community, farm). As such, MSPs represent relatively novel organizational forms that support actors in the agri-food value chains to address critical world challenges (Dentoni et al., 2012) such as rural poverty, food insecurity, and the negative effects of climate change (Spielman, Hartwich, and Grebmer 2010; Dentoni, Bitzer and Schouten 2018).

The recent appearance of MSPs in emerging economies has attracted the attention of a wide range of practitioners and academics seeking to understand and compare different examples and practices in MSPs. Recent comparisons of multiple examples of MSPs (e.g., (Dentoni & Ross, 2013; Schut, Klerkx, et

al., 2018)) have helped to reflect on if and how MSPs are effective in reaching their set goals, yet little comparative work across multiple MSPs has focused specifically on if and how MSPs support and sustain farmer innovation over time. The rapid rise of collective attention on MSPs has led many analysts to use a wide range of terms to describe them, such as "innovation platforms" (Kilelu et al., 2013; Pamuk et al., 2014), "learning alliances" (Lundy et al., 2005), "multi-stakeholder partnerships, alliances or initiatives" (Abate et al., 2011; Dentoni & Bitzer, 2015; Dentoni & Peterson, 2011), or "public-private or inter-sectoral partnerships" (Bitzer, Glasbergen, & Arts, 2013; Narrod et al., 2009). This variety in terminology also reflects that MSPs are being studied from multiple disciplinary angles ranging from agriculture to the social sciences and from various stakeholder standpoints including actors in the arenas of policy, business, and humanitarianism.

Since multiple and different disciplinary and stakeholder viewpoints have been used to analyse MSPs, the literature still lacks an integrative framework that comprehends what MSPs currently are, what their influence on farmer innovation is, and how such an influence takes place. Recent studies on MSPs have used single case study descriptions (Nederlof et al., 2011) multi-case study comparisons (Vellema, Ton, de Roo, & van Wijk, 2013), and panel data analyses (Cavatassi et al., 2011) on different dimensions of farmer innovation. Furthermore, a rich strand of literature stemming from organization and management theories emphasizes the different structures (Mena & Palazzo, 2012), power dynamics (Fransen & Kolk, 2007), learning processes (Dentoni et al., 2016; Selsky & Parker, 2010) and goals of MSPs (Selsky & Parker, 2005; Van Tulder, Seitanidi, Crane, & Brammer, 2016). This strand is particularly relevant because it delves into how MSPs are organized internally, therefore shedding light on how changes in the structure and activities of MSPs may

influence their impact on external stakeholders, especially those who are most marginalized (Yawar & Seuring, 2017). Nevertheless, this strand has not yet related MSPs' internal organization to their impact on farmers and farmer innovation. Therefore, to the best of our knowledge, there has not yet been a study that reviews and integrates the available studies across multiple disciplines on if and how MSPs' influence farmer innovation.

To start filling this knowledge gap, this paper provides an integrative view of the available research in this domain of growing societal relevance. In particular, the paper bases its findings on a systematic review of the literature on the influence of MSPs on farmer innovation. Through this SLR, the paper aims to first describe the existing literature (in other words, the current state of the research) in this domain and, second, to critically review and synthesize it to draw managerial, policy, and theoretical implications. The two guiding questions of this systematic literature review are: 1) *What is the current state of research on the influence of MSPs on farmer innovation?* 2) *Overall, how do MSPs influence farmer innovation, according to the existing literature?* By tackling these questions, this paper aims to inform decision makers in and around MSPs of how theories applied in this domain can be used to create managerial and policy practices. This will make managers and policy-makers more aware of the intended or unintended influences of MSPs on both farmer innovation and the complex systems surrounding them (Waddell, McLachlan, & Dentoni, 2013; Waddock, Meszoely, Waddell, & Dentoni, 2015). Furthermore, by critically reviewing what the existing literature has so far accomplished, this paper reflects on open scientific questions that should be addressed by applying organization and management theories to the domain of MSPs and their influence on farmer innovation.

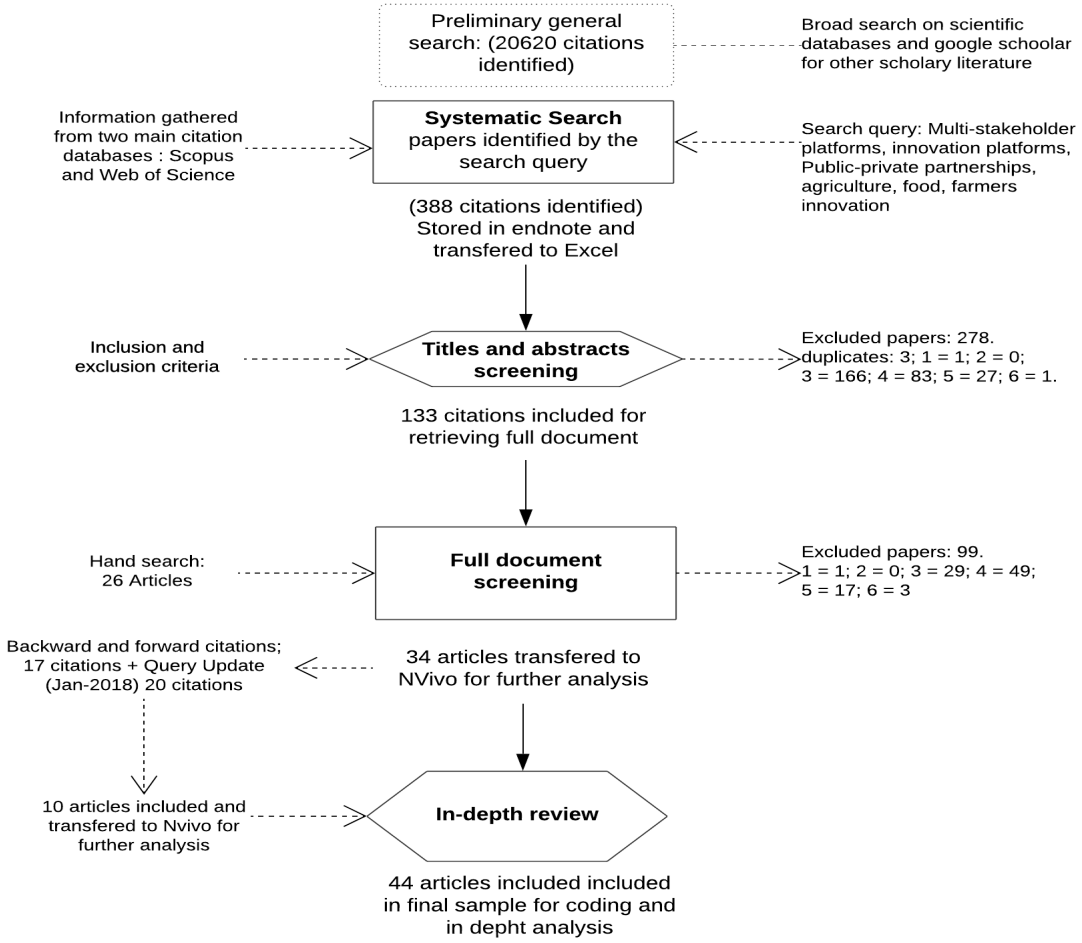
To address these questions, the rest of this paper is organized as follows: section two illustrates the sample selection of the ultimately identified 44 key papers and their follow-up analyses. Afterwards, we describe key trends of the available studies on MSPs and their influence on farmer innovation. In section four, we offer a synthesis of the key emerging themes on MSP research in terms of concepts related to MSPs and their associated levels of innovation. In section five, we complete our analysis by relating the key activities undertaken within MSPs to the impact pathways and the external conditions that lead to (or constrain) farmer innovation. The sixth section connects our analysis to policy, managerial, and theoretical implications on MSPs in relation to farmer innovation. Finally, the conclusions in section 7 summarize the contributions that this research provides to the study of novel organizational forms in emerging economies.

2.2. Methodology

Through a SLR, this study synthesizes the state of the art of the studies focused on MSP's influence on farmer innovation by describing, integrating and assessing multiple stakeholder and disciplinary analytical perspectives. SLRs are an appropriate method of investigation on research topics that have rapidly risen to public attention in relatively short periods of time, yet empirical evidence is still too scattered among multiple cases and standpoints to be compared and contrasted to derive useful implications for informing and improving decision-making for the actors in the field (Gough et al., 2017). This is exactly the case of the study domain around MSPs, which have rapidly flourished in practice, yet remain poorly conceptualized on theoretical grounds. Consistent with the SLR approach suggested by Gough et al 2017 the sampling of papers undertook the following steps (see Figure 2.1):

- First, through an initial broad search with two main online scientific citation databases (*Scopus* and *Web of Science*), a broad assessment was made on the use of the term "multi-stakeholder platform" in literature vis-à-vis other related terms such as 'innovation platforms,' 'learning alliances,' 'multi-stakeholder partnerships,' 'alliances,' or 'initiatives,' as well as 'public-private or inter-sectoral partnerships.' From this first step, given the predominance of this term relative to others, the decision was made to bring the concept of MSPs to the core of this review query.
- Second, this initial broad search was complemented with 'grey literature' from conference papers, university theses and dissertations, academic books, pre-prints, abstracts, and technical reports on MSPs through the search tool *Google Scholar*. At the end of this second step, this initial search identified a total of 20,620 entries on studies on MSPs and related terms.
- Third, a soft screening of the results aimed to eliminate papers that were not relevant to agriculture and farmer innovation. A more specific search query was developed to mitigate bias and deploy a comprehensive search for analysis framework. This soft screening led to a sample of n=388 papers.

Figure 2.1: Flow of included studies based on the PRISMA diagram[1]



Legend: The inclusion criteria (1-6) mentioned on the right side of the figure refer to the following. 1= full-text available; 2 = language is English and Spanish; 3= context of food and/or agriculture; 4 = key focus is multi-stakeholder platform or its synonymous; 5 = key focus is impact study; 6 = key focus is farmer innovation.

[1] Inspired by medical research, the PRISMA diagram consists of a N-item checklist or phases flow diagram. The aim of the PRISMA diagram is to help authors improve the reporting of systematic reviews and meta-analyses (Moher, Liberati, Tetzlaff, Altman, & Grp, 2009).

- Fourth, papers on MSPs were content-analysed and selected according to the following six specific inclusion/exclusion criteria: availability of full-text documents; availability in English language (these two criteria already led to a reduced sample of 133 papers); applicability to agriculture or food context; involvement of MSPs in the study; analysis or at least description of the functioning of MSPs; and mention of farmer innovation. Finally, excel files were created to keep track of the inclusion/exclusion criteria of papers. From this selection, a sample of n=34 papers were identified.
- Fifth, the final sample of studies was scrutinized by a chain search of 'backward and forward citations'[2]. Ten studies in total were added, resulting in a final sample of 44 articles. In this final step, the sample was also updated to include publications until early 2018.

The first part of the in-depth analysis of the final 44 articles included in the final sample includes descriptive statistics. The second part of the analysis uses qualitative methods. Coding was done with Nvivo and later transferred to Microsoft Excel for in-depth analysis.

The first stage of the analysis (section 2.3) gives an overview of the sample and delves into the differences and similarities across the 44 selected papers in terms of key themes and key concepts. The second stage synthesizes a categorization of impact pathways (consistent with the definitions provided by

[2] Backward reference searching involves identifying and examining the references or works cited in an article. Forward reference searching is when a researcher identifies articles that cite an original article or work after it had been published.

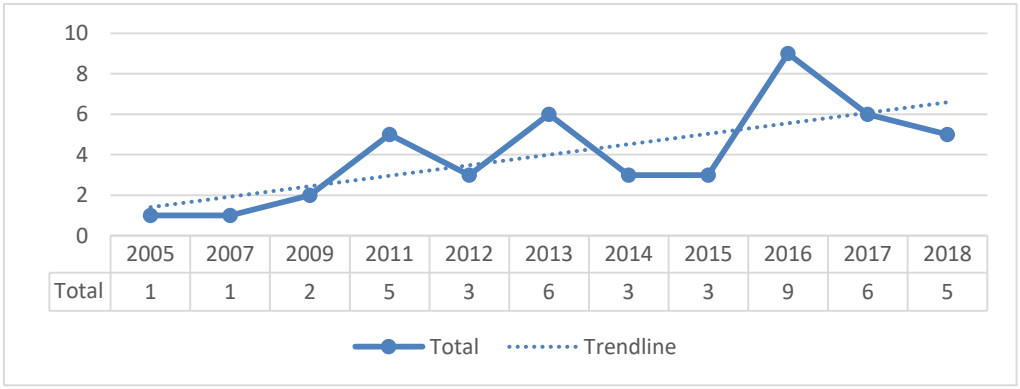
Douthwaite et al. 2003 and Springer-Heinze et al. 2003) to understand how MSPs influence farmer innovation across their multiple expected outcomes, activities, intermediate outcomes, and levels of innovation (section 4).

2.3. Descriptive analysis: Overview and patterns of publications

2.3.1. Temporal, geographical and methodological distribution of the literature

This section identifies the major patterns and trends within the selected sample of n=44 published articles, which is synthesized in Table 2.1 to provide a comprehensive snapshot of the existing academic research on MSPs' influence on farmer innovation to date. It includes a description of the rise of publications, the locations of the studies and research teams, and the key foci and methods of study.

Figure 2.2: Temporal distribution of the selected sample (2005-2018).

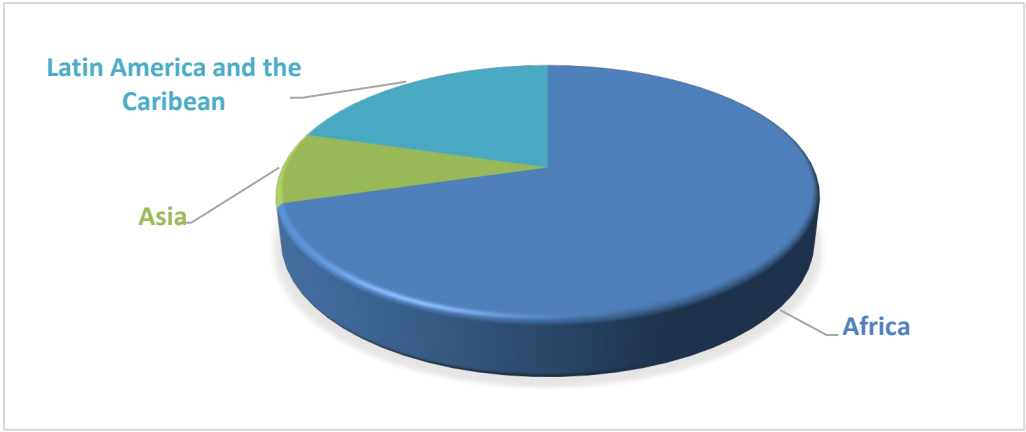


First, in terms of trends over time, Figure 2.2 shows the growing academic interest in MSPs in relation to farmer innovation over time. Specifically, the growth of studies between 2011 and 2018 relative to the previous years is

remarkable. This indicates that, over time, the field has moved from a more generic description of the functioning of MSPs to a more focused analysis of how MSPs impact or, more broadly, influence farmers.

Second, the analysis of the selected sample confirms that the academic teams studying MSPs in the agricultural and food sectors in relation to farmer innovation have an inherently global nature. Conversely, the locations of the empirical contexts chosen in the selected sample have been remarkably biased towards Africa - mostly Western and South-Eastern Africa - with 68% of the studies focusing on the influence of MSPs on the innovation of African farmers (Figure 2.3). After Africa, a number of selected papers also focus on Latin America and the Caribbean (23%, mostly from the Andes) and Asia (9%, mostly from the South-East).

Figure 2.3: Geographical distribution of the selected sample.



Third, in terms of key methods, Table 2.1 illustrates how authors have studied MSPs at various levels by adopting different conceptual lenses and analytical strategies. A first group of **quantitative studies** evaluates the impact of MSPs based on panel data and the use of a counterfactual sample (i.e. comparing

farmers who participated to MSPs over time with those who did not) (Cavatassi et al., 2011; Pamuk et al., 2015). The same group of articles also employs other statistical analyses to test the relationships between farmer participation in MSPs and their farm productivity growth, farm yields, adoption of technology, and poverty reduction (Abate et al., 2011; Kabambe et al., 2014; Nyemeck Binam et al., 2011).

A second group of studies entails qualitative studies focusing on the **descriptive analysis of (mostly individual) cases** and draws implications for policy on the basis of reflections on the functioning and outcomes of the MSPs. Key issues raised in these studies include farmers' interactions with other stakeholders, their competence and skill development, and the performance of MSPs in interplay with interventions by other actors in the system (Nederlof et al., 2011; Swaans et al., 2014).

A third and last group of studies analyses the influence of MSPs on farmer innovation by inductively building **conceptual frameworks**. Key issues addressed in these studies involve the inclusion or exclusion of farmers in value chains(Bitzer et al., 2013; Van Paassen et al., 2014), processes of institutional change (Kilelu et al., 2013), scaling up or out of environmentally or socially sustainable farming practices (Schut, Klerkx, et al., 2016), linking farmers to markets (Cadilhon, 2013; Devaux et al., 2009; Narrod et al., 2009; Thiele et al., 2011) and social learning among multiple farmers (Lundy et al., 2005).

Table 2.1: Multi-stakeholder platforms: Sampled cases organized by key concepts, methods/data, and focus of the study (listed in temporal order).

Article	Key concept	Methods	Key themes and contexts of the study
Lundy, Gottret, & Ashby, 2005	Learning Alliances	Conceptual Framework	Poverty eradication; knowledge; processes innovation; rural entrepreneurial development.
Hartwich & Tola, 2007	Public-Private Partnerships	Conceptual Framework	Partnerships for development of innovations; opportunities and limitations for rural development.
Devaux et al., 2009	Stakeholder platforms	Conceptual Framework	Collective action for market chain innovation; Implications for policy and research.
Evans, Raschid-Sally, & Cofie, 2009	Multi-stakeholder Processes	Qualitative study	Wastewater management; urban agriculture.
Abate et al., 2011	Partnerships	Quantitative study	Facilitation of agricultural innovations; diffusion of new technologies; technology adoption; productivity growth.
Cavatassi et al., 2011	Multi-stakeholder Platforms	Quantitative study	Linking smallholders to markets; impact evaluation; impact on yields and gross margins.
Kefasi, Oluwole, Adewale, & Gbadebo, 2011	Multi-stakeholder Partnerships	Qualitative study	Institutional innovation; agricultural policy formulation and development; design principles.
Nyemeck Binam, Abdoulaye, Olarinde, Kamara, & Adekunle, 2011	Innovation Platforms	Quantitative study	Outcomes of innovation platforms; adoption of improved crop varieties.
Thiele et al., 2011	Multi-stakeholder Platforms	Conceptual Framework	Smallholders' inclusion; Institutional Analysis and Development (IAD); Innovation and market governance.
Bitzer, Van Wijk, Helmsing, & Van Der Linden, 2012	Partnerships	Conceptual Framework	Smallholders' inclusion; relationship between institutional changes, value chains and smallholders' inclusion.
Dessie, Wurzinger, & Hauser, 2012	Platforms	Conceptual Framework	Social learning; adoption of soil conservation practices; Trust relationships among actors; combining indigenous and scientific knowledge.
Kabambe et al., 2012	Innovation Platforms	Quantitative study	Scaling out soil acidity technologies; farmers'

			participation; engagement of agri-input dealers.
Badibanga, Ragasa, & Ulimwengu, 2013	Multi-stakeholder Platforms	Quantitative study	Decentralizing governance of agricultural policies; platform effectiveness.
Bitzer, Glasbergen, & Arts, 2013	Intersectoral Partnerships	Conceptual Framework	Improving smallholders' livelihoods; linking farmers to markets.
Cadilhon, 2013	Innovation Platforms	Conceptual Framework	Institutional innovation; platform management structure; platform outcomes for the members.
Eneku, Wagoire, Nakanwagi, & Tukahirwa, 2013	Innovation Platforms	Qualitative study	Implications of technology adoption; accelerating uptake and use of technologies.
Kilelu, Klerkx, & Leeuwis, 2013	Innovation Platforms	Conceptual Framework	Co-evolution of technical, social, institutional and organizational innovation; enhancing smallholder productivity and livelihoods.
Vellema, Ton, de Roo, & van Wijk, 2013	Partnerships	Qualitative study	Partnership between companies, NGOs and farmers. Value chain partnerships; linking farmers to markets; institutional change.
Amede & Sanginga, 2014	Innovation Platforms	Conceptual Framework	Innovation platforms; facilitating technology adoption and scaling up; sustainable land management practices.
Swaans et al., 2014	Innovation Platforms	Qualitative study	Inclusive innovation; value chain; innovation brokers.
Van Paassen, Klerkx, Adu-Acheampong, Adjei-Nsiah, & Zannoue, 2014	Innovation Platforms	Conceptual Framework	Institutional change; institutional entrepreneurship; export oriented agro-enterprise.
Breeman, Dijkman, & Termeer, 2015	Partnerships	Conceptual Framework	Global policy agenda on sustainable livestock; type of governance arrangement; enhancing food security
Mariami, Cadilhon, & Werthmann, 2015	Innovation Platforms	Conceptual Framework	Links between platform structure, conduct, and performance; industrial organization; new institutional economics; marketing relationships.
Pamuk, Bulte, & Adekunle, 2014	Innovation Platforms	Statistical comparison	Decentralized approach to innovation policy; innovation in conventional extension approaches.
Adjei-Nsiah & Klerkx, 2016	Innovation Platforms	Conceptual Framework	Effects of the innovation platform interventions; agricultural practices; institutional constraints to innovation.

Cadilhon, Pham, & Maass, 2016	Innovation Platforms	Qualitative study	Measuring impact of platforms on value chains; New Institutional Economics (NIE); marketing relation management.
Hounkonnou et al. 2016;	Innovation Platforms	Qualitative study	Enabling institutional context; institutional change; innovation systems.
Jiggins et al., 2016	Innovation Platforms	Qualitative study	Local conflicts; changes in university curricula; researching practices.
Mulema & Mazur, 2016	Innovation Platforms	Conceptual Framework	Farmers' motivation and participation; farmers' livelihoods; evolution of innovation platforms.
Ragasa, Badibanga, & Ulimwengu, 2016	Multi-stakeholder Forums	Qualitative and quantitative study	Challenges in formation and implementation of multi-stakeholder forums.
Sanyang, Taonda, Kuiseu, Coulibaly, & Konaté, 2016	Innovation Platforms	Qualitative study	Improving competence and skills; value chains; food systems; natural resource management; new agricultural technologies.
Schut et al., 2016	Innovation Platforms	Conceptual Framework	Implementation; institutionalization; adoption and adaptation; performance and impact of platforms.
Teno & Cadilhon, 2016	Innovation Platforms	Qualitative study	Improving agricultural production.
Lamers et al. 2017;	Innovation Platforms	Conceptual Framework	Stakeholder interaction; agenda setting; collective action; sustainable agricultural development.
Niggli, Andres, Willer, & Baker, 2017	Innovation Platforms	Qualitative study	Pathways towards new technology development; organic farming adoption; innovation and technology transfer.
Palis, Lampayan, Flor, & Sibayan, 2017	Multi-stakeholder Partnerships	Qualitative study	Engagement of innovation partners; efficient technology diffusion.
Ramos Castro & Swart, 2017	Multi-stakeholder Partnerships	Qualitative study	Roundtable for sustainability; standards setting; agenda setting.
Saint Ville, Hickey, & Phillip, 2017	Multi-stakeholder Processes	Qualitative study	Stakeholder interaction; national agricultural policy.
Wurzinger & Gutierrez, 2017	Multi-stakeholder Processes	Qualitative study	Interaction of farmers with other stakeholders.

Akullo, Maat, & Wals, 2018	Public-Private Partnerships	Conceptual Framework	Institutional processes; agricultural innovation; smallholder livelihoods.
Osei-Amponsah, van Paassen, & Klerkx, 2018	Partnerships	Conceptual Framework	Institutional diagnosis; context-embedded negotiation and change processes; project-based partnership interventions.
Schut, Cadilhon, et al. 2018	Innovation Platforms	Conceptual Framework	Maturity of innovation platforms; technology dissemination; scaling mechanisms.
Schut, Kamanda, et al. 2018	Innovation Platforms	Conceptual Framework	Human and financial resource investments; enabling environments; design principles.
Thorpe, 2018	Public-Private Partnerships	Conceptual Framework	Value chain governance; inter-organizational relationships; value chain performance; farmer perceptions and commitment; public sector role.

2.3.2. Emerging themes of research across multiple fields of study

By inductively identifying the key emerging themes of research, we found that the selected sample of n=44 papers can be clustered into five key fields of study roughly corresponding to five specific underlying disciplines (see Figure 2.4), each one composed of a remarkably homogenous number of papers. The proposed clusters are: 1) agribusiness management, 2) agricultural economics, 3) agricultural innovation systems, 4) agricultural research for development, and 5) governance and public policy. Since some papers are multidisciplinary, papers are placed in the cluster that best corresponds to them. As illustrated below, these fields complement (and partially overlap) each other in some themes.

First, the *agribusiness management* field focused - mostly through qualitative studies – on how MSPs combine formal mechanisms (e.g. new codes of

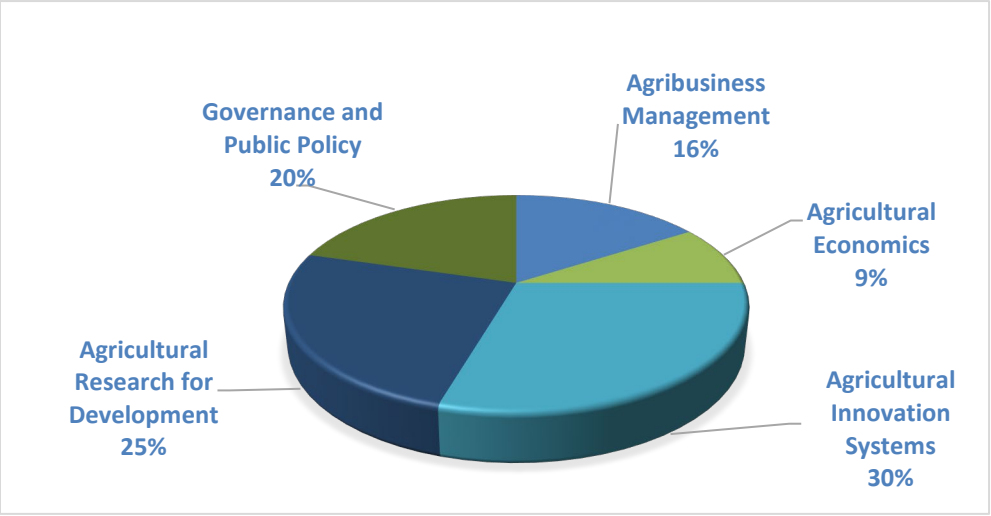
practices or quality certifications) and informal mechanisms (e.g., establishment of trust and knowledge-exchange) to govern agri-food value chains (Cadilhon, 2013; Cadilhon, Pham, & Maass, 2016; Ramos Castro & Swart, 2017) to influence farmer innovation. Theories of marketing and relationship management also contributed to explaining how MSPs promote knowledge exchange, resource recombination, and innovation among agri-food value chain actors (Hartwich & Tola, 2007; Mariami, Cadilhon, & Werthmann, 2015; Spielman et al., 2010) in ways that affect farmers.

Second, the field of *agricultural economics* focused predominantly on defining and assessing the impact of MSPs on farmer innovation. These papers were mostly quantitative impact evaluations with longitudinal data. They used counterfactual examples to assess differences between farmers who participated to MSPs and those who did not (Nyemeck Binam et al., 2011). Other studies were used to assess the impact on linking smallholders to high value chains (Cavatassi et al., 2011), both local and international (Narrod et al., 2009), and other market innovation practices (Devaux et al., 2009). Some papers in this domain focused on the impact of MSPs on reaching international quality standards through the adoption of novel technologies and practices (Pamuk et al., 2014, 2015).

A third field of research around the topic of MSPs is *agricultural innovation systems*, representing 30% of the sample (Figure 2.4). This field mostly revolves around the concept of innovation platforms (Kilelu et al., 2013; Van Paassen et al., 2014), but also extends to learning alliances (Lundy et al., 2005) and public-private partnerships (Akullo, Maat, & Wals, 2018; Jiggins et al., 2016). Unlike other fields, papers on *agricultural innovation systems* focused on facilitation, learning, and knowledge flows linking networks of farmers

with each other and with other stakeholders (Adjei-Nsiah & Klerkx, 2016; Amede & Sanginga, 2014; Teno & Cadilhon, 2016). Therefore, a distinctive feature of this field is the systems-level analytical approach looking at MSPs as pivotal institutions in fostering a co-evolutionary process among multiple agents (Kilelu et al., 2013). Through such a co-evolution, different MSP actors engage across multiple technical, social, institutional, and organizational dimensions (Osei-Amponsah et al., 2018), with implications for policy (Nederlof et al., 2011; Schut, Klerkx, et al., 2016).

Figure 2.4: The multiple fields of study analyzing MSPs from different disciplinary angles.



Fourth, a contiguous yet different field of study is *agricultural research for development*. A key distinctive feature of this field is its focus on the implications of MSPs for farmers' technology adoption (Abate et al., 2011; Kabambe et al., 2014; Palis, Lampayan, Flor, & Sibayan, 2017). By increasing technology adoption, MSPs play a role also in improving livelihoods and rural development as a whole (Kefasi, Oluwole, Adewale, & Gbadebo, 2011;

Vellema et al., 2013; Wurzinger & Gutierrez, 2017). Therefore, these papers focus on the role of MSPs in making the transfer of knowledge or technologies more efficient (Niggli, Andres, Willer, & Baker, 2017; Sanyang, Taonda, Kuiseu, Coulibaly, & Konaté, 2016). This field involves diverse methodologies, including longitudinal studies that quantify changes over time (Abate et al., 2011), qualitative descriptive studies (Eneku, Wagoire, Nakanwagi, & Tukahirwa, 2013; Swaans et al., 2014) and conceptual frameworks (Dessie, Wurzinger, & Hauser, 2012).

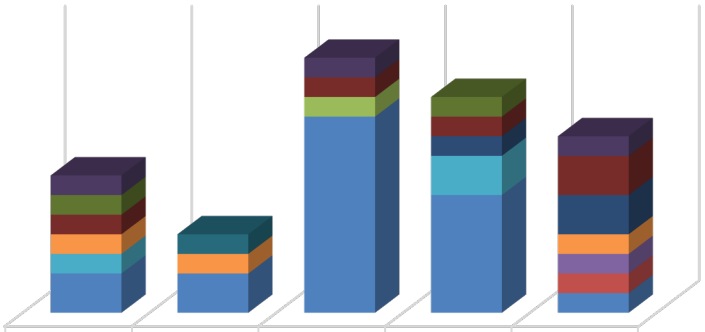
Fifth, the field of *governance and public policy* addresses issues and impacts of MSPs in relation to the implementation of agricultural and food policies (Badibanga et al., 2013) and the implications for smallholders' inclusion in value chains (Bitzer et al., 2013). Many of these studies draw conclusions on how MSPs lead to institutional changes along the agri-food value chains (Bitzer et al., 2012; Thiele et al., 2011) depending on the procedures taking place within MSPs (Thorpe, 2018). This field of study also investigates how MSPs seek to shape global issues and multi-lateral policy agendas and their outcomes and, in turn, how the nature of global challenges shapes the agenda of MSPs (Breeman et al., 2015; Evans, Raschid-Sally, & Cofie, 2009; Mulema & Mazur, 2016; Ragasa et al., 2016; Saint Ville et al., 2017).

Table 2.2: Selected papers clustered in five fields of studies and their relative key themes.

Fields of study	Studies
Agricultural Economics Key theme: MSPs' impact on farmers' market innovations, inclusion in value chains, and adoption of quality standards.	Cavatassi et al., 2011 Devaux et al., 2009 Narrod et al., 2009 Nyemeck Binam, Abdoulaye, Olarinde, Kamara, & Adekunle, 2011 Haki Pamuk, Bulte, Adekunle, & Diagne, 2015 H. Pamuk, Bulte, & Adekunle, 2014

Agricultural Innovation Systems Key theme: MSPs' role in facilitation of networks of agents and co-evolutionary learning processes.	Adjei-Nsiah & Klerkx, 2016 Akullo, Maat, & Wals, 2018 Amede & Sanginga, 2014 Jiggins et al., 2016 Kilelu, Klerkx, & Leeuwis, 2013 Lundy, Gottret, & Ashby, 2005 Nederlof, Wongtschowski, & van der Lee, 2011 Osei-Amponsah, van Paassen, & Klerkx, 2018 Schut et al., 2016 Teno & Cadilhon, 2016 Van Paassen, Klerkx, Adu-Acheampong, Adjei-Nsiah, & Zannoue, 2014
Agricultural research for Development Key theme: MSPs' role in influencing the transfer of knowledge to farmers and improved rural livelihoods.	Abate et al., 2011 Dessie, Wurzinger, & Hauser, 2012 Eneku, Wagoire, Nakanwagi, & Tukahirwa, 2013 Kabambe et al., 2012 Kefasi, Oluwole, Adewale, & Gbadebo, 2011 Niggli, Andres, Willer, & Baker, 2017 Palis, Lampayan, Flor, & Sibayan, 2017 Sanyang, Taonda, Kuiseu, Coulibaly, & Konaté, 2016 Swaans et al., 2014 Wurzinger & Gutierrez, 2017
Governance and public policy Key theme: Dynamics linking MSPs' deliberation and decision-making processes with the changing nature of global problems and policy agendas.	Badibanga, Ragasa, & Ulimwengu, 2013 Breeman, Dijkman, & Termeer, 2015 Ragasa, Badibanga, & Ulimwengu, 2016 Bitzer, Van Wijk, Helmsing, & Van Der Linden, 2012 Bitzer, Glasbergen, & Arts, 2013 Evans, Raschid-Sally, & Cofie, 2009 Mulema & Mazur, 2016 Thorpe, 2018 Saint Ville, Hickey, & Phillip, 2017
Agribusiness management Key theme: MSPs' influence on transactions and relationships along agri-food value chains.	Cadilhon, 2013 Cadilhon, Pham, & Maass, 2016 Hartwich & Tola, 2007 Mariami, Cadilhon, & Werthmann, 2015 Ramos Castro & Swart, 2017 Spielman, Hartwich, & Grebmer, 2010 Thiele et al., 2011 Vellema, Ton, de Roo, & van Wijk, 2013

Figure 2.5: Key concepts around MSPs used in different fields of study.



	Agribusiness Management	Agricultural Economics	Agricultural Innovation Systems	Agricultural Research for Development	Governance and Public Policy
Stakeholder platforms		1			
Public-Private Partnerships	1		1		1
Platforms	1			1	
Partnerships	1		1	1	2
Multi-stakeholder Processes				1	2
Multi-stakeholder Platforms	1	1			1
Multi-stakeholder Partnerships	1			2	
Multi-stakeholder Forums					1
Learning Alliances			1		
Intersectoral Partnerships					1
Innovation Platforms	2	2	10	6	1

These five fields of studies conceptualize MSPs under a wide variety of definitions (Figure 2.5). First, of all the concepts, the term "innovation platforms" is the most common synonym of MSPs, with a strong emphasis on the role of MSPs in stimulating innovation processes among farmers. The fields of agricultural innovation systems and agricultural research for development used the term 'innovation platforms' most, but this term is predominant also in the fields of agribusiness management and agricultural economics. Furthermore, concepts in the field of agribusiness management

emphasize the role of stakeholders in MSPs (e.g., stakeholder platforms) – highlighting the importance that stakeholder theory (Freeman, 2010) holds in the broader domain of strategy as applied to agribusiness (Ingenbleek & Dentoni, 2016). Finally, terminology involving multi-stakeholder processes or forums – as opposed to partnerships - appears in the field of governance and public policy, signaling an emphasis on the role of MSPs in stimulating public debate and societal impacts that reach beyond farmers and food value chains (Breeman, Dijkman, & Termeer, 2015).

2.3.3. Impact Pathways of MSP influence on farmer innovation

In summary, the existing literature on MSPs' influence on farmer innovation highlights that innovation takes place across multiple levels (see section 4.1) and, accordingly, stems from multiple avenues of impact (see section 4.2). The notion of innovation being a multi-level and multi-avenue process resonates with the theory of innovation ecosystems (Adner, 2006; Carayannis & Campbell, 2009) and their applications in the domains of food and agriculture (Klerkx et al., 2010; Klerkx, van Bommel, et al., 2012). Specifically, the theory of innovation ecosystems highlights the need for coordination among a multiplicity of actors as well as the necessity of multiple changes occurring at several levels to stimulate innovation effectively and at scale (Carayannis & Campbell, 2009; Klerkx et al., 2010). Furthermore, the multiple levels and processes needed to stimulate farmer innovation have practical and theoretical implications on how to organize MSPs internally - for example, by aligning expected outcomes and activities – to coordinate multiple actors and changes simultaneously. Accordingly, the critical analysis at the end of this section will lead to several implications that will be explained in the discussion and conclusion sections.

2.3.4. Multiple levels of innovation triggered by MSPs

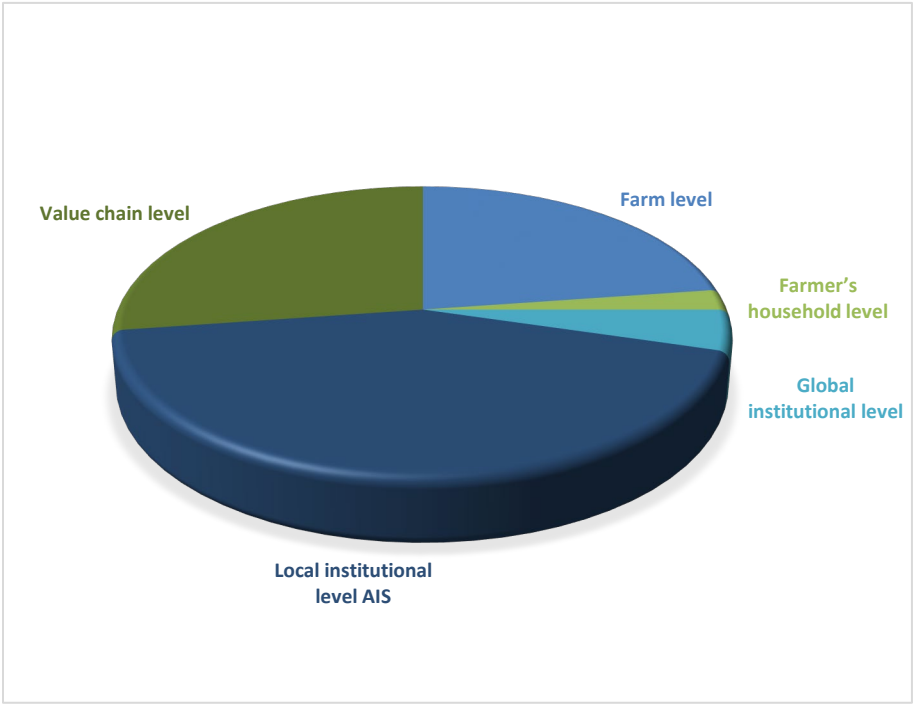
In generic terms, innovation is the implementation of new processes, dynamics, products, structures, or methods in a regular practice or activity (Rogers, 2010; Van de Ven et al., 1999). Farmer innovation is traditionally related to the literature on "Transfer of Technology" (ToT) and the role of extension services (Anderson & Feder, 2004; Leeuwis, 2008; van den Ban, 1999). Beyond the ToT, it is now recognized that innovation is a complex and dynamic process leading to simultaneous effects at multiple levels (van den Ban 1999; Dentoni and Klerkx 2015) and taking place in multiple dimensions such as scientific, technological, organizational, managerial, commercial, institutional, and even policy (Cullen et al., 2014; Klerkx et al., 2013; Materia, Dries, & Pascucci, 2014). In this study, we recognize farmer innovation as the process through which individuals or groups discover or develop new and better ways of managing their available resources to suit specific local conditions (Barzola Iza, Dentoni, Mordini, et al., 2019). Therefore, the outcome of the innovation process may be technical, social, or institutional.

In line with these broad definitions of innovation, we inductively categorize five levels of innovation from the selected sample of n=44. These levels of innovation include: a local institutional level (e.g., (Kilelu et al., 2013; Ragasa et al., 2016; Spielman et al., 2010)); farm level (e.g., (Dessie et al., 2012; Eneku et al., 2013; Kabambe et al., 2014)); value chain level (e.g., (Cadilhon, 2013; Narrod et al., 2009; Vellema et al., 2013)); global institutional level (e.g., (Breeman et al., 2015; Niggli et al., 2017)); and farmer household level (e.g., (Pamuk et al., 2014)).

Two considerations need to be noted in relation to these five levels of innovation. First, these levels of innovation imply that MSPs have multiple

facets and pathways in the ways they ultimately seek to address farmer innovation. Instead of being a direct process, MSPs operate with theories of change that often expect to influence farmer innovation indirectly through an articulated sequence of effects. For example, MSPs may influence the global or local institutional levels of innovation or the value chain level of innovation and through these, impact farmer innovation.

Figure 2.6: Levels of innovation influenced by MSPs in the selected sample.



Second, Figure 2.7 shows how the various levels of innovations have been studied depending on the location of the case study. For example, studies on MSPs in Latin America and the Caribbean have mostly focused on the value chain level of innovation (Bitzer et al., 2012; Cavatassi et al., 2011; Pamuk et al., 2015; Thiele et al., 2011). African studies on MSPs have predominantly concentrated on local institutional level studies (e.g., (Kilelu et al., 2013;

Ragasa et al., 2016; Spielman et al., 2010)), while Asian case studies on MSPs have had a mixed focus on farm, value chain, and local institutional levels of innovation (Evans et al., 2009; Palis et al., 2017; Ramos Castro & Swart, 2017; Swaans et al., 2014).

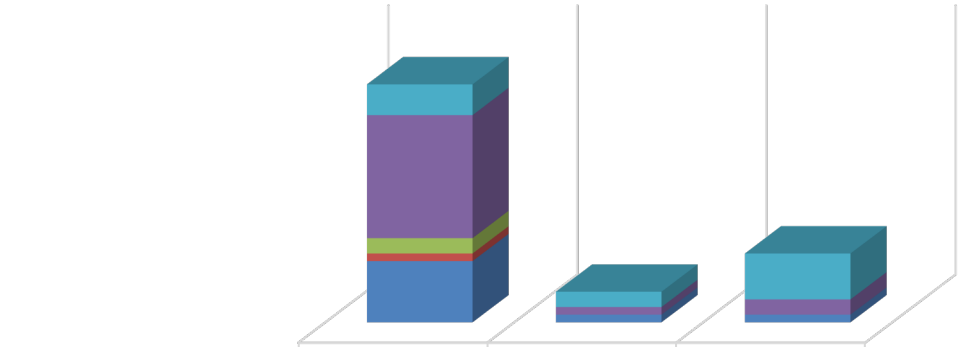
2.4. Processes of MSP influence on farmer innovation

After reviewing the key concepts of MSPs and the levels of innovation that they bring about, in this section we analyze *the process* – or, more specifically, the impact pathways - *through which MSPs influence farmer innovation*. From the selected sample of n=44 papers reviewed, we found that these impact pathways entail seven typologies of expected MSP outcomes; five typologies of influential activities in MSPs; and four key external forces that hamper or support the influence of MSPs on farmer innovation. While the specific typologies emerged from the reviewed literature, the stages of the process (illustrated in Figure 2.8) align with the common definitions of impact pathways in complex systems (Douthwaite et al., 2003), involving first the MSPs' expected outcomes (or goals), followed by their activities, the intermediary outcomes achieved, and finally their influence on the several levels of innovation (Figure 2.8; center arrow pointing from top to bottom). Furthermore, along these impact pathways, external (e.g., social, political, ecological and market) forces may hamper or support the innovation processes across multiple stages (Figure 2.8; side arrows pointing towards the center arrow).

First of all, we find that MSPs' impact pathways are shaped by a wide diversity of **expected outcomes** (on the top of Figure 2.8). Some MSPs aim to *stimulate the adoption of sustainable agriculture or climate-smart agricultural practices*

(Abate et al., 2011) and *other forms of technology transfer* (Pamuk et al., 2014). This is the case, for example, of the MSPs connected with the Ethiopian national agricultural research system Consultative Group on International Agricultural Research (CGIAR) in which researchers, farmers, extension officers and non-governmental organizations in rural Ethiopia aimed to stimulate adoption of inputs for legume productivity in rural Ethiopia in the late 2010s (Abate et al., 2011). Other MSPs focused more broadly on *stimulating farmer entrepreneurship and skills development* (Lundy et al., 2005; Spielman et al., 2010). For example, the Rural Agroenterprise Development Project of the International Center for Tropical Agriculture (known by its Spanish acronym CIAT) sought to purposively develop "multi-layered sources of knowledge in processes of innovation to promote increased learning and effectiveness in rural entrepreneurial development" (Lundy et al., 2005, p. 1). In a similar but more general study that encompassed multiple cases, Spielman et al., (2010) assessed if and how 75 collaborative projects in partnership with CGIAR centres and private firms were effective in reducing research costs and stimulating learning processes.

Figure 2.7: Levels of innovation addressed in the different case study locations.



	Africa	Asia	Latin America and the Caribean
Value chain level	4	2	6
Local institutional level AIS	16	1	2
Global institutional level	2		
Farmer's household level	1		
Farm level	8	1	1

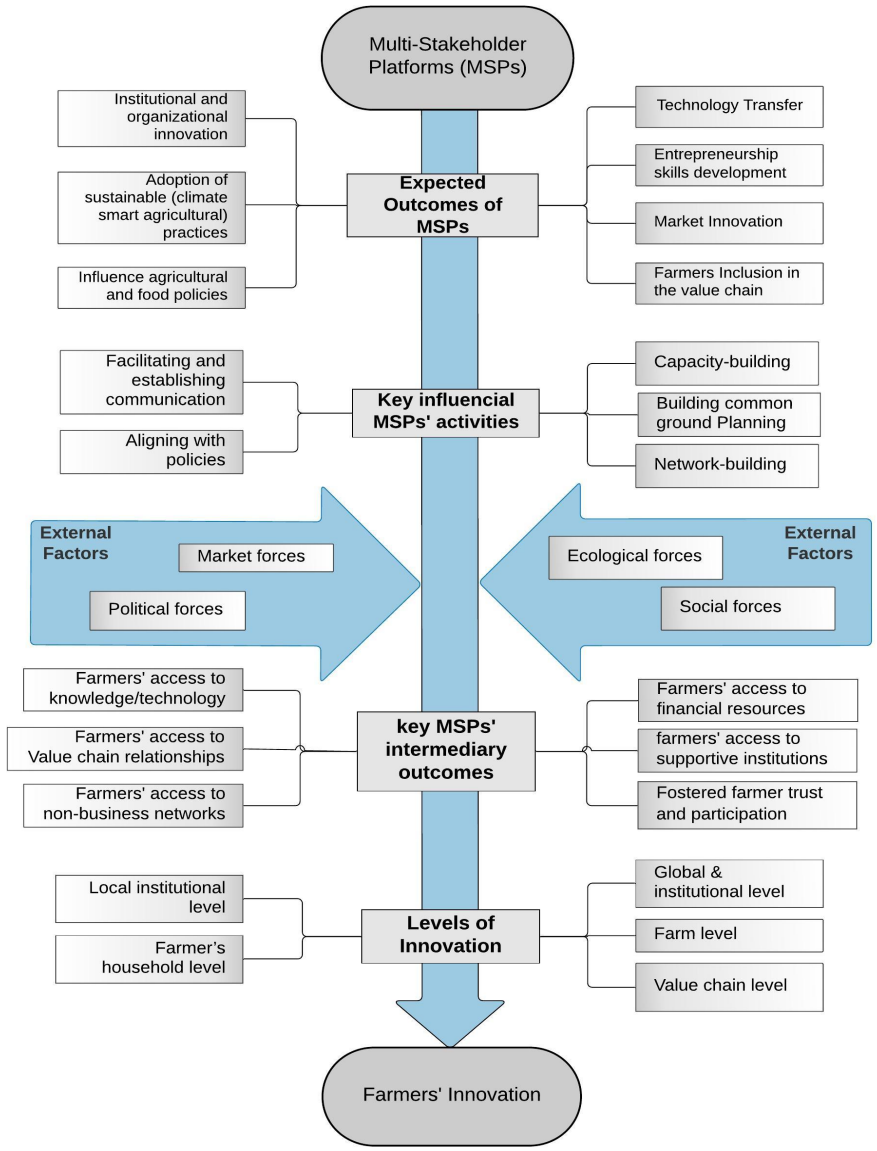
Other MSPs expected *to trigger farmer inclusion in the value chain* (Devaux et al., 2009; Narrod et al., 2009) and *other forms of market innovation* (Cadilhon, 2013). For example, Devaux et al. (2009) analysed stakeholder platforms in the Andes that sought to link small potato producers together with market agents and agricultural service providers, while J. Cadilhon et al., (2016) focused on MSPs seeking to improve dairy value chain coordination in rural Tanzania. Finally, other MSPs sought *to support organizational and institutional changes* (Bitzer et al., 2013, 2012) or *to promote policy reforms* (Badibanga et al., 2013; Breeman et al., 2015; Ragasa et al., 2016). For example, Ragasa et al. (2016) evaluated the effectiveness of 55 Agricultural and Rural Management Councils for policy dialogue, priority-setting, and program monitoring in local-level public institutions.

Second, and perhaps not surprisingly, the **five levels of innovation** identified from the sample (at the bottom of Figure 2.8) are strongly related to the expected outcomes of the studied MSPs.

This means that while assessing the ultimate impact of MSPs on farmer innovation is inherently a complex, multi-faceted task, all studies on MSPs have zoomed in on a specific level of innovation to operationalize their assessment of farmer innovation based on their expertise. In particular:

- The g*lobal institutional level of innovation* was studied mainly by governance and public policy scholars (e.g., Breeman et al., 2015; Saint Ville et al., 2017), who mostly selected MSPs aiming to promote policy reforms;
- Agricultural Innovation Systems scholars (e.g., Kilelu et al., 2013; Van Paassen et al., 2014) predominantly focused on the *local institutional level of innovation*, specifically on MSPs aiming to support organizational and institutional changes;
- The *farmer household level of innovation* was analysed mostly by Agricultural research for Development scholars (e.g., Swaans et al., 2014; Wurzinger & Gutierrez, 2017), who mainly selected MSPs seeking to stimulate the adoption of sustainable agriculture or climate-smart agricultural practices;
- Agribusiness management scholars (Cadilhon et al., 2016; Thiele et al., 2011; Vellema et al., 2013), and increasingly also agricultural economists (Narrod et al., 2009) and Agricultural Innovation Systems scholars (Kilelu et al., 2013; Spielman et al., 2010) studied primarily the *value chain level of innovation*. The studied MSPs aimed to trigger farmer inclusion in the value chain and other forms of market

Figure 2.8: The MSP pathways toward farmer innovation that emerged from the samples (n=44).



Legend: blue arrows = the process of MSP influence on farmer innovation as shaped by external forces. Grey boxes overlapping the center arrow = key stages that together constitute the impact pathway. Grey boxes branching from the boxes overlapping the center arrow = dimensions, or facets, of the key stages of the impact pathway.

- innovation. According to our review, this was the level of innovation that has experienced by far the most cross-fertilization across disciplines to date;
- The *farm level of innovation* has been predominantly studied by agricultural economists (e.g., Cavatassi et al., 2011; Pamuk et al., 2015), who focused on MSPs supporting technology transfer for the adoption of farm-level innovations (e.g., novel inputs, novel production practices, novel products, and production quality standards).

The crucial implication of these typologies – which generate "silos" of studies that are segmented across different disciplines and include MSPs with different objectives operating at different levels of innovation - is that the domain of studies on MSPs in relation to farmer innovation has so far seen little cross-fertilization across disciplinary fields. This surprisingly limited inter-disciplinarity represents a major limitation of the current domain of study on MSPs. Thus, implications will be drawn in the next section for both scholars and practitioners.

From the expected outcomes of MSPs to the levels of innovation, the MSP impact pathway reveals a rich set of key activities, external forces, and intermediary outcomes that lead to farmer innovation. The **key influential activities** constitute MSPs' organizing practices – in other words, the things that actors actually do during MSP meetings - in the selected n=44 studies. In line with the MSP partners' expected outcomes, these activities emerged as determinant factors in shaping MSPs' pathways to achieve impact. They involve:

- *Facilitating and establishing communication practices among stakeholders. For* example, the studied MSPs established procedures for making conversations and learning processes bi-directional (i.e., actors learn from each other) and built a routine of frequent communication. Furthermore, facilitation reinforced the notion that several stakeholder voices were efficiently heard during MSPs' meetings, mitigating potential tensions, supporting negotiations, and leading stakeholders towards the design of tailor-made actions (Amede & Sanginga, 2014; Badibanga et al., 2013; Devaux et al., 2007).
- *Aligning with policies.* In particular, MSPs encouraged participation of local policy-makers to MSP meetings, thus helping participants to understand how socio-political factors may influence their goals in relation to farmer innovation. By cooperating with local authorities, the MSPs purposefully acted on the enabling environment to make the goal of farmer innovation politically acceptable (Kefasi et al., 2011; Mulema & Mazur, 2016; Saint Ville et al., 2017).
- *Capacity building of stakeholders.* These activities had multiple facets, including the development of famers' tangible skills and higher-level competencies from services supporting input adoption (e.g., how to apply organic agriculture practices) to developing effective leadership competencies. Besides farmers, these activities also targeted other government officers, businesses, and researchers to identify institutional and technological sources of change and to understand how the organization of MSPs functions (Kilelu et al., 2013; Lundy et al., 2005; Ragasa et al., 2016).
- *Building common ground and network-building among stakeholders.* These activities involved developing a common vision among the MSP

participants, encouraging participation, building social capital, engaging in joint problem recognition, reflecting on past collective decisions and actions, and developing trust. In environments that rely heavily on informal institutions, as is typical in developing countries, these activities were instrumental for MSP participants to establish longstanding networks that support joint investments in farmer innovation (Ramos Castro & Swart, 2017; Swaans et al., 2014; Vellema et al., 2013).

- *Planning.* MSPs were also found to need formal structuring activities to deliver impact. For example, MSPs were reported to benefit from establishing clear objectives, robust time schedules, allocation of financial resources in the MSP processes and innovation outcomes, transparency rules, and periodic monitoring and evaluation processes (Eneku et al., 2013; Hartwich & Tola, 2007).

Given their importance in shaping the impact pathways, these activities deserve particular attention and may provide empirical ground for future organization and management scholars who want to understand how organizational dynamics of MSPs may influence broader innovation processes at multiple levels (see section 6).

Finally, the n=44 selected papers often referred to several **intermediary outcomes** brought to farmers along the MSP impact pathways. While farmer innovation can include long-term changes that are relatively difficult to assess, these intermediate outcomes are early-stage changes that MSP studies were able to document with stronger empirical evidence. These entail:

1) **Farmers' access to knowledge and technology**. Especially when aiming to trigger technology transfer and entrepreneurial skills development, MSPs facilitated farmers' access to knowledge and technology through activities of capacity building and establishing communication among stakeholders (Thiele et al., 2011; Van Paassen et al., 2014; Vellema et al., 2013).
2) **Farmers' access to value chain relationships**. Especially when seeking to stimulate farmer inclusion in value chains, MSPs supported farmers' access to value chain relationships by building common ground and networks among stakeholders (Cadilhon, 2013; Kabambe et al., 2014; Thiele et al., 2011).
3) **Farmers' access to non-business networks**. Especially when attempting to influence institutional and organizational innovations, MSPs helped farmers access non-business networks by facilitating and establishing communication practices among stakeholders. (Lamers, Schut, Klerkx, & Van Asten, 2017; Nyemeck Binam et al., 2011).
4) **Farmers' access to financial resources**. Especially when trying to increase the adoption of sustainable practices, MSPs sustained farmers' access to financial resources through planning and tailored capacity-building activities (Cadilhon et al., 2016; Mariami et al., 2015).
5) **Farmers' access to supportive institutions**. Especially when attempting to influence agricultural policies and sustain farmers' inclusion in value chains, MSPs succeeded in making institutions more supportive by aligning with policies and building common ground among stakeholders (Saint Ville et al., 2017; Thorpe, 2018).
6) **Farmers' trust towards peers and buyers**. Especially when intending to trigger institutional, organizational and market innovation, MSPs

helped farmers build trust towards their peers and buyers through network-building and facilitating communication practices among stakeholders (Dessie et al., 2012; Jiggins et al., 2016).

These emerging typologies of intermediary outcomes suggest that the links between specific expected outcomes, activities, and intermediary outcomes in MSPs are very strong. In other words, from the reviewed literature, the established goals of MSPs seemed to have a strong influence on their outcomes. This also leads to managerial implications discussed in the next section.

Independently from the described MSP activities, though, the impact pathways of MSPs on farmer innovation were also influenced by **external forces** that fall outside the sphere of control, and sometimes even of influence, of MSP participants. Influential *market forces*, for example, refer to the availability of supply and demand data and the presence of accessible market information systems, which may affect farmers' judgement on the financial viability of adopting innovations (Kilelu et al., 2013; Lundy et al., 2005). *Ecological forces* relate to the seasonal and multi-annual trends of rainfalls and temperatures that influence farmers' ability to innovate (Abate et al., 2011; Nyemeck Binam et al., 2011). *Political forces* involve the availability of public funds to complement the MSP participants' investments, the alignment between local governments and their extension agencies engaging with farmers, and the general political stability of the regions where the MSPs operate (Devaux et al., 2009; Saint Ville et al., 2017; Thiele et al., 2011). Finally, *social forces* include the external stakeholders' perception of the legitimacy of MSP endeavors as well as their awareness and experience in

engaging with MSPs with similar structures and objectives (Bitzer et al., 2013; Van Paassen et al., 2014).

2.5. Discussion: Taking stock and moving forward with MSPs and their impact in agri-food

The analysis of the existing literature on MSPs' impact on farmer innovation allows us to take stock of the existing knowledge on MSPs as relatively novel organizational forms and to highlight areas that need further research. Therefore, this section will unfold as follows. First, on the basis of the reviewed literature, we will synthesize what MSPs are and how they deliver impact relative to other novel organizational forms. Second, we will discuss four limitations of the existing literature that urgently need to be addressed in future research: disciplinary silos-thinking; linear thinking; the limited focus on informal institutions; and the lack of emphasis on power dynamics.

2.5.1. MSPs and their impact on farmer innovation: Taking stock

We start by discussing what MSPs are relative to other (relatively) novel organizational forms (Dentoni, Bijman, et al., 2019). Because of their geographical and disciplinary segmentation, the papers' findings highlight that the concept of MSPs is semantically fluid across multiple terms, including 'partnerships,' 'forums,' 'processes,' or 'alliances,' that are accompanied by adjectives such as 'learning,' 'innovation,' 'inter-sectoral,' or 'public-private.' Nevertheless, we find that all these terms have a common denominator, which is that the core concept of MSPs involves the *presence of a virtual interface (e.g., email, online forum, website, etc.) and/or physical interface (e.g,. a space for regular meetings) that supports knowledge-sharing and decision-making*

processes across groups of multiple heterogeneous stakeholders. Therefore, the presence of an interface that flexibly brings together a wide range of actors from within and outside the organization is a distinctive, unique feature of MSPs as opposed to, for example, new generation cooperatives (Bijman & Hu, 2011), value chain partnerships (Bitzer and Hamann 2015), or commodity exchanges (Meijerink, Bulte, & Alemu, 2014). Compared to these other novel organizational forms, such an interface inherently makes its organizational boundaries less defined – i.e., it may be hard in MSPs to pinpoint exactly who is internal staff and who is a 'user' because the tasks, benefits, and resources among actors within MSPs are pooled together.

On the basis of the existing literature, we reflect that the presence of this virtual and/or physical interface as a distinctive feature of MSPs also shapes how impact is achieved relative to other novel organizational forms. In particular, Figure 2.8 illustrates how MSPs hold potential to achieve impact on their external environment (i.e., innovation at multiple levels, including farmers) starting from their organizational goals and activities – in other words, from the inside out. We find that, *depending on their expected outcomes and organizational activities* (Figure 2.8, near the top)*, MSPs achieve different intermediate outcomes and influence different (yet interrelated) levels of innovation* (Figure 2.8, near the bottom). For example, as discussed in the previous section, when seeking to stimulate farmer inclusion in value chains and build common ground and networks among stakeholders, MSPs supported farmers' access to value chain relationships and triggered market innovation (Cadilhon, 2013; Kabambe et al., 2014; Thiele et al., 2011). Or, when attempting to influence agricultural policies and build common ground among stakeholders, MSPs proved to maintain farmer inclusion in value chains and shape institutions to make them more supportive (Saint Ville et al., 2017;

Thorpe, 2018). Because of this strong link between MSPs' expected outcomes, activities, outcomes, and impacts, the reviewed literature in the context of agriculture and food provides fertile empirical ground to organization and management theories on the functioning and impact of MSPs (Mena & Palazzo, 2012; Selsky & Parker, 2005; Van Tulder et al., 2016). This has immediate implications for the actors that participate and shape MSPs who, depending on their agency, have the opportunity to shape the innovation ecosystem that surrounds them (Carayannis & Campbell, 2009; Klerkx et al., 2010).

2.5.2. MSPs and their impact on farmer innovation: Moving forward

Despite the advancements in understanding what MSPs are, how they are organized, and how they impact farmer innovation, several limitations need to be noted in the literature reviewed in this paper. In particular, we believe that organizational and management theories, if combined with a deep understanding of the food and agricultural sectors, may play a critical role in addressing these limitations.

First of all, our review highlighted that the study of MSPs' impact on farmer innovation is strongly affected by **disciplinary silos-thinking**. Silos-thinking across disciplines became evident in two forms, both stemming from the description in section 3.2. First, *different disciplines have used different terminologies extensively to refer to the same empirical phenomenon*, i.e. MSPs (Figure 2.5). Second, in the study of the same empirical phenomenon, *the focus of different disciplines has been on different elements of MSPs*. For example, literature on agricultural economics has overwhelmingly focused on

quantifying the MSPs' impact on farmers' market innovations, inclusion in value chains, and adoption of quality standards, while the literature on policy has predominantly focused on deliberation and decision-making processes in the context of changing global problems and policy agendas, thus taking a much broader look into how MSPs influence farmer innovation. While looking at an empirical phenomenon such as MSPs from complementary perspectives may add value, the lack of scientific dialogue and cross-pollination among these disciplines leaves many questions unanswered. Interdisciplinary research – at least within the social sciences - on MSPs may help address the following questions: What is the impact of MSPs or their specific activities on farmers' access to new knowledge and technology, establishment of new value chain relationships, access to non-business networks, or trust towards peers and buyers? These questions are inherently interdisciplinary as they call for stronger theoretical and methodological collaboration among scholars of agricultural economics, agribusiness management, and agricultural innovation. And, importantly, the questions would be societally and managerially relevant for better assessing how and under what conditions the specific activities of MSPs may influence the knowledge and relational processes that often underlie farmer innovation.

Second, our review – and, specifically, Figure 2.8 – suggests that the literature on MSPs has overall been limited by a **linear thinking approach**. In other words, *few studies among those reviewed have described and analyzed the interplay among the multiple levels of innovation around farmer innovation*. For example, the different levels of farmer innovation (value chain, local institutional, global institutional, farm, and farmer household) have hardly been considered simultaneously in the existing literature. A notable exception to linear thinking in this domain is represented by Kilelu et al. (2013) and the

studies that followed in agricultural innovation systems (Osei-Amponsah et al., 2018; Van Paassen et al., 2014) which specifically focused on the co-evolution of innovation across different levels. Even in these notable exceptions, though, *what is missing is a deeper observation and understanding of the possible conflicts and trade-offs – or at least frictions – that often emerge in processes of innovation at multiple levels* (Waddell et al., 2015). For example, important multi-level research questions related to the impact of MSPs on farmer innovation should include: How do MSPs align – and resolve plausible tensions among - value chain level and local/global institutional levels of innovation? Are changes at value chain and farm levels complementary, or do they conflict with each other in stimulating farmers' ability to innovate? Addressing these questions across multiple levels would inform MSPs agents on how to foster synergies and smooth frictions among the multiple levels of innovation that stem from MSPs.

Third, our analysis reveals that the existing literature had **a limited focus on informal institutions** that may affect MSPs' impact on farmer innovation. Broadly speaking, informal institutions refer to the intrinsic norms, routines, and beliefs that bond a community together at national, regional, local, or even family levels (North, 1991; Stiglitz, 2000). While many studies on MSPs focused on how to build common ground among stakeholders or make institutions more supportive (Thorpe, 2018; Vellema et al., 2013), *no study has zoomed into how MSPs need to adapt in relation to the different indigenous contexts where they operate*. A reason underpinning this limitation may involve the striking lack of multi-case comparative studies, with the notable exception of (Schut, Klerkx, et al., 2016; Schut, Cadilhon, Misiko, & Dror, 2017). Also, the overwhelming focus of the existing studies, including the aforementioned exception, was on Sub-Saharan Africa, which represented

almost 75% of the empirical cases reviewed (see Figure 2.3). This persisting gap calls for more comparative studies of MSPs, or novel organizational forms similar to them, in other geographical or disciplinary contexts. Key relevant questions may entail: how might the organization of MSPs vary in so-far understudied contexts? Or more generally, how do cultural norms and beliefs shape MSP activities and their impact pathways towards farmer innovation? Addressing these questions would inform MSP managers on how to adapt the organization and expected outcomes of MSPs to the indigenous context where they operate.

Fourth, our analysis surprisingly reveals that the extant literature has **little emphasis on the power dynamics** in MSPs. As organizational theory applied to multi-stakeholder processes at large (H. Brouwer, Hiemstra, van Vugt, & Walters, 2013) informs us that power dynamics could refer to two critical aspects of the life of an MSP: first, how the influence of one or a few dominant actors may shape the expected outcomes and activities of MSPs and, second, how the outcomes of MSPs may shift power relationships among the stakeholders involved (Dentoni et al., 2018). While Swaans et al. (2014) and Schut et al. (2018) have tangentially hinted that some powerful stakeholders (e.g. local or national governments, multinational companies) may influence MSP agendas and their influence on farmers, the work of (Bitzer et al., 2013, 2012) and (Thorpe, 2018) is the only study that looks closely at this theme. Thus, several socially relevant questions are yet to be addressed, such as: who funds MSPs? Do public or private funders look for a return investment from MSPs, and if so, in what form and under what time horizon? How do the funding mechanisms and sources of MSPs influence their expected and intermediate outcomes? And, ultimately, do the funding institutions also influence the approach that researchers take in the study of MSPs, as well as

the focus of their analyses? These internal power dynamics may trigger or foment processes of farmer inclusion/exclusion over time, raising questions such as: which farmers benefit from MSPs in terms of learning and innovation, and which ones remain excluded from the expected innovation and learning processes? For example, do farmers with lower education, initial resources and networks, or entrepreneurial orientations than their peers engage and benefit from MSPs? Addressing these questions would allow for informing stakeholders, particularly those at risk of exclusion and marginalization, on how to establish equitable relationships with the other actors involved in MSPs.

2.6. Conclusion

This paper contributes to the study of novel organizational forms in emerging economies through a systematic literature review by zooming into one of its peculiar examples (Dentoni, Bijman, et al., 2019) namely MSPs, and their impact on farmers innovation and rural development. Based on a sample of n=44 selected papers (see section 2), we find that MSPs – as opposed to other novel organizational forms emerging across the field of international development and agribusiness management (Dentoni, Bijman, et al., 2019) involve the presence of a virtual and/or physical *interface among multiple, heterogeneous stakeholders*. This distinctive feature of MSPs also makes their organizational boundaries flexible and, as a consequence, leads to peculiar *impact pathways towards farmer innovation*. In particular, depending on their goals and the activities taking place within their interfaces, MSPs achieve different intermediate outcomes in terms of providing resource access to farmers and supporting multiple interrelated levels of innovation (see section 4).

Looking at the state of the art of MSPs (i.e., the development across time, geographies, and disciplinary fields; see section 3) from an organizational theory perspective also reveals four key limitations. First, disciplinary silos-thinking persistently limits the researchers' ability to assess the impact of MSPs on farmer innovation in more nuanced and societally relevant ways. Second, linear thinking inhibits the understanding of how multiple, simultaneous (i.e., policy, institutional, value chain, household and farm) levels of innovation triggered by MSPs may synergize or collide in relation to farmers. Third, a limited focus on informal institutions interplaying with MSPs does not (yet) inform change-agents on how to adapt MSPs to different cultural and social contexts. Fourth, the lack of emphasis on power dynamics in and around MSPs does not (yet) allow for critically assessing processes of inclusion or exclusion that may happen along the described impact pathways. Through a set of questions that address these limitations (see section 5), future research on the impact of MSPs on farmer innovation has the chance to corroborate its managerial and societal relevance.

Chapter 3. The Role of Farmers' Entrepreneurial Orientation on Agricultural Innovation in Ugandan Coffee Multi-Stakeholder Platforms

An earlier version of this chapter has been published as:

Barzola Iza C.L., Dentoni D., Mordini M., Isubikalu P., Auma Oduol J.B., Omta O. (2019) The Role of Farmers' Entrepreneurial Orientation on Agricultural Innovations in Ugandan Multi-Stakeholder Platform. In: Rosenstock T., Nowak A., Girvetz E. (eds) The Climate-Smart Agriculture Papers. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-92798-5_17. Online ISBN 978-3-319-92798-5.

3.1. Introduction

A wide discourse on academic literature and policy currently celebrates multi-stakeholder platforms (MSPs) as organizational forms promoting knowledge co-creation and innovation uptake across farmers and other stakeholders for rural development (Sartas et al., 2018; Schut, Klerkx, et al., 2016) and climate resilience (Shackleton, Ziervogel, Sallu, Gill, & Tschakert, 2015). However, recent empirical evidence also revealed that not all farmers may equally innovate through their participation to MSPs. For example, farmers in smallholder dairy development program in Tanzania lagged in their ability to build value chain relationships (i.e., *market innovation*) because of institutional constraints (Kilelu et al., 2017). Coffee farmers embedded in MSPs in Uganda engaged in coffee quality upgrades (i.e., *product innovation*) to different extents because of organizational constraints in the MSPs themselves (D B Magala, Mangheni, & Zonal, 2018). And, some pineapple farmers struggled to develop new ways of organizing with fellow farmers (i.e., *process innovation*) because of limitations in the design and procedures of the MSPs (Martens, Gansemans, Orbie, & D'Haese, 2018). Assuming that product, process, and market innovation are indeed desirable for rural development and climate resilience, the persistence of innovation differentials among farmers brings up the longstanding debate on how and to what extent it is possible for MSPs to be truly inclusive organizational forms (Dentoni & Ross, 2013; Vieira, Hoppe, & Schneider, 2016; Warner, 2006a).

Therefore, the presence of an *innovation differential among farmers participating in MSPs* calls for a better understanding of the drivers of individual farmers' product, process, and market innovation. While most of the literature on MSPs – apart from the recent aforementioned exceptions (Kilelu

et al., 2017; D B Magala et al., 2018; Martens et al., 2018)- has remained silent on this topic, a much broader academic conversation outside the empirical context of MSPs has been taking place on understanding the institutional drivers of farmer innovation. In previous studies, farmers innovation was found to depend on the broader structure and dynamics of the agricultural innovation system they are embedded in (Klerkx & Leeuwis, 2008c, 2008a). For example, farmers may experience different repercussions on their incentives or ability to innovate depending on how intermediaries in the system mediate between demand for and supply of knowledge (Klerkx & Leeuwis, 2008a) or between competing demands (Klerkx & Leeuwis, 2008c). Furthermore, farmers innovation was found to depend also on the immediate networks surrounding the farmers (Abebe, Bijman, Pascucci, & Omta, 2013; Pascucci & de-Magistris, 2011). For example, the extent to which Italian farmers diversify crops was found to depend on their membership in associations and rural networks (Pascucci & de-Magistris, 2011). Similary, Ethiopian farmers with more access to technical assistance, credit, and radio/television were found to take up more improved potato varieties (Abebe et al., 2013).

While the literature outside the scope of MSPs has focused mostly on the institutional and network drivers of farmers innovation, a less explored set of drivers involves the farmers' attitudes that may antecede innovation and, more specifically, their entrepreneurial orientation (EO) (Gellynck et al., 2015; Matsuno et al., 2002; Verhees et al., 2011). While the concept of EO has a history deeply rooted in general business management literature (Academy et al., 1996; Robinson et al., 1991), at an individual farmer level of analysis, *EO refers to a farmer's intentional bias towards experimenting, taking risks, and being proactive* (Gellynck et al., 2015; Matsuno et al., 2002; Verhees et al.,

2011). Given this definition, farmers' EO may constitute an important driver of their innovation and, as such, may explain the innovation differential taking place among farmers participating in MSPs. So far, the literature on farmers' EO has focused on its impact on absorptive capacity (Gellynck et al., 2015) and farm business performance (Matsuno et al., 2002; Verhees et al., 2011), but hasn't yet addressed its relationship with product, process, and market innovation. Furthermore, only a few studies so far have assessed farmers' EO in the rural context of developing countries (Etriya Etriya et al., 2018; Gellynck et al., 2015) and, to the best of our knowledge, only one (Yessoufou, 2017) has done so in the Sub-Saharan African context.

Therefore, to expand our knowledge on the psychological antecedents that may drive farmer innovation in MSPs, this chapter explores the relationships between farmers' EO and their product, process, and market innovation. Empirical data have been obtained through a survey with 152 Ugandan coffee farmers participating in one coffee MSP in the Manafwa district. In the empirical context of the Ugandan coffee sector, *product innovation* refers to the use of new farm inputs, transformation of resources into new products or production according to a new standard of quality. *Process innovation* involves the adoption of new farm practices and ways of organizing with other farmers and/or other value chain actors. Finally, *market innovation* entails opening new market channels for agricultural products, either temporarily or permanently, with value chain actors. To explore these relationships, a measurement model for farmer's EO adapted to the context of rural Uganda was tested. Afterward, the complex relationships linking the multiple dimensions of farmers' EO and innovation were assessed via multi-variate statistics through PLS.

The rest of this chapter is organized as follows: Section two lays out the extant literature on farmers EO and innovation in and beyond the context of MSPs. Our methods are illustrated in section three, followed by a description of the empirical findings in section four. In section five, we discuss the implications of the findings for advancing knowledge on the psychological drivers of farmer innovation and, consequently, for managers and policy-makers. A summary and conclusion are in section six.

3.2. Theory

3.2.1. Farmer innovation in the context of Multi-Stakeholder Platforms

Farmer innovation involves the adoption at an individual level (Sunding et al., 2001) and diffusion at a community and societal level (Rogers & Kim, 1985) of new valuable products, practices, and processes in and around farming. The adoption and diffusion of farmer innovation are themselves processes that unfold over time. From an early stage of knowledge-sharing and idea development, the process of farmer innovation leads to uptake and its outcomes (Ghadim, Pannell, & Abadi Ghadim, 1999). A number of factors shape farmers' innovation process, including technological, economic, institutional and social factors (Klerkx, Van Mierlo, et al., 2012).

In the Sub-Saharan African context, dynamics around agricultural innovation may play a critical role in the future of the continent (Juma, 2015). On one hand, Africa has experienced an unprecedented wave of foreign direct investment in agriculture and food value chains both from Western countries and other emerging economies (i.e. China, the Middle East, Latin America) (George, Corbishley, Khayesi, Haas, & Tihanyi, 2016) in the past ten years.

This wave of investments offers opportunities for access to technology, knowledge, and financial resources to stimulate farmer innovation on a large scale (Juma, 2015). On the other hand, alarming issues around climate change, natural resource depletion, rural poverty, and healthcare risk to undermine agricultural innovation. These social and environmental issues require a profound re-thinking of how to steer farmer innovation along with the deeper and wider process of system transformation (Dentoni et al., 2017; Waddell et al., 2013).

Because of its timely societal relevance, the policy and scientific debate around agricultural innovation in Sub-Saharan Africa has intertwined several perspectives on the drivers involved (Spielman, Ekboir, Davis, & Ochieng, 2008; Sumberg, 2005; Van Rijn, Bulte, & Adekunle, 2012). For example, (Sumberg, 2005) noted that that if we are to understand and influence farmer innovation in Africa, we must also grasp the local and regional institutional, policy, bio-physical and socio-economic heterogeneity of African agriculture Complementarily, the role of agricultural education and training may play a critical role in building the capacity of organizations and individuals to trigger farmer innovation along multiple pathways (Spielman et al., 2008). It is also worth noting that this process of agricultural innovation in Sub-Saharan regions has been criticized for influencing traditional polycultures to shift away from subsistence farming and move towards the "adoption of modern seed varieties, inputs, and credit in order to specialize in marketable crops and achieve increased production and income." (Dawson, Martin, & Sikor, 2016, p. 204).

Because of its societal relevance and timeliness, it is not surprising that novel policy, institutional, and managerial efforts have advanced in recent years to

coordinate the innovation systems surrounding farmers in Sub-Saharan Africa (Barasa et al., 2017). MSPs especially have been thriving as novel organizational forms to build networks and co-create knowledge among farmers and other actors in innovation systems since the early 2010s (Schut, Klerkx, et al., 2016; Schut, van Asten, et al., 2016; van Rooyen et al., 2017). Since then, a literature has emerged, analyzing the impact of MSPs on farmer innovation across multiple countries, predominantly in Sub-Saharan Africa (Schut, Klerkx, et al., 2016). This bulk of research highlights that the impact of MSPs on farmer innovation takes place along multiple outcomes: depending on their expected outcomes, MSPs generate different activities and intermediary outcomes, ultimately influencing innovation around farmers across multiple levels (i.e. policy, institutional, community, farm, and individuals) (Barzola Iza, Dentoni, Mordini, et al., 2019).

Despite these scientific and policy efforts to analyze and steer farmer innovation through coordination among multiple stakeholders, one perspective relating to MSPs and farmer innovation remains underexplored – namely, a focus on farmers' psychology. Broadly speaking, the state of farmers' psychology involves their set of perceptions, attitudes and (intentional or unintentional) biases that may either drive or hamper their intentions to innovate in and around their farms (Alomia-Hinojosa et al., 2018; Hammond et al., 2017; Meijer, Catacutan, Ajayi, Sileshi, & Nieuwenhuis, 2015). Outside the context of MSPs, for example, (Meijer, Catacutan, Ajayi, et al., 2015) focused on how farmers' perceptions and prior knowledge interacted with information received from stakeholders in deciding whether to adopt agroforestry practices (Meijer, Catacutan, Ajayi, et al., 2015). Some studies in this vein focused on farmers' intentional choices. For example, Hammond et al. (2017) analyzed the motivations underlying farmers' willingness to adapt

to sustainable agricultural practices. Others focused more on unintentional biases. For example, Alomia-Hinojosa et al. (2018) delved into the perceptions that underpin farmers' decisions to intensify their maize-legume farm systems, and (Meijer, Catacutan, Sileshi, et al., 2015) zoomed into the underlying factors that mediate between farmers' attitudes and their intentions to innovate. Still other studies focused on the intentional attitudes of farmers that may drive their innovation. For example, (Lioutas & Charatsari, 2018) investigated how farmers' innovativeness antecedes their uptake of environment-friendly innovations. Along these lines, in order to expand the current understanding of the psychological drivers of farmers' innovation and their intentional attitudes in particular, the current study focuses on the concept of farmers' EO, which will be discussed extensively in the next sub-section.

3.2.2. Farmers' entrepreneurial orientation

Building on earlier work on entrepreneurial attitudes (Robinson et al., 1991), the concept of EO has been progressively studied at an individual level, but outside of farming and agricultural contexts (Frese & Gielnik, 2014; Johnson et al., 2017; Krauss et al., 2005; A. Rauch & Frese, 2007). Building upon Robinson et al. (1991) in particular, many scholars have used the established measurement of individual-level EO in five dimensions: autonomy, innovativeness, risk-taking, proactivity and competitive aggressiveness (Krauss et al., 2005). In parallel, other studies have focused on the concept of EO at an organizational (i.e., a firm or farm) level of analysis (Academy et al., 1996; Mthanti & Ojah, 2017). Both the studies that looked at EO in individuals and those that focused on organizational levels of analysis found a positive relationship between EO and business performance and economic growth in multiple contexts worldwide (Frese & Gielnik, 2014; Mthanti & Ojah, 2017).

Because of its intent to contribute to filling a knowledge gap on the psychological drivers of farmer innovation, this study focuses on EO at an individual level of analysis. The debate around the role and measurement of individual-level EO in business performance and economic growth has also influenced scholarship and practice in the agricultural sector (Gellynck et al., 2015; Matsuno et al., 2002; Verhees et al., 2011). Unlike Krauss et al. (2005), the literature in agricultural studies adapted the measurement of farm and farmer EO to reflect *three key dimensions: innovativeness, risk-taking and proactiveness* (Matsuno et al., 2002; Verhees et al., 2011). The dimensions of autonomy and competitive aggressiveness were dropped because of the peculiar characteristics of farming and agricultural contexts in which there is more collaboration and less competition relative to other domains where EO has been studied (Fitz-Koch, Nordqvist, Carter, & Hunter, 2018). Similar to the studies conducted in non-farm contexts, farm EO was found to positively relate to innovation and business performance (Gellynck et al., 2015). Furthermore, scholars have remarked that the measurement of EO needs to adapt not only to the industry (e.g., agriculture), but also to the local geographical context under study (Eijdenberg, 2016; Mthanti & Ojah, 2017). Accordingly, recent studies have adapted the measurement of individual-level EO to the contexts of rural Philippines (Lai, Chan, Dentoni, & Neyra, 2017), Indonesia (Etriya Etriya et al., 2018), Ivory Coast (Yessoufou, 2017), and Albania (Xhoxhi, Dentoni, Imami, & Skreli, 2019).

Along with the dimensions of innovativeness, risk-taking and proactiveness, this study also assesses *entrepreneurial intentions* as a possible dimension of EO at an individual farmer level. In an agricultural context, (George, Reddi, Priti, Tufool, & S., 2015) defined and measured entrepreneurial intentions as the willingness to engage in new business activities, ventures, or projects

within the following three years.. Several studies in multiple contexts of emerging economies found a strong positive relationship between the aforementioned dimensions of EO and entrepreneurial intentions (Ekpe, Mat, & Ekpe, 2015; Koe, 2016; Lai, Dentoni, Chan, & Neyra, 2017). This suggests the possibility that, in the context of farms in emerging economies entrepreneurial intentions in individuals may be considered as a dimension effectively reflecting EO along with innovativeness, risk-taking, and proactiveness.

Within the agricultural context, the relationships between farmers' EO and their innovation have hardly been explored yet, leaving a knowledge gap on how psychological antecedents affect farmer innovation. The study by (Etriya Etriya et al., 2018) represents a notable exception, as the authors assessed how farmers' EO influenced product innovation in the context of the Indonesian vegetable sector. But unlike (E Etriya, Wubben, Scholten, & Omta, 2012), the current study expands the focus from the impact of farmers' EO on product innovation alone to its impact on product, process, and market innovation. Furthermore, it shifts the empirical focus from South-East Asia to Sub-Saharan Africa within the context of MSPs. Therefore, this study provides an opportunity to further refine the emerging theory that relates farmers' EO and agricultural innovation in the context of MSPs and, more broadly, expand our current understanding of the psychological drivers of farmers' innovation in Sub-Saharan Africa.

3.3. Methodology

3.3.1. Data collection

Primary data were collected through a survey questionnaire with 152 farmers in four sub-counties (Mukoto, Namabya, Bukhofu and Namboko) involved in one coffee MSP in the Manafwa district. The data were stratified according to the differences in landscape (highland, midland and lowland), since these altitudes make a considerable difference in the type of coffee production. This data collection was organized in partnership between researchers at Makerere University, the World Agroforestry Centre (ICRAF), and Wageningen University as part of the Value chain Innovation Platforms for Food Security (VIP4FS) project (2015-2018). Based on the demands of the local stakeholders and the project funders (the Australian Centre for International Agricultural Research, ACIAR), the goal of the VIP4FS project was to make the existing coffee MSPs (originally created in 2010 with a focus on stimulating agroforestry practices) in Manafwa more market-oriented. After the research design was completed, a local team of enumerators composed of two trained Master students administered the survey under the supervision of the research team. All the interviewed farmers agreed to participate and gave consent for the data analysis and dissemination of the empirical findings in aggregated and anonymized form. After a short introduction of the goals and structure of the survey, the enumerators administered the questionnaires to the farmers in interviews of approximately 45 minutes. The questionnaires included items sequentially measuring farm characteristics, farmers' entrepreneurial orientations, and their related product, process and market innovations. All questionnaire items were organized on a 5-point Likert scale as presented in table 3.1 and 3.2.

Table 3.1: Operationalization of Entrepreneurial Orientation

Measure	Related literature	Questionnaire item
Innovativeness	"Entrepreneurial orientation: a psychological model of success among southern African small business owners" (Krauss et al., 2005) and "Adapting the measurement of youth entrepreneurship potential to the context of Mindanao, Philippines" (Lai, Dentoni, et al., 2017)	1. I always like to search for the latest information on technologies for my farm.
		2. I like to try new technologies in my farm.
		3. If there is an improvement in my product, I am willing to change where I sell it.
		4. I am willing to include new varieties on my farm to satisfy more customers.
Risk-taking		5. I would keep my current varieties on the farm rather than substituting them with others that I do not know.
		6. I prefer avoiding investments in my farm if I do not know the benefits that I will get.
		7. I do not want to expand my farm activities because I do not want to incur more costs.
		8. If someone suggests to include more/new varieties on my farm, I will take the risks for a chance for higher profits. *[reverse scale]*
Proactiveness		9. I am willing to start farm practices that other farms do not do yet.
		10. If asked to adopt another type of technology on my farm, I am one of the first farmers to use it.
		11. For my job, I perform above and beyond expectations and there is always something more to be done or improved.
		12. I do not mind failing if I learn something different from another farming practice.
Intentions	"Social structure, reasonable gain, and entrepreneurship in Africa" (George et al., 2015)	13. I intend to start a new business activity or project in the next three years (i.e. trading, processing).
		14. I intend to include new technologies to increase the yield of my farm production in the next three years.
		15. I intend to expand the contacts with other actors in my value chain in the next three years.
		16., I intend to expand use credit and savings to expand my farm production in the next three years.

Specifically, the survey questionnaire was structured as follows. First, farm characteristics entailed demographics, farm size, and access to resources. The key profiling characteristics were **Socio-demographic** (Diamantopoulos,

Schlegelmilch, Sinkovics, & Bohlen, 2003). They mostly played the role of controls in the conceptual framework, which primarily focused on farmers' EO and their product, process and market innovation. Specifically, due to their potential role in driving farmer innovation, age, gender, and education level were included. Empirical evidence shows a correlation between these characteristics and farmer innovation in developing countries (Adesina & Baidu-Forson, 1995; Doss & Morris, 2005; Weir & Knight, 2004). **Farm size** corresponds to the average dimensions of a smallholder's farm. In many developing countries, the average farm size is relatively small (i.e., 2,4 hectares in sub-Saharan Africa), which implies that the agricultural sector is dominated by owner-operated family units that combine ownership of agricultural equipment with management (Deininger & Byerlee, 2012). **Access to resources** was another important characteristic to include in the research since not all farmers in sub-Saharan Africa have the same access to resources, and this issue can have an impact on the efficiency of their value chains (Tittonell et al., 2010). In this research, resources will be categorized into two different blocks: tangible resources on one hand, intangible ones on the other. The tangible resources are represented by financial and physical assets: credit, artificial fertilizers/beehives, seedlings/bees, and networks are tangible resources in the Ugandan context. The intangible resources correspond to human resources and intellectual capital (Bontis, N., Dragonneti, N.C., Jacobavailable to measure and manason, K., Roos, 1999; Grant, 1991) or organizational and relational capital (Fernández, Montes, & Vázquez, 2002).

Table 3.2: Operationalization of farmer innovation

Measure	Literature	Questionnaire item
Product Innovation	"Social connectedness in marginal rural China: The case of farmer innovation circles in Zhidan, north Shaanxi" (Wu & Pretty, 2004)	I have improved the quality features of my coffee in the past five years.
Process Innovation	"An empirical research on farmer innovation in agriculture industrial clusters" (Yang, 2013)	I have improved my way of organizing with other fellow farmers in the past five years.
Process Innovation		I have improved my way of organizing with other actors in my value chain in the past five years.
Market Innovation	"Successful market innovation" (Johne, 1999)	I have changed where I sell my coffee production in the past five years.

Second, as shown in Table 3.1, farmer EO was measured along four key dimensions, namely, **innovativeness, risk-taking, proactiveness,** and **entrepreneurial intentions**. As discussed in the previous theory section, these dimensions combined a personality trait approach (Krauss et al., 2005; Lai, Chan, et al., 2017) and an approach focusing on intentions (George et al., 2015). The former approach is rooted in the study of psychology and assumes that personality traits deeply underlie a person's ability to recombine resources innovatively (Kalkan & Kaygusuz, 2012; A. Rauch & Frese, 2007). In its early conceptual development, this approach considered entrepreneurial orientation as a personality trait that actors either have or don't have, but is inherently impossible to form over time (A. Rauch & Frese, 2007).

Later, though, studies found that entrepreneurial orientation is rather an attitude or mindset that can grow, shift, or decrease over time (Johnson et al., 2017; Kalkan & Kaygusuz, 2012). This is an important development with

implications for agricultural studies, as it means that farmers may develop (or even be appropriately trained to form) an entrepreneurial orientation over time. Also, we built upon (George et al., 2015) in measuring entrepreneurial intentions, keeping in line with the assumption that farmers' intentions are an important aspect of their entrepreneurial orientation.

Third and last, as shown in Table 3.2, farmer innovation was measured in terms **of product, process, and market innovation** in line with the empirical analyses by Wu & Pretty (2004) on product innovation, Yang (2013) on process innovation, and Johne (1999) on market innovation. All items were adapted to the Ugandan coffee context through two steps. First, the questionnaire items coming from the literature were discerned and adapted by the research team in collaboration with the trained enumerators. Second, a pilot test with five coffee farmers was administered. After further adaptation through the outcome of this pilot phase, the same five farmers took the final questionnaire again as part of the final sample of n=152 respondents.

3.3.2. Data analysis

For the first step of the analysis, a **Confirmatory Factor Analysis (CFA)** was performed to assess whether the questionnaire items from an earlier study in a different rural context (i.e., The Philippines, Lai et al., 2017) also reflected the measurement of EO in the context of rural Uganda. Adapting the measurement of farmers' EO to the local context under study improves farmers' understanding of the questionnaire items, therefore improving the explanatory power of the statistical inference (Gerbing & Anderson, 1988). Specifically, CFA allows for the assessment of whether a measurement model for a latent or intangible variable (such as entrepreneurial orientation) is appropriately

reflected by a set of questionnaire items in a specific context (such as Ugandan coffee and honey value chains) (Long, 2011). As we know from the CFA methodological literature (Harrington, 2009), the following indices help to assess the fit of the measurement model of EO within the local context: chi-squared test, the root mean square error of approximation (RMSEA, along with its confidence interval), and the Comparative Fix Index (CFI) (Table 3.3). Finally, to adapt the model to better fit the data, the Wald test and the Lagrange Multiplier (LM) test indicated which questionnaire items to drop and which additional relationships to consider, respectively.

After performing the CFA, multi-variate statistics were run in the form of **path analysis through partial least squares (PLS)**. The use of multi-variate statistics is appropriate when testing complex relationships among multiple variables and, more specifically, when testing a model with multiple dependent variables (Hair et al., 2016). Furthermore, PLS for path analysis suits cases in which the sample of respondents is small relative to the degrees of freedom of the tested model (Hair et al., 2016). Therefore, in line with the research question, path analysis through PLS was used to: 1) explore the complex relationships linking farmers' EO dimensions (proactiveness, innovativeness, risk-taking, and entrepreneurial intentions) and their product, process and market innovations; and 2) assess the role of control variables (such as socio-demographic characteristics, farm size and access to resources) on agricultural innovation relative to farmers' EO. As such, with path analysis, it is possible to assess to what extent farmers' EO plays a role in shaping agricultural innovations compared to other commonly hypothesized antecedents, such as education, gender, age, farm size, and access to resources. Because of goodness-of-fit considerations on the PLS model, though, farm size and gender were omitted from the final model displayed in Figure 3.2 and Table 3.4 on the

basis of the low covariance with farmers' innovation and the related Wald test (Hair et al., 2016)

3.4. Empirical findings

3.4.1. Adapting the measurement of farmers' entrepreneurial orientation

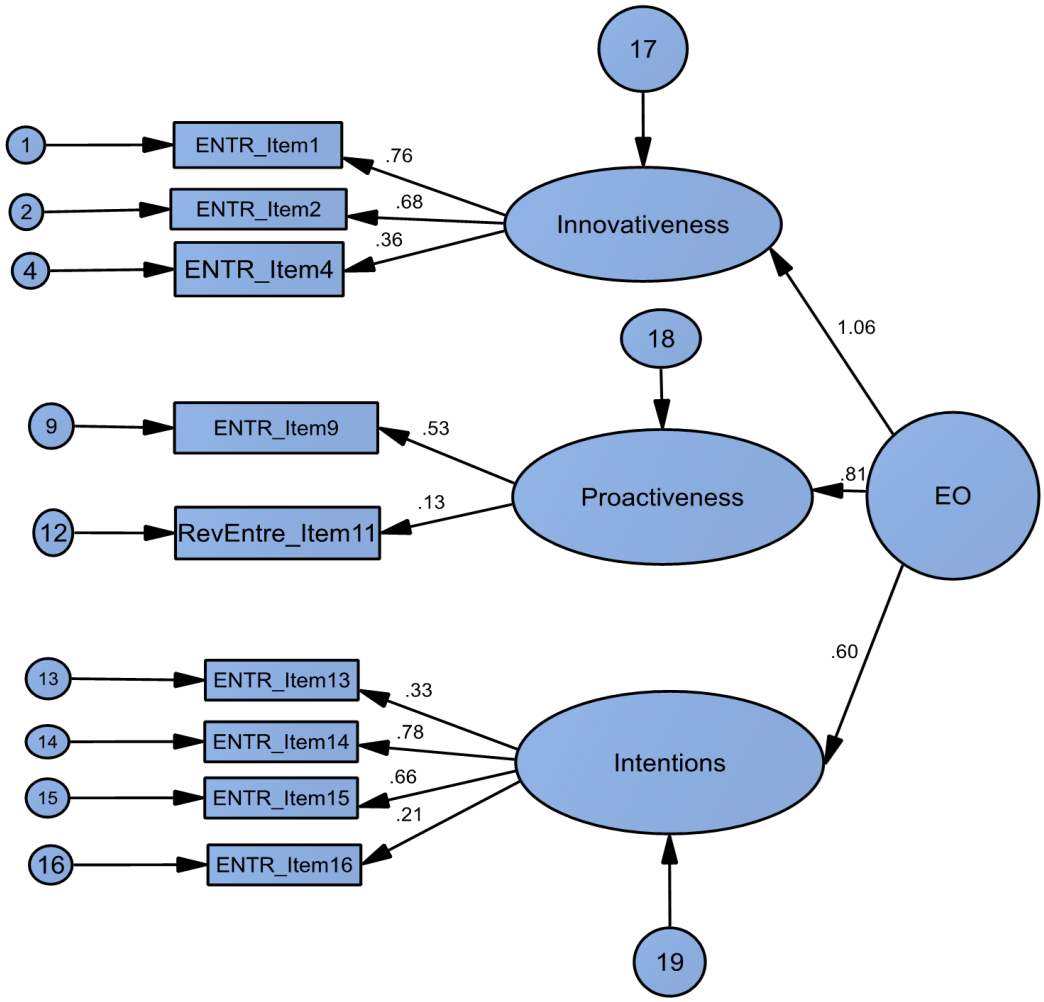
Overall, empirical findings from the CFA (reported in Figure 3.1 and Table 3.3) suggested that the measurement of innovativeness, proactiveness, and entrepreneurial intentions require a slight adaptation to fit the context of Ugandan honey and coffee MSPs. Conversely, the measures related to risk-taking did not sufficiently fit the empirical context. Therefore, the risk-taking factor was eliminated from the final measurement model (Figure 3.1).

Consistent with the use of CFA, the process of testing and adapting the measurement model of farmers' EO in the context of rural Uganda involved three steps, which delivered the following partial results:

> Model 1 results (i.e., the initial model with all 16 questionnaire items from Table 3.1): As Table 3.3 (second column) suggests, the goodness-of-fit indexes of this first measurement model indicated a poor fit with the empirical data. Therefore, on the basis of the covariance matrix and the Wald test (Hair, Murtagh, & Heck, 2006), the risk-taking factor was dropped since its items were the least related with the other EO items and latent factors. This indicates that the questionnaire items reflecting risk-taking do not have a strong relation to the other measures and dimensions of EO in the context of rural Uganda.

Model 2 results (after dropping the four risk-taking measures): As Table 3.3 (third column) suggests, the measurement model had improved, yet it still displayed a poor fit to the empirical data.

Figure 3.1 The measurement model of farmers' entrepreneurial orientation and intentions adapted to the context of Ugandan coffee and honey multi-stakeholder platforms.



Therefore, again on the basis of the covariance matrix and the Wald test (following the trial-and-error iterative procedure of multi-variate statistics to find the model with the best fit; see Hair et al. 2006), two questionnaire items of proactiveness (Items 10 and 11) and one questionnaire item of innovativeness (Item 3) were dropped. This means that the following two items did not strongly relate with the other measures of farmers' proactiveness and, more broadly, farmers' EO: "If asked to adopt another type of technology in my farm, I am one of the first farmers to use it" (Item 10) and "For my job, I perform above and beyond expectations and there is always something more to be done or improved" (Item 11). Similarly, "If there is an improvement in my product, I am willing to change where I sell it" (Item 3) did not strongly relate with the other measures of farmers' innovativeness.

Model 3 results (the final model displayed in Figure 3.1): As Table 3.3 (fourth column) suggests, this model had an acceptable or good fit with the empirical data, depending on the specific index considered. In particular, the chi-square p-value scored below the cut-off value for a good fit (therefore, it is statistically considered as an 'acceptable' fit). Conversely, the CFI and RMSEA indices (which are more reliable in situations with small sample sizes and non-normal distribution of the data (see Hair et al. 2006) displayed values above the cut-off point for a good fit.

Therefore, on the basis of these considerations, we chose Model 3 as the final model for the follow-up path analysis through PLS.

Table 3.3: The goodness-of-fit indices of the adapted measurement models of farmers' entrepreneurial orientation and intentions.

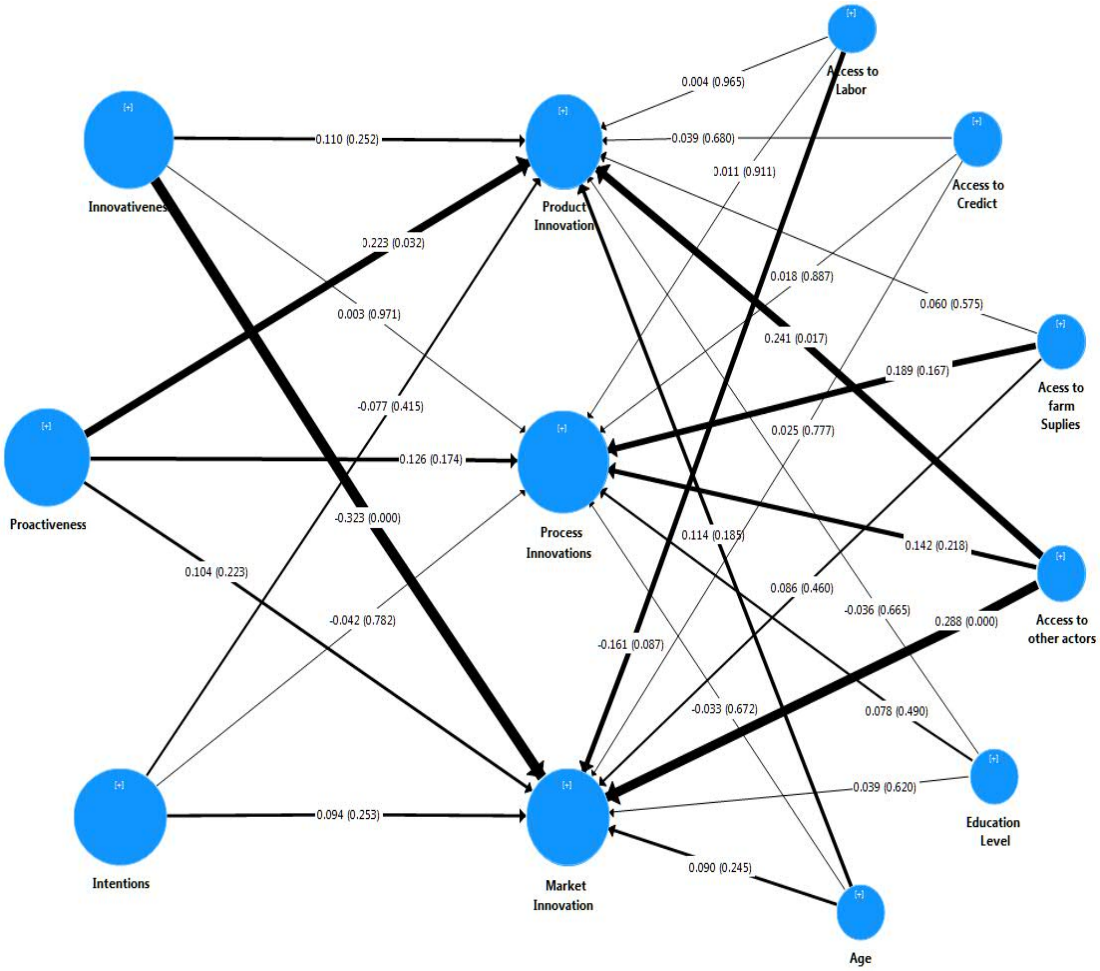
	Cut-off for good fit	**Model 1 (see Table 3.1)**	**Model 2 (Table 3.1after excluding risk-taking)**	**Model 3 = Final Model (see** Figure 3.1**)**
Chi-square (X^2) p-value	p-value> 0.05	0,000	0,003	0,045
CFI	CFI > 0.90	0,755	0,872	0,933
RMSEA	0,08	0,072	0,065	0,055
RMSEA (low 90%; high 90%)	(0,05; 0,08)	(0,054; 0,089)	(0,038; 0,089)	(0,009; 0,088)

Legend: Cut-off values for good fit are based on (Hooper, Coughlan, & Mullen, 2008). Findings from Model 1, 2 and 3 stem from our own data elaboration.

3.4.2. The influence of entrepreneurial orientation on farmers' innovation

The empirical results of the complex relationships linking farmers' EO – as well as the control variables, i.e., socio-demographic characteristics, farm size, and access to resources – to product, process, and market innovations are illustrated in Figure 3.2 and Table 3.4. Figure 3.2 provides a visual understanding (given the thickness of the arrows) of which antecedents play a strong role in farmers' product, process and market innovations. Complementarily, Table 3.4 shows which relationships were found to be statistically significant at 90% (*), 95% (**) or 99% (***) likelihood.

Figure 3.2 Visual representation of the strength of the relationships linking farmers' EO, control variables and farmers' product, process, and market innovation.



Legend: the thickness of the arrows visually represents the strength of the relationships among the analyzed variables. The values associated with each arrow refer to the original sample mean (p-values).

Table 3.4: Statistical details on the direction and strength of the relationships linking farmers' EO, control variables and farmers' product, process and market innovation.

Analyzed Relationships	Original Sample Mean	Standard Deviation	T Statistics	Sig
Access to Credit -> Market Innovation	0.025	0.087	0.289	
Access to Credit -> Process Innovations	0.018	0.125	0.144	
Access to Credit -> Product Innovation	0.039	0.097	0.404	
Access to Labour -> Market Innovation	**-0.161**	**0.096**	**1.669**	**
Access to Labour -> Process Innovation	0.011	0.101	0.113	
Access to Labour -> Product Innovation	0.004	0.093	0.044	
Access to other actors -> Market Innovation	**0.288**	**0.081**	**3.550**	***
Access to other actors -> Process Innovation	0.142	0.116	1.228	
Access to other actors -> Product Innovation	**0.241**	**0.101**	**2.392**	***
Access to farm Inputs -> Market Innovation	0.086	0.117	0.734	
Access to farm Inputs -> Process Innovation	0.189	0.137	1.377	
Access to farm Inputs -> Product Innovation	0.060	0.107	0.560	
Age -> Market Innovation	0.090	0.078	1.150	
Age -> Process Innovation	-0.033	0.078	0.425	
Age -> Product Innovation	**0.114**	**0.084**	**1.349**	*
Education Level -> Market Innovation	0.039	0.079	0.490	
Education Level -> Process Innovation	0.078	0.115	0.677	
Education Level -> Product Innovation	-0.036	0.083	0.432	
Innovativeness -> Market Innovation	**-0.323**	**0.071**	**4.518**	***
Innovativeness -> Process Innovation	0.003	0.091	0.037	
Innovativeness -> Product Innovation	0.110	0.097	1.133	
Intentions -> Market Innovation	0.094	0.083	1.128	
Intentions -> Process Innovations	-0.042	0.151	0.278	
Intentions -> Product Innovation	-0.077	0.093	0.823	
Proactiveness -> Market Innovation	0.104	0.085	1.216	
Proactiveness -> Process Innovation	**0.126**	**0.092**	**1.371**	*
Proactiveness -> Product Innovation	**0.223**	**0.103**	**2.171**	***

The key findings from the path analysis can be synthesized in the following four points. First, **farmers' proactiveness has a significantly positive relationship especially with product innovation and**, to a lesser extent (90% statistical significance), **with process innovation** (Table 3.4). This means that the more a farmer is "willing to start farm practices that other farms do not do yet" (Item 9) and does not "mind failing when learning something different from another farming practice" (Item 12), the more s/he has "improved the quality features of her/his coffee in the past five years." To some extent, this also means that farmers' proactiveness relates to the improvement of their "ways of organizing with other fellow farmers" and "with other actors in the value chain" in the past five years. These results are not particularly surprising, per se, as they confirm the literature both in a Western context (Unsworth & Parker, 2008) and African non-rural context (Boso, Story, & Cadogan, 2013). What is more interesting, though, is the importance of the role farmers' proactiveness plays on product innovation compared to several other demographic factors (e.g., age, gender, or education) and strategic factors (e.g., farm size or access to resources and other actors).

Second, **innovativeness has a significantly strong *negative* relationship with market innovation** (Table 3.4). Referring to the specific meaning of the questionnaire items may help interpret the meaning of this negative relationship more granularly. Specifically, the more a Ugandan coffee farmer is willing to "search for the latest information on technologies for her/his farm" (Item 1), "change where s/he sells it if there is an improvement in her/his product" (Item 3), and "include new varieties in her/his farm to satisfy more customers" (Item 4), the lower is the likelihood that s/he has "changed where s/he sells coffee production in the past five years". This result is surprising when compared to the established literature from Western non-rural contexts

(Kreiser & Davis, 2010; Miller & Friesen, 1983), which asserts that innovative firms (at an organizational level) and managers (at an individual level) are more likely to also engage in new markets over time. However, recent literature highlights how the use of market innovation and performance measures may need deeper re-thinking when applied to an African context (Sethibe & Steyn, 2016). For example, to a Ugandan coffee farmer, *not* having "changed where s/he sells coffee production in the past five years" may have a stronger association with performance and, more broadly, with something desirable (for example, because of the stability of the income from the market) compared to changing her/his market channels.

Third, **access to other actors has a significantly strong positive relationship with product and market innovation**. In the questionnaire item, access to other actors was explained as "access, for example, to non-government organizations, extension officers, policy-makers, or value chain actors." Unfortunately, the questionnaire does not provide a more detailed understanding of which among these actors may have a stronger influence when accessed by farmers. This means that the more a farmer had access to these actors, the more s/he "improved the quality features of her/his coffee in the past five years" and "changed where s/he sells coffee production in the past five years." This finding is not surprising considering that networks giving access to these actors play a critical role for innovation in the context of MSPs in several African contexts (Dentoni, Klerkx, et al., 2019; Hermans et al., 2017; Kilelu et al., 2013; Thiele et al., 2011). What is surprising, though, is that farmers' access to these actors holds the strongest relationship with product and market innovation vis-à-vis access to other key resources (e.g., credit or labor), the studied dimensions of EO, and other farmers' and farm characteristics (e.g., education, age, gender, or farm size).

Fourth, **access to labor has a significant *negative* relationship with market innovation**. In coffee farming, labor usually involves – in different seasons - picking cherries and pruning, while most of the other activities are usually performed by the farmer and her/his family. Hence, in this context, this finding means that the more available farm labor is to farmers, the less s/he is likely to have "changed where s/he sells coffee production in the past five years." Again, from a Western perspective, this is quite surprising because human capital may create competitive advantage and result in market upgrading (Noe, Hollenbeck, Gerhart, & Wright, 2017). Yet, similar to what was highlighted in the second finding, the notion of "changing where s/he sells coffee production in the past five years" may not necessarily have been perceived as being related to good performance or something desirable by the sampled farmers – as in cases where, given their situation, they value the stability of their existing market channels more than change (Stolze et al., 2018).

3.5. Implications

By bringing farmers' EO to the core of the debate on what drives and supports agricultural innovation in the context of MSPs, the empirical findings from this study lead to methodological, theoretical, and organizational implications. Broadly speaking, the findings have methodological implications for future studies on EO and innovation in the context of rural Africa. Theoretical implications can also be taken from these empirical findings, thus contributing to our collective understanding of farmers' EO and innovation in the context of MSPs. Finally, managerial implications stemming from these empirical findings offer actionable suggestions to decision-makers (e.g., agents in non-governmental organizations, companies, or communities) involved in MSPs.

3.5.1. Methodological implications

The first methodological implication involves the measurement of farmers' EO, and specifically risk-taking, in the context of rural Uganda. Relative to the measurements of farmers' EO in other international contexts (Matsuno et al., 2002; Verhees et al., 2011)– including Indonesia (Etriya Etriya et al., 2018), Ivory Coast (Yessoufou, 2017) and Albania (Xhoxhi et al., 2019) – our empirical findings from the CFA (see section 4.1) show that the measurements of risk-taking as a specific dimension of entrepreneurial orientation did not fit the data in the studied Ugandan coffee MSP context. This means that the interviewed farmers in Uganda did not strongly relate the questionnaire items on risk-taking to the other EO questionnaire items. One plausible interpretation of this mismatch between risk-taking items and other EO items is that risk-taking may not be a suitable dimension of EO in a farm context afflicted by market, social and environmental shocks, such as the Ugandan coffee sector. This could confirm the same findings and interpretation of Lai et al. (2017)in the Philippines, where the uncertain, fragile context under study was also rural, but non-farm. Given the limited sample size used in this study, though, it is worth conducting further tests on risk-taking in other contexts before recommending to definitively drop this dimension from future studies involving EO in rural contexts.

The second methodological implication *concerns the measurement of market innovation in the context of rural Uganda*, which was consistent with the most surprising empirical finding of this study – that market innovation is more likely to decrease when farmers are more innovative and have more access to labor. It is plausible that the interviewed Ugandan farmers may have perceived the formulation of this item – adapted from Johne (1999) in a Western, non-

rural socio-economic context – as something not necessarily desirable, or even undesirable, in relation to market performance. For example, some interviewees may have interpreted the "change where they sell" item as a downgrade or an increased uncertainty related to market stability. Hence, on the basis of this surprising empirical finding and following this plausible interpretation, we suggest testing different formulations of the questionnaire item reflecting market innovation (i.e., "I have changed where I sell my coffee production in the past five years") in future research.

3.5.2. Theoretical implications

From a theoretical standpoint, empirical findings contribute to the scientific debate on the drivers of agricultural innovation by exploring the influence of farmers' EO on their product, process, and market innovation. Specifically, the empirical findings contribute to this scientific debate in three ways. First, they confirm that *farmers' EO, and more specifically farmers' proactiveness, plays a remarkable role in influencing product innovation even when other competing strategic drivers* (i.e., access to resources or networks) *are taken into account*. This result confirms that EO – and, more broadly, farmers' (self-reported) attitudes and behaviors – play an important role as psychological drivers of innovation. This advances the literature on the farmers' psychological drivers of agricultural innovation (Alomia-Hinojosa et al., 2018; Hammond et al., 2017; Meijer, Catacutan, Ajayi, et al., 2015) by bringing EO to the foreground. Furthermore, it confirms and extends the result recently found by Etriya et al. (2018), but in the context of rural Africa and MSPs in the coffee sector.

Furthermore, relative to Etriya et al. (2018), this study expanded the focus from product innovation alone to process and market innovation. Likewise, in line with Lai et al. (2017), this study expanded from considering only proactiveness, risk-taking, and innovativeness as dimensions of farmers' EO to also include entrepreneurial intentions. The addition of entrepreneurial intentions as a dimension of farmers' EO did not lead to significant relationships with agricultural innovations. Conversely, *the addition of market innovation led to a surprising result – that is, market innovation decreases with farmers' innovativeness and access to labor*. Along with the methodological issues discussed in the previous sub-section, this finding calls for a deeper exploration of possible trade-offs between product, process, and market innovation that Ugandan coffee farmers, especially when entrepreneurial, may face in their agricultural practices.

Third and last, this study reveals the importance of accessing resources (such as labor) and networks relative to farmers' EO. Importantly, we found that *farmers' access to networks represents by far the strongest driver of product and market innovation*. This empirical result confirms that – also when considering farmers' EO as psychological drivers - agricultural innovation systems play a structural role in relation to farmer innovation, both in terms of knowledge and more tangible resources (Abebe et al., 2013; Klerkx & Leeuwis, 2008b, 2008a; Pascucci & de-Magistris, 2011). This finding calls - especially in future research at the intersection of innovation and psychology studies applied to agricultural value chains – for an assessment of how farmers' position in their network *together with* their psychological features (such as EO) influence their agricultural innovations. Considering this combination of network and psychological drivers at a farmer level is essential, especially in the context of MSPs, since their goal is – often explicitly – to inclusively (i.e.,

with a specific attention to the more resource-scarce actors) provide capacity-building and network facilitation services (Barzola Iza, Dentoni, Allievi, et al., 2019; Kilelu, Klerkx, & Leeuwis, 2014).

3.5.3. Managerial implications

In turn, the theoretical contributions highlighted above lead to managerial implications, especially for those involved in decision-making within MSPs. In particular, empirical findings from this study suggest that the development of farmers' proactive and innovative mindsets and attitudes should be brought to the core of capacity building activities – for example, through workshops, coordination of hubs or incubators for farmers, and other temporary or permanent events. In doing so, MSPs can represent useful organizational spaces for engaging in entrepreneurship training and thus supporting the development of entrepreneurial ecosystems (Bruton & Ahlstrom, 2003; Dentoni & Klerkx, 2015; Seuneke, Lans, & Wiskerke, 2013; Manyise et al. 2019). In relation to capacity-building, our findings highlight that older farmers significantly (with 90% likelihood) invest more on product innovation than younger ones. This finding suggests that different capacity-building activities could be further tailored to the age of the farmers involved, depending on the specific MSP goals. If the goal of the MSP is to maximize product innovation by those most likely to innovate, then older farmers should be at the core of capacity-building activities that trigger farmers' proactiveness. Conversely, if the goal of the MSP is to widen the distribution of innovation across the whole range of farmers involved, then training on proactiveness should focus especially in the younger generation of farmers.

This managerial implication on the importance of entrepreneurial capacity-building in MSPs sheds light on an underlying controversy in the academic literature of EO. This controversy revolves around the question: can farmers' EO, and, more broadly, EO as a psychological trait or mindset, change over time? In the specific context of agriculture, can a capacity-building activity generate a significant shift of EO in a relatively short period of time?

Early scholars assumed that EO constituted an immutable trait that individuals are born with, rather than learn (Rausch and Frese 2000; Frese et al. 2002). Conversely, recent large-scale empirical research demonstrated that individual-level EO can change even over relatively short periods of time, as, for example, an outcome of dedicated trainings (see Campos et al. 2017 in the context of rural Western Africa with specific emphasis on proactiveness). In this study, we embrace the latter view, thus suggesting that EO may shift over time. This assumption seems in line with the broader notion of agricultural entrepreneurship as a farmer's process of recombining resources innovatively to seek or create opportunities for value creation (Lans et al. 2017; Shane & Venkataraman, 2000). Since entrepreneurial processes start from an orientation towards generating, developing, implementing, or adapting new ideas (Damanpour & Wischnevsky, 2006)(Damanpour & Wischnevsky, 2006) it seems plausible to assume that training could play an important role in stimulating EO and its specific dimensions. Hence, in the specific context of coffee MSPs, decision-makers may find it effective to invest in entrepreneurship training – with activities specifically focused on practicing proactiveness on the coffee farm – to stimulate farm innovations (Devaux et al., 2007; Kilelu et al., 2013), process innovations (Hounkonnou et al., 2012; Leeuwis, 2004), and market innovations (Dentoni et al., 2012; Devaux et al., 2009; Schut, Klerkx, et al., 2016).

3.6. Conclusion

This study has empirically investigated how farmers' EO influences agricultural innovation in the context of Ugandan coffee MSPs, contributing to explanations of why some farmers participating in MSPs may engage in product, process, and market innovations more than others. Empirical findings revealed that farmers' proactiveness and innovativeness – two key dimensions of farmers' EO – play an important role in explaining innovation also when other important factors (such as access to resources and networks) are taken into consideration. Moreover, from a methodological standpoint, it seems plausible that the measurement of risk taking (as another key dimension of EO) and of market innovation requires further adaptation to the context of the Ugandan coffee sector and, perhaps more broadly, of rural Africa.

Two limitations need to be taken into account when generalizing and drawing managerial recommendations from these empirical findings. First, since only farmers participating in MSPs were interviewed, the sample size is quite limited. Hence, replications possibly with larger samples seem necessary to establish novel theories and methods from these findings. Second, the PLS multi-variate statistics utilized to analyze the empirical data do not uni-directionally resolve the causal relationship between farmers' EO and their innovation. In other words, the empirical findings may also be interpreted as if farmers' innovation may shape their EO over time. While much of the literature on entrepreneurship and innovation assumes that EO as a psychological trait (Rausch and Frese 2000; Frese et al. 2002) does not vary as rapidly over time as innovation (Gellynck et al., 2015), it would be helpful in future research to test the causality of the relationship.

Taking these limitations into account, this empirical study contributes to the scientific debate on agricultural innovation in MSPs by highlighting the role of an important yet underexplored driver, that is, farmers' EO. The empirical findings suggest that, in particular, MSPs may – and perhaps should – play an important role in building farmers' entrepreneurial capacity to accelerate and scale agricultural innovation processes. With a stronger focus on entrepreneurial capacity building, MSPs may reduce the persisting innovation gap among different farmers participating in the same MSP, a gap which may limit processes of inclusive development or, worse, fuel dynamics of socio-economic exclusion in rural Africa.

Chapter 4. The role of farmers' value network embeddedness on agricultural innovation in Ugandan coffee multi-stakeholder platforms

An earlier version of this chapter has been published as:

Barzola Iza, C.L., Dentoni, D., Allievi, F., Slikke, T., Isubikalu, P., Oduol, J., Omta, S.W.F. (2019). "Challenges of youth involvement in sustainable food systems: Lessons learned from the case of farmers' value network embeddedness in Ugandan Multi-Stakeholder Platforms". In: (Eds.), Valentini, R., Sievenpiper, V., Antonelli, M. and Dembska, K, *Achieving the Sustainable Development Goals through sustainable food systems*. Springer, Cham. In press.

4.1. Introduction

This chapter delves into the broad societal and managerial question of why some farmers may innovate more than others when participating to the same Multi-Stakeholder Platforms (MSP). This innovation may come in many forms. For example, engaging in new farm practices (i.e., product innovation), experimenting with new ways of organizing with their peers (i.e., process innovation), or linking to novel market channels (i.e., market innovation). This question has societal implications if we assume that farm innovation plays a vital role for rural development (Hermans et al., 2017) and climate resilience (Campbell et al., 2016), especially in the context of rural Sub-Saharan Africa, where this study is situated. Also, this question has managerial implications for decision makers of MSPs (Sartas et al., 2018). If we assume that MSPs ultimately seek to promote and sustain inclusive pathways to rural development, then decision makers need to understand why such an 'innovation gap' among farmers persists and how to reduce it (N Faysse, 2006). This question taps into a underlying debate in the flourishing literature on MSPs and farmer innovation on whether and to what extent MSPs are 'truly' inclusive in promoting agricultural innovation and rural development (Cheyns, 2011; Dentoni et al., 2018; Hall, Matos, & Langford, 2008; Hall, Matos, Sheehan, & Silvestre, 2012).

While studies have not yet investigated the causes driving this 'innovation gap' among farmers participating in the same MSPs (see Barzola Iza, Dentoni, & Omta, (2019) for a systematic review), a much broader strand of the literature – outside the specific context of MSPs – has investigated drivers of agricultural innovation (Leeuwis & Van den Ban, 2004; Sunding et al., 2001). Widely studied drivers of agricultural innovation include, among other things, farmer

demographics such as education, farm size, age, off-farm activities (Läpple, Renwick, & Thorne, 2015), organizational arrangements such as the flexibility of innovation programs dealing with farmer diversity (Camacho-Villa et al., 2016), and social factors such as access to technology and social capital (Birhanu, Girma, & Puskur, 2017). Within this wide literature, the field of agricultural innovation systems (AIS) has looked closely at the systemic conditions – that is, the configuration of the social networks and other institutions in which farmers are embedded – that may explain this 'innovation gap' (Klerkx et al., 2010), including MSPs (Kilelu et al., 2017; Schut, Klerkx, et al., 2016). Nevertheless, this AIS view on farmer innovation has been recently criticized for insufficiently taking into account the deeper socio-economic background from which farmers originate (Barrett, Feola, Krylova, & Khusnitdinova, 2017) and the power dynamics that underlie issues of exclusion in and around MSPs (Cullen et al., 2014).

In relation to this debate, this chapter introduces *the concept of value network embeddedness to understand the systemic conditions that may influence farmer innovation while taking into consideration the power dynamics present in MSPs*. Value networks represent sets of relationships in a system (e.g., a community, country, or region) associated with key resources (Allee, 2008). Thus, in addition to social networks do, value networks describe also which key resources (e.g., information, knowledge, finance, technology, or a combination of those among the others) are shared or exchanged between each node of the network (Allee, 2008). Hence, value networks associate 'values' to the resources that foster relationships in a network (see section 2). Therefore, in the context of agricultural systems, the study of the value networks in which farmers are embedded, i.e., *farmers' value network embeddedness*, may explain why some farmers are in stronger positions than others (Block et al.,

2008; Dentoni, Bijman, et al., 2019) and are therefore more likely to access the resources that they need to innovate. Given the potential of this concept for explaining levels of farmer innovation in MSPs, the specific research question of this study can be framed as: *how does farmers' value network embeddedness drive their innovation in the context of MSPs?* More specifically, while MSPs themselves may aim to foster farmers' value network embeddedness, this study seeks to understand how farmers' value network embeddedness *prior to* their involvement in MSPs may shape their innovation efforts and outcomes over time.

To contribute to understanding the drivers of agricultural innovation in MSPs from the perspective of farmers' value network embeddedness, this chapter looks at the context of the Ugandan coffee sector, specifically in one MSP in the Manafwa district in the east of the country (Muthuri, 2017). Uganda has a strong tradition of MSPs in several agricultural sectors (Fungo et al., 2011; Mutebi Kalibwani et al., 2018) including coffee (D B Magala et al., 2018; Schut, Klerkx, et al., 2018), yet the innovation gap among farmers remains problematic (Cooper & Wheeler, 2015; Katungi, Edmeades, & Smale, 2008). Thus, seen through the lens of value network embeddedness (see section 2), the case of Ugandan coffee MSPs constitutes an interesting empirical context to explore why this innovation gap persists and how farmers' value network embeddedness might play a role in it. Based on qualitative data collection and analysis, this study unfolds in three interrelated steps. First, it operationalizes farmers' value network embeddedness in its empirical context (see section 3.1). Second, it clusters farmers according to their different levels of value network embeddedness (see section 3.2). And third, it relates farmers' value network embeddedness to the challenges faced in their innovation efforts (see section 3.3). The empirical findings stemming from this study (see section 4)

lead to a discussion on how the concept of value networks may support the study of agricultural innovation and inform MSP theory and practice (see section 5).

4.2. Literature review

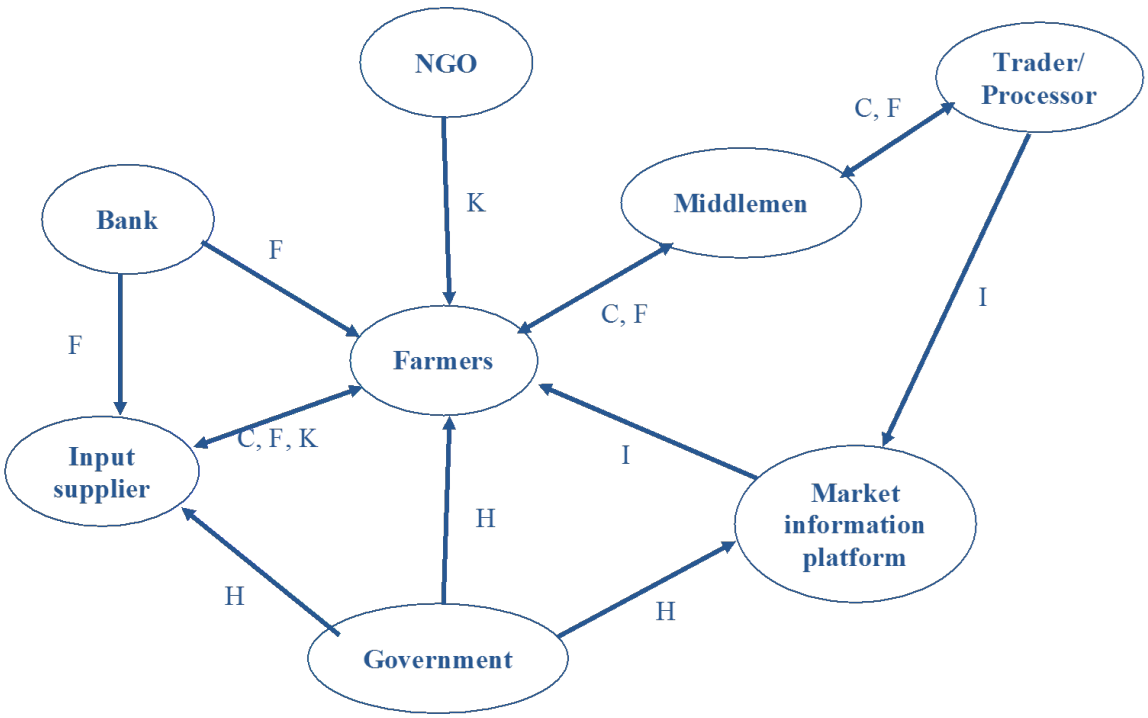
4.2.1. Value networks: definitions, distinctive features, and systems-level implications

This study introduces the concept of value networks, and specifically of value network embeddedness, as a possible driver of farmer innovation in MSPs. Broadly speaking, *value networks* (also called *value webs*) represent sets of relationships in a system (e.g., a community, country, or region) through which key resources, both tangible (e.g., money, products, or infrastructure) and intangible (e.g. rules, knowledge, or reputation) are exchanged (Allee, 2008, 2009). Figure 4.1 illustrates a basic example of a value network in which farmers may be embedded (for a full visual representation of value networks applied to African food and agriculture, see Dentoni & Krussmann 2015).

The features of the value network are different from, but complementary to, similar networks – namely, value chains, social networks, and net-chains (Lazzarini, Chaddad, & Cook, 2001) – in understanding an actor's strategic position in a complex system (Block et al., 2008; Dentoni, Klerkx, et al., 2019). A similar figure illustrating value *chains* would exclude actors such as NGOs and Government because they focus only on an actor's position relative to others in their value chain (Gereffi, Humphrey, & Sturgeon, 2005). Value networks, though, are concerned with the broader set of networks surrounding each actor. Likewise, social networks focus only on the sets of relationships connecting each actor, and so they would not consider resources such as

knowledge (K), hierarchy (H) or funding (F) associated with the relationships among nodes (Dentoni, Klerkx, et al., 2019), while value networks also consider the valuable resources (e.g., money, information, knowledge, etc.) flowing through each relationship.

Figure 4.1 Basic illustrative example of value networks in a farming context



Legend: Nodes represent actors in a simplified system; arrows represent relationships between actors; letters associated to each relationship represent the following resources: C = commodity; F = funding; H = hierarchy or rules; K = knowledge or advice; I = information; the direction of the arrows represents the direction of transfer of the associated resources. Source: authors' elaboration. Source: (Dentoni, Klerkx, et al., 2019).

Given this definition of the features of value networks, it follows that *the configuration of value networks in any system, including agricultural and food systems, is of strategic importance* both for the individual actors embedded in that system as well as for the system as a whole (Rossignoli, Lionzo, Francesca, & Andrea, 2018; Scheiterle, Ulmer, Birner, & Pyka, 2018). For the individual actors, the configuration of the value networks surrounding them determines how easily they can access valuable resources, i.e., information about market opportunities, policy influence, reputation, academic knowledge, human capital, funding from investors, etc. Moreover, the configuration of value networks matters also for the system as a whole. From complex adaptive systems theory, we know that the systems that are most modular (i.e., that have the highest heterogeneity of value networks among its actors; see (Dentoni, Klerkx, et al., 2019) are the least resilient (Dentoni et al., 2017; Waddell et al., 2015). In the case of an economic or environmental crisis, for example, the whole system may be at risk if a only few actors are highly interconnected among each other while most remain poorly interconnected (Day, 2014; Levin et al., 2013). Therefore, from a systems-level perspective, the reconfiguration of value networks "will help achieve sustainability goals by solving the problem of resource dependency" (Rossignoli et al., 2018, p. 694). However, we also know that new resource dependencies continuously emerge as farmers' and other actors' problems evolve over time (Rossignoli & Lionzo, 2018). Therefore, the continuous re-assessment of value networks is critical if organizations and actors are to remain aware of their risks, their dependencies, and the ways in which they create value for others (Bocken, Short, Rana, & Evans, 2013). This was shown in the context of the Brazilian bio-economy, where the results of a value network assessment suggested integrating national and international private sector organizations (Scheiterle et al., 2018) In this

example, the concept of value networks was used to inform and support the achievement of sustainability goals. In the context of the US food sector, the analysis of value networks led to the purposive development of higher education–community partnerships in several cities and states (Block et al., 2008).

4.2.2. Value network embeddedness and resource dependence theory

Consistent with the definition and features of value networks, ***value network embeddedness*** can be defined as the whole set of interactions that a person, group, or organization has established with others in a system in relation to the valuable resources taken, given, exchanged or pooled throughout each of these relationships (Allee, 2009). Given the strategic importance of value networks for individual actors and for the system as a whole, it is not surprising that value network embeddedness represents a critical feature for farmers to innovate, reduce risk, and create social and economic value (Dentoni & Peterson, 2011; Ferris et al., 2006; Zott & Amit, 2010). As such, in this study we intend to assess whether this 'whole set of interactions' underpins, or at least relates to, farmers' ability to innovate when exposed to the same 'treatment', that is, when they participate equally in the same MSP.

How can value network embeddedness be assessed in a farming context in Sub-Saharan Africa? We focus on three dimensions of value network embeddedness that can be operationalized in the context of rural Uganda. These dimensions have been already applied by Dentoni et al. (2019) in a Sub-Saharan context, namely the Malawian legume sector, but without analyzing their relationship with farmer innovation. The first dimension of value network

embeddedness is ***reciprocity***, which represents the extent to which an actor shares resources bi-directionally with other actors in its network (Grudinschi, 2014). The second dimension involves ***resource diversification***, that is, the heterogeneity of the resources an actor provides to or receives from other actors (Grudinschi, 2014). The third dimension of value network embeddedness entails ***channel diversification,*** or, in other words, the number of channels through which an actor's resources (e.g., information, knowledge, or money) are shared with others (Grudinschi, 2014).

From a theoretical standpoint, ***resource dependence theory*** (Pfeffer & Salancik, 1978, 2003) helps us to fully grasp how these dimensions of value network embeddedness may strongly relate to farmer innovation and broader sustainable transformations in general. In a nutshell, resource dependence theory assumes that "to understand the behavior of an organization, you must understand the context of that behavior—that is, the ecology of the organization." (Pfeffer & Salancik, 1978, p. 1). Central to these behaviors is the concept of power, defined as control over vital resources (Ulrich & Barney, 1984). Thus, resource dependence theory assumes that organizations - such as farms, farmers' households, or groups of farmers - attempt to reduce others' power over them (Hillman et al., 2009) and, when possible, attempt to increase their own power over other actors. Therefore, if farmers configure or organize their networks to control the resources that they need, then they will reduce their environmental interdependence and uncertainty (Hillman et al., 2009). It follows that building strategic inter-organizational relationships represents a critical avenue for farmers to minimize their environmental dependences (Pfeffer & Salancik, 2003).

Resource dependence theory shows that the value network embeddedness of an actor - such as a farmer - or an organization, e.g., a group of farmers, determines its power (Casciaro & Piskorski, 2005). This implies that, ideally, farmers need to be strategically aware and active about reconfiguring their value networks to reduce uncertainty and expand their control over strategic resources. As Casciaro and Piskorski (2005, p. 167) put it: "To reduce uncertainty in the flow of needed resources, organizations will try to restructure their dependencies with a variety of tactics. Certain tactics are unilateral in that they bypass the source of constraint by reducing the interest in valued resources, cultivating alternative sources of supply, or forming coalitions." Another tactic involves the cooptation of other organizations in the network: "through cooptation, for instance, the dependent organization stabilizes the flow of valued resources by socializing members of the constraining organization or through the exchange of other valuable goods such as status, friendship, or information." (Casciaro & Piskorski, 2005, p. 168). This means that farmers, for example, can either embed themselves more into value networks or, if necessary, try to exercise influence over other actors such as buyers or the government by reconfiguring the networks surrounding them.

4.3. Methodology

4.3.1. Analysis of coffee farmers' value network embeddedness in rural Uganda

To analyze farmers' value network embeddedness in the Ugandan coffee sector, this study focused on 27 smallholder farmers in one MSP located in the Manafwa district, which specializes in the production of Arabica coffee. Located at the foot of Mount Elgon, this MSP was the subject of the "Value

chain Innovation Platforms for Food Security" (VIP4FS) project, which funded this research, between 2015 and 2018. The studied MSP seeks to facilitate the participation of coffee farmers, especially young farmers and women, into local and global coffee value chains (Barzola Iza, Dentoni, Mordini, et al., 2019). Uganda is one of Africa's major coffee exporters. In 2016/2017, it exported approximately 4.60 million kilograms, equal to a value of USD 545 million. This is up from 3.30 million kilograms (USD 326 million) in 2015/2016 (Authority Uganda Coffee Development, 2018). Despite this boom of exportation in the international market, Uganda's coffee market remains highly dependent on the 500,000 smallholder farmers who produce it (Chiputwa, Spielman, & Qaim, 2015). The country also provides an archetypal context for investigating dynamics of youth inclusion in agriculture, with 77% of the population under 30 years of age, 80% of which are living in rural areas (United Nations Population Fund (UNFPA), 2017).

For our study, the 27 smallholder farmers were purposively sampled to show key geographical and gender differences among coffee producers in Manafwa. In order to stay both in line with the research question of this study and consistent with the principles of purposive sampling (Yin, 2017), the stratification of the sample based on geographical, gender, and age differences was chosen to increase the likelihood of displaying heterogeneous levels of value network embeddedness. During the sampling and the first round of interviews - which took place in November and December of 2016 - it became clear that these differences among farmers cut particularly across the highlands (around Mukoto village, 48km and 2.30 hours from Mbale market, the major local trading coffee center), midlands (Namabya village, 40km and 1.30 hours from Mbale market) and lowlands (Bukhofu village, 39km and 1.00 hours from Mbale market). Despite the wide variations, the sampled farmers were 52

years old on average with a 7-person household, 3,6 acres of total arable land, and an annual coffee production between 65 kilograms and 1,5 tons.

Through semi-structured interviews, the 27 sampled farmers were asked to discuss the following aspects in detail: (1) the constraints on innovation that they currently face in their coffee production, input supply, and demand; (2) the set of actors that influence these innovation constraints; and (3) how these actors exercise influence by giving or receiving resources. As a form of triangulation, nine key informants who are also involved in the same coffee value network including input suppliers, middlemen, government workers, processors/exporters, and an area cooperative enterprise have been interviewed. On average, the interviews lasted 1.5 hours each. After the interviews, consistent with the principles of value network analysis (Allee, 2008; Dentoni, Klerkx, et al., 2019; Dentoni & Krussmann, 2015), notes from the interviews were transposed into a matrix of relationships (and associated resources) among the all actors mentioned by the farmers and key informants during the interviews.

Subsequently, to assess farmers' value network embeddedness in the context of Ugandan MSPs, data have been analyzed according to the following two steps. First, value network analysis was employed qualitatively by mapping the existing actor relationships in and around the value chain together with the key resources that these actors exchange or share with each other (Figure 4.1 in section 4; Allee, 2008). Second, three key indicators of farmers' value network embeddedness - reciprocity, resource diversification, and channel diversification - were operationalized along a three-point scale (low, medium, and high) in the specific study context (Table 4.1). This operationalization in a three-point scale is highly contextual and inductive, and therefore inherently

interpretative (Gioia, Corley, & Hamilton, 2013). It is contextual because it is grounded on the local conditions of rural Uganda; in other contexts, for example, low, medium, or high reciprocity would have very different meanings. It is inductive as it emerged from the empirical data rather than from theory itself. Therefore, it is inherently interpretative since the research team has subjectively assessed, through team triangulation, the development of the emerging scale (Gioia et al., 2013).

Table 4.1: The three contextualized dimensions of farmers' value network embeddedness

	Reciprocity	Resource diversification	Channel diversification
(1) Low	These farmers do not share or exchange any resources bi-directionally with other actors in the value network.	These farmers receive three or less different types of resources, most often seedlings, information, and fertilizers, and provide only one resource, namely their grown commodity (i.e., coffee).	These farmers exchange resources with three different types of actors at most including other farmers, buyers, and extension officers.
(2) Medium	These farmers exchange predominantly information and knowledge with other actors in their networks.	These farmers receive four or five different types of resources including pesticides and training. Along with commodities, they also provide information and knowledge.	These farmers exchange resources with four or five different types of actors at most, including input suppliers and cooperatives.
(3) High	These farmers own a coffee pulping machine, and, with it, they exchange pulping services for money with other actors in their network.	These farmers receive more than five types of resources including knowledge from key informants and loans. They also provide pulping services to the actors in their network.	These farmers exchange resources with at least six different types of actors including banks and non-governmental organizations (NGOs).

4.3.2. Clustering farmers' value network embeddedness and their characteristics

After assessing their value network embeddedness, the 27 farmers were clustered according to their heterogeneity in terms of value network embeddedness, demographic features (education, gender, and age), and farm characteristics (farm location, farm size, and area of land used for coffee production). Cluster analysis was conducted through a two-step procedure (Field, 2013; Norušis, 2012) that suited the combination of categorical variables (i.e., education, gender, and farm location by sub-county) and continuous variables (i.e., age, farm size, and area of land used for coffee production). As a first step, to determine the optimal number of clusters, the Akaike's Information Criterion (AIC) (Akaike, 2011) was applied with a maximum possibility of fifteen clusters. This first step showed that the ideal number of clusters to synthesize the heterogeneity of the 27 sampled farmers was between two or three clusters. Then, using the Silhouette index of cohesion and separation (Rousseeuw, 1987), we found that grouping similar sets of farmers into two or three clusters both resulted in identical scores, meaning that the sample could be described, with a similar level of accuracy, using either two or three clusters. The research team chose to use three clusters to provide a more granular understanding of the key differences among the sampled farmers.

4.3.3. Relating farmers' value network embeddedness to their innovation constraints

Finally, after clustering the farmers into three groups according to their key differences, each group was compared based on their key innovation constraints and outcomes. We learned from the interviews (in November-

December 2016), that innovation constraints included (among others) limited access to extension services, financial capital, profitable marketing channels, high-capital inputs, and specialized labor, thus sometimes leading to innovation outcomes such as limited farm investments, limited collective action with other farmers, low market prices, and high price fluctuations. To further understand changes in these farmers' innovation processes over the development and maturing stages of the MSP, follow-up interviews with nine farmers equally distributed across the three clusters were performed in February 2019. In this second round, farmers were asked to discuss the unfolding of their innovation constraints in the past three years, to describe any product, process, or market innovation they had undertaken, and to refer to which role, if any, they played in the MSP that they participated in. In relation to this final point, follow-up questions included, when necessary, what role, if any, the MSP had in their innovation process, how, and why.

Once the innovation constraints and outcomes were identified across the three groups, the researchers qualitatively assessed the relationships between farmers' value network embeddedness in MSPs and their innovation constraints and outcomes. Again, this was inherently an inductive and interpretative process which allowed us to gain a richer understanding of how and why barriers may persist for farmers with lower value network embeddedness than a quantitative analysis would have.

4.4. Empirical findings

Overall, the empirical findings show that the 27 farmers sampled in the MSP differ widely from each other in terms of their value network embeddedness and other key demographic and farm characteristics. Second, this

heterogeneity among farmers is related to a persisting innovation gap; that is, farmers that are more embedded in value networks tend to innovate more than farmers that are less embedded (Table 4.2). These findings are discussed in detail across the three clusters of farmers that emerged during the analysis. As the next sub-sections (4.1-4.3) illustrate, these clusters show distinct levels of farmers' value network embeddedness and innovation.

Table 4.2: Overview of qualitative findings.

Key concepts	Key indicators	Cluster 1 Younger male in highlands	Cluster 2 Older female in midlands	Cluster 3 Middle-aged male in lowlands
Value network embeddedness	*Reciprocity*	Low	***Highest***	Low
	Resource diversification	Lowest	Average	***Highest***
	Channel diversification	Lowest	Average	***Highest***
Agricultural Innovation	*Market innovation*	Reactive, moderate	Lowest	***Highest***
	Process innovation	Limited	***Highest***	Limited
	Product innovation	Reactive, moderate	Proactive, moderate	***Highest***

Note: For visualization purposes, the highest levels of each operationalized variable is highlighted in *bold & italic fonts*.

4.4.1. Cluster 1: Lower value network embeddedness and lower innovation outcomes

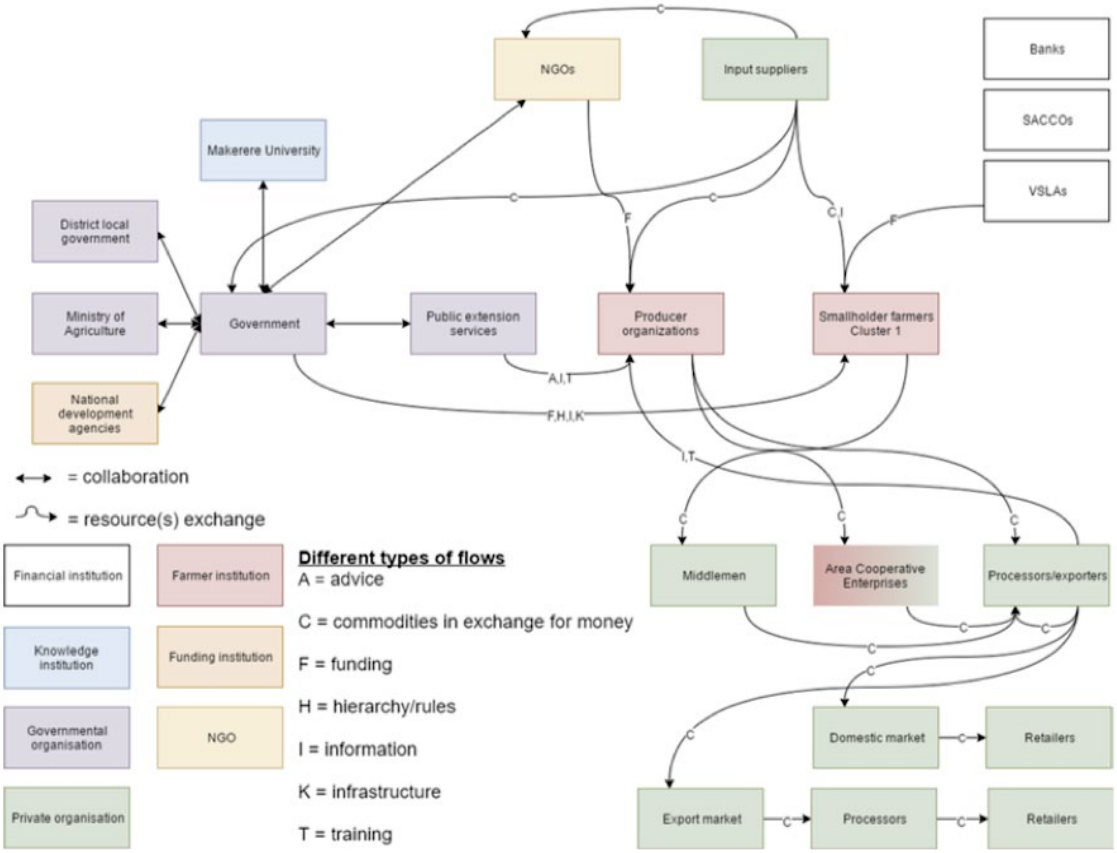
4.4.1.1. Younger male farmers with lower value network embeddedness

This cluster includes predominately male farmers of 36 years of age on average, whose farms are located in the highlands (around the village of

Mukoto). These farmers have only a small coffee production, with less than 0,5 acres dedicated to coffee. They make little use of agricultural inputs and sell predominantly to middlemen. As Figure 4.2 shows, they are not directly involved in coffee producer organizations.

In terms of value network embeddedness, these farmers display significantly *lower resource diversification* and *lower channel diversification* (according to the operationalization in Table 4.1) *relative to the other two clusters*. In terms of *resource diversification*, these farmers do not receive training (T) or advice (A) from any other actor in their network. In terms of *channel diversification*, they rely on only the Government, without the intermediation of government agencies or extension officers, to gain access to physical infrastructures (e.g., roads) or knowledge (K) as well as understanding of the existing legislation (H, hierarchy/rules). Furthermore, they receive information (I) on agricultural inputs (C, commodities) that can be purchased mostly from input suppliers and the government, without the chance to triangulate the information received with other actors in the network. Finally, these farmers are not connected to the formal financial markets or microfinance institutions. Therefore, when they have access to credit (F, funding), it is only through village savings and loans associations (VSLAs). Like those in Cluster 3, these farmers display *lower reciprocity than Cluster 2* as they are not involved in producers' organizations to exchange or pool resources. They give their coffee (C) to the middlemen while they themselves are dependent on other actors in the systems for several resources that they need, including information (I), advice (A), training (T), knowledge and infrastructures Before, "K" was "knowledge and advice" (K) or an understanding of existing regulations (H).

Figure 4.2 Value network embeddedness in Cluster 1 (predominantly younger males in Mukoto)



4.4.1.2. More limited and reactive innovation outcomes

Given their limited embeddedness in value networks, it is perhaps not surprising that – despite their participation to MSPs – this cluster of farmers faces the toughest innovation constraints. First of all, *these farmers only moderately engaged in* ***market innovation*** *despite the strong demand increase for high-quality coffee* in the region. Since 2016, farmers' access to markets has significantly increased, with several traders like Kyagalanyi, OLAM, and the Bugisu Cooperative Union (BCU) readily available to purchase high

quality coffee. The price of coffee has also significantly increased. For example, one farmer experienced a price increase from 1,400 Ugandan Shillings (USh)/kilogram in 2016 to 2,000 USh/kg in 2019, while another recounted that prices almost doubled. Nevertheless, for a higher price, traders also demand higher quality coffee. The increased demand for high-quality coffee has pushed these farmers to engage, to a limited extent, in ***process innovation***. One farmer explained how the traders, through the MSP, made it clear that they needed only the perfectly ready, intense red coffee cherries to maximize quality: *"(In 2016) we used to pick the mix of ready cherries and then green ones. (...) We were spoiling the coffee quality, because at the end of the day we were not familiar with the final coffee taste and the aroma. So, through the platform, we were trained to only pick the ready cherries."* The outcome was that because of the higher market demand for only high-quality coffee berries, these farmers incurred more farm losses because all the under-ripe and over-ripe berries they picked had to be thrown away. Along with picking only the red cherries, many of these farmers also had to hire a pruning specialist to cause less damage to the coffee trees and thus increase the likelihood of being accepted by traders. Furthermore, while in 2016 many of these farmers were used to storing and pulping the berries while waiting to find a buyer, traders nowadays come straight to the farm to pick up the (red) berries soon after they are picked. In conclusion, for these farmers, process innovation manifested itself mostly as passive changes - reactions to the increased market pressure from traders.

Product innovation *for Cluster 1 farmers was also mostly a reaction to the increasing area of land dedicated to coffee*, which is again an indirect consequence of the increasing market pressure. The increase in land size pushed farmers in Cluster 1 to use more farm labor (from 3-4 people on average

in 2016 to 7-8 in 2019, mostly family members) and more inorganic fertilizers (ranging from 30-60 kg in 2016 to 70-200 kg in 2019); it also meant more seedlings to be planted and the introduction of knapsack sprayers as pest and disease management tools. While the process of growing coffee has become more labor and input intensive, these farmers were not able to invest in technology that could reduce their farm costs and labor such as spray pumps or pulping machines. Therefore, the increased demand and price for high-quality coffee led to limited product innovation which was manifested by intensifying what they had already been doing rather than by making substantial changes to their business model.

However, there is a remarkable gap between the low innovation levels achieved by these farmers and their innovative intentions. The farmers expressed urgency to respond to the climate change issues manifesting on their farm. One farmer revealed: "*The coffee is increasingly affected by the heat, by the sun. […] We would need more shading trees to be planted in the farm and also connecting water. We have irrigation coming from a dry spell and tanks, but in latest years this was not sufficient. We need pipes to connect to the garden*". Along with heat and sun, climate change also manifests itself increasingly during rainy seasons with too much rain and humidity destroying the coffee along with a rapid rise in the number and diversity of pests and diseases affecting the coffee production.

4.4.1.3. Persisting innovation constraints

Despite having identified which product and process innovations are most needed, these farmers were restricted from turning their intentions into action by two key innovation constraints. First, ***access to key resources*** remains problematic, mostly because of the poor transport network (and increasing

transport costs) linking Mukoto to the closest coffee trading center, Mbale. Because of the challenge of finding transport that reaches their agricultural area, farmers experience limited access to labor. They also have limited access to credit, which is afflicted by particularly high interest rates, limited access to capital-intensive equipment for pulping, and a high risk of purchasing fake agricultural inputs. Second, despite the increasing market demand, the ***market incentives*** remain too low and uncertain to support these farmers' investments in innovation. While coffee cherry prices have increased, the cost of inputs and labor has increased accordingly, thus limiting the profit margins and the opportunity to re-invest in innovation. Furthermore, these farmers experienced increased levels of competitive aggressiveness further down in their value chain. For example, they found it challenging to establish forms of collective action for improving their bargaining power, and they suspect that traders may tamper with their coffee cherries to expand their own profit margins.

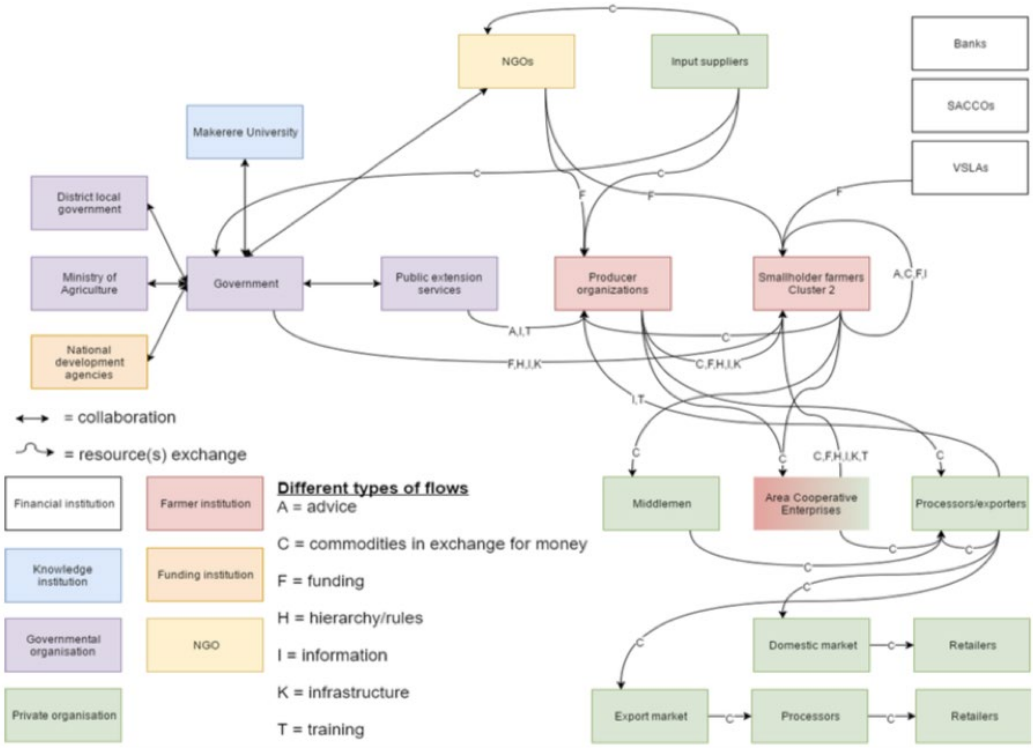
4.4.2. Cluster 2: Intermediate value network embeddedness and innovation outcomes

4.4.2.1. Predominantly female farmers with average value network embeddedness

This cluster includes predominantly older female farmers of 58 years on average, located in the midlands (Namabya), with between 0.5 and 2.5 acres of coffee-producing land. These farmers make limited use of technologically advanced agricultural inputs and sell predominantly to middlemen and their cooperatives. The findings in Figure 4.3 show that these farmers have *a remarkably higher reciprocity than the other two cluster groups*. Specifically, through their predominant participation in cooperatives and other producer associations, they exchange more advice, knowledge, and information with

each other than do the farmers in Cluster 1. The peer-to-peer collaboration also underlies the *higher resource diversification of these farmers relative to Cluster 1* because they gain access to complementary training and advice through their cooperatives. At the same time, because of their limited embeddedness with input suppliers and financial institutions, their *resource diversification is lower than Cluster 3* (see next section). Likewise, *channel diversification is higher than Cluster 1* (through cooperatives and other producers' organizations), *yet lower than Cluster 3* because of their limited embeddedness with input suppliers.

Figure 4.3 Value networks embeddedness in Cluster 2 (predominantly older females in Namabya)



4.4.2.2. More tangible and proactive innovation outcomes

Compared to the other clusters, farmers in Cluster 2 had *remarkably lower* ***market innovation*** between 2016 and 2019, the period when the MSP was developed. Unlike Cluster 1, coffee trade was already established for this group before 2016, so they experienced no major shifts in demand quantity and price. Instead, farmers in Cluster 2 complained about low prices and major price fluctuations, which affect them because of their limited embeddedness in buyers' and traders' value networks. The following statement highlights how these farmers are powerless vis-à-vis their buyers: "*It is very expensive to process [coffee in farm], because as a farmer it is difficult to have the cash. There is a problem with the place they take the coffee* [name anonymized] *They take too long to give the money. They buy and they dry the coffee and they export it*. […] *With the middleman it was also the same problem. The middleman sometimes does not give the money."* In other words, buyers sometimes pay farmers late or not at all.

Because of their limited market innovation, though, farmers in Cluster 2 were *very proactive in* ***process innovation*** as the MSP activities (2016-2019) unfolded. Farmers experimented with bulking their coffee cherries to gain market power vis-à-vis buyers and middlemen, and they made small-scale attempts at collective sales. Furthermore, farmers intended to develop a central point for washing and processing the coffee locally, yet cash constraints limit the feasibility of these intentions for the time being. Other forms of emerging collective actions in 2016-2019 involved the development of community-based nurseries, where seedlings are pooled under the so-called Operation Wealth Creation (OWC). Farmers also mobilized each other and shared ideas after trainings; they shared tools such as pruning saws and started collective

coffee-picking processes to enhance quality and uniformity. Finally, to overcome market issues, Cluster 2 farmers made concrete steps to merge with other coffee platforms in other districts to form a larger scale coffee farmers' cooperative society. These new forms of collective action also motivated Cluster 2 farmers to engage in a plethora of novel farming practices that they learned and shared with each other as a follow-up to their MSP participation. These include, for example, experimenting with organic fertilizer from homemade compost based on animal manure; the application of gentle digging; strategically spacing coffee plants and trees for shade and wind-breaking as ways to prevent weather-related damages; or using de-suckering pratices to decrease branches that would compete for nutrients in coffee plants. Finally, in the post-harvest phase and before bulking, these farmers introduced a process in which they sorted the cherries, removed the coffee skins and cherries with defects, then fermented them for 12 hours before washing and drying the cherries on a raised stand under moderate sun heat and storing them in aerated sacks and baskets. This empirical evidence shows, overall, that process innovation for this group was much more remarkable and proactive than for farmers in Cluster 1.

Unlike process innovation, ***product innovation*** *was limited* for farmers in Cluster 2 in 2016-2019. Since market demand remains constant, these farmers do not have resources or incentives to change or upgrade their inputs. On average, farmers moderately increased (on average 1 acre) their farm coffee production; they started hiring labor just for weeding and cherry-picking; they substituted some old coffee plants with new ones and introduced *calliandra* variety trees for shading purposes. Finally, they introduced the use of inputs such as spraying pumps and new, clean containers for picking coffee.

4.4.2.3. Addressing some key innovation constraints

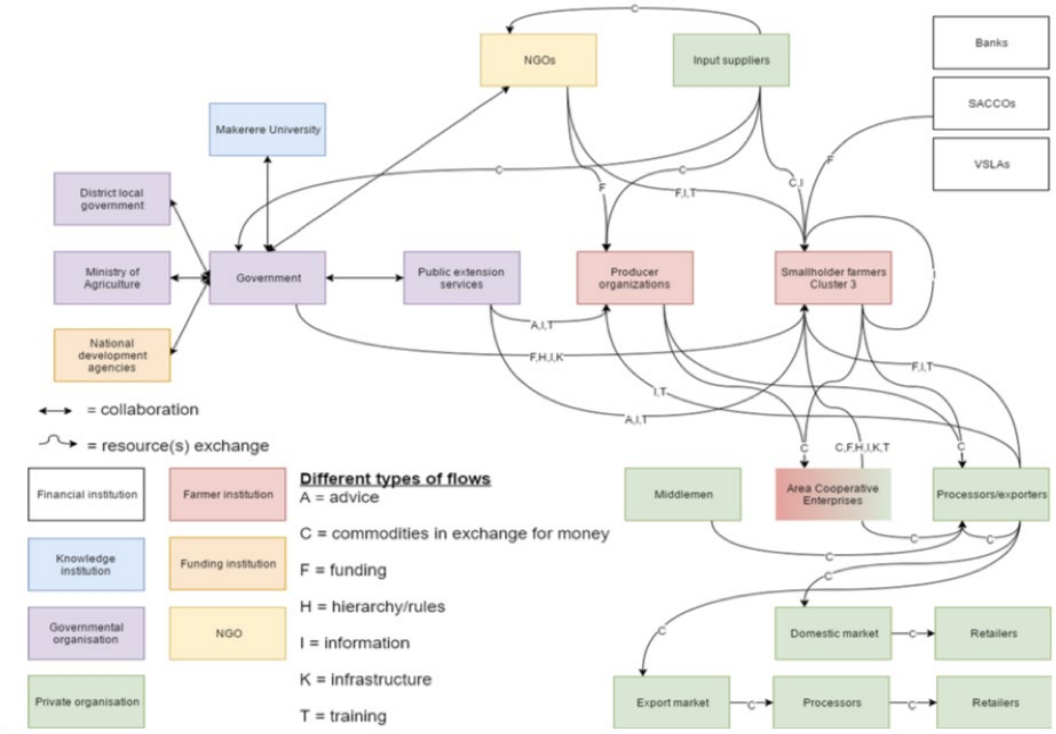
As is clear from the evidence above, limited value network embeddedness with buyers and traders underlies ***limited access to credit and inputs***. One farmer revealed: *"Last year, I wanted to work with all the package of organic fertilizers, but I had not enough money for that: there are no loans, or credits. Getting tools, machines and fertilizers is therefore very difficult."* Because of this limited access to credit and inputs, farmers cannot find adequate capital to purchase fertilizers or invest in equipment like pulping machines. As a second innovation constraint, the ***effects of climate change at farm level*** limit the farmers' opportunities to invest: pests and diseases proved to be a serious challenge, and the farmers had little knowledge of how to deal with them; heavy rains were surprisingly coupled with strong winds, jeopardizing the possibility to invest in the coffee trees while at other times, prolonged droughts affected the farms; and finally, increased demand for timber and charcoal resulted in a serious rise in in-farm thefts. As discussed above, farmers in Cluster 2 engaged in collective action and knowledge-sharing in ways that partially addressed these constraints. Furthermore, on a positive note, roads – which are critical for connecting to markets and buyers – have been recently improved although they are still muddy in the increasingly unpredictable rainy seasons. These improvements show promise for further addressing the underlying issues of limited value network embeddedness.

4.4.3. Cluster 3: Higher value network embeddedness and innovation outcomes

4.4.3.1. Predominantly male middle-aged farmers with higher value network embeddedness

Cluster 3 includes mostly middle-aged male farmers (with an average of 46 years) located in the lowlands (Bukhofu) with larger coffee production (2.5+ acres). In general, they make more extensive use of agricultural inputs and sell more regularly to processors/exporters than farmers in other clusters. Similar to Cluster 1, these farmers showed *lower reciprocity* than farmers in Cluster 2 because they are less involved in cooperatives or producers' organizations exchanging or pooling resources (Figure 4.4). However, these farmers displayed *higher resource diversification* and *higher channels diversification* than farmers in the other clusters, especially because they have direct relationships with the commodity exchange and better access to knowledge, information, and finance from actors outside their local network than farmers in Clusters 1 and 2 (Figure 4.4).

Figure 4.4 Value networks embeddedness in Cluster 3 (predominantly middle-aged males in Bukhofu)



4.4.3.2. Remarkable market-driven innovation outcomes

Between 2016 and 2019, farmers in Cluster 3 experienced remarkable market innovation. which also drove their product innovation. Compared to Cluster 2, though, these farmers seemed less active on process innovation. In terms of market innovation, farmers brought their collective marketing into full scale: after being packed in clear sacks, coffee is stored in a cooperative-owned central facility and sold through their cooperative. The collective marketing process is much more established and smoother than Cluster 2's. As one farmer put it: "*We used to sell dry coffee, now I sell raw beans. Cherries. Since we are*

part of the MSP, there are some companies that buy the cherries. Before, there was no market for these cherries. Last year, we got a company [name anonymized] *that buy them. So now you pick, you take, and you sell."* The smoothness of this marketing process, in stark contrast with the other clusters, is also evident in the words of another farmer: "*It took time […]. But now, you just pick the right cherries, take it to the store you sell, and you get your money. And you come back home, you prepare for tomorrow*." Farmers also explicitly acknowledge that the interaction with stakeholders at local and district levels and with other farmers within and outside their village played a vital role in this market upgrade.

As anticipated, farmers in Cluster 3 engaged moderately in ***process innovation***, which mostly consisted of the fine-tuning of agronomic practices over time, such as mulching, contour establishment, spacing the plants, pruning, and stamping. Also, like the other clusters, farmers improved the cherry-picking process to maximize quality and avoid affecting the stems. Conversely, these farmers experienced remarkable ***product innovation***, especially in the coffee drying and processing phases of the post-harvest process. They introduced the use of drying racks that are raised above the ground to ensure good quality and tasty coffee. In the racks (where mats are now used instead of tarpaulins), coffee now ferments and floats before being sorted into separate quality grades. Much of their produce is graded "one" (01) as the top quality in the region. Afterwards, coffee is stored on a raised platform in new clean bags. Finally, these farmers were also able to purchase their own pulping machine to reduce post-harvest losses and further diversify their ease market access. Along with innovations in the post-harvest phase, improvements also took place in pruning: saws and even secateurs were

introduced to facilitate the pruning process, and specialized people are hired seasonally to prune more efficiently.

4.4.3.3. Climate change brings new challenges

As the innovations illustrated above testify, farmers in Cluster 3 were able to overcome some of the key constraints facing the farmers in the other clusters, such as fluctuating coffee prices and limited access to technological capital to support the growing, picking, and drying of high-quality coffee. Nevertheless, a new constraint currently affects the innovation of farmers in all three clusters, namely the ***effects of climate change***. First, heavy rains jeopardize the drying of the coffee and thus its quality and profitability. Second, increasing water scarcity limits coffee washing. Furthermore, diseases have increased despite the improved agronomic practices, and treatments no longer seem to be able to adapt to the rapid development of the diseases. So, despite their remarkable progress, these farmers face seriously challenges to innovating further to adapt to these rapidly changing climate conditions.

4.5. Discussion

4.5.1. Generalizing from the empirical findings

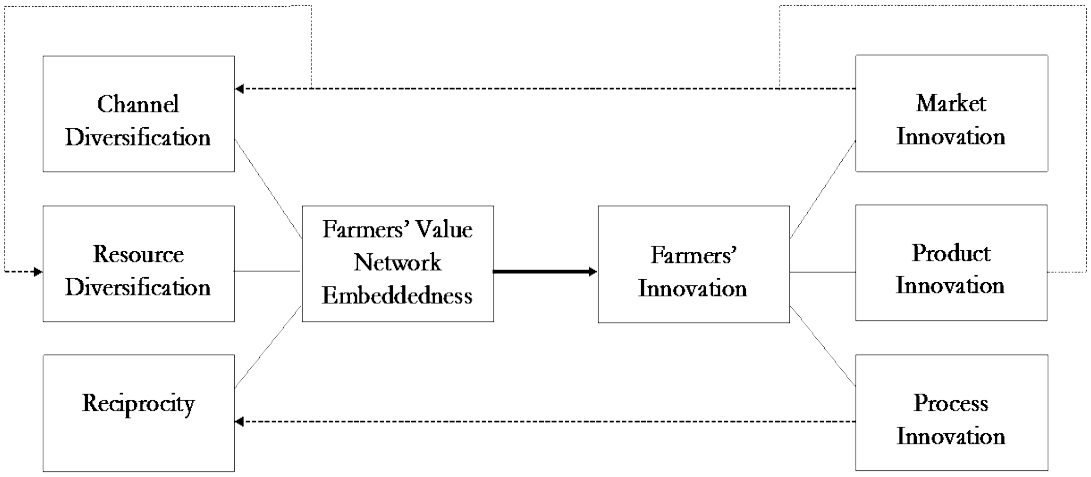
The empirical findings from 27 smallholder farmers involved in one MSP located in the Manafwa district, Uganda, reveal that – as expected – farmers with different levels of value network embeddedness and demographics show different levels of agricultural innovation. The qualitative nature of our findings, which were inherently based on subjective interpretation, allow for some exploration of the causal relationships between farmers' value network embeddedness and their innovation. In particular, farmers with higher channel

diversification, resource diversification, and reciprocity engaged more in product, process, and market innovation between 2016 and 2019 (Figure 4.5; arrows from left to right). For example, a female farmer in the midlands (Cluster 2), being in a less powerful position to negotiate with the middleman and buyers, is more likely to focus on collective actions, therefore enhancing process innovation. Or, a male farmer from the lowlands (Cluster 3), being in a stronger bargaining position vis-à-vis his buyers, is more likely to engage in market innovation and thus to invest in product innovation (e.g., coffee pulping, fermenting, drying, and using more high-technology agricultural inputs in general). Furthermore, farmers that engaged in market and product innovation improved their channel diversification and resource diversification from 2016 to 2019, while farmers that engaged in process innovation improved their reciprocity from 2016 and 2019 (Figure 4.5 arrows from right to left). For example, as they are unable to develop market and product innovations, young farmers in the highlands (as in Cluster 1) struggle to diversify their resources and channels, remaining in a powerless market position relative to other farmers, buyers, and suppliers. Conversely, female farmers in the midlands (as in Cluster 2) that invest in process innovation through collective action establish stronger reciprocity in their value networks.

From the conceptual model that emerged from these empirical findings (Figure 4.5), an important remark can be made. On one hand, farmers with higher value network embeddedness in an MSP have more chances to generate agricultural innovation, which in turn is likely to *strengthen* their embeddedness in value networks – *hence generating a virtuous circle*. On the other hand, in the same MSP, farmers with lower value network embeddedness have fewer chances to engage in agricultural innovation, which in turn is likely to *weaken* their

embeddedness in value networks – *hence generating a vicious circle*. We further reflect on the risks and opportunities of this emerging model as follows.

Figure 4.5 Conceptual model emerging from the qualitative findings.



Legend: the arrows indicate cause-effect relationships among the variables in the boxes. The lines indicate key indicator relationships among variables.

4.5.2. Contribution to agricultural innovation literature

The generalization that we make from these empirical findings has implications for the field of agricultural innovation systems (AIS) (Klerkx et al., 2010) and specifically to the recent literature that analyzed MSP from an AIS perspective (Kilelu et al., 2017; Schut, Klerkx, et al., 2016). On one hand, the empirical findings convene with AIS in that the configuration of the systems where farmers are embedded plays an important role in driving their product, process, and market innovation. On the other hand, though, empirical findings support the recent criticisms of AIS for not sufficiently taking into account the farmers' socio-economic backgrounds (Barrett et al., 2017) and

especially the power dynamics underlying collaboration in MSPs (Cullen et al., 2014). Our findings reveal that youth and women face persistent underlying issues in being embedded in value networks and innovating – related to their geographical position predominantly in the midlands and highlands – vis-à-vis older male farmers. What is most serious, though, is that if we do not purposively and carefully address these socio-economic unbalances in MSPs, the socio-economic gap among different farmer segments may actually become bigger and deeper over time because of the vicious and virtuous circles activated through value network embeddedness and innovation. Therefore, taking a value network perspective on the study of agricultural innovation in MSPs is important when considering possible unintended consequences of MSPs and, more specifically, potential dynamics of socio-economic exclusion (Hall et al., 2012) .

4.5.3. Contribution to value networks literature

As highlighted in the previous sub-section, the focus on value networks, and specifically on value network embeddedness, helps explain what drives agricultural innovation and sheds light on some of the socio-economic differences and power dynamics that affect it. In particular, value networks help to visually show the differences in embeddedness and resource access among actors within a system (Allee, 2008, 2009). As such, the concept of value networks raises awareness about why certain challenges persist and offers points of entry for engaging in strategic networking or even for organizing new forms of collective action (Dentoni, Bijman, et al., 2019). This value network perspective also confirms that the configuration of a system of actors in a value network is tightly interrelated with the nature of the collective problems that those actors face (Waddell et al., 2015; Waddock et al., 2015).

For example, our empirical findings reveal that the differences in market, process, and product innovation among coffee farmers in rural Uganda reflect deeper issues of unbalance in their access to critical resources. Therefore, understanding the constraints and opportunities of a value network configuration may be vital for the actors involved to (re-)organize their collaborative partnerships in and around MSPs to shift the current power structures (Schouten, Vink, & Vellema, 2018) that underlie and affect processes of innovation towards sustainability (Dentoni, Bijman, et al., 2019).

4.5.4. Managerial and policy implications on MSPs

If the end goal of MSPs is to promote and sustain inclusive pathways to rural development, these empirical findings can inform MSP decision makers and stakeholders on how to tailor the goals, approaches, and activities of MSPs to the different backgrounds of the farmers participating in them. A rich literature on MSPs has called for the development of inclusive governance mechanisms in MSPs (Dentoni et al., 2018; Helmsing & Vellema, 2011; Tenywa et al., 2011) to effectively support pathways towards equitable rural development through agricultural innovation. Yet how can MSPs become, in practice, more inclusive to farmers with different characteristics? These empirical findings suggest that a deeper understanding of the socio-economic background and the value network embeddedness of farmers is a prerequisite for inclusiveness. For example, in the case of coffee in the Manafwa district, MSPs would be particularly helpful to young farmers in the highlands (Cluster 1) in fostering networks to access a wider set of financial and input resources. For older female farmers in the midlands (Cluster 2), MSPs may be better used to access a wider set of market channels. Conversely, MSPs could be less proactive in fostering the building of new networks for farmers in the lowlands (Cluster 3),

who are already naturally (and geographically) strongly embedded in value networks. In other words, depending on their initial value network embeddedness, each group of farmers may need to use MSPs differently to build value networks that complement the knowledge that they already receive and co-create in MSPs. As such, these findings highlight the need - not only for farmers or MSPs, but also for governments, companies and other powerful stakeholders in the broader agri-food system - to address the context-specific challenges experienced by farmers.

4.6. Conclusion

This chapter used a different theoretical perspective than the previous chapter– that is, the perspective of value networks and, specifically, of farmers' value network embeddedness – to explain why farmers participating in the same MSPs may experience different levels of innovation. The qualitative empirical findings from 27 coffee farmers in the Mafanwa region confirm that farmers' value network embeddedness indeed drives their product, process, and market innovation. Furthermore, farmers that innovate tend to further strengthen their value network embeddedness. These findings reveal that the differences in farmers' value network embeddedness may generate and reinforce an 'innovation gap' among farmers participating in the same MSPs, potentially triggering dynamics of socio-economic exclusion.

As such, the empirical findings from this chapter lead to recommendations for MSP decision-makers and stakeholders. MSPs may take a tailored approach in supporting farmers' network development depending on geographical location, socio-economic background, and current value network embeddedness. They might also take a transversal approach across all farmers,

independent from geographical location, socio-economic background, and current value network embeddedness, to support their learning processes on how to establish stronger and more strategic value networks. Both approaches may be helpful in reducing the 'innovation gap' among farmers in the same MSPs and preventing dynamics of socio-economic exclusion or underlying competition among farmers.

Chapter 5. Discussion and Synthesis

5.1. Synthesis of the Thesis Findings

5.1.1. Premise on Multi-Stakeholder Platforms and agricultural innovation

Multi-Stakeholder Platforms, (MSPs) are now widely recognized in academic, policy, and management arenas as organizational forms with potential to foster agricultural innovation and rural development through knowledge-sharing and network-building activities among multiple stakeholders. If effective, they may be instrumental in supporting sustainable transitions in agri-food systems, hence addressing the great challenges of our times, such as rural poverty, food insecurity, and the negative effects of climate change. Because of their recognized potential, MSPs have been widely studied across several disciplines that apply to agricultural and food systems, including sociology, economics, political sciences, business management, and agronomy. One of the main quests in the extant literature on MSPs has been to find out whether MSPs influence agricultural innovation and rural development, when and how effective they are. In this thesis, the key objective was to contribute to this flourishing strand of literature.

Two knowledge gaps initially triggered the design of this thesis work. First, despite a widespread scientific interest if, when, and how MSPs influence agricultural innovation and rural development, the extant literature remains scattered across multiple disciplinary fields and geographically diverse examples. In the extant literature, the richness of individual cases and research methods provides a vast range of examples that stakeholders in and around MSPs may learn from. However, little research has taken stock of the wide array of existing empirical knowledge, organized it logically in an overarching framework, and critically assessed it to delineate what we know and still do

not know about the influence of MSPs on agricultural innovation and rural development. Second, little of the existing literature has discerned how the heterogeneous characteristics of the farmers involved in MSPs may shape their ability to uptake agricultural innovation. This is a remarkable gap because if MSPs do not take into account the wide heterogeneity of farmers that they seek to support, they may struggle to fulfil their potential to foster agricultural innovation and rural development. Furthermore, a poor understanding of farmers' heterogeneity in MSPs may lead to dynamics of socio-economic exclusion because resource-scarce farmers may fall behind if the MSPs do not tailor activities to their needs.

To address these two knowledge gaps, this thesis aimed to integrate and refine theories on how MSPs stimulate agricultural innovation and rural development by taking into account some relevant yet underexplored facets of farmers' heterogeneity. Accordingly, after elaborating on the knowledge gap persisting in the literature and on the goals of this thesis (Chapter 1), the rest of this book aimed to ***integrate the existing knowledge on the influence of MSPs on agricultural innovation*** across several examples of disciplinary methods and geographically spread cases (Chapter 2). Second, this thesis attempted *to* ***assess the role of two underexplored characteristics of farmers that may further explain when and how MSPs may effectively influence agricultural innovation.*** These underexplored characteristics involve farmers' entrepreneurial orientation (Chapter 3) and their value network embeddedness (Chapter 4). With these objectives in mind, in the rest of this chapter we synthesize the key findings from this thesis work with how they contribute to the extant literature and how they may inform stakeholders in and around MSPs (Chapter 5).

5.1.2. Research methods in relation to the key objectives

To choose the appropriate research methods for reaching the objectives stated above, this thesis work employed a diverse set of scientific approaches that are already established in organization studies, yet novel to the flourishing research strand on MSPs and agricultural innovation. These methods entail, respectively: a systematic literature review (Chapter 2); multi-variate statistics through the use of partial least squares (PLS) (Chapter 3); and a qualitative study seeking to inductively infer causal relationships from empirical patterns (Chapter 4).

First of all, the ***systematic literature review*** was instrumental to integrate the so-far scattered literature on how MSPs stimulate agricultural innovation and rural development into a coherent theoretical framework. While a few recent literature reviews (Schut et al. 2016; 2018) and empirical cross-case analyses (Vellema, Ton, de Roo, & van Wijk, 2013) have been performed on the influence of MSPs on farmer innovation, none of them has systematically considered the abundant collection of papers published in this domain. As such, according to the features of systematic literature reviews (Gough et al 2017), a set of criteria drove the selection of n=44 articles, published between 2004 and 2018, on the influence of MSPs on agricultural innovation.

Second, ***multi-variate statistics through the use of PLS*** was critical to empirically assess how farmers' entrepreneurial orientation (EO) influences agricultural innovation in the context of one MSP. While much literature has recently assessed farmers' EO (Gellynck et al., 2015; Verhees et al., 2011) and its influence on agricultural innovation (Etriya et al. 2018), no study has assessed this relationship in the context of one MSP. Specifically, the use of multi-variate statistics has been vital to assess the role of farmers' EO in

multiple dimensions of agricultural innovation (namely product, process, and market innovation) while the use of PLS has been instrumental in assessing the relationships between a large number of variables (including a set of other independent variables such as farmer demographics) with a relatively small dataset (n=152 farmers). The empirical context for this study was one coffee-focused MSP from the Manafwa district in Eastern Uganda.

In that context, an ***inductive approach to qualitative research*** was vital to understanding the complex causal relationships linking farmers' value network embeddedness to their agricultural innovation. Value networks have been widely used in organization theory to understand power dynamics among a large set of stakeholders and identify viable pathways for systemic change (Allee 2008), yet little research has connected it to agricultural innovation (Dentoni et al. 2019), let alone in the context of MSPs. By identifying the patterns emerging between the dimensions of value network embeddedness and agricultural innovation, this inductive approach reveals if and how MSPs' influence on farmer innovation may differ depending on how the farmers were initially embedded in their value networks. In this study, results were drawn from two rounds of in-depth interviews with n=27 farmers in the Manafwa district, Uganda.

5.1.3. Summary of Key Findings

With these objectives and research methods, this thesis work, led to three sets of findings. **First**, the systematic literature review (Chapter 2) led to a theoretical framework that integrates and, to some extent, critiques the extant literature on how MSPs influence agricultural innovation. **Second**, the empirical study, using multi-variate statistics through PLS (Chapter 3), tested

a theoretical framework linking the multiple dimensions of farmers' EO on agricultural innovation in the context of one MSP. **Third**, through an inductive approach of qualitative research (Chapter 4), the study developed a theoretical framework that causally relates the multiple dimensions of farmers' value network embeddedness with agricultural innovation in the context of the same MSP. While each of these three studies integrates, tests, and develops a separate theoretical framework, (Figure 5.1: Implications stemming from the empirical testing of the theoretical framework) in this Chapter provides an overarching model that synthesizes the outcomes across these studies. As Figure 5.1 illustrates, the findings can be summarized in three main points: the MSPs' pathways of influence on agricultural innovation; the role of farmers' EO on moderating the relationship between MSPs and agricultural innovation; and the role of farmers' value network embeddedness in shaping the same relationship.

First of all, the systematic literature review (Section 2) gives the framework for a theoretically sharper definition of MSPs than that found in the existing literature. That is, relative to other novel organizational forms seeking to stimulate agricultural innovation, this thesis suggests that the key distinctive feature of MSPs is the presence of a virtual and/or physical interface that supports knowledge-sharing and decision-making processes across groups of multiple heterogeneous stakeholders. Through this interface, farmers and several other stakeholders communicate, sharing information and knowledge that may become a critical driver for innovation. Furthermore, this systematic literature review reveals the pathways through which MSPs may realize their influence. Overall, these ***pathways of MSP influence involve four key interrelated steps: 1. expected outcomes and 2. key activities***, which take place within the boundaries of MSPs (Figure 5.1); ***as well as 3. intermediary***

outcomes and 4. key levels of innovation, which are outside the sphere of MSPs' direct control (Figure 2.8). These steps are interrelated because MSPs tend to achieve different intermediary outcomes and levels of innovation depending on their organizational goals and activities. On the basis of the integrated framework emerging from this literature review, ***four key limitations of the extant MSP literature were identified.*** These are: ***disciplinary silos-thinking***, or sub-disciplines focusing only on some facets of MSPs' influence on agricultural innovation while ignoring those outside of their domain; ***linear-thinking,*** which is to say that researchers have focused on how MSPs may impact agricultural innovation, but not on how agricultural innovation outcomes may, in turn, shape MSPs' activities and their outcomes; ***limited focus on the role of informal institutions***, i.e., little research has focused on how trust and social networks may moderate MSPs' influence on farmers' innovation; and ***little emphasis on power dynamics,*** meaning that little research has focused on how farmers with lesser resources, therefore with less power, may be influenced differently by MSPs.

These limitations refined and gave further theoretical ground to the empirical findings in the following two chapters. Therefore, in Chapter 3, the use of multi-variate statistics sought to help test how differences in farmers' EO may explain different levels of agricultural innovation in the context of one MSP. The empirical findings first revealed, through the use of a confirmatory factor analysis, that the measuring of farmers' EO requires slight adaptation to the empirical context of rural Uganda. For example, the concept of risk-taking, which in the literature represents an important dimension of farmers' EO, was not found to fit the empirical context of rural Uganda (Figure 3.1). Along with this measurement-related finding, the study confirmed that, overall, ***two dimensions of farmers' EO*** (namely proactiveness and innovativeness)

respectively influence the three key dimensions of agricultural innovation (namely product, process, and market innovation). Specifically, farmers' proactiveness significantly drove their product innovation and, to a lesser extent, process innovation. This effect held when considering key control variables such as access to key resources and associated actors. Moreover, and more surprisingly, farmers' innovativeness hampered market innovation. In the context of our study, the more a farmer is willing to "search for the latest information on technologies for her/his farm" , "change where s/he sells it if there is an improvement in her/his product" , and "include new varieties in her/his farm to satisfy more customers", the lower is the likelihood that s/he has "changed where s/he sells coffee production in the past five years". This result is surprising when compared to the established literature from Western non-rural contexts (Kreiser & Davis, 2010; Miller & Friesen, 1983), which asserts that innovative firms (at an organizational level) and managers (at an individual level) are more likely to also engage in new markets over time. It is important to mention that in the model, other aspects such as power, culture, number of buyers were not included. These aspects are part of the context of our study that differentiate our result to other studies, for example to Claro, P. (2004, p. 196), who found that Dutch horticultural farmers that were more oriented towards communicating with colleagues and experts in the field (building input supplier, other supplier and cooperative agent networks in his terms, a kind of MSP in your terms) were less successful in terms of sales than their colleagues who were primarily oriented on communicating with their customers (building customer buyer and other buyers networks). Finally, entrepreneurial intentions per se did not play a significant role in farmers' innovation (Figure 3.2). Overall, these findings suggest that ***farmers' EO represents a key psychological trait that may explain, to some extent, why***

farmers participating to the same MSP may engage in agricultural innovation to different extents (Figure 5.1).

Finally, in Chapter 4, the use of an inductive approach to qualitative research allowed for analyzing value network embeddedness as another factor that may explain why farmers participating to the same MSP engage in agricultural innovation to different extents. The empirical findings first showed that farmers participating to the same MSP displayed remarkably heterogeneous value network embeddedness, which was assessed in terms of reciprocity, resource diversification, and channel diversification. Specifically, predominantly younger males who live furthest away from the major coffee commodity markets displayed the lowest levels of all the dimensions of value network embeddedness; the group of predominantly older female farmers living an intermediate distance from the commodity markets displayed high levels of reciprocity yet low channel and resource diversification while predominantly middle-aged males located closest to the commodity markets displayed low levels of reciprocity and the highest levels of resource and channel diversification. Furthermore, empirical findings revealed that farmers with higher channel diversification, resource diversification, and reciprocity engaged more in product, process, and market innovation. Finally, farmers that engaged more in market and product innovation also improved their channel and resource diversification, while farmers that engaged more in process innovation improved their reciprocity. This means that, overall, ***farmers with higher value network embeddedness in MSPs have more chances to generate agricultural innovation***, which in turn is likely to strengthen their embeddedness in value networks. Conversely, ***farmers with lower value network embeddedness in MSPs have fewer chances to generate agricultural innovation***, which in turn creates fewer opportunities for strengthening their

value network embeddedness. As such, farmers' heterogeneity in value network embeddedness may help explain the dynamics of socio-economic exclusion that some farmers experience in MSPs.

5.2. Contribution to the Literature

5.2.1. Contributing to Theories of Agricultural Innovation

The findings of this thesis contribute to several theories of agricultural innovation that have been recently applied to the context of MSPs. As stated in the introduction, we refer to agricultural innovation as a set of theories (rather than one theory) because several scientific disciplines have so far attempted to explain what drives agricultural innovation. These theories involve, among others, *transfer of technology* (ToT) (van den Ban, 1999; Anderson & Feder, 2004; Leeuwis, 2008), which sees agricultural innovation as the result of extension officers communicating to farmers; *agricultural innovation systems* (AIS) (Hounkonnou et al., 2012; Kilelu et al., 2013; Schut et al. 2016; Hermans et al. 2017), which looks more broadly at agricultural innovation as a product of the complex interactions among farmers and several interrelated stakeholders; *institutional theories* (Breeman et al. 2015; Ragasa et al. 2016), which focus on how institutional and policy frameworks shape agricultural innovation in interplay with MSPs (Breeman et al. 2015; Ragasa et al. 2016); *value chain theories* (Devaux et al., 2009; Thiele et al. 2011) which focus on how buyer-supplier relationships may shape the impact of MSPs on agricultural innovation; and *adoption of innovation theories*, which determine how farmer demographics such as gender and age shape the influence of MSPs on agricultural innovation as well as their ultimate impact on farmers' livelihoods (Pamuk et al. 2014a; Pamuk et al. 2014b).

Each chapter of this thesis makes one theoretical contribution relating to these theories of agricultural innovation. First and foremost, the key contribution of the systematic literature review (Chapter 2) involves ***integrating the several facets of how MSPs can influence agricultural innovation into one overarching framework***. Specifically, the systematic literature review delivers a processual model (or pathways) ***on how the expected outcomes and activities taking place in MSPs relate to the intermediary outcomes and levels of innovation that ultimately influence farmers***. The definition of this pathway from the extant literature allows us first to identify which specific goals and activities of MSPs may lead to certain outcomes and impacts. For example, MSPs that intend to stimulate novel agricultural practices (e.g., climate-smart agriculture) (Abate et al. 2011; Swaans et al. 2014) focus predominantly on facilitating and establishing communication among farmers and other stakeholders; these goals and activities result predominantly in boosting farmers' access to knowledge and technology and lead to agricultural innovation mostly at farm level. MSPs that aim to influence agricultural and food policies (Saint-Ville et al. 2017; Thorpe 2018) and engage in building common ground among several stakeholders tend to give farmers access to more supportive institutions, thus shaping agricultural innovation at a (local or global) institutional level. Therefore, the definition of these pathways clarifies that there are several ways for MSPs to influence agricultural innovation and that setting up clear goals and activities within the boundaries of MSPs has remarkable repercussions on their effects outside their sphere of control. Furthermore, the definition of these pathways highlights how future research may address the current limitations of the extant literature. To overcome the limit of silos-thinking, for example, future research may address questions that cut across sub-disciplines with socially and managerially relevant questions,

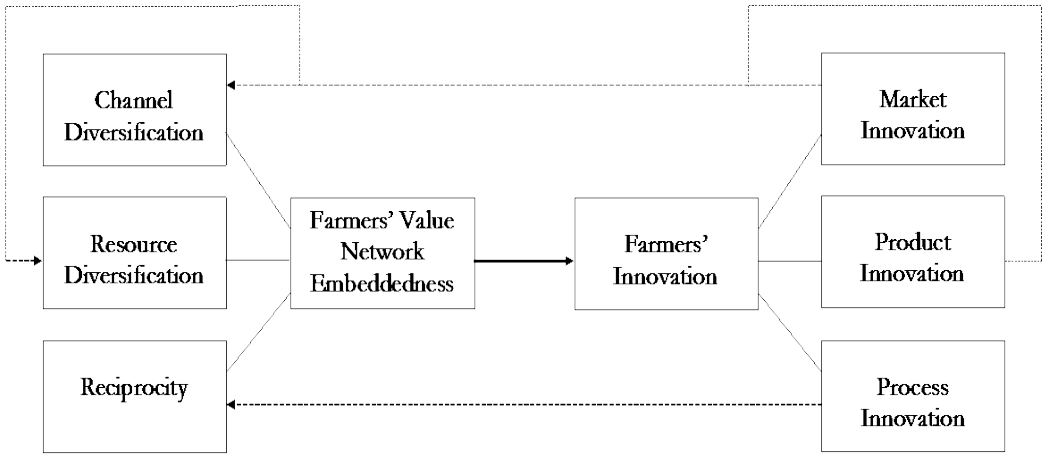
using Figure 2.8 as a framework to generate novel research questions and hypotheses. For example, some relevant questions that emerge from studying the pathways of MSPs' influence on agricultural innovation (Figure 2.8) include: how do MSPs' goal of shaping institutions and policies ultimately influence farm-level innovations and farmers' livelihoods? Or, how do specific activities of capacity-building or network-building in MSPs influence farmers' trust and participation or their access to value chain relationships? The framework that emerges from the systematic literature review will help clarify the connections between the aforementioned theories to explain why, how, and when MSPs may influence different facets of agricultural innovation.

Last, the two empirical studies of this thesis (Chapter 3 and 4) address another notable limitation that emerged from the systematic literature review, that is, the lack of emphasis on power dynamics. The systematic literature review (Chapter 2) demonstrated that theories on agricultural innovation within MSPs had so far put little emphasis on how power unbalances among farmers participating to the same MSP may influence their agricultural innovation. Contributing to filling this knowledge gap, the quantitative analysis using multi-variate statistics (Chapter 3) confirmed ***one plausible explanation of the 'innovation gap' among different farmers participating to the same MSP, that is, their heterogeneity in entrepreneurial orientation***. In other words, this thesis (Chapter 3) contributed to the theories of agricultural innovation by proposing farmers' EO – particularly their proactiveness and innovativeness – as an important, underexplored factor that helps explain why some farmers innovate more than others even when participating to the same MSP. Similarly, the inductive approach of qualitative analysis (Chapter 4) contributed to highlighting ***another important factor that explains the 'innovation gap' taking place in MSPs, that is, farmers' value network embeddedness***.

Importantly, it was empirically found that lower levels of agricultural innovation also generated fewer opportunities for farmers to strengthen their value network embeddedness. This finding further emphasizes the power dynamics at play in MSPs that may result in virtuous cycles (of socio-economic inclusion) or vicious cycles (of socio-economic exclusion) depending on whether these issues are taken into account. Considering farmers' EO and their value network embeddedness as novel, underexplored factors that help explain why and when MSPs effectively influence agricultural innovation also creates a space for future research. For example, future research may address managerially relevant questions such as: which specific activities in MSPs would trigger farmers' EO? Which specific activities would develop farmers' value network embeddedness? Which specific goals or activities should a MSP choose to make sure that farmers' EO and value network embeddedness would positively support agricultural innovation? Addressing these questions would inform managerial and policy practice in and around MSPs, as will be elaborated in the next sub-section (Section 5.3).

Furthermore, from the conceptual model that emerged from the empirical findings of chapter 4 (Figure 5.1), we suggest that, whereas farmers with higher value network embeddedness in an MSP have more chances to generate agricultural innovation. In the same MSP, farmers with lower value network embeddedness have fewer chances to engage in agricultural innovation, which in turn is likely to *weaken* their embeddedness in value.

Figure 5.1: Conceptual model emerging from the qualitative findings.



Legend: the arrows indicate cause-effect relationships among the variables in the boxes. The lines indicate key indicator relationships among variables.

5.2.2. Extending Organization Theory to a novel empirical context

To make a contribution to the aforementioned theories of agricultural innovations, this thesis has borrowed several concepts from organization theory. Therefore, while its core contribution lies in advancing the field of the influence of MSPs on agricultural innovation, this thesis also expands the use of three sets of concepts from organization theory and applies them to the novel context of MSPs and agricultural innovation. The three sets are: theories of cross-sector partnerships (Selsky & Parker, 2005; Van Tulder et al., 2016); theories of entrepreneurship and specifically the concept of entrepreneurial orientation (Krauss, Frese, Friedrich, & Unger, 2005; Rauch & Frese, 2007); and resource dependence theory with the idea of value network embeddedness in particular (Pfeffer and Salancik 1978; 2003).

First of all, the systematic literature review (Chapter 2) of this thesis takes stock of the extant studies on the influence of MSPs on agricultural innovation through the support of ***theories of cross-sector partnerships*** (Selsky & Parker, 2005; Van Tulder et al., 2016). In general, theories of cross-sector partnerships seek to explain how collaboration among multiple actors across different sectors (i.e., public, profit-oriented and non profit-oriented) unfolds and why (Selsky & Parker, 2005; 2010). From this perspective, MSPs can be seen as peculiar types of cross-sector partnerships that are organized and configured around a physical and/or virtual interface for knowledge-sharing and network-building purposes. Specifically, theories of cross-sector partnerships have recently zoomed into how the configuration and organization of MSPs impact society (Van Tulder, Seitanidi, Crane, & Brammer, 2016; Dentoni, Bitzer, & Pascucci, 2016) and trigger changes in the socio-ecological systems they are embedded in (Clarke and Crane 2018; Dentoni et al. 2018). This thesis builds upon theories of cross-sector partnerships ***to understand how goals and activities in MSPs relate to their pathways of influence on agricultural innovation***. Hence, these theories of cross-sector partnerships were instrumental in integrating the scattered extant literature on the influence of MSPs. At the same time, this thesis expanded the use of theories of cross-sector partnerships to a novel and societally relevant context, that is, farming in rural areas in emerging economies.

Second, the quantitative study using multi-variate statistics (Chapter 3) leverages the ***concept of entrepreneurial orientation*** (Krauss, Frese, Friedrich, & Unger, 2005; Rauch & Frese, 2007), which is one of the most popular concepts in entrepreneurship theory worldwide (Wales 2016; Wales et al. 2019). In general, theories of entrepreneurship focus intensely on the psychological drivers of the creation of new ventures and on the individual

attitudes of those engaging in innovative forms of value creation (Robinson et al., 1991). Specifically, entrepreneurship scholars zoomed into the various dimensions of entrepreneurial orientation as key features that characterize the multi-faceted psychological traits of someone that is more inclined to innovate (Frese & Gielnik, 2014; Johnson et al., 2017). This concept has been already extensively applied in the context of food and agricultural value chains (Gellynck et al., 2015; Matsuno et al., 2002; Verhees et al., 2011), and its key dimensions have been adapted accordingly. At the farmer level, entrepreneurial orientation has been measured in three dimensions, namely innovativeness, risk-taking, and proactiveness (Matsuno et al., 2002; Verhees et al., 2011). Furthermore, the concept of farmers' EO has recently been related to agricultural innovation in other contexts in emerging economies (Lai, Chan, Dentoni, & Neyra, 2017; Etriya et al. 2018; Yessoufou, 2017). This thesis has used the concept of entrepreneurial orientation ***in the novel context of MSPs in order to explain why an 'innovation gap' persists even among farmers who participate to the same knowledge-sharing and network-building activities***. By bringing the concept of entrepreneurial orientation to the novel context of MSPs, this thesis draws important implications for understanding potential dynamics of socio-economic exclusion or inclusion in MSPs. In fact, findings show that farmers with higher levels of proactiveness (as a key dimension of entrepreneurial orientation) are more likely to innovate their products than those with a lower level of proactiveness. Furthermore, and counterintuitively, farmers with higher levels of innovativeness have lower levels of market innovation. Hence, the use of entrepreneurial orientation in a novel context leads to important implications for policy and management of MSPs that will be discussed in the next section.

Finally, the qualitative study using an inductive approach (Chapter 4) mobilizes the ***concept of value network embeddedness*** (Allee 2009) which, in the context of this thesis, is underpinned by resource dependence theory (Pfeffer and Salancik 1978; 2003). Value network embeddedness refers to the whole set of interactions that a person, group, or organization has established with others in a system in relation to the valuable resources taken, given, exchanged, or pooled throughout each of these relationships (Allee 2009). As such, value network embeddedness relates to access to critical resources, and therefore to power, relative to other actors in a network (Hillman et al. 2009). Therefore, the concept of value network embeddedness usually informs actors on how to strategically reconfigure their networks to gain power over others (Hillman et al. 2009), obtain desirable outcomes through the networks (Casciaro and Piskorski 2005), and minimize their environmental dependencies (Pfeffer and Salancik 2003). This thesis transposes the concept of value network embeddedness to the novel context of MSPs in food and agriculture. By doing so, it helps ***understanding network embeddedness as another plausible driver of the persisting 'innovation gap' among farmers that participate in the same MSPs.*** Qualitative findings show that the concept of value network embeddedness may explain why MSPs may generate either vicious circles of socio-economic exclusion or virtuous circles of socio-economic inclusion because it has been found that farmers who innovate more further develop their value network embeddedness over time. This extension of resource dependence theory has remarkable implications for managers and policy-makers in and around MSPs, which will be elaborated in the next section.

Other contributions to the value network literature as highlighted, helps to explain what drives agricultural innovation and sheds light on some of the

socio-economic differences and power dynamics that affect it. In particular, value networks help to visually show the differences in embeddedness and resource access among actors within a system (Allee, 2008, 2009). This value network perspective also confirms that the configuration of a system of actors in a value network is tightly interrelated with the nature of the collective problems that those actors face (Waddell et al., 2015; Waddock et al., 2015). For example, as mentioned in chapter 4, our empirical findings reveal that the differences in market, process, and product innovation among coffee farmers in rural Uganda reflect deeper issues of unbalance in their access to critical resources. Therefore, understanding the constraints and opportunities of a value network configuration may be vital for the actors involved to (re-)organize their collaborative partnerships in and around MSPs to shift the current power structures (Schouten et al., 2018) that underlie and affect processes of innovation towards sustainability (Dentoni, Bijman, et al., 2019).

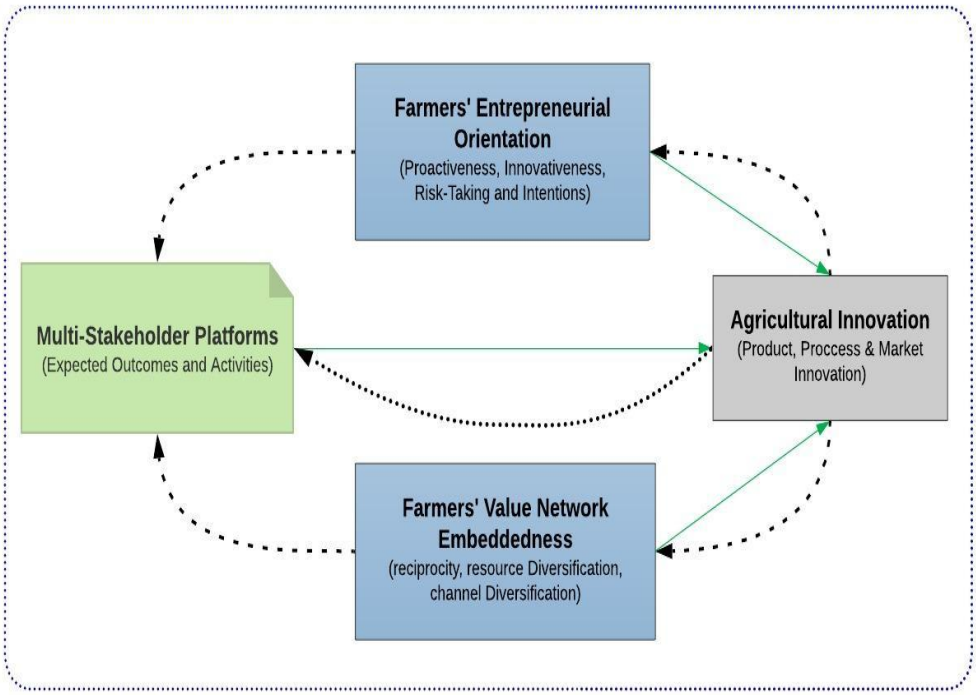
Building upon the features of value networks, these empirical findings provide – to the best of our knowledge – the first illustration of how the concept of value network embeddedness can be operationalized and applied to draw implications for MSPs or similar collaborative arrangements. These findings suggest that the issue of limited value network embeddedness of young farmers deserves specific attention in MSPs (Tenywa et al., 2011). With specific knowledge of which young actors are poorly embedded in identified value networks, MSPs can potentially undertake interventions that close the 'missing links' or 'blind spots' in a local system (Dentoni, Klerkx, et al., 2019). Furthermore, findings on this heterogeneity in value networks may support knowledge institutions, including universities, to provide more tailored entrepreneurship education programs (Lai et al. 2017b) to address complex systemic problems (Dentoni & Bitzer, 2015). With a stronger focus on

processes of including specific population segments of marginalized farmers, such as resource-scarce and network-disembedded youth, MSPs may overcome organizational challenges and move towards more adaptive and transformative governance (Richardson, 2007), which is necessary for supporting sustainable transitions towards the SDGs.

5.3. Implications for Stakeholders in and around Multi-Stakeholder Platforms

Building upon organization theories (Section 5.2.2) and contributing to theories of agricultural innovation as applied to MSPs (Section 5.2.1), the findings of this thesis – which were synthesized in section 5.1 – bring to the foreground a number of points for reflection for stakeholders in and around MSPs. A wide literature on MSPs advocates that these organizational forms represent a promising vehicle for triggering and sustaining agricultural innovation especially in emerging economies, ultimately generating rural development and supporting sustainable transitions in agricultural and food systems towards the Sustainable Development Goals (HLPF, 2017). As discussed in the sub-sections below, (Figure 5.2) illustrates (in dotted arrows) how the findings of each chapter lead to societally relevant implications for managers and policy-makers.

Figure 5.2: Implications stemming from the empirical testing of the theoretical framework



Legend: The full arrows represent the key relationships validated (either conceptually, quantitatively, or quantitatively) within this thesis. The dotted arrows represent the key implications drawn for the decision-makers in MSPs based on the findings in this thesis. The boxes represent the key concepts of the theoretical framework, and the key dimensions of each concept are displayed in between the parenthesis within each box.

5.3.1. Managerial and policy implications on MSPs

In turn, the theoretical contributions highlighted in section 5.2, lead to managerial implications, especially for those involved in decision-making within MSPs. In particular, empirical findings from chapter 3, suggest that the development of farmers' proactive and innovative mindsets and attitudes should be brought to the core of capacity building activities – for example, through workshops, coordination of hubs or incubators for farmers, and other

temporary or permanent events. In doing so, MSPs can represent useful organizational spaces for engaging in entrepreneurship training and thus supporting the development of entrepreneurial ecosystems (Bruton & Ahlstrom, 2003; Dentoni & Klerkx, 2015; Seuneke, Lans, & Wiskerke, 2013; Manyise et al. 2019). Also, In relation to capacity-building, results of chapter 3 suggest that older farmers significantly (with 90% likelihood) invest more on product innovation than younger ones. This finding suggests that different capacity-building activities could be further tailored to the age of the farmers involved, depending on the specific MSP goals. If the goal of the MSP is to maximize product innovation by those most likely to innovate, then older farmers should be at the core of capacity-building activities that trigger farmers' proactiveness. Conversely, if the goal of the MSP is to widen the distribution of innovation across the whole range of farmers involved, then training on proactiveness should focus especially in the younger generation of farmers.

This managerial implication on the importance of entrepreneurial capacity-building in MSPs sheds light on an underlying controversy in the academic literature of EO. This controversy revolves around the question: can farmers' EO, and, more broadly, EO as a psychological trait or mindset, change over time? In the specific context of agriculture, can a capacity-building activity generate a significant shift of EO in a relatively short period of time?

Early scholars assumed that EO constituted an immutable trait that individuals are born with, rather than learn (Rausch and Frese 2000; Frese et al. 2002). Conversely, recent large-scale empirical research demonstrated that individual-level EO can change even over relatively short periods of time, as, for example, an outcome of dedicated trainings (see Campos et al. 2017 in the

context of rural Western Africa with specific emphasis on proactiveness). In this study, we embrace the latter view, thus suggesting that EO may shift over time. This assumption seems in line with the broader notion of agricultural entrepreneurship as a farmer's process of recombining resources innovatively to seek or create opportunities for value creation (Lans et al. 2017; Shane & Venkataraman, 2000). Since entrepreneurial processes start from an orientation towards generating, developing, implementing, or adapting new ideas (Damanpour & Wischnevsky, 2006)(Damanpour & Wischnevsky, 2006) it seems plausible to assume that training could play an important role in stimulating EO and its specific dimensions. Hence, in the specific context of coffee MSPs, decision-makers may find it effective to invest in entrepreneurship training – with activities specifically focused on practicing proactiveness on the coffee farm – to stimulate farm innovations (Devaux et al., 2007; Kilelu et al., 2013), process innovations (Hounkonnou et al., 2012; Leeuwis, 2004), and market innovations (Dentoni et al., 2012; Devaux et al., 2009; Schut, Klerkx, et al., 2016).

If the end goal of MSPs is to promote and sustain inclusive pathways to rural development, these empirical findings can inform MSP decision makers and stakeholders on how to tailor the goals, approaches, and activities of MSPs to the different backgrounds of the farmers participating in them. A rich literature on MSPs has called for the development of inclusive governance mechanisms in MSPs (Dentoni et al., 2018; Helmsing & Vellema, 2011; Tenywa et al., 2011) to effectively support pathways towards equitable rural development through agricultural innovation. Yet how can MSPs become, in practice, more inclusive to farmers with different characteristics? These empirical findings suggest that a deeper understanding of the socio-economic background and the value network embeddedness of farmers is a prerequisite for inclusiveness. For

example, in chapter 4, in the case of coffee in the Manafwa district, MSPs would be particularly helpful to young farmers in the highlands (Cluster 1) in fostering networks to access a wider set of financial and input resources. For older female farmers in the midlands (Cluster 2), MSPs may be better used to access a wider set of market channels. Conversely, MSPs could be less proactive in fostering the building of new networks for farmers in the lowlands (Cluster 3), who are already naturally (and geographically) strongly embedded in value networks. In other words, depending on their initial value network embeddedness, each group of farmers may need to use MSPs differently to build value networks that complement the knowledge that they already receive and co-create in MSPs. As such, these findings highlight the need - not only for farmers or MSPs, but also for governments, companies and other powerful stakeholders in the broader agri-food system - to address the context-specific challenges experienced by farmers.

Along with fostering value networks with an approach tailored to the needs of each farmer segment, these empirical findings also suggest that MSPs may act as spaces for farmers to learn how to develop their own value networks strategically. For example, by engaging farmers in informal processes of reflection on their farming, collaboration, and marketing experiences (Allievi, Dentoni, & Antonelli, 2018; Manyise, Dentoni, Lans, & Trienekens, 2019), MSPs may develop farmers' capabilities in mobilizing and deploying resources and networks strategically. Therefore, an MSP that supports trainings beyond technical skills (e.g., pruning, cherry picking, storing, drying, etc.) to also include social skills (e.g., entrepreneurship, networking, negotiating, or collaborating) may be able to transversally impact the identified farmer clusters' agricultural innovation. MSPs themselves should expand their value network embeddedness to provide trainings that combine social and

technical skills to their members and, above all, to farmers. For example, MSPs can establish stronger value networks with farmer field schools, tech-companies that disseminate social skills training material for farmers via the internet, and youth-led civil society organizations that bring specific knowledge on how to mobilize youth (both on coffee farming and complementary activities along the coffee value chain) by establishing a stronger collaboration among them. Finally, to do this, MSPs need to establish stronger and more stable collaboration with policy-makers and local institutions: if they are recognized as providers of holistic training and networking services to farmers – transversally to their socio-economic background and value network embeddedness – then MSPs may have more legitimacy to demand longer-term support through government funding.

5.3.2. Recommendations for Stakeholders *in* Multi-Stakeholder Platforms

First of all, the findings from this thesis inform decision-makers within MSPs, who are usually the funders, i.e., the actors that finance the creation and/or sustenance of the physical and/or virtual interface; their chairs, i.e., the actors that organize the unfolding of the MSP activities; and the other influential stakeholders of the MSPs, which may be representatives of farmer groups or associations, value chain actors, non-governmental organizations, or government officers. Findings from this thesis, in accordance with the extant literature, inform these stakeholders about ***which specific activities and goals of MSPs lead to intermediary outcomes and levels of innovation that influence farmers*** (see Figure 5.2, dotted arrow from agricultural innovation to MSP goals and activities). Specifically, these findings clarify the causal links among goals, activities, intermediary outcomes, and levels of innovation

in MSPs, therefore informing stakeholders on how to focus the several endeavors they are engaging with. First, stakeholders can use these findings to negotiate the goals of their MSPs. For example, by being aware of how MSPs' objectives can lead to different outcomes for farmers and their ecosystems (e.g., farm, value chain, or regional or national institutional contexts), decision-makers in MSPs can reconsider and refocus their activities and resource allocations accordingly. Second, stakeholders may leverage these findings to support their influence measurement strategies. For example, a funder (or monitoring & evaluation expert) seeking to assess the influence of an MSP may use the causal links among their goals, activities, intermediary outcomes, and levels of innovation as a 'theory of change' to monitor if the MSP has at least reached its intermediate outcomes (e.g., more access to networks, knowledge, capacities, technology, finance, or supportive institutions) *en route* to delivering influence on agricultural innovation and farmers' livelihoods. This is particularly important because, as we know from influence studies of cross-sector partnerships (van Tulder et al. 2016), measuring the ultimate influence of MSPs is extremely complex and uncertain. Therefore, the measurement of intermediate outcomes along a clearly defined theory of change becomes critical.

Furthermore, relative to the extant literature, findings from this thesis lead to recommending that stakeholders ***take into account and act upon the heterogeneity among farmers that may widen 'innovation gaps' and lead to dynamics of socio-economic exclusion*** (see Figure 5.2, dotted arrows from agricultural innovation to farmers' entrepreneurial orientation and value network embeddedness). In other words, results from this thesis emphasize that farmers are not equally equipped to benefit from their participation in MSPs. Some farmers who are more entrepreneurially oriented and embedded in value

networks have greater opportunities to innovate in their products, processes, and markets relative to their peers. Depending on the magnitude of this 'innovation gap' and the process that leads to it, these dynamics may generate socio-economic exclusion or inclusion among farmers in MSPs, which often leads to unpredictable consequences for the agricultural and food systems in which they are embedded. Once aware of the drivers of this 'innovation gap' revealed in this thesis, decision-makers in MSPs may choose among at least two options for how to address it. One, they may opt for providing tailored services or activities for farmers that have lower levels of entrepreneurial orientation (e.g., entrepreneurial training activities) or value network embeddedness (e.g., tailored network-building activities). Or, depending on the negotiated goals, they may opt to narrow down the number of farmers who engage in their MSP. For example, a MSP may decide to focus only on farmers that have higher level of entrepreneurial orientation and value network embeddedness (for example, if the goals of the MSP is more oriented towards rapidly linking farmers to markets or attracting private financial investments), or only on farmers with lower entrepreneurial orientation and value network embeddedness (for example, if the MSP has goals of poverty reduction, social inclusion or community development).

5.3.3. Recommendations for Stakeholders *around* Multi-Stakeholder Platforms

Along with stakeholders in MSPs, the findings from this thesis will also suggest possible actions for actors around MSPs – for example, policy-makers and institutions that implement policies, non-governmental organizations, universities, and brokers who purposively seek to bridge the gaps between the multiple organizations and initiatives taking place in agricultural and food

systems. First of all, these stakeholders around MSPs may use the findings from the causal links among the goals, activities, intermediary outcomes, and levels of innovation in MSPs to advance their monitoring and evaluation endeavors (see Figure 5.1, dotted arrows from agricultural innovation to MSP goals and activities). For example, by taking into account its ostensible declared goals and performed activities, ***policy officers and non-governmental organizations have the chance to assess how a MSP, or multiple MSPs, are influencing agricultural innovation on the basis of the identified intermediary outcomes and levels of innovation***. Accordingly, from a policy-making standpoint, actors have the opportunity to regulate the processes of monitoring and evaluating MSPs. This may be politically relevant, especially when MSPs are (at least partially) government-funded. Furthermore, non-governmental organizations outside of MSPs may also use the found pathways linking goals, activities, intermediary outcomes, and levels of innovation to keep decision-makers accountable for the process of influence achieved in relation to their targeted farmers.

Finally, the findings from this thesis may inform ***stakeholders around MSPs on how to support MSPs in developing farmers' entrepreneurial orientation and value network embeddedness*** (see Figure 5.1, dotted arrows from agricultural innovation to farmers' entrepreneurial orientation and value network embeddedness). Given the relevance of entrepreneurial orientation and value network embeddedness in reducing the 'innovation gap' which often exists among farmers in MSPs, non-governmental organizations and universities in emerging economies have the chance to develop and deliver entrepreneurship trainings with the specific learning objective of increasing farmers' entrepreneurial orientation. Furthermore, non-governmental organizations or other brokering organizations may organize purposive

networking events (outside or across multiple MSPs in the same ecosystem) with the goal of fostering farmers' value network embeddedness. Through these endeavors, informed by the findings of this thesis, stakeholders around MSPs have the opportunity to concretely enact dynamics of socio-economic inclusion in MSPs, thus preventing dynamics of socio-economic exclusion.

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Summary

Multi-Stakeholder platforms (MSPs) are physical or virtual decision-making bodies that creates an enabling environment for interaction, coordination and collectively knowledge creation among multiple stakeholders to reach common objectives. An extensive discussion in academic literature and policy currently celebrates MSPs as novel organizational forms that promote knowledge co-creation and innovation uptake among farmers and other stakeholders to address great challenges surrounding agri-food systems.

While MSPs represent relatively novel organizations that support actors in the agri-food value chains to address critical challenges such as rural poverty, food insecurity, and the negative effects of climate change, little is known on how they influence farmer innovation. Therefore, this thesis investigates how agricultural MSPs influence farmer innovation and rural development in emerging economies. By empirically investigating one MSP in the Manafwa district located in the Eastern region of Uganda, this thesis combines qualitative and quantitative research methods. First, ***it provides an overview on what MSPs are and how they influence farmer innovation in emerging economies. Second, it assesses how farmers' heterogeneity, in terms of entrepreneurial orientation and value network embeddedness, influences agricultural innovation in the context of one MSP.***

In the first part of this thesis, a systematic literature review (SRL) provides an overview on what MSPs are and how they influence farmers' innovation in emerging economies. The second part of the study shows a model fit of a Confirmatory Factor Analysis, a Partial Least Square multi-variate statistics, and a Value Network Analysis, to understand why farmers participating in the

same MSPs may innovate to different extents, thus potentially generating dynamics of socio-economic exclusion.

Based on secondary data from 44 papers published from 2005 through 2018 and primary data of 152 survey questionnaires filled in by and 27 in-depth interviews with Ugandan coffee farmers, the results of this study describe MSPs as a virtual and/or physical interface spanning across multiple heterogeneous stakeholders. First of all, the analysis of secondary data highlight that MSPs have been studied by five main strands of literature: agribusiness management, agricultural economics, agricultural innovation systems, agricultural research for development, and public policy and governance. By integrating these literature strands, it was possible to identify that MSPs tend to achieve different intermediary outcomes (impact pathways) and levels of innovation depending on their organizational goals and activities. These findings also reveal four key limitations of the extant MSP literature – namely, disciplinary silos-thinking, linear-thinking, limited focus on the role of informal institutions, and little emphasis on power dynamics – which, if addressed, as in the current study, would more comprehensively inform managers and policy-makers on how MSPs may influence farmer innovation.

The empirical findings of this thesis reveal how two of the three key dimensions of farmers' entrepreneurial orientation - namely, proactiveness and innovativeness - drives product, process, and market innovation in the context of one coffee MSP in Uganda. The third key dimension of farmers' entrepreneurial orientation, risk-taking, was not found to fit the empirical context of rural Uganda. It is shown that especially farmers' proactiveness significantly drives product innovation and, to a lesser extent, process innovation. This effect holds when considering key control variables such as

access to key resources and associated actors. Also, and more surprising, farmers' innovativeness hampers market innovation, different to what is usually expected in the contexts of developed economies.

Finally, by exploring the network conditions that may support or undermine agricultural innovation, this study suggest that farmers within MSPs show remarkable differences in their socio-economic status, value network embeddedness, and levels of product, process, and market innovation. This may suggest that power unbalances may underlie how MSPs influence agricultural innovation. In particular, farmers' value network embeddedness both drives and is driven by agricultural innovation. This feedback loop generates virtuous circles for farmers who can afford to innovate, and vicious circles for those who cannot. These findings connect agricultural innovation systems and resource dependence theories through the notion of value network embeddedness, and they also lead to managerial and policy implications for MSPs, which should take both a tailored approach towards supporting farmers' network development as well as trainings of their technical and social skills.

Empirical findings of this thesis also provide a novel illustration of how the concept of value network embeddedness can be operationalized and applied to draw implications for MSPs or similar collaborative arrangements. Findings also suggest that the issue of limited value network embeddedness of young farmers deserves specific attention in MSPs. With specific knowledge of which young actors are poorly embedded in identified value networks, MSPs can potentially undertake interventions that close the 'missing links' or 'blind spots' in a local system. As such, recommendations for MSP decision-makers and stakeholders include to take a tailored approach in supporting farmers' network development depending on geographical location, socio-economic

background, and current value network embeddedness. This might also need to take a transversal approach across all farmers, independent from geographical location, socio-economic background, and current value network embeddedness, to support their learning processes on how to establish stronger and more strategic value networks. Both approaches may be helpful in reducing the 'innovation gap' among farmers in the same MSPs and preventing dynamics of socio-economic exclusion or underlying competition among farmers.

About the author

Carlos Luis Barzola Iza was born in Guayaquil-Ecuador on the 26th of September 1986. He finished fundamental education with a specialization in Chemistry and Biology according to the Ecuadorian education system. In 2004, he was admitted to study Agricultural Engineering at the Higher Polytechnic School of the Coast (Escuela Superior Politecnica del Litoral, ESPOL). During his bachelor, Carlos decided to do an internship in the pork industry. He received training on breeding and farrowing systems in Carthage, Illinois, United States. He also did an internship in a community development program working with small pork producers in a coastal community in the province of Santa Elena in Ecuador.

Carlos graduated as an Agricultural engineer in 2010 after defending a thesis based on economic analysis to test the adaptation of new technology for rice fertilization in the lowlands in the Guayas Province in Ecuador. Later, Carlos worked in the private sector managing farms and also as an independent grower of rice, maize and watermelons in different areas on the coast of Ecuador. During this period, he was also assisting in a project at the Center for Research in the Rural Areas (CIR) at ESPOL. He took a role in the organization of farmer field schools in the Santa Elena Province, and the supervision of bachelor thesis focuses on agriculturall and rural development research.

In 2011 Carlos was granted an Erasmus Mundus Scholarship and was admitted to the International Master of Science in Rural Development, IMRD. The mobility element of this master program allowed Carlos to study at the University of Ghent in Belgium, Humboldt University in Berlin, Germany and finally to move to Wageningen University. He obtained his MSc in Rural

Development after presenting his thesis title: Understanding the dynamic of innovation support services: The case of "*Alianzas Productivas*": public-supported and market-oriented privatized services for smallholders in Chile.

In 2013, Carlos was granted with a scholarship from the Ecuadorian institute: "Instituto Ecuatoriano de Crédito Educativo y Becas (IECE)", and the "Secretaria Nacional de educación Superior, Ciencia y Tecnología e Innovación (SENESCYT)" after presenting a research proposal to investigate muti-stakeholder platforms and their influence on farmer innovation.

During his Ph.D., apart from his research activities, Carlos participated as a coach in the course of "Interdisciplinary Themes in Food and Sustainability" and he worked as assistant of the course of "Management and Marketing" at Wageningen University.

He was also involved in the organization of the biannual conference 2018 in Ancona, Italy, organized by the Business, Management & Organisation, (BMO) group.

From October 2016 until October 2018, Carlos served to the Wageningen School of Social Science (WASS) Ph.D. council and took participation in the Wageningen Ph.D. Council (WPC). During this period, he was involved in the organization of academic and social events such as the annual Wageningen Ph.D. symposium, the WASS Ph.D. day in-house conference, the annual Wageningen Ph.D. party, and other social events.

Peer reviewed publications

Barzola Iza, CL., Dentoni, D., Omta, S.W.F. (2019). The influence of Multi-Stakeholder Platforms on farmers' innovation and rural development in emerging economies: A systematic literature review. Journal of Agribusiness in Developing and Emerging Economies. In press.

Barzola Iza C.L., Dentoni D., Mordini M., Isubikalu P., Auma Oduol J.B., Omta O. (2019) The Role of Farmers' Entrepreneurial Orientation on Agricultural Innovations in Ugandan Multi-Stakeholder Platform. In: Rosenstock T., Nowak A., Girvetz E. (eds) The Climate-Smart Agriculture Papers. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-92798-5_17. Online ISBN 978-3-319-92798-5.

Barzola Iza, C.L., Dentoni, D., Allievi, F., Slikke, T., Isubikalu, P., Oduol, J., Omta, S.W.F. (2019). "Challenges of youth involvement in sustainable food systems: Lessons learned from the case of farmers' value network embeddedness in Ugandan Multi-Stakeholder Platforms". In: (Eds.), Valentini, R., Sievenpiper, V., Antonelli, M. and Dembska, K, *Achieving the Sustainable Development Goals through sustainable food systems*. Springer, Cham. In press.

Completed Training and Supervision Plan

Carlos Luis Barzola Iza
Wageningen School of Social Sciences (WASS)

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
WASS Introduction course	Wageningen School of Social Science (WASS)	2014	1.0
Entrepreneurship in Emerging Economies	WASS	2018	2.0
European School of New Institutional Economics	Dauphine University Paris	2015	1.1
Qualitative Comparative Analysis and fuzzy Sets	Summer school, University of Ljubljana and ECPR	2015	3.0
B) General research related competences			
Academic Publication and Presentation in the social science	WASS	2018	4.0
Introduction to R	Summer school, University of Ljubljana and ECPR	2015	0.6
Writing PhD research Proposal	Wageningen University	2015	4.0
Making an Impact in Research	Wageningen Graduate Schools	2018	1.0
CERES basic training	Research School for International Development	2014	4.0
'The impact of Multi-Stakeholder Platforms on small farmers' innovation and rural development in developing countries'	WICaNeM, Wageningen	2018	1.0
Information Literacy PhD including EndNote Introduction	Wageningen Graduate Schools	2015	0.6
Writing retreat	Centre for Space, Place and Society	2018	1.0
C) Career related competences/personal development			
The Essentials of Scientific Writing and Presenting	Wageningen Into Languages	2014	1.2
Lecturer of the course Agricultural Extension and Rural Development	Escuela Superior Politecnica del Litoral	2014	1.0
Lecturer/ Assistant courses MST24306, YSS33806, YSS32306	Wageningen University	2015-2019	3.0
Participation in the WASS PhD Council	WASS	2017	3.0
Collaboration in the Organization of the 13th Wageningen International Conference on Chain and Network Management, WICANEM 2018	Business, Management & Organisations group, WASS	2018	1.0
Brain Training	Wageningen Graduate schools	2015	0.3
Social Dutch 1	Wageningen Into Languages	2014	2.4
Total			**35.2**

*One credit according to ECTS is on average equivalent to 28 hours of study load

The research described in this thesis was financially supported by Convocatoria Abierta 2012, Instituto Ecuatoriano de Crédito Educativo y Becas (IECE), Secretaria Nacional de educación Superior, Ciencia y Tecnología e Innovación (SENESCYT) and Australian Center for International Agricultural Research (ACIAR) project FST/2014/093 titled "Value chain Innovation Platforms for Food Security" (VIP4FS).

Financial support from Wageningen University and Convocatoria Abierta 2012, IECE and SENESCYT for printing this thesis is gratefully acknowledged.

Cover design by Carlos L. Barzola Iza.

Printed by Digiforce and ProefschriftMaken.