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Value Chain Upgrading through Producer Organisations: Linking Smallholder Vegetable Farmers with Modern Retail Markets in Indonesia

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ABSTRACT

The study uses three elements of value chain analysis (VCA) – network structure, added value, and governance – to explore upgrading possibilities of value chains of producer organisations (PO)s in Indonesia in order to link smallholders to the modern retail market. Qualitative data are obtained through semi-structured interviews with PO members and other value chain actors. POs upgrade their value chains through linking smallholders with the modern retail market. Upgrading network structures is achieved by building collaboration between PO members and buyers. Upgrading added value is obtained by increasing the capability of farmers to meet quality requirements. Upgrading of governance structures in the chains is reached through contracts as vertical governance mechanisms and enhanced member services as horizontal arrangements.

Keywords Modern retail; Indonesia; producer organisation; value chain; upgrading.

1 Introduction

Upgrading value chains is important for firms in developing countries as a strategy to respond to the challenges of globalisation and increased competition (Ponte & Ewert, 2009). Upgrading can enable firms and industries to move towards making better products and advance efficiently into more skilled activities with greater rewards in high-value markets (Giuliani et al., 2005; Kilelu et al., 2017). In value chain analysis, upgrading concepts have been widely applied to identify the possibilities for producers to 'move up the value chain,' either by shifting to more rewarding functional positions or by offering products with more added-value (Bolwig et al., 2013; Gereffi, 1999). In many cases, upgrading value chains is achieved through multi-business efforts, such as combined upgrading of products and processes or collaborative upgrading under contractual arrangements (Humphrey & Schmitz, 2000; Trienekens, 2011).

Many studies describe upgrading value chains at the firm or industry level (Giuliani et al., 2005; Lee & Gereffi, 2015; Tanrattanaphong et al., 2020; Tessmann, 2018). Other studies on upgrading agri-food value chains focus on export markets (Maertens & Swinnen, 2012; Ponte & Ewert, 2009; Roy & Thorat, 2008; Trienekens et al., 2017). In addition, some studies examine upgrading of domestic agri-food value chains at individual producer level through contract farming (Bellemare, 2012; Maertens & Velde, 2017; Ragasa et al., 2018). Only rarely has a study looked at upgrading the value chain at the level of the producer organisation (PO), that sells members' products to domestic modern retailers.

Similar to export markets, the retail markets in developing countries have transformed to become more integrated in vertical coordination and with higher concerns for food quality and safety (Reardon, 2011; Reardon et al., 2012). The emergence of modern retail has opened the opportunity for smallholders to participate in high-value food chains. However, many farmers face constraints when trying to sell in high-value markets due to a lack of organisation, finance, and knowledge about certification and quality control (Royer et al., 2016). An institutional innovation aiming to solve such constraints and facilitate linking with modern retailers is the producer organisation (Markelova et al., 2009; Royer et al., 2016). Although POs have been around in developed and developing countries for a long time, the innovation lies in the more business orientation of modern and new POs (where the old ones were more focussed on lobbying and/or distributing state support). Prior studies have found that (modern) POs help smallholders connect with high-value markets in developing countries (Fischer & Qaim, 2012; Kaganzi et al., 2009; Moustier et al., 2010; Trebbin, 2014). To the best of our knowledge, no studies have been conducted on the role of POs in Indonesia in the context of modern retail markets.

In Indonesia, most smallholder vegetable farmers engage with a Farmer Group (FG), a type of PO initiated by the government in 1979 to distribute financial support and technical assistance (Hermanto & Swastika, 2011; Ibnu et al., 2018). Several POs have evolved from social-community organisations into economic organisations whose aim is to integrate their members into high-value food chains. There is, however, scant information on how POs engage in upgrading value chains. By using a multiple case study approach, our study explores how POs in Indonesia have upgraded their value chains by supporting the link between smallholder farmers and modern retail markets. This study contributes to the existing literature on value chain development and the role of POs in linking farmers to modern retail markets. The findings may also serve as lessons for POs and policy makers to upgrade the capabilities of POs from a value chain perspective.

This paper is organised into seven sections. In Section 2, the theoretical framework is presented. Section 3 describes the background of modern Indonesian retail, the transformation of POs and vegetable value chains. Section 4 presents the methodology used, while Section 5 outlines the empirical results, and Section 6 discusses the role of the POs in value chain upgrading. Section 7 concludes and discusses managerial and policy implications.

2 Theoretical framework

Smallholder farmers face constraints when selling farm products in modern retail markets, such as poor access to finance, extension services, market information and quality control, and the lack of organisation (Royer et al. (2016). Producer organisations have been claimed to be capable of solving these constraints by successfully linking farmers to modern retail (Markelova et al., 2009; Trebbin, 2014).

Value chain analysis (VCA) can be used to describe and explain the role of different actors in a (food) value chain. "Value chain" refers to the progression of activities and actors through each phase of production, handling, and distribution when delivering a product to the end consumer (Kaplinsky, 2000).

These activities include the flow of products, exchange of information, financing of investments, distribution of value-added, coordination among actors, and governing the chain (Kaplinsky & Morris, 2001; Trienekens, 2011). VCA is an analytical approach used to understand the nature of ties between the actors in the value chain (De Boer et al., 2019; Ellis et al., 2019).

VCA can be conducted at different levels: global, macro, meso or micro (Gereffi & Kaplinsky, 2001). This study was carried out at the meso level focusing on smallholders' activities in the domestic modern retail market in Indonesia. Trienekens (2011) proposed a framework of VCA in developing countries. He used three key elements of VCA in developing countries: network structure, added value and governance. This paper uses these three elements of VCA to explore the role of POs in mitigating smallholders' constraints and in linking them to modern retail markets.

The first element — network structure — includes both vertical and horizontal dimensions. Lazzarini et al. (2001) developed the concept of a 'netchain' to present the interrelationship between horizontal and vertical dimensions in the value chain. The horizontal dimension reflects the collaboration between actors at the same level of the chain (e.g., collaboration among the farmers in a PO), while the vertical dimension reflects the collaboration between actors at different levels of the chain, such as between farmers and traders (Barratt, 2004; Lazzarini et al., 2001). According to Omta et al. (2001), networks are looked upon as the total of actors within industries and/or between industries which can work together to add value to products. According to Ellis (2010) and Lenney and Easton (2009), joint activities in networks include exchange, planning, and organising. The network structure in this study includes the vertical and horizontal relationships between PO members and other value chain actors, that jointly produce added value.

The second element is the added value created at different levels and by different actors along the chain (Trienekens, 2011). Added value refers to adding economic value to a product by adding characteristics preferred by customers (Coltrain et al., 2000). Added value can be achieved, for example, by upgrading packaging, processing, and distribution functions (Trienekens, 2011). For the operationalisation of upgrading in this study, we focused on value-added activities conducted by the PO to comply with buyers' quality specifications and logistic requirements. The main PO activities included the provision of technical assistance regarding organic production, the post-harvest handling, and the distribution of vegetables to buyers.

The third element of VCA is the governance of the value chain, that is, the organisational arrangements among value chain actors. Governance consists of a collection of rules between actors for carrying out their bilateral transactions. In this study, the governance of value chains was identified not only in the governance of vertical arrangements between PO and buyers (Wever et al., 2012) but also in horizontal arrangements among the members of the PO. These horizontal arrangements relate to the internal governance of the PO, such as to how information exchange is organised, how decision are being made, and how leaders are selected and elected (Bijman et al., 2007; Bijman et al., 2014).

Upgrading all three elements of VCA may help smallholder farmers link with modern retail markets. Upgrading is defined as the actions a firm takes to improve its abilities to make better products or to produce them more efficiently (Gereffi, 1999; Giuliani et al., 2005; Kaplinsky, 2000). Upgrading in agrifood value chains may involve modifying production processes to improve productivity or introducing production methods that adhere to quality standards and food safety measures (Bolwig et al., 2013; McCullough et al., 2008). In most cases, upgrading of value chains is achieved by using multi-business approaches, such as a combination of upgrading of products and processes, often in collaborative arrangements (Trienekens, 2011). This study used upgrading options for three elements in VCA, as mentioned above—network structure, value-added, and governance. This upgrading, then, will illustrate the role of POs in linking smallholder farmers to modern retail markets

Upgrading network structures in this research refers to improving the networks of POs with buyers on the one hand and the members of the PO on the other hand. Network structures depend on market channels (Wilkinson, 2001). By improving the network, the PO can help farmers to access (new) market channels, for instance shifting from traditional retail markets to higher-value markets. Upgrading added value relates to upgrading product quality, packaging, and distribution (Trienekens, 2011). The PO can help smallholders increase the value of their vegetables by making sure they meet the quality specifications of modern retailers. Upgrading governance refers to improving the vertical relationships with the buyers and the horizontal relationships among the farmers, so as to reduce transaction costs and strengthen the bargaining position of the farmers. According to North (1990), transaction costs consist of information, contract, and monitoring costs. Information cost refers to efforts to obtain knowledge about suppliers, buyers, and quality of the product. Contract cost relates to the cost of negotiating prices and designing

contracts. Monitoring cost refers to determining whether actors are complying with their agreements and preventing opportunistic behaviour. To reduce transaction costs, actors to a transaction choose a certain governance structure depending on the levels of asset specificity, uncertainty, and measurement difficulties (Ghosh & John, 1999; Rindfleisch & Heide, 1997). Those governance structures range from spot market, via contracts to vertical integration (Ménard, 2005; Williamson, 1999). Meanwhile, upgrading governance in horizontal relationships is related to improving the internal governance of the PO in organising meetings and joint decision-making among the members (Bijman et al., 2014) and providing member services (Bijman et al., 2007). Figure 1 illustrates the conceptual framework of this study: value chain analysis helps to explore options for value chain upgrading, which leads to mitigating smallholder constraints in selling in modern retail markets. Table 1 shows the operationalisation of VCA concepts used in this study.

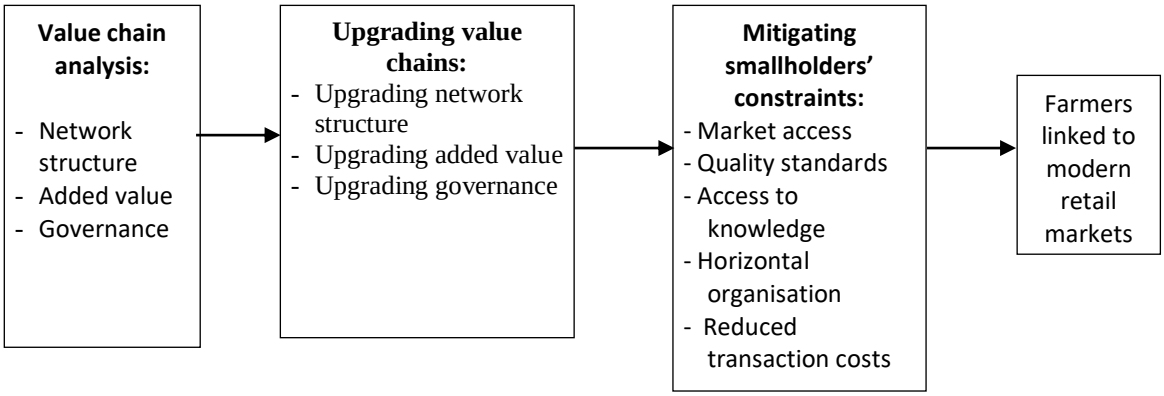

Figure 1. Conceptual framework.

Table 1.
Operationalisation of the value chain analysis.

Value chain element	Dimension	Indicators	Literature
Network structure	Actors involved in increasing added value	All vertical and horizontal actors involved, from producers to end market/consumers, in increasing added value.	(Lazzarini et al., 2001; Omta et al., 2001)
Added value	Production process	Organic cultivation.	(Kaplinsky, 2000; Trienekens, 2011)
	Post-harvest handling	Sorting, cleaning, packaging, labelling of brand and organic logos.	
	Distribution	Delivery or transportation to the buyers.	
Governance	Vertical arrangements	Contract arrangements between PO and buyers: type of agreement, price, quantity, quality, place of delivery, and payment mechanism	(Wever, 2012)
	Horizontal arrangements	Internal governance of PO in organising meetings, decision making, and providing services.	(Bijman et al., 2014; Bijman et al., 2007)

3 Background

3.1 Modern Indonesian retail market

Modern retail in Indonesia expanded rapidly after 1998 when the government allowed direct foreign investment (FDI) in the operation of food retail (Neven & Suleiman, 2007; Suryadarma et al., 2010). In 2014, the total number of retailers was 24,449, comprising 269 hypermarkets, 1,362 supermarkets, and 22,818 convenience stores. The market share of modern retail increased constantly each year, from 5% in 1999 to 16% in 2014. In comparison, the share of traditional retail decreased from around 93% in 1999 to

83% in 2014 (USDA, 2015). Factors driving the emergence of modern retail in Indonesia are income growth, liberalisation of FDI in the retail sector, urbanisation, and consumer awareness of food quality and safety (Minot et al., 2015; Reardon et al., 2016).

In the beginning, the modern retail market focussed on staple and processed foods, for which supply chains are easy to organise. As the market developed, fresh fruits and vegetables were added to the assortment. The retail share of fresh fruits and vegetables (FFV) in Indonesia increased from 15% in 1998 to 21% in 2014. When purchasing FFV, Indonesian consumers still rely heavily on the traditional market (Minot et al., 2015). However, the share of FFV in retail sales is expected to continue to increase along with the rapid growth of consumer demand for food quality, safety, availability, ease, brand, and traceability (Natawidjaja et al., 2007; Slamet et al., 2017). In fact, increasing consumer awareness about food quality and safety has encouraged retailers to allocate more space to organic products. To supply organic vegetables, organic certification from a third party is needed as well as placing an organic logo on the packaging. According to the Alliance of Organic Indonesia (AOI), domestic consumption of organic food is dominated by fruits and vegetables (21%), rice (20%), and honey (10%). The total area of land of certified organic crops increased from 62 thousand ha in 2012 to almost 80 thousand ha in 2015 (David & Ardiansyah, 2017) .

3.2 Producer organisations in Indonesia

One type of PO is the Farmer Group (FG). According to the Indonesian Agriculture Ministry Regulation # 82/2013, a FG is defined as a group of farmers formed on the basis of mutual interest, common environmental conditions (social, economic, and resources) and solidarity to improve and develop the members' businesses. Commonly, the FGs are formed around the crop(s) cultivated by their member farmers. A FG largely contains farmers from the area in and around a specific village. An average FG in Indonesia consists of 30 members. These groups organise collaboration among farmers, facilitate knowledge sharing and learning processes, and help distribute farming inputs and credit from the government (Hermanto & Swastika, 2011; Ibnu et al., 2018). Usually, the members of the FG pay a membership fee for covering operational cost and for investments in equipment for post-harvest handling.

The management board of the groups commonly consist of a group leader, secretary, and treasurer. The board consists of members of the FG who are selected in meetings of all the FG members. The leader of the FG is the coordinator and energiser of the group – taking actions, making decisions and motivating the group to carry out activities that have been determined during the group meetings (Raya, 2014). The FG management board governs the PO to ensure that it runs well according to the guidelines outlined in the group meetings. FGs are independent of the government in taking any decision.

The formation of FGs was initiated by the central government in 1979 to facilitate the distribution of governmental aid and input subsidies to individual farmers (Hermanto & Swastika, 2011; Ibnu et al., 2018). Many programs have since been established to strengthen the bargaining position of FGs, to improve production, and to provide credit. In many cases government efforts were unsuccessful in sustaining of the FGs and many groups collapsed after the project or program was finished (Hermanto & Swastika, 2011; Nuryanti & Swastika, 2011). However, those that were based on farmers' initiative to help, serve, and improve their members' farms remained in existence.

According to the Indonesian Agriculture Ministry Regulation # 273/2007, FGs should be developed based on six principles: openness, freedom, participation, self-reliance, equality, and partnership. FGs also have three main functions: (1) helping farmers to improve their knowledge and skills; (2) building cooperation among farmers as well as between FGs and with other parties such as buyers, governments and NGOs; and (3) helping farmers develop their farms.

According to data from the Agricultural Extension Center, published in the Indonesian Agriculture Ministry's database[1], the number of FGs reached 643,710 in 2020. These FGs have been registered in each regional agricultural ministry and they are guided by agricultural extension services to improve farmer knowledge. FGs operate with diverse internal governance mechanisms and provide services to their members such as inputs for production, technical assistance and training, post-harvest handling, storage, and marketing[2].

[1] https://app2.pertanian.go.id/simluh2014/index.php

[2] In the rest of the paper we will use the term Producer Organisation (PO) instead of Farmer Group (FG).

3.3 Indonesian vegetable value chains in modern retail markets

The vegetable value chains that supply the modern retail involve several actors at different levels (Figure 2). Based on the survey and interviews with key informants, we found four vegetable value chains to modern retail markets: smallholder farmers can link with retail markets via a PO (chains 1 and 2), a specialised wholesaler (chain 3), and a local collector (chain 4). Various vertical coordination mechanisms exist in the relationship between farmers and buyers. There are four general types of vegetable value chain arrangements. The first is a contract negotiated directly between a PO and a retailer (chain 1). The second is a tripartite contract between PO, specialised wholesaler and retailer. The specialised wholesaler serves as a service provider for the transactions between PO and retail. The third arrangement is a contract between the farmer and a specialised wholesaler. Unlike the contract of POs, contract arrangements of farmers individually with buyers (in this case, specialised wholesalers) are driven by buyers (Gramzow et al., 2018). Finally, the fourth arrangement is a spot market arrangement. Transactions in the spot market are characterized by low vertical coordination. In spot market arrangements, farmers and local collectors engage in transactions mostly at the farm-gate, without any quality standards and with variable quantities. The local collectors act as middlemen, subsequently selling and delivering these vegetables to traditional wholesalers.

The modern retailers in Indonesia mostly use written contracts with specialised wholesalers to procure vegetables. The specialised wholesalers, in turn, have their own contracts with various actors, such as POs, farmers, and traditional wholesalers as their strategies to procure the vegetables. The specialised wholesalers are commonly small and medium sized enterprises (SMEs), a family business, with few employees, and usually owning a truck to transport the fresh produce. They act as collection centers, where vegetables are sorted and packaged. They are also gateways through which farmers can enter modern retail markets.

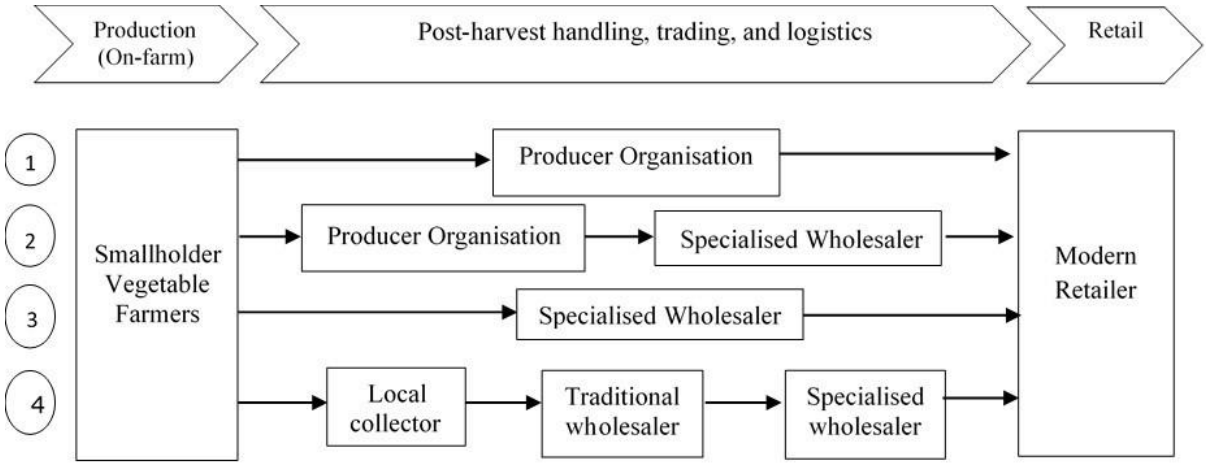

Figure 2. Vegetable supply chains to modern retailers in Central Java, Indonesia (own survey, 2017)

4 Research methods

The study was conducted on the slopes of Mount Merbabu which is administratively divided into three regencies: Magelang (subdistricts: Pakis and Ngablak), Boyolali (subdistrict: Cepogo), and Semarang (subdistrict: Getasan). These regencies are the centre of vegetables production in Central Java, Indonesia. The area of the districts is approximately 18,524 ha. Vegetables produced in this area are supplied to modern retailers in the cities of Semarang, Yogyakarta, and Surakarta.

To select the POs for our study, we used snowball sampling based on information from three modern retailers. We chose three modern retailers[3] out of eight which have operated in Central Java and Yogyakarta provinces, based on convenient sampling. These three retailers were willing to share information and to be interviewed.

In addition, the three retailers have a high-market share compared to other modern retailers in Indonesia (Slamet et al., 2017), and they are spread across the cities in the research area (Semarang, Yogyakarta, and Surakarta).

By tracing the suppliers of the retailers, we found that five POs were involved in modern retail chains. Out of these five, we purposively selected three POs because they had different relationships and arrangements with their members and buyers. PO1 — Tranggulasi — is located in the village of Batur, a sub-district of Getasan, in the regency of Semarang. PO2 — Redo Tani — is located in the village of Kragilan, a sub-district of Pakis, in the regency of Magelang. PO3 — Kredo Tani — is located in the village of Tarubatang, a sub-district of Selo, in the regency of Boyolali. The selected three POs supplied vegetables to two modern retailers via direct contract (chain 1) and specialised wholesalers (chain 2). Figure 3 shows the research location of the POs and the modern retailers.

The unit of analysis in this paper is the PO. This paper uses data collected through semi-structured interviews with the actors involved in the chains of the three sampled POs: seven smallholder farmers (members of the PO), four specialised wholesalers, and two modern retailers (Table 2). A qualitative research methodology with multiple cases was used to obtain in-depth information on the functions of POs. According to Yin (2003), case studies are used to provide in-depth information regarding a specific phenomenon in the field. The interviews were conducted from November 2016 through March 2017. The operationalisation of the VCA concept in the interviews is shown in Table 1. All interviews were recorded and transcribed. The average length of the interviews was about 90 minutes.

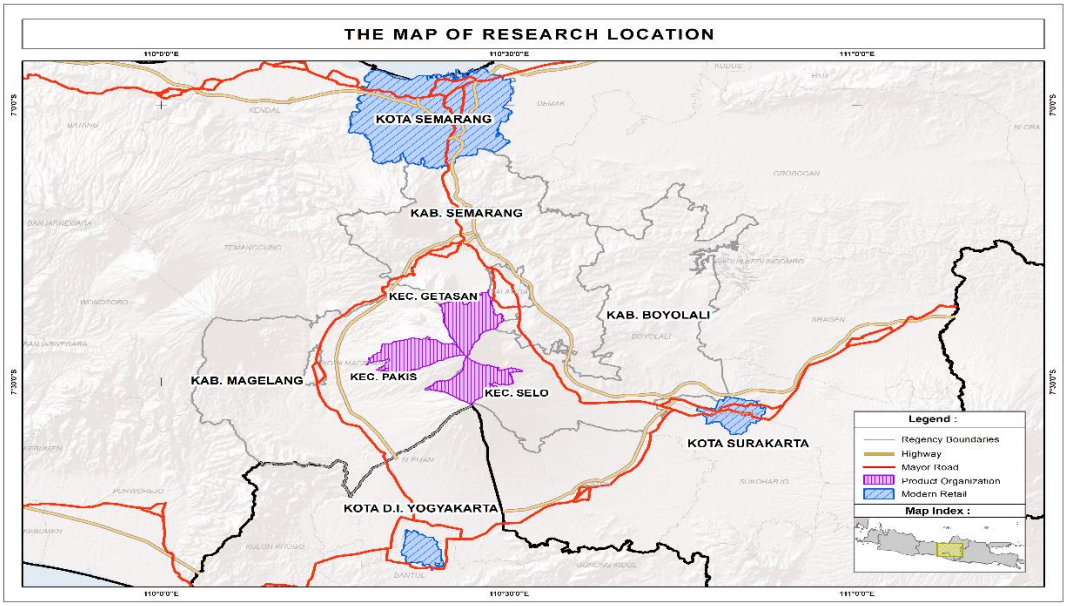

Figure 3. Research locations

[3] The three modern retailers are Transmart Carrefour, Giant Supermarket, and Superindo

Table 2.
Respondent interviews.

Actors (number interviewed)	Interviewee's role	Location
Smallholder farmers (7)	Members of the PO	Getasan-Semarang, Pakis-Magelang, and Selo-Boyolali
Producer organisations (3)	Leader and secretary of the PO	Getasan-Semarang, Pakis-Magelang, and Selo-Boyolali
Specialised wholesalers (4)	Owner	Cangkringan-Sleman, Depok-Sleman, Teras-Boyolali, and Ngablak-Magelang
Modern retailers (2)	Purchasing staff	Yogyakarta and Surakarta

5 Descriptive results

5.1 Network structures

The three POs in this study were founded in the 2000s at the initiative of the farmers themselves. As communities of farmers, the POs' main functions are helping farmers to learn; building cooperation among farmers; and helping farmers develop their farms. According to the interviews, the POs in our study have transformed from being community POs, with no marketing activities, to being marketing POs. The transformation of POs is pushed by the farmers themselves and also comes from increasing demand of high-value markets (e.g., processors, export markets, and modern domestic retail). Importantly, the growth of high-value markets in Indonesia has changed the procurement process from weaker to stronger coordination between farmers and buyers through POs and contracting mechanisms (Reardon et al., 2016; Sahara & Gyau, 2014).

Specialised wholesalers and modern retailers are more likely to work with a group of farmers (thus POs) rather than with individual farmers, in their procurement of vegetables. They look for POs that can meet their quality, quantity, price, and delivery requirements. The three POs in our study are able to comply with the quality, quantity, price, and delivery requirements and therefore buyers have offered them contracts to supply vegetables. PO1 has been supplying vegetables to modern retailers since 2010, and PO2 and PO3 have been doing so since 2013.

The POs that produce for these retail markets indicated to have strong horizontal collaboration among its members and strong vertical collaboration with the buyers, in order to meet the market demands. The network of PO1 includes 32 smallholder farmers supplying organic vegetables to the retailer. In the vertical relationship, PO1 has a direct contract with a modern retailer and three specialised wholesalers. Figure 2 shows that, in chain 2, the specialised wholesaler has an important role as intermediary actor connecting farmers and modern retailers. PO1 delivers the fresh vegetables to the specialised wholesalers, then the specialised wholesaler sorts, packages, labels, and delivers vegetables to the modern retailers.

PO2 connects 50 smallholder farmers supplying organic vegetables to two retailers via two specialised wholesalers. The 50 farmer-members are located in one village. PO3 connects 30 smallholder farmers who supply non-organic vegetables to retailers through a specialised wholesaler.

Table 3 shows the number of horizontal actors (farmers) and vertical actors collaborating in the PO value chains. Only PO1 deals directly with the retailer; the others work through specialised wholesalers.

Table 3.
The number of horizontal and vertical actors collaborating in the PO chain.

PO	Horizontal actors (farmers) collaborating	Vertical actors collaborating
PO1	32	1 modern retailer, 3 specialised wholesalers
PO2	50	2 specialised wholesalers
PO3	30	1 specialised wholesaler

5.2 Added value

PO1 increases the added value of vegetables by providing technical assistance and facilitating organic production, such as sorting, cleaning, packaging, labelling of brand and organic certification, and distributing vegetables to the modern retailer directly. The regional government, as part of its aid initiative, gave PO1 a vehicle for delivering vegetables. The vehicle's operational costs are covered by PO1. For this, PO1 has defined regulations about how membership fees are used for such operations and also for investments such as tools for improving production and post-harvest handling. PO1 provides technical assistance regarding the production of organic vegetables and provides members with organic fertilizer and environmentally-friendly phyto-pesticides. The technical assistance is provided by the PO members themselves and by an agricultural extension agent. During PO meetings, the members share information about what technical assistance they may need for improving production and implementing new technology. PO1 also has an internal control system (ICS) to monitor organic production and quality. The ICS team ensures that the vegetables are produced in accordance with organic farming guidelines, and it provides training in producing organic fertilizer and phyto-pesticides. Establishing an ICS in the PO is one of the requirements for achieving organic certification.

To increase the added value of vegetables, PO2 provides technical assistance for its members in cultivating organic farming and it monitors production. The technical assistance comes from PO member-farmers who share knowledge and experience, and also from the agricultural extension service. PO2 has built an ICS team to monitor and ensure that the vegetables are produced in accordance with organic farming guidelines. The PO also provides training to its members in producing organic fertilizer and phyto-pesticides. Post-harvest, PO2 sorts and cleans the members' vegetables which are then transported to a specialised wholesaler who provides packaging with the brand and organic labelling and transports the products to the retailers. According to the agreement between the PO and the specialised wholesaler, half the cost of organic (re-)certification is covered by the wholesaler.

PO3 increases the added value of vegetables post-harvest only by sorting according to appearance and cleaning of the vegetables. There are no value-added activities in the PO related to improving quality or post-harvest handling. Specialised wholesalers pick up the vegetables at the PO and perform the rest of post-harvest handling activities required up to distribution to the retailers. Table 4 shows the differences in value-added activities across the three POs. PO1 performs more added value activities than the other POs.

Table 4.
Value-added activities in three PO cases.

PO	Production process	Post-harvest handling	Distribution
PO1	Technical assistance for organic farming	Sorting quality, cleaning, packaging, and labelling with brand and organic logos	Delivery to buyers
PO2	Technical assistance for organic farming	Sorting quality and cleaning	Delivery to buyers
PO3	-	Sorting quality and cleaning	-

5.3 Governance

5.3.1 Vertical arrangements

Regarding the vertical arrangements between POs and buyers, PO1 has written contracts with modern retailers directly and verbal agreements with the specialised wholesalers. The contracts include price agreements between the PO and the buyers. On average, the agreed price is slightly higher than the market price and tends to remain constant. The buyers set a base price based on the market price. If the market price rises, the PO can renegotiate the price agreement with the buyers. Quantity agreements in the contract are specified based on supply agreements. The retailer sets a fixed quantity of a specific vegetable to be ordered in one year during the contract. Every three days, the retailer orders vegetables from the PO in a certain volume, while specialised wholesalers order every weekday in a certain volume. Quality agreements in the contract with a modern retailer are determined by the prevailing quality standards. The standard establishes the appearance, size, packaging, branding, and organic certification as quality assurance of the products. Quality agreements in the contract with specialised wholesalers are specified for appearance, size, and organic certification. The place of delivery is the buyer's location.

PO2 has verbal agreements with specialised wholesalers. The agreements include price arrangements. Specialised wholesalers set the base price based on the retail price. Quantity arrangements are based on supply agreements. In the purchasing order, the specialised wholesalers determine the volume of the order, including the kinds of vegetables. Quality specifications in the arrangements are based on appearance, size, and providing organic certification for quality assurance. The PO delivers the vegetables to the buyer's location. The cost of transportation is partly covered by the buyers.

PO3 has a verbal agreement with a specialised wholesaler. The agreement includes an arrangement on the price. The specialised wholesaler sets the base price of the contract based on the price established by the retailers. The specialised wholesaler orders the vegetables from the PO every weekday in a specific volume. The quality specifications in the contract are related to appearance and size. According to the place of delivery agreement, the specialised wholesaler picks up the vegetables from the PO's location. Table 5 outlines the contract arrangements of the three POs.

It demonstrates that the contract arrangements in PO1 are more compatible with modern retail than the others because PO1 has a direct contract with the modern retailer.

Table 5.
Contract arrangements between POs and buyers.

PO	Type of agreement	Price	Quantity	Quality	Delivery location
PO1	Written and verbal contract	Price agreement	Fixed	Appearance, size, packaging, and organic certification	Buyer's location
PO2	Verbal contract	Price agreement	Fixed	Appearance, size, and organic certification	Buyer's location (half the cost of transportation paid by buyer)
PO3	Verbal contract	Price agreement	Fixed	Appearance and size	PO's location

5.3.2 Horizontal arrangements

The horizontal arrangements refer to the relationships among the farmers in the PO. PO1 holds regular meetings, at least once a month. In the meeting, the board of the PO and members share information, such as market and financial information. In addition, the PO organizes knowledge transfer among members and/or by agricultural extension officers. In the meeting, the decisions are made on strategies and operations for production, such as planting and harvesting schedules, distribution, determining what vegetables should be planted, and payment mechanisms. A part of revenues is retained by the PO to cover operational costs, re-certifying organics, and investing in new tools. PO1 provides member services such as a marketplace, technical assistance for improving quantity and quality of organic products, and inputs.

PO2 organises meetings at least once a month. In the meeting, information is shared with the members, including market conditions and the PO's general financial status. PO2 also organizes knowledge transfer internally and/or with the agricultural extension service. PO2 makes decisions jointly with members concerning the procurement of vegetables, such as arranging the schedule for planting, harvesting, and distributing, and determining what kinds of vegetables should be planted, and the payment mechanism. As an organisation driven by member-farmers, this PO provides member services, such as market access and technical assistance to improve the quantity and quality of organic products.

PO3 organises regular meetings at least once a month. In the meeting, the PO and members share market and financial information and occasionally organize knowledge transfer within the PO internally and/or with the agricultural extension service. All decisions are discussed internally with the members on matters relating to the supply of vegetables to the modern retail market, including harvesting and distribution schedules, the kinds of vegetables to be planted, and payment mechanisms. PO3 offers services, such as providing a marketplace for its members, knowledge sharing, and training related to crop production.

It is clear that all three POs hold regular meetings and involve their members in making decisions. The difference is in member services; PO1 provides more services consisting of marketplace, technical assistance for improving quantity and quality of organic products, and technical input for farming.

6 Discussion

The aim of the study was to explore how POs in Indonesia have upgraded their value chains, hence help the smallholder farmers to link with modern retail markets. In line with the three principal elements of value chain analysis – network structure, added value, and governance - the POs have upgraded their value chains to resolve smallholders' constraints and link farmers to the modern retail market. For upgrading the network structure, the POs entered vertical networks with specialised wholesalers, and PO1 has a direct relationship with modern retail. The capabilities of POs to improve their networks, particularly with vertical actors such as specialised wholesalers and directly with modern retailers, can enhance their ability of accessing new market channels. These findings are in line with other studies that have shown that building networks may lead to increased market share and value-added market channels (Fitter & Kaplinksy, 2001; Gereffi, 1999).

With regard to upgrading added value, POs increase the value of the vegetables supplied by smallholders by providing technical assistance on organic farming in PO1 and PO2, post-harvest handling activities, such as sorting and cleaning in all three POs, packaging and labelling in PO1, and distribution of the vegetables in PO1 and PO2. Such added value complies with the quality requirements of the buyers. Upgrading the value-added activities in the PO can resolve smallholder constraints related to low quality compliance. The role of POs in increasing the added value of smallholders' production has been presented in previous studies (Moustier et al., 2010; Roy & Thorat, 2008).

Upgrading the governance of value chains includes both vertical and horizontal governance arrangements. The governance structure in the vertical relationship between POs and buyers is the contract. The three POs had a variety of contract arrangements with buyers (Table 5). By switching the form of governance from spot market to the contract, transaction costs between the farmers or POs and the buyers are reduced (Ménard, 2005; Williamson, 1999). The contract may lead to a reduction of transaction costs by reducing the cost of monitoring, coordination, and information at the buyer level (Bijman, 2008; Kirsten & Sartorius, 2002). The quality arrangement in the contract can reduce buyers' monitoring cost because the vegetables supplied already went through quality inspections. Coordination to meet contract arrangements is conducted by POs rather than by individual farmers. Hence, the coordination cost in the transaction can be minimised. Information costs can also be reduced by contracts because the contract specifies the characteristics required—price, quantity, quality, and delivery. Only farmers who can meet these requirements will become suppliers. Therefore, the cost of monitoring suppliers can be minimised. A contract reduces uncertainty for farmers because it provides a guarantee of sales. Through a contract, the buyer absorbs the vegetable production of the farmers. Contracting also lowers the risk of high asset specificity because the farmers' investments in the production of high-value vegetables is rewarded at ex ante agreed prices.

The governance structure in the horizontal arrangement among farmers in a PO reflects the internal governance of the PO in arranging meetings, decision making, and providing member services (Bijman et al., 2007; Bijman et al., 2014). The empirical results show that the three POs hold regular meetings and that decision making is shared among the members. As an organisation formed by smallholder farmers, the POs provide a variety of member services, including a marketplace, technical assistance for improving quantity of production and quality of organic products, and inputs. Upgrading the internal governance of POs by organising meetings, shared decision-making, and providing member services may reduce asymmetric information and opportunistic behaviour (Bijman & Wollni, 2008). In addition, upgrading the governance structure through contracts and enhancing the internal governance of the PO may strengthen the bargaining position of the farmers in the value chains. This is clearly observed in the capabilities of these three POs to negotiate contract arrangements with buyers.

7 Conclusions and implications

Many studies have explored the upgrading of value chains of firms in the export market, and several studies have explored value chain upgrading in domestic market. However, the role of POs in upgrading of agrifood value chains in domestic markets in developing countries has rarely been analysed. This study explores how POs in Indonesia upgraded their value chains to link smallholders to modern domestic

retail markets. We used Value Chain Analysis (VCA) to explore upgrading in three elements — network structure, added value, and governance.

The empirical results show that POs upgraded their value chains, thereby helping smallholders link with modern retail markets. In the upgrading of network structure, the POs built a network with vertical actors, such as specialised wholesalers and modern retailers. In addition, the POs strengthened their network horizontally with the farmer members coordinating in the sales of vegetables. The capabilities of POs to build their networks, particularly with vertical actors, can help smallholders' access modern retail. In the added-value upgrading, the PO helps farmers increase the value of their vegetables by providing technical assistance for organic farming, post-harvest handling, and distribution to the buyers. The value-added activities in the POs consist of their efforts to help the smallholders comply with the quality standards and specifications established in the contract. In upgrading the governance of the value chain, the POs bolster the vertical arrangements through contracts and the horizontal arrangements through their internal governance. Upgrading governance both vertically and horizontally can reduce transaction costs and strengthen the bargaining position of POs in value chains. The combination of the three items of value chain upgrading mitigates smallholders' constraints and enables linking them to modern retailers.

Based on these results, we can point to some managerial implications for POs to improve their capabilities. First, POs should upgrade their value chains by improving their networks, particularly with vertical actors, to obtain market access. Second, POs can improve added value by increasing the smallholders' capabilities to comply with quality standards and specifications of modern retailers. Third, governance can be improved by negotiating contracts with buyers in the vertical chain, which may strengthen members' bargaining position. In the horizontal dimension, improving the internal governance enhances the collaboration within the PO to meet market expectations. The empirical evidence shows that POs in Indonesia can help smallholders link with modern retail. It provides the lesson that POs have an important role in increasing smallholder participation in modern retail markets. Therefore, policy makers should support POs in the process of upgrading their value chains. For example, they should support POs to collaborate in value chains, provide assistance to POs to increase the added value of vegetables, and finally, support POs in the mechanisms of contract negotiations.

There are several limitations associated with our research. The first is that the study examines only three POs. Future research could include more and different types of POs, to gain a more complete assessment. Second, upgrading value chains in this study focused on three elements. For future studies, the research could look into other elements involved in upgrading value chains, such as reinforcing partnerships with non-chain actors like governments and NGOs. Third, upgrading in this study focused on the economic perspective, i.e. linking farmers to modern retail markets. Future studies on value chain upgrading could also include environmental and social objectives. Integrating these different perspectives in research on POs in value chains could contribute to more sustainable upgrading of developing country value chains. Fourth, this research used qualitative methods to collect data for describing the role of POs in linking smallholder farmers with the retail market. Future studies could include a quantitative approach to gain a more comprehensive understanding of the impact of PO coordination in improving smallholders' access to modern retail markets.

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