

Influence of Supply Chain organization on Quality Performance of Mandarin Orange Small Farmers in Indonesia

Rio Lawandra BMO 80436 - MSc Thesis Business Management Organization 10/6/20

Influence of Supply Chain Organisation

on Quality Performance of Mandarin Orange Small Farmers in Indonesia

MSc Thesis



Rio Lawandra 960118505060 MFT – Food Innovation and Management

Supervisor Examiner : Prof. Jacques H. Trienekens : dr. Valentina C. Materia

Acknowledgment

I would like to express my deepest gratitude to my supervisor, Professor Jacques Trienekens, who has patiently and sincerely guided me during my first thesis writing about supply chain as the main subject. His humble guidance and encouragement helped me research and write this thesis during the Covid-19 pandemic. I could not have imagined having a better supervisor and mentor for my MSc study. I am incredibly thankful for his understanding, warm-hearted, and empathy. It was a great privilege and honor to work and study under his guidance.

Besides my supervisor, I would like to express my sincere gratitude to my examiner, Assistant Professor Valentina Materia. During this challenging time, she has provided strong encouragement and straightforward guidance during my thesis's finalization.

The completion of this thesis could not have been accomplished without the support of Mrs. Suliati. She has helped me reach small farmers, collectors, retailers, governments, and farmer counselors during the interview period. Furthermore, my special thanks are given to Mr. Budi, who has helped me drive safely through the difficult road to reach the farmers' area and his guidance about Sambas regency's culture and people.

My special thanks to my parents and sisters; without their unconditional care, support, and prayer, I cannot reach this stage in my life and studying abroad for the second time.

Finally, I would like to express my deepest thanks to my beloved friends, the American Protestant Church de Hague (APCH) community, and colleagues from Indonesia and Wageningen University. Your encouragement and prayers are great comfort and relief.

Abstract

Indonesia was a big producer of mandarin orange globally; however, the organization of relationships within the supply chain and the constraints and challenges remains mostly unexplored. The small farmers, who are the major producers, are currently facing challenging barriers to improving their quality performance to meet consumers' quality of products. Such challenges are high transaction costs due to the long distance between producers and consumers, poor facilities and infrastructure, uncertain price value, high variability in quality attributes, and unfair value distribution. Supply chain governance is mechanized depending on the transaction cost levels by both vertical and horizontal relationships within the chain. Relationship quality is used to examine both relationships comprehensively and abstractly. For improving better quality, active cooperation of governance regime is required, including quality management implementation. Therefore, this research aims to understand how the supply chain's organization affects the quality performance of mandarin orange small farmers in Indonesia. Semi-structured interviews are conducted with twenty respondents: ten farmers, four collectors, two retailers, and four experts based on the convenience sampling method. The results showed that the supply chain's nature is characterized by a high degree of uncertainty, lack of trust, unclear shared objective, institutional voids, imbalance power relationship with collectors that resulted in poor farmers' quality performance. The organizational supply chain choice significantly improved farmers' quality performance through vertical and horizontal relationships that aim at explicit quality/certification schemes, resulting in more integrated governance.

Keywords: small farmers, transaction cost, mandarin orange, supply chain governance, relationship quality, relationship, quality performance

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1. Introduction

1.1 Background

Indonesia has abundant tropical fruit production and a wide range of biodiversity in horticulture. Mandarin orange is one of the potential horticulture in which consumption has been rising in recent years. In 2008, Indonesia produced more than 2,400 tonnes of mandarin, making it one of the top ten big citrus producers globally (FAO, 2016). However, the production from then until 2019 keeps declining. In such a situation and growing national demand, the government had no option but to import oranges from Pakistan and China.

Although Indonesia was once a big producer globally, it has never exported their mandarin orange yet mainly due to its heterogeneous and inconsistent product quality throughout the chain. Nowadays, imported oranges have put the country's own local orange variants in a tight squeeze, further jeopardizing local businesses that are already facing a hard time against their foreign counterparts. Consumers prefer to consume imported mandarin oranges due to low prices, appealing appearance, and better yet consistent quality (Indonesian Ministry of Agriculture, 2016).

Indonesian mandarin orange production is majorly dependent on smallholder farmers. Smallholder Indonesian mandarin orange producers face challenging barriers to improving their quality performance to meet the quality of products desired by consumers (Haryono, et al., 2014). Such significant challenges across the Indonesian mandarin orange supply chain management are listed below (Supriyanto & Zamzani, 2014; Kurniawan, 2003; Kilmanun & Warman, 2016):

- 1. Slow farming technological adoption
- 2. Poor post-harvest handling and logistics
- 3. Low access to information, market access, and dissemination
- 4. Local oligopoly market that leads to low bargaining power
- 5. High transaction costs due to the long distance between producers and consumers
- 6. Poor facilities and infrastructure
- 7. Uncertain price value
- 8. High variability in quality attributes (size, color, taste)

The increasing globalization of trade widens the gap, both physically and metaphorically, between small-scale producers and end-consumers. This divide could contribute to high unawareness of each actor's needs, quality-related issues, and challenges in the supply chain. In developing countries, the distances between consumers and producers are further amplified by high transaction costs.

The high transaction costs are significantly related to the products' quality under the monopsony market environment where there are unequal levels of bargaining power and value-added distribution (Saenz-Segura, D'Haese, Schipper, & Ruben, 2007). These higher transaction costs are likely to lead to difficulties controlling costs further down the supply chain associated with maintaining the product's quality due to long intermediaries or a lack of appropriate infrastructures such as roads, electricity, packaging, and cold chain facilities (Arinloye, 2013).

Mandarin oranges are perishable products, meaning that there are many risks and uncertainties in the supply chain. With regards to food products, quality is not only determined by producers; all supply chain actors who handle the product are responsible for its final quality (Gereffi, Humphrey, & Sturgeon, 2005). Thus, it is crucial to study every actor's activities and relations across the supply chain, including distribution, storage, and food processing (Humphrey & Schmitz, 2001).

There are several relationship issues between actors in the Indonesian mandarin orange supply chain. For example, collectors transact with farmers without written contractual agreements before the harvest period. Local farmers had limited access to information about the retailer's end-price, and few relationships with other farmers have low bargaining power. Collectors pay lower prices to the farmers in order to gain a higher margin from retailers. This phenomenon results in asymmetrical and unfair value-added distributions across the smallholder farmers (Zamzami & Sayekti, 2010). Most smallholder farmers are frustrated, unmotivated, and lack trust with collectors due to the low prices they offer (Supriyanto & Zamzani, 2014).



Figure 1. Mandarin Orange Supply Chain in Indonesia

Chain governance, also referred to as the organization of supply chains, influences the requirements of specific quality attributes of the final product for consumers and quality performance based on monitoring costs for quality compliance (Ruben, Tilburg, Trienekens, & Boekel, 2007). Governance in modern market-oriented chains results in shorter intermediaries between upstream and downstream parties. Such type of governance is contrary to the Indonesian mandarin orange supply chain, characterized by long intermediaries from primary producers until final consumers. Supply chain governance is crucial as it impacts food chains' quality performance in developing countries (Ruben, Tilburg, Trienekens, & Boekel, 2007).

Quality performance refers to how chain actors cooperatively manage food technology processes to achieve or enhance specific quality levels and exploit quality variability. The end quality of a food product depends on the type of governance across the food supply chain and food handling. Every chain actor needs to coordinate with other chain actors, and participation in joint decision-making can improve the processes affecting the quality of products, which implies establishing collaborative relationships (Martins, Trienekens, & Omta, 2019).

There are various studies on the role of supply chain governance in managing and promoting quality performance. Governing actors can combine resources and work together to reduce risks, which has increased suppliers' quality performance (Lopez-Bayon S., Gonzalez-Diaz, Solis-Rodriguez, & Fernandez-Barcala, 2018). The literature also points to how governance shapes incentives to meet the required quality along the supply chain, thus promoting quality performance (Handley & Gray, 2013). Governance mechanisms shape the relationships between buyers and sellers, determining the quality and value-added performance of end products in the chain.

The agenda to export mandarin orange from Indonesia will be put in motion in the next few years; however, the organization of relationships within the Indonesian mandarin orange supply chain and the constraints and challenges on these relationships remains mostly unexplored. Still, there is little evidence about how governance structures influence smallholder farmers' quality performances in the Indonesian mandarin orange supply chain.

The addressed problem leads to the central research question of understanding how the supply chain's organization impacts the farmers' quality performance. In this research, I am also interested in identifying the condition and challenges in the Indonesian mandarin orange supply chain's relationship related to quality performance.

1.2 Central Research Question

How does the supply chain's organization affect the quality performance of mandarin orange small farmers in Indonesia?

1.3 Sub-Research Question

- 1. How does vertical relationship affect the quality performance of small farmers?
- 2. How does farmers' horizontal relationship influence the quality performance of the small farmers?
- 3. What are the relationships that exist between the farmers-collectors and farmers-retailers in the Indonesian mandarin orange supply chain?
- 4. What is the impact of the organization of the supply chain on quality performance, according to literature?

1.4 Objective

- 1. To understand the influence of the vertical relationship between the supply chain's organization on the small farmer's quality performance.
- 2. To understand the influence of the horizontal relationship between the supply chain's organization on the small farmer's quality performance.
- 3. To identify the relationships between the actors involved in the Indonesian mandarin orange supply chain
- 4. To understand the impact of the organization of the supply chain on quality performance

2. Literature Review

In this section, the literature review will be divided into nine subsections that help develop this research's conceptual framework and understand the critical concepts used during this research to address the central research question.

Section 2.1 provides the background and relevancy of Indonesia's mandarin orange production. Section 2.2 explained the global value chain concept as the results of globalization and the urgency of exporting local oranges that are critically linked with the governance concept. Section 2.3 explained the transaction cost economics (TCE) theory, which acts as a widely applied approach to economic systems and governance. Further related to TCE, section 2.4 provided an overview concept of governance from TCE perspectives where the mode of governance can be conceptualized along a continuum from market-based contracts to hierarchies. The governance-based concept provided a comprehensive way of studying relationships in the supply chains.

Then, section 2.5 explored the governance mechanism via vertical and horizontal coordination that can be formed in formal or informal manners. Section 2.6 explained the concept of relationship quality and the relation with quality performance. Section 2.7 explained the concept of quality, including its dimensions and constructs. Finally, section 2.8 explained the quality performance concept positively linked with quality management, relationship quality, and governance in the supply chain.

Section 2.9 explained how each concept linked and will be worked as the conceptual framework in this research.

2.1 The mandarin orange production in Indonesia

The development of Indonesian mandarin orange is increasing throughout the five years. It has the largest harvested area and production of oranges in ASEAN, followed by Vietnam, Thailand, and Cambodia (FAO, 2013). At present, the government sets high urgency in mandarin orange production to increase the national export earnings from this commodity. Although the production has exceeded the local consumption amount, Indonesia is still importing many mandarin oranges as the local oranges' quality cannot fulfill the desired orange quality from specific market segments (Indonesian Ministry of Agriculture, 2016). A consumer study reported that Indonesian *siam* orange has a worse appearance and taste than imported orange (Adiyoga, Setyowati, Ameriana, & Nurmalinda, 2009). This situation jeopardized the local farmers to compete with their oranges' quality against imported oranges.



Figure 2.Productivity (ton/ha) Trend of Indonesian Mandarin Orange in Java (red line), Outside of Java (dark green line), and Indonesia (blue line) from 1980-2015

Most Indonesian mandarin oranges are produced by small-scale farmers with a plantation area of 0.1 - 1 ha. The production area is centralized in a particular region per regency. Different types of mandarin oranges are produced in Indonesia, such as *siam* orange (*Citrus sinensis*), *keprok* orange (*Citrus reticulata*), *pomelo* orange (*Citrus maxima*), and other hybrid varieties derived from *siam* orange. The *siam* orange accounted for 90% of total mandarin orange production in Indonesia for more than 20 years. Every farmer has a different farm area, scale of production, technical and financial capacities, and access to inputs, land, and labor. They can be divided into two different categories: small and big producers. The small-scale producers have a plantation size of 0.1 to 1 ha, and the medium-scale producers have 1 to 5 ha. Due to a lack of data, the exact numbers of mandarin orange producers in Indonesia is unknown (Kilmanun & Warman, 2016).

Several stakeholders, such as creditors, banks, and governments, are also involved in the value chain process. However, such relationships are unidentified due to a lack of literature. Even so, there is a crucial stakeholder representing governments such as *Balitjestro* (National Citrus and Sub-Tropical Plant Centre) provide support for the farmers in farming, handling post-harvest, and mediator between bankers and intermediaries. *Balitjestro* also provides technical guidance and field planning, including GHP (Good Handling Practices), GAP (Good Agricultural Practices), and connectivity of farmers to the local guidance (Laoli, 2019).

2.2 Global Value Chain

The concept of global value chains (GVC) explains the structure and dynamics of different supply chain actors. A full range of activities is required to bring the product or service through different stages, from production, delivery to final consumers, and disposal after use in a particular industry (Gereffi & Fernandez-Stark, 2011). GVC gives an approach to understand the value chain by taking into account both upstream and downstream chain actors. This concept emphasized a vast distance between the local producers with their global consumers (Bair, 2005). The advantage of the GVC concept is the context implementation of the development of economic activities on resources and markets of individual entrepreneurs and clusters of producers competing in local, regional or international markets (Dijk & Trienekens, 2015).

There are four dimensions in value chains: (1) input-output structure, (2) geographic areas covered, (3) internal governance structure, and (4) institutional framework, which sets the local, national, and international conditions and policies which are shaping the condition of every

actor involved in the chain (Gereffi, Humphrey, & Sturgeon, 2005). The institutional framework is essential since it decides whether the channels are effective or act as barriers to delivering the products' quality. Internal governance structures are the most important in GVC, referring to power relations, which determine how the whole chain distributed the economic surplus (Humphrey & Schmitz, 2001). The concept of governance is important to the global value chain approach. It encompassed how the chain actors enforce parameters under one another to operate the supply chain effectively (Humphrey & Schmitz, 2001).

2.3 Transaction Costs-Economic Theory

Transaction costs-economic (TCE) is an approach for studying economic systems and organizations based on an integrated perspective of institutions, law, and economics (Williamson, 1985). It is widely used as a perspective to study governance. The basic unit of analysis in TCE is the transactions between companies. The cost of carrying out a transaction between buyer and seller or the costs involved in coordinating activities along the supply chain are called transaction costs (Gereffi, Humphrey, & Sturgeon, 2005).

There are three key variables to assess transaction costs: frequency of exchange, asset specificity, and uncertainty (Williamson, 1979). Transaction costs could appear in different forms, such as finding a buyer/market, negotiating, signing a contract, controlling contract compliance, and all lost opportunities (Bijman, 2008). Williamson (1985) creates a distinction between *ex ante* and *ex post* transaction costs, which means the transaction costs subjected before and after entering a contract.

According to TCE) theory, the primary function of governance structure is to reduce or economize the transaction costs as it is developed to support the mechanism of transactions in the most efficient way, reducing uncertainties under conditions of bounded rationality and opportunistic behavior of partners (Williamson, 1985). Every supply chain organization will shape and select the governance structure associated with the lowest transaction costs (Williamson, 1985). Thus, a governance structure's primary function is reducing transaction costs under conditions of bounded rationality and opportunistic behavior of partners (Bijman, 2007).

Transaction costs (TC), cooperation, collective actions, and trust among supply chain actors are affected by the supply chain's governance, which builds the interactions between buyers and sellers (Williamson, 1985). When transaction costs are low, economic actors will favor market governance, but if they are high, contracting or vertical integration is preferred. Quality certification and strict procedures for monitoring, control, and sanctions are used to reduce uncertainty and control opportunistic behavior (Bijman, 2007).

2.4 Governance Structure

The term governance is defined as "a multidimensional phenomenon encompassing the initiation, termination, and maintenance of ongoing relationships between a set of parties" (Heide, 1994). A wide range of perspectives can be used to study governance, such as marketing channels, business networks, organizational design, and TCE. In this study, we used TCE as the central perspective to understand the governance relationship's nature.

Based on Transaction Costs-Economic theory, the term of governance is defined as the institutional framework within which the integrity of a transaction is decided or the rules by which exchange is administered to support transactions' execution in the most efficient way (Williamson, 1979). Governance structure associated with the lowest transaction costs will be chosen to govern the transaction (Williamson, 1985).

The governance structure is meant to cope with the governance problems that are the leading causes of transaction costs: safeguarding transaction-specific investments, solving difficulties in performance measurement, and adapting the transaction to changing environmental conditions (Humphrey & Schmitz, 2001). The main objective of governance is to reduce the uncertainty, conflict, and opportunism inherent during market transactions and the bureaucracy and inefficiencies of enforced cooperation through hierarchy or third-party governance (Gundlach, Achrol, & Mentzer, 1995).

Governance structure can be viewed as a continuum, and different types of governances are chosen on the level of the environmental and transaction uncertainty (Williamson, 1979). Governance forms range from (spot) market relationship, hybrid governance forms (e.g., contract farming) to vertical integration or hierarchy, which means brought all activities in various companies together into one legal entity or ownership (Dijk & Trienekens, 2015). On the contrary, the spot market has zero levels of integration. (Raynauld, Sauvee, & Valceschini, 2005) identified there are six different governance structures:

- **Spot market contract**. This contract is characterized by low switching costs to find a new partner as the transaction partner's identity is irrelevant. It focused on the immediate exchange of goods or services
- **Relational (or implicit) contract.** The transaction manifested in the share of understanding based on reputational or social ties. The identity of a business partner is important as the transactions are repeated
- **Relational contract with approved partner**. Before the transaction, supply chain actors may choose their trading partners based on qualification. For instance, buyer/sell that is certified by a legal organization
- **Formal contract.** A legal promise with duration enforces the transaction depends on the written agreement
- *Equity*-based contract. One of the supply chain actors is a stockholder of its business partner but stays legally independent. For example, a joint venture where is characterized by a specific level of equity participation
- Vertical integration (hierarchical governance). All activities involved in a transaction from various actors are thoroughly monitored within one legal ownership

There are several features of transactions between actors with specific implications on business in developing countries: (Tilburg, Trienekens, Ruben, & Boekel, 2007)

- Business transactions are subject to uncertainties regarding quantities, quality, delivery conditions, price. In developing countries, poor physical infrastructures (storage/cooling facilities, roads), weak institutional infrastructures (government support, sanction systems), unbalanced trade relationships (dependencies, opportunistic buyer behavior), and unfavorable social and political conditions.
- Business transactions are enabled and necessary to be supported by information exchange (about the quality of the products/service and its characteristics, production, delivery condition). In many cases of developing countries, there are many significant information asymmetries between chain partners and mixed market channel structures, thus intricate in the monitoring of transactions.
- Opportunistic behavior on the actors is often found due to enforcement by uncertainties on every supply chain actors in order to be able to sell their products and gain profit as maximum as possible.
- Transactions differ in regularity and frequency from one-time transactions to regular basis transactions.

Supply chains in developing countries are characterized by a distinct food sub-system with specific quality and safety requirements for the national and international markets. Such weakly-connected sub-systems present significant challenges to the development of harmonized quality and safety standards. With a weak governance structure in developing countries, it is challenging to implement complete contracts; thus, many actors prefer relational contracts based on personal relationships and trust rather than a formal written contract (Bijman, 2008).

Developing country's governance is facing many uncertainties caused by insufficient physical infrastructures (e.g., storage facilities, roads, and telecommunication), weak institutional infrastructures (e.g., government support and sanction systems), unbalanced trade relationships (dependencies, opportunistic buyer behavior), and unfavorable social and political conditions (Dijk & Trienekens, 2015). Furthermore, information exchange needed to support and enable the transactions hardly happens as there are information asymmetries between chain actors and diffused market channel structures. The long intermediaries and channels result in unawareness of each other's needs, quality issues, constraints, and challenges at both ends of the supply chain (Ruben, Tilburg, Trienekens, & Boekel, 2007). These uncertainties make the monitoring of transactions complicated (David & Han, 2004).

2.5 Supply Chain Coordination

Supply chain management manages resources, information, and practices adopted throughout each stage of a product's supply chain to maximize customer satisfaction with the final product (Borade & Bansod, 2007). The relationships within this chain are often enforced by specific investments and quality management designed to decrease delivery uncertainty and increase quality consistency. By doing so, governance enables the collaboration of actors in value chains, facilitating a smooth flow of products concerning quality compliance and information (Trienekens, 2011).

The mechanism to enforce governance within the supply chain is also known as supply chain coordination. It displays the interdependencies between discrete actors in the supply chain. The coordination depends on the costs of transactions, information asymmetries between parties, and local social-cultural practices.

The supply chain coordination is divided into two dimensions, which are vertical relationship and horizontal relationship. Vertical relationship is the coordination between different layers of actors throughout the supply chain (i.e., between suppliers and traders). Meanwhile, the horizontal relationship is the coordination between the same layers of actors in the supply chain (i.e., between farmers and farmers). These relationships have been examined in the literature via information exchange and relationship quality (Martins, Trienekens, & Omta, 2019). The degree of information that supply chain partners exchange influences their ability to make decisions operationally, tactically, and strategically (Tran, Childerhouse, & Deakins, 2016). For example, through contractual agreements, buyers provide producers with technical advice, communicate the requirements farmers must meet, and align incentives with farmers (Jang & Olson, 2010; Goodhue, 2011). In doing so, producers and buyers can identify the causes of problems and opportunities, then work to overcome production challenges and improve the quality of products together by maintaining frequent interactions (Martins, Trienekens, & Omta, 2019).

The concept of vertical relationships, together with the horizontal relationships, are developed in the net chain, showing those interrelationships (Lazzarini, Chaddad, & Cook, 2001).



Figure 3. The supply chain network – red line depicted horizontal relationship while the blue line depicted vertical relationship (Lazzarini, Chaddad, & Cook, 2001).

Within different supply chain coordination, the end-products market access and market orientation may also differ. Depending on quality demands, internationalization, and market differentiation, there are different distinct food sub-systems with specific quality and safety requirements. The illustration of the critical distinction between three different economic sub-systems of the supply chain in developing countries can be seen in Figure 4.



Figure 4. Economic sub-systems in developing countries (Ruben, Tilburg, Trienekens, & Boekel, 2007)

The A-system is the local low-income chain where producers are small-scale with the traditional production system and aimed at local market outlets (usually found in staple products). Longer intermediaries between producers and downstream actors are the main character in developing a country's supply chain coordination. Within that environment, most value-chain parties will have limited access to market information, unequal distribution of

added-value over a large number of actors, and longer transportation distances to the end consumers (Trienekens, 2011).

The B-system is characterized by the local middle to high-income chains. Most of the products are produced by small/medium scale producers organized in cooperatives and linked with subcontracting arrangements. The value distribution within B-system is larger and more equal as the products may be transported nationally or internationally with higher quality and safety standards.

Lastly, the C-system is the complete focus of the export chain with increasing economies of scale and foreign direct investments. The chain is more integrated with fewer actors, and the value-added is relatively high (Trienekens, 2011). This chain is much shorter, and fewer intermediaries between producers and downstream parties. It mostly prefers to trade with larger producers or retailers directly (Tilburg, Trienekens, Ruben, & Boekel, 2007).

2.5.1 Formal and Informal Mechanisms

There are various mechanisms in supply chain coordination such as formal and informal mechanisms (Dyer & Singh, 1998); price, authority and social mechanisms (Bradach & Eccles, 1989); motivation and coordination mechanisms (Milgrom & Roberts, 1992); output-based or behavior-based mechanisms (Ouchi, 1979); a contractual and procedural mechanism (Sobrero & Schrader, 1998). However, I am particularly interested in formal and informal governance mechanisms as a theoretical framework in this research.

Formal mechanisms are divided into two categories: contractual or outcome-based mechanisms and organizational or behavior-based mechanisms. In contractual/outcome-based mechanisms, the examples are incentive and reward systems founded on contractual agreements or ownership of assets (Williamson, 1979). Meanwhile, the behavior-based mechanisms example relies on an actor who is authorized to develop and execute command structures, standard operating procedures, performance monitoring systems, and dispute settlement procedures, including sanctions (Stinchcombe, 1985). These formal mechanisms heavily relied on rules, incentives, and authority support between supply chain actors, thus reducing transaction costs (Bijman, 2007).

Meanwhile, informal mechanisms (also known as social control and relational governance) are related to the mechanisms of identity (Kogut & Zander, 1996), embeddedness (Granovetter, 1985), trust (Nooteboom, 2002), and routines (Nelson & Winter, 1982). Embeddedness itself has two dimensions, which are relational and structural. The mechanism of relational embeddedness refers to forming the relationship through repeated transactions with the same partners. The structural embeddedness refers to a dyadic relationship in a community of past, present, and potential trading partners. In a part of the community, an individual's reputation results from his/her exchanged information with the community. The information exchanged to a community also represents the trustworthiness of present or potential trading partners. Reputations are built, and partners' selection based on established identities or built routines is fundamental at the beginning of a relationship. The longer the relationship between two actors lasts, the more trust can be built between them. The commitment and the outcome of the coordination between two actors depend on how the information is shared, joint-goal is set, joint-problem solving and decision is made (Das & Teng, 1998).

2.5.2 Vertical Relationship

The vertical dimension reflects the flow of products and services from the primary producer until the consumers (Trienekens, 2011). Vertical relationships may follow whole stages in the

value chain or even skip the value chain's links, such as relationships between collectors and retailers. The network structure is mostly dependent on the type of market channels chosen by supply chain actors.

In food products, the final quality depends on how different vertical chains' stages coordinate one to another, from the farmer, collector to the retailer. Supply chain actors coordinate vertically as the process of aligning and controlling price, incentives, quantity, quality, and the terms of exchange across segments of a production or marketing system (Peterson, Wysocki, & Harsh, 2001). For example, quality labeling and contracts based on reputational capital may lead to the adoption of hybrid forms or vertical integration rather than spot markets to cope with the need for greater control over the vertical chain steps that improve product quality (Zuniga-Arias, 2007).

Vertical coordination depends on the type of products and the type of market demands. Gereffi, Humphrey, & Sturgeon (2005) divided several channels of vertical supply chain integration:

1. Conventional marketing channels

Coordination among partners across the supply chain runs through bargaining and negotiation at spot markets. It consisted of isolated and autonomous units or stages that performed traditionally defined a set of marketing functions.

2. Vertical marketing channels.

The coordination among partners is vertical marketing systems such as voluntary cooperation or coordination by joint planning, contractual relationship, and corporate ownership. It is designed and consisted of networks to achieve technological, managerial, and promotional economies through integration, coordination, and synchronization of marketing flows from production points to end-users.

- 3. Networks of agents based on trust (e.g., relatives or people belonging to the same ethnic or specific group).
- 4. Hybrid forms of governance.

The vertical relationship concept has been most operationalized by TCE theory, where the literature commonly represents the governance structure choice (Vroegindewey, 2015). As mentioned earlier, there are three key variables to assess transaction costs, namely asset specificity, uncertainty, and transaction frequency. Transaction costs embodied the search and information costs, bargaining, decision costs, and policing and enforcement costs. The critical variables in transaction cost act as independent of the business's nature; meanwhile, the governance choice is the dependent variable (Fredikind, 2014).

2.5.3 Horizontal Relationship

Horizontal relations between the producers, collectors, and processors at the same level of the supply chains are also important (Martins, Trienekens, & Omta, 2019). Collaboration among actors in the same chain link enables them to improve performance. Literature shows that farmers who form horizontal relationships increase their access to information on transactions, better access to technologies, build better relationships with buyers and improve their performance in producing better quality products (Brito et al., 2015; Lu, Feng, Trienekens, & Omta, 2012; Lu, Trienekens, & Omta, 2007; Hennessy & Heanue, 2012). Furthermore, horizontal relationships may also help farmers to improve their vertical relationships in the value chain. Within interaction among a collective group of farmers, the group members gained more information concerning industry developments and access to new markets (Brito, et al., 2015). Other examples of horizontal relationships between the same level of stakeholders are through centralized warehousing, market revenue sharing segmentation, and alliance/partnership (Xu, 2016).

Farmer organization is an example of horizontal relationships that help small farmers access the market on behalf of farmers' interests and place farmers in an equal position between trading partners (Min, 2011). Besides, it also helps farmers decide on the quality of their product and lower the transaction costs related to measuring quality compliance. Collective action between farmers reduce their transaction costs of accessing inputs/outputs to obtain the necessary market information, access new technologies, and enter high-valued markets. By doing so, it allows them to compete with large-scale farmers. It is also improving their bargaining powers against buyers or intermediaries (Kherallah, Delgado, Gabre-Madhin, Minot, & Johnson, 2002; Stockbridge, Dorward, & Kydd, 2003).

Another study also argued that the establishment of farmer organization helps to support its members' economic welfare. This purpose can be obtained through more specific objectives in the organization such as (a) to overcome market failure when access is constrained or markets do not exist; (b) to gain economies of scale; (c) to strengthen bargaining power in the relationship with customers or suppliers; (d) to share market risks or natural condition related risks; (e) to reduce transaction costs, for example through creating more transparent market; and (f) to foster innovation which requires considerable investment and risks that cannot be afforded by the individual farmer (Bijman, 2007).

Collective action and service provision to members are the critical elements in farmer organization (Bijman, 2007). Collective action is the voluntary action by a group of individuals who invested capital, time, and energy to pursue members' shared objectives (Markelova, Meinzen-Dick, Hellin, & Dohrn, 2009). Many kinds of literature reported that such collective action had promoted marketing and processing activities to harness economies of scale and reducing transaction costs in collective marketing, acquisition of equipment, training, and information services (Valentinov, 2007; Fischer & Qaim, 2014; Poulton, Dorward, & Kydd, 2010).

Service provision to members comes in different forms, such as production service, financial service, training, or even purchase of inputs. As farmer organization is a social community, such services are coming in social processes such as commitment, identity, solidarity, and information exchange (Bijman, 2007).

There are positive relationships between horizontal relationships and quality performance (Lu, Trienekens, & Omta, 2007; Saenz-Segura, D'Haese, Schipper, & Ruben, 2007; Martins, Trienekens, & Omta, 2019). Several studies described how horizontal relationships help achieve consistent quality performance (e.g., supporting members through dissemination or quality programs and providing members with quality-demanded information from the consumers). The establishment of horizontal relationships may deliver economies of scale that strengthen actors' bargaining position and allow for joint investments in production, marketing, and distribution. Such collective action is useful in linking smallholder farmers with significant market outlets (Ruben, Tilburg, Trienekens, & Boekel, 2007). Saenz-Segura et al. (2007) studied that mango farmers in Costa Rica evidence the positive impacts a producer's organization can have on the quality and consistency of a product. Producer organizations also have a significant role in training their members to improve quality control (Bijman, 2007).

Some studies showed that both horizontal and vertical coordination in the supply chain such as farmer organization with contract formation, often work best. Both transactional parties gain benefits from lowered transaction costs through contract farming with cooperative/farmer organizations. For example, the introduction of quality and certification by monitoring and controlling vertically integrated governance has decreased the uncertainties in developed countries' value chain (Dijk & Trienekens, 2015). In developed countries, the governance

mechanism is characterized by a centralized decision to resolve the misalignment of each stakeholder's incentive through joint actions via contractual agreement (Xu, 2016).

2.6 Relationship Quality

Relationship quality refers to a mechanism for discerning buyer-supplier relationships along a continuum (low to high relationship quality) to assess different aspects of the relationships, including trust level (Jap, Manolis, & Weitz, 1999). It represents a relationship comprehensively and abstractly instead of a specific dimension of the relationship. Such a concept distinguished the difference between specific relational dimensions and pointed out the impact of specific relational dimensions (Nyaga & Whipple, 2011).

Commonly, the dimensions used frequently to measure relationship quality are commitment, trust, and communication (Crosby, Evans, & Cowles, 1990; Ulaga & Eggert, 2006). Commitment is the belief of business partners that the ongoing relationship is so meaningful. Therefore, the mutual actors are worth to be maintained with the highest effort (Molnar, Gellynck, & Weaver, 2010). Trust is the perception of relationship partners as credible and benevolent (Ganesan, 1994). In the business relationship, trust tends to reduce uncertainty and opportunism, also encourages greater openness and shared goals. Furthermore, last, communication reflects the sharing of meaningful and timely information between supply chain actors (Anderson and Narus, 1990).

Fynes et al. (2005) showed that relationship quality had a positive impact on quality performance. Mutual trust and commitment are essential in moving away from the relationships from power-based bargaining. Those require frequent communication along with the process design, quality, and scheduling during the transaction. Lai et al. (2005) also suggested that a stable relationship between firms is positively linked with a higher commitment to quality.

2.7 Quality in Food Supply Chain

Quality means "meeting or exceeding customer and consumer expectations." Customers are defined here as "those who receive a product (ranging from raw materials to finished products) or a service from a supplier within a food production chain." Meanwhile, consumers are the end-users of a food product (Luning & Marcelis, 2009). Quality is the center of attention in agribusiness and the food industry, including its supply chain, which raised consumer concerns and stakeholders' increased demand like government, interested parties, and retailers (European Union, 2016).

There are two dimensions of quality: conformance quality, which refers to the outcome of the actual product after it has been manufactured, and design quality, defined as the degree of quality in the designed product (Fynes, Voss, & Burca, 2005). However, both constructs essentially measure the internal quality of the product. Other empirical studies also highlighted the importance of measuring external quality, specifically via consumer satisfaction (Yeung, Chan, & Lee, 2003; Das, Handfield, Calantone, & Ghosh, 2002). The consumers' satisfaction reflects the delivered quality and includes intangible quality, such as value and consumer expectation (Choi & Eboch, 1998).

Consumers are the end recipient of the food supply chain. Nevertheless, foods are complex as they can potentially harm consumers (food safety aspect), easily spoilt (limited shelf life), provide a specific amount of nutrients and energy (nutritional aspects), and provide enjoyment/pleasure (sensorial aspects) (Luning & Marcelis, 2009). As foods are natural products of biological origin from nature, they are not fully controllable. Furthermore, their characteristics are subject to change, either intentionally through processing or unintentionally,

due to uncontrollable outside occurrences on the route from primary producers to end consumers (Dijk & Trienekens, 2015).

Consumers value both intrinsic and extrinsic quality attributes and have their perceptions. Different actors across the supply chain can have different perceptions of quality, though they share a common goal to satisfy the end-consumer. For instance, pest-resistance of vegetables and fruit may not be very important to a consumer, but it is imperative to the breeder and the grower. Each specific product's quality attributes depend on certain critical control points at various stages of the supply chain that can be influenced by technological practices and organizational changes guiding human behavior (Verkerk, Linnemann, & Boekel, 2007). Below, Table 2 lists the different meanings of various chain actors to the concept of quality. The major challenge is to ensure good cooperation among the members to deliver the desired end quality (Tilburg, Trienekens, Ruben, & Boekel, 2007).

Specific quality standards are defined in quality management systems and upheld by various private or public institutions' rules and regulations. They are used to ensure integrity, transparency, and harmonization of global agricultural standards. In 2002, the EU introduced the General Food Law to define general food safety principles and food safety procedures as standard quality requirements. To help ensure implementation, the European Food Safety Authority was established for risk assessment and advising on food safety (FAO, 2004). However, the private sector may also demand specific quality standards from their suppliers, not based on public standards, such as BRC and GLOBAL-GAP in the EU. The International Standardization Organization (ISO) also has specified requirements in its food safety management system ISO 22000, which is implemented across the food supply chain to ensure final products' consistent safety.

Actor	Quality aspects
Grower	The vitality of seed, yield
Cultivator	Productivity, uniformity, disease resistance
Auction	Uniformity, reliability of supply, consistent quality
Distribution	Shelf life, availability, sensitivity to damage
Retailer	Shelf life, diversity, exterior, little waste
Consumer	Taste, nutritional value, perishability, convenience, consistent quality

Table 1. Interpretation of quality by various chain actors (Ruben, Tilburg, Trienekens, & Boekel, 2007)

2.8 Quality Performance

The quality performance deals with how firms perform organizationally, considering different quality practices to be implemented in their process in order to enhance quality levels and exploit quality variability. It can be measured by conformance quality and customer satisfaction (Fynes, Voss, & Burca, 2005). Conformance quality is defined by how well the actual product conforms to the design once it has been produced. It is also defined as the ability to meet targets for quality within the manufacturing unit and operationalized as a construct using defect rates, new product yield, and scrap and rework (Flynn et al. 1994).

A quality performance is affected by a particular governance regime's option due to monitoring costs on quality compliance. It also refers to the perceived satisfaction of food quality during the buyer purchased the products (Lu, Trienekens, & Omta, 2007). The way actors cooperate, relate, and be involved throughout the chain are strong influences in quality compliance. Depending on the chain's organizational structure, the motivation for innovations toward better quality performance may be low or high (Ruben, Tilburg, Trienekens, & Boekel, 2007). If a

key player, like a supermarket chain, government policies, or export chain, can enforce specific quality standards, upstream agents' actions. The quality performance is measured by the perception of the consumers (Laven, 2007).

Actors can try to achieve compliance with specific quality standards by defining rules and regulations. Usually, measures to be taken to safeguard food safety are launched by governmental institutions, such as the EU's general food law. Management systems such as BRC and EUREP-GAP (mainly from the retailer perspective) describe what chain actors should do, with the ultimate goal to achieve a certain quality standard at the end (Arinloye, 2013).

For improving better quality, active cooperation of governance regime is required, including co-investments between chain actors. Therefore, the choice for a specified quality already dictates the structure and organization of the supply chain. Quality and certification schemes lead to increasing control and more integrated governance, such as long-term contracts (Bijman, 2008). At the same time, they may lower transaction costs. Mechanisms like output quality control are common in any food chain. Monitoring supplier processes and even input control is increasingly applied by Western retailers and large food industries in developing countries. These uncertainty-reducing instruments are embedded in more integrated governance mechanisms, such as contracts or vertical integration (Ruben, Tilburg, Trienekens, & Boekel, 2007).

A quality performance is positively linked with quality management practices that involved many interactions within chain actors on the products. The implementation of quality assurance (QA) is essential as it guarantees quality requirements to meet customer requirements. Such implementation involves both technological and managerial measures in quality management. Technological measures play an essential role in quality management, such as measuring/analyzing food properties and using knowledge to influence processes/conditions within the food to define quality attributes. Managerial measures are as necessary as technological measures. They related to quality performance are transparent organizational and administrative systems, development of quality assurance systems, support activities for each actor within the food chain (knowledge level, motivation, experience), and policy regulations (Tilburg, Trienekens, Ruben, & Boekel, 2007). Both quality management systems and governance structures need to be aligned in order for a quality performance to be safeguarded (Wever, Wognum, Trienekens, & Omta, 2010).





Figure 5. Conceptual Framework

The conceptual framework is developed to connect the key concepts in this research and help the researcher understand and explore the central research question. Based on the studied literature, it was understood that quality performance is positively linked with quality management practices and relationship quality. Specific quality standards are enforced in the quality management system within supply chain governance to ensure conformance quality and customer satisfaction at the end of the chain. Both upstream and downstream agents are collaborating, sharing mutual trust and commitment in delivering aimed standards. Depending on the level of relationship quality, the quality performance of producers may be low or high.

The relationship between supply chain actors in governance can be vertical or horizontal. Quality management mostly functions between different levels of the actor in the supply chain. The level of transaction cost (uncertainty, frequency of exchange, and type of agreement) among different levels of actors in the supply chain determines how quality management is arranged. The supply chain coordination, both vertical and horizontal, is examined via relationship quality. The level of communication, trust, and commitment between actors influence their ability to decide the products' quality. Producers with buyers or actors at the same level can work together to overcome such challenges and improve the quality of products together.

3. Methodology

3.1 Research Design

Research design is built to provide conceptual structure in investigation and analysis. The research is a qualitative study with a deductive approach, where the researcher begins with theory and continues with hypothesis and observation. A qualitative approach has its characteristics such as open, flexible, and explores diversity with its purpose, which is to describe a situation, phenomenon, or problem. The study is qualitative research to explore differences in experiences in both vertical and horizontal relationships across the supply chain influence the small farmer's quality performance. A literature review approach is conducted to develop a conceptual framework of organizational supply chains' influence on small farmers' quality performance. It is built on the assumption that the case being studied can provide insight into the situations prevalent for a group where the case has been studied (Kumar, 2011).

3.2 Methods of Data Collection

Data collection will be done by literature review and interviews with mandarin orange supply chain actors and government in Indonesia, mainly in West Borneo, as Siam mandarin's significant producers in Indonesia. During this study's initial stage, the researchers will conduct a literature review on central concepts of the mandarin orange supply chain, governance regime, formal & informal relationship in the supply chain, and tropical food chains in developing countries. The conceptual framework will be first developed from literature and possibly change based on the interview information. Later, those concepts are further operationalized as a guide to prepare questions before the interview.

The semi-structured interviews will be carried out with supply chain actors and experts from governments to create a depth understanding of the role of both vertical and horizontal relationships. A non-probability sampling method is done, which involves selecting respondents in a non-random manner, precisely using a convenience sampling method. This method is generally used for exploratory purposes to understand different views on the dimensions of an issue, probe possible explanations on hypotheses, and explore constructs for dealing with particular problems or issues (Kumar, 2011). The farmers, collectors, and retailers are selected based on:

- 1. Farm size (0.1 ha 2 ha; 2 ha 5 ha; and more than 5 ha)
- 2. Type of market served (local, national, and international),
- 3. Non-member/member of the association.

The interviews are performed in Indonesian and Malay languages. Most of the questions are answered on a Likert scale combined with their reason and explanation of giving the score. All interviews were recorded for the research purpose according to the permission of the respondents. The recordings were then transcribed into the Indonesian language to obtain all valuable information, in combination with taking field notes to identify and code data as the interview progresses and include the content of the interview as well as feelings and nonlinguistic data (Kieren & Munro, 1985; Wengraf, 2001). After that, the transcripts were translated into English.

The interviews were conducted with twenty respondents: **ten farmers**, **four collectors**, **two retailers**, and **four experts** representing governments in the semi-structured interview manner. As it is a semi-structured interview, additional questions could be added during interviews depending on the situation and information needed.

The researcher also found that six out of twenty interviewees had more than one role in the supply chain. In table 3, the primary role is mentioned first, then followed by the other role (i.e., farmer-collector means the farmer is the primary job and collector is the secondary role). The researcher knew their primary role first before the appointment for the interview. Then, the secondary role was revealed during the interviews.

Code	Role in the	Age	Gender	Education	Date of	Duration of
	Supply Chain				Interview	Interview
F1	Farmer	49	Male	Senior High School	20-12-2019	0:58:45
F2	Farmer	44	Male	Senior High School	20-12-2019	0:55:15
F3	Farmer	48	Male	Senior High School	22-12-2019	1:02:46
F4	Farmer	47	Male	Primary School	22-12-2019	0:30:16
F5	Farmer	46	Male	Junior High School	22-12-2019	0:55:00
FR6	Farmer-Retailer	30	Male	Diploma Degree	21-12-2019	1:15:04
F7	Farmer	55	Male	Senior High School	21-12-2019	0:57:04
F8	Farmer	53	Male	Senior High School	20-12-2019	1:15:16
FC9	Farmer-Collector	53	Male	Senior High School	21-12-2019	0:50:16
FC10	Farmer-Collector	59	Male	Senior High School	23-12-2019	0:57:13
CR1	Collector-Retailer	41	Male	Junior High School	21-12-2019	0:49:59
CF2	Collector-Farmer	64	Male	Primary School	19-12-2019	1:34:01
C3	Collector	53	Female	Junior High School	21-12-2019	0:40:19
C4	Collector	68	Male	Primary School	22-12-2019	0:45:21
R1	Retailer	44	Male	Bachelor Degree	13-12-2019	1:23:05
R2	Retailer	25	Female	Bachelor Degree	16-01-2020	0:51:45
E1	Expert (Head of Horticulture-	55	Male	Bachelor Degree	20-12-2019	2:01:19
	Sambas					
	Government)					
E2	Expert (Socio-	64	Male	Master Degree	5-12-2019	1:05:22
	economic					
	Agricultural					
	Researcher –					
	West Borneo					
	Government)					
EF3	Expert-Farmer	40	Male	Bachelor Degree	23-12-2019	1:19:09
	(Head of Citrus					
	Center – West					
	Borneo Province					
E4	Government)	42	M-1	Destates D	20.12.2010	1.22.06
E4	Expert (Orange	43	Male	Bachelor Degree	20-12-2019	1:22:06
	rarmer s					
	Counsenor –					
	Samuas Regency)					

Table 2 Code of the interview, Role, Age, Gender, and Education of the interviewees

The interviews took place in West Borneo province, specifically in Sambas regency and Pontianak regency in Indonesia. The researcher started by explaining the research's objective and providing the interview guidelines (in appendix). Each interview is coded as a reference in analysis/discussion based on the source of interviewees. The information about the code and additional information of the interview are represented in table 2.

The transcribed interviews were coded in two manners: template coding and open coding. Template coding was conducted to identify data from the empirical evidence, which is in line with the literature (Blair, 2015). However, not all the information gathered in the interview matched the predefined constructs identified in the literature. Open coding allows the data as open as possible towards a new direction that can be seen as an addition to the literature (Blair, 2015).

Majority of the farmers is dominated by the male who finished their education until senior high school. The collector's demography also shares similar characteristics, whose age ranges between 30-61 years old. However, most retailers have higher education and a younger age range (24-44 years old) than the population of farmers and collectors.

All of the interviewed experts in this research are working for the local government (West Borneo province, Sambas regency) in various positions (head of the horticulture department, a socio-economic agricultural researcher, head of citrus development center, and farmer's counselor). The experts have the highest educational background compared to all interviewees.

3.3 Operationalization

Each variable has the identified constructs from the literature review and then was operationalized into questions for the interview (see Appendix). Vertical relationship is mostly operationalized by TCE theory. There are three key variables to assess transaction costs, namely asset specificity, uncertainty, and frequency of exchanges (Vroegindewey, 2015). Besides, the type of agreement (formal or informal mechanisms) is incredibly important to understand the nature of vertical relationships. In this research, I decided to use the frequency of exchanges, uncertainties, and types of agreements to operationalize vertical relationships. For relationship quality, it is already explained in the literature that the variable is frequently measured by the level of commitment, trust, and communication (Crosby, Evans, & Cowles, 1990; Ulaga & Eggert, 2006). Next, for farmers' horizontal relationship variable is examined via collective action and service provision to members as those are the critical elements in farmer organization (Bijman, 2007).

Quality management consists of a techno-managerial approach mainly from quality policy & strategy, quality design, quality control, quality assurance, and quality improvement to improve product quality and increase customer satisfaction (Luning & Marcelis, 2009). According to the literature, the Indonesian mandarin orange supply chain unlikely consumer-driven but production driven. Therefore, quality design is irrelevant as it starts with specifying consumer demands, then translating them into product and process specifications. In this research, I only focused on quality assurance, quality control, and quality improvement to assess quality management.

A quality performance is often measured via customer satisfaction. Price is a crucial element to understand whether the delivered product meets consumer requirements in terms of food quality. Finally, flexibility is also used to measure farmers' quality performance. If there are any changing requirements on products/processes/ resources due to new customer wishes or legislative demands, the producer should respond as quickly as possible.

The theoretical constructs in this research are presented in Table 3.

Variable	Measurement
Vertical Relationship	Frequency of exchanges, uncertainties, type of agreement
Relationship Quality	Trust, communication
Farmers' Horizontal	Collective action, service provision to members
Relationship	
Quality Management	Quality assurance, quality control, quality improvement
Farmers Quality	Satisfaction, price, flexibility
Performance	

Table 3. Theoretical constructs identified from each variable

4. Results and Analysis

In this chapter, the result of the recorded interviews has been processed by transcribing and coding. It briefly shares the finding of the fieldwork conducted in November until December 2019. There are six-sections in this chapter. Section 4.1 presented the socio-demographic and background of farmers, collectors, retailers, and experts.

The next section, until the last section, explained the interview results based on key concepts and constructs developed from the conceptual framework. Section 4.2 presented the vertical relationship variable results measured from the frequency of exchanges, uncertainties, and type of agreement. Section 4.3 presented the results on relationship quality, which is examined via trust, commitment, and communication. Section 4.4 presented the results on collective action and service provision to members in farmers' horizontal relationship. Section 4.5 explained the results of interviews about quality management measured via quality assurance, quality control, and quality improvement. Moreover, the last section 4.6 explained the farmers' quality performance measured via satisfaction, price, and flexibility.

4.1 Sociodemographic and background of interviewees

The socio-economic characteristics of Indonesian mandarin orange producers are presented in table 5. The interviewed farmers are classified based on farm area, market outlet, and members of the association. The orange farm size varied from 0,2 to 7 ha, and not all of the farmers owned their farm. Most farmers worked on a small farm (0.1 - 2 ha) and owned their farms. All farmers relied on selling their products to the middleman, and few are selling their products directly to the retailer and end-consumers. Also, 8 out of 12 interviewed farmers are growing other crops besides mandarin oranges, predominantly rice. Other crops are grown as well, such as lemon, chili, cucumber, palm, and watermelon as the farmers said there is relatively high demand in those crops as well, and as long as they have the resources and capability.

"(...) most of the farmers here are not only producing oranges, as the government is aiming to produce more rice, more supports are given to those who also farm rice. They do not focus only on producing mandarin oranges." Expert (Farmer's Counselor) – E4

Code of Interview	Grown crops	Experience working	Member of Farmer Association	Mandarin Orange's Farm Area	Type of market channel	Owned/Rented Land	Products sold to
F1	Rice, Mandarin Orange	32 years	Yes	0,5 ha	Local	Owned	Middleman
F2	Rice, Mandarin Orange	16 years	Yes	1 ha	Local	Owned	Middleman
F3	Rice, Mandarin Orange	11 years	Yes	0,5 ha	Local, National	Owned	Middleman
F4	Mandarin Orange	4 years	No	0,2 ha	Local	Rented	Middleman
F5	Lemon, Chili, Palm,	20 years	Yes	7 ha	National	Owned	Middleman, Retailer

Table 4. Socio-economic characteristics of the interviewed farmers

	Mandarin Orange						
FR6	Chili, Cucumber, Watermelon, Mandarin orange	8 years	Yes	2 ha	Local	Owned	Middleman, End- consumers
F7	Rice, Mandarin Orange	19 years	Yes	2 ha	Local, National	Owned	Middleman
F8	Rice, Mandarin Orange	33 years	Yes	1 ha	Local	Owned	Middleman
FC9	Mandarin Orange	5 years	No	1,5 ha	Local	Owned	Middleman
FC10	Mandarin Orange	40 years	No	5 ha	National	Owned	Middleman, Retailer
CF2	Rice, Mandarin Orange	29 years	No	0,5 ha	Local	Owned	Middleman
EF3	Mandarin Orange	3 years	Yes	1,2 ha	Local	Owned	Middleman

The farmers have a wide range of working experience from 3-40 years. The average working experience among the farmers is around ten years. Most of the farmers are in the adult category with an age range of 30-64 years old were selling their products to either the local or national market.

"Our farmers are selling their products in local, national, and international markets. In the national market, the oranges are sold into Java, Sumatera, Bangka Belitung, and many more. Internationally, few farmers/collectors sold their oranges into Malaysia via Kuching, which is on the border and the nearest with West Borneo. Every week, I heard that they delivered two tonnes, and they are the ones who had the certification as fruit exporters."

Expert (Head of Horticulture Sambas Government) – E1

During the interview, it was difficult to reach farmers who had an international market channel. A tiny number of farmers are exporting their oranges within the international market channel, and most of them are the large farmers who had more than 10 ha of land. However, most of them reject to participate in my study for an unknown reason. Few government experts argued about my situation that most of them rejecting as they were conducting an illegal export (avoiding taxes).

Another interesting finding is that most small farmers (0.1 - 2 ha) had no idea where their products ended. Unlike the big farmers (>2 ha) who knew where their products most-likely ended as they manage their market channels. This result showed that small farmers have limited knowledge of market channels and access.

There are 8 out of 12 farmers (75% of total respondents) who joined a farmer's association. This result showed that most farmers are involved in a horizontal relationship. The government

initiates the farmer's association to facilitate farmers financially through either equipment or counseling support.

4.1.2 Multiple roles of value chain actors

Across the supply chain, some farmers and collectors concurrently had a double role, for example, farmers who also act as collectors/ retailers and collectors who also act as farmers/retailers. In general, the reasons are to gain more profit, new market access, and market information. Some quotations can be seen below to emphasize the following reasons.

"(...) If I only worked as a farmer, I cannot access to market information outside, and I felt no choice to sell my crops but for the middlemen. For sure, that is not good as I only lean on them. In that condition, the opportunities for gaining more profits are limited to me."

Farmer-Collector – FC10

The price uncertainties in the harvest period and lack of access to market information are why farmers had a double role. When farmers transacted with collectors, farmers cannot offer the starting price of their harvested products. The prices were often unfair as they are too low for the farmers, especially during harvest season. The opportunities are very minimal for only a farmer as they are subjected only to sell their products without the market information and how their products will end. Some of the farmers accused collectors of abusing their market power to increase their profit margins as they consequently receive too little.

FC10 is one of the good examples as he had 40 years of working experience. He is appointed as the head of the farmer association in Sambas Regency by the government. However, he decided to quit because the association seems dysfunctional for his benefit as farmers tend to work individually. They did not see that cooperation could strengthen their low bargaining power. He turned himself into a collector to increase his bargaining power as a senior farmer with a big capacity.

Some collectors also had a double role as well. The reasons are because the market becomes very competitive among collectors as they were trying to sell their products in any possible market channels. Thus, some collectors selling their oranges to the end-consumer directly via a pre-order system to another potential group of end-consumers. By doing this, collectors prevented their possible losses.

Some collectors became farmers with scheduled farming and harvesting time as they saw the opportunity to stabilize their supply during a short period. Many farmers failed to supply their oranges during a short period, and their qualities are bad. Therefore, they decided to farm with different timing compared to what most farmers did. Collectors-farmers can make more profit as the orange price could rise to 2-3 times higher than the retailers' usual price.

There is also an expert who turns himself into a farmer as well. The primary motivation is to setup himself as a role model for small farmers to apply PTKJS good farming practices.

4.2 Vertical Relationship

4.2.1 Uncertainty

Every business transaction depended on uncertainties concerning quantities, quality, availability, delivery condition, and price. The uncertainties could arise from poor physical infrastructures, weak institutional infrastructures (government support, sanction systems, incentive systems), unbalanced trade relationships (dependencies, opportunistic buyer behavior), and unfavorable social and political conditions. Uncertainty is a degree of

complexity during transactions, associated with value-added distribution for each actor in the supply chain. During the interview, four questions about uncertainties (see Table 6) were asked subject to price, quantities, quality, availability, and delivery condition.

Response	Q1. Does the mandarin	Q2. Does the demand for the	Q3. Does the product always	Q4. Does the buyer always
	orange price over the seasons	product always vary significantly	available for the buyers?	stick to the payment
	always stable every year?	over the seasons?		agreements?
Almost always	0	1	1	3
Often	0	13	3	15
Sometimes	5	2	13	1
Rare	1	3	3	0
Never	14	1	0	1

Table 5. Response summary on uncertainties

From the results above (see Table 6), it can be seen that unstable prices, fluctuating demand, and the irregular availability of oranges to buyers were characterizing the Indonesian mandarin orange's supply chain. However, the buyer always sticks to the payment agreements. The supply chain often faces uncertainties in terms of price, delivery volumes, availability, and demands.

The first question's result (price stability) showed that mandarin orange price situations are **never** stable every year. In general, they responded that the mandarin orange price never stable.

"During the harvest season around May, the amount of harvested oranges are tremendous, and the price fell very low, farmers cannot make their profits out of it. The usual price is around 0.40-0.50 Euro/kg on the collector. However, in the harvest season, it could be less than 0.10 Euro/kg. Moreover, the price could change every day based on the collectors' decision, but we never know what the reasons are. It is unpredictable."

Farmer – F5

There are multiple reasons for the unstable price in mandarin orange's supply chain based on the interview.

1). Unorganized harvest schedule

The farmers did not realize that most of them have the same harvest schedule, leading to an oversupply or shortage season of mandarin orange. However, they had no choice as the best farming conditions were in that period. As the oversupply occurred, mandarin orange prices were falling as well. Farmers cannot afford storage or farming technologies to mitigate such problems due to weak financial affordability in cold storage/ other technology.

2). The presence of exotic fruits in retailers

End-consumer prefer to consume exotic fruits than oranges as they are rarely available over the year

3). Unequal value distribution within the chain

Among different levels across the supply has unfair value distribution. Retailers are restricted from gaining a higher margin as the collectors had a higher authority in deciding price and market channels. Collectors are likely to be accused of abusing their market power to increase profit margins in any transactions

Based on the second question's result, the demand for oranges **often** varies significantly over the seasons. The change in supply-demand is mostly affected due to the oversupply/supply shortage. All collectors will suppress their demand when oversupply occurred by dividing farmers' supply ratio. The main reason is that most collectors had limited access to market their products. In previous cases, most products are thrown away as they are spoilt before being sold into the market. As the price fell very low, profit is meager, and collectors are still paying the transportation costs. Collectors are often overwhelmed by the oversupply problem. Because of this problem, they abused their market power during the transaction by rationing the number of oranges sold for each small farmer. It shows the characteristic of the oligopsony market by the collectors within the supply chain.

The third question underlined the availability of the oranges. Results showed that most interviewees responded "**sometimes**" the oranges are available for the buyer. The availability mainly depends on the production capability of producers. However, the producers face difficulties in supplying the regular amount for a whole year. They did not plan/manage the farming schedule carefully or implement the harvesting technology to manage their production. Producers also cannot avoid the losses if the climate is in the rainy season.

"The availability of the oranges depends on the harvest season, during this period of months (December-February), it is hardly found a single orange. In April last year, the flower will bud (when the climate is hot with high raining season) into fruits that took around eight months. The farmers are not able to control this yet. However, we have introduced a new technology called 'Bujangseta.' When the tree is flowering, farmers should trim-off some of the flowers. Therefore, we can avoid all of the flowers developed into fruits at the same time. During our trial, this technology can produce a tree that can be harvested every two months in a year."

Expert (Farmer Counselor) – E4

The government just introduced a technology called *Bujangseta* that could control the amount of harvested fruits for a whole year and avoid the same big harvest seasons between the farmer, in order to help to stabilize the price in the market. The technology involved three different farming management: 1) pruning management; 2) nutrition management; 3) pest and disease management. An orange tree could bear fruits with different tiers of oranges from its ripeness-level by implementing those managements. Also, oranges are always available to be harvested every two months, and cold-storage is unnecessary as the oranges always freshly available to be harvested (Cahyono, 2018).



Figure 7. The result of "Bujangseta" implementation

The last question in uncertainties is whether the buyer always sticks to the payment agreements or not. Based on Table 6, most interviewees stated that their buyers "**often**" stick to the payment agreements based on the harvested fruits' grading quality. The buyers will only pay according to grading quality, which is based on the oranges' size. The ripeness-level also decides whether the buyer will purchase the products or not. Interestingly, some farmers stated that they could not even call this an agreement because collectors are the only one who decides the price, and farmers have weak bargaining power.



Figure 8. Collectors are sorting and grading mandarin oranges based on size tools and ripeness level

The price of the oranges is determined based on the diameter size of the oranges, ranging from grade AB (6.4 cm or higher), C (5.9 cm), D (5.4 cm), and E (4.6 cm or lower). The bigger the size, the higher the price is. The collectors checked the oranges ripeness with their workers manually from the skin color, hard/soft when it pressed, and overall appearances. They will examine the oranges one by one in a swift manner, and often the farmer who delivered his oranges is helping with the grading and sorting together with the collector.

There are a few cases where the buyers deceived the seller. For example, when the farmer is sold to the collector, the grading process is very fast without the right equipment; thus, measurement results are not always accurate and precise. Buyers said that the delivered oranges are even smaller than the farmers' actual size harvested. For that reason, collectors paid a lower price. This activity is also found between small collectors with prominent collectors who distribute the products in different regions. The prominent collectors can accuse that the orange quality is unacceptable without solid proof through a phone call.

Summary Analysis:

- The instability of price is caused by the unorganized harvest schedule among farmers, exotic seasonal fruits' presence in retailers, and collectors' abusive activity to raise prices anytime for their own profit gains.
- Products are not always available in the market as the adaption of farming/harvesting technology is low.
- The buyer always sticks to the payment agreement. The price of oranges is based on the diameter-size and ripeness level. However, collectors' sortation/grading practices are inaccurate and unprecise as it is conducted without a transparent and responsible procedure. In this way, some collectors deceived farmers by telling the smaller oranges' smaller size as cheaper, although the actual size is bigger than what is being told.

4.2.2 Frequency of exchange

The frequency of exchange refers to how often the transaction occurs within different actors in the supply chain. It is related to the level of vertical integration in the supply chain. Maher (1997) observed that a higher frequency of exchange subject to a higher tendency towards the hierarchy, therefore indicating a cautious validation of the relationship between the actors. The frequency of transactions between the same business partners is different among the market channels, depending on risk behavior and reward structures in different channels. Two questions are being asked to understand the nature of transaction frequency in the Indonesian mandarin orange supply chain.

Response	Q1. How often do you transacting your product with the same downstream actors?	Q2. How often does the transaction always deal smoothly?
Almost	7	8
always		
Often	9	9
Sometimes	2	3
Rare	2	0
Never	0	0

Table 6. Response summaries on the frequency of exchange

The result for the first question is that they **often** transacted with the same buyer (9 out of 20 interviewees responded "often"; 7 out of 20 interviewees responded "almost always"). There are different reasons for farmers transacting with the same buyer, such as financial dependency, loyalty, the limited number of traders, and ease of accessibility. Some small farmers do not have enough financial power to fulfill their families' daily needs. In doing so, they ask for a loan with collectors where their harvested fruits will become the guarantee on loan.

However, in some cases, actors sold their products with different actors due to opportunistic behavior and incapability to fulfill consumers' standards (2 out of 20 responded **sometimes**, and 2 out of 20 responded **rarely**). Whenever buyers are willing to pay a higher price, that is where the seller will most likely transact. Besides, sellers will tend to avoid sorting/grading practices as it always leads to a higher rate of rejection of products.

I found that most interviewees often had a smooth transaction with different actors from the second question. There are 9 out of 20 interviewees who responded **often**, 8 out of 20 interviewees responded **almost always**, and 3 out of 20 interviewees responded **sometimes**.

"Almost always dealt smoothly. Most of the time, farmers experienced a very smooth transaction with the collectors; the payment and the products are exchanged very well." Expert (Farmer Counselor) – E4

Some transactions are not smoothly dealt with because of the unavailability/ oversupply of mandarin oranges and even dishonesty among the actors due to high opportunistic behavior.

Summary Analysis:

- Actors tend to transact with the same buyers mainly because of their dependency, limited number of traders, and ease of accessibility
- The transaction between actors often went smooth in a reciprocal manner
- Some actors admitted that they frequently transacted with the same partners due to long-term relationships.

4.2.3 Type of agreement

Transactions between the Indonesian mandarin orange supply chain actors are predominantly based on **oral arrangements** (18 out of 20 interviewees), meaning that it is **informal** and without written agreements. Most cases happened in the traditional market channel, but in the modern market channel, the elements of their agreements are written down. Based on the interviews, farmers will tell the collectors whether they want to sell their products. The farmers did not perform or grading on the farm but in the collector's storage house. Most of the time, the farmers will wait, observe, or help with the sorting/grading then collect the payment right away.

Response	Q1. What type of agreement you mostly use in selling your product?
Oral	18
Written	2

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"Oral. When my fruits are ready to be harvested, I will make a phone call with every collector I knew in my phone contact. If I find the highest price, I will send it there. Then, I will observe and help the collectors during grading, sorting, and weighing my oranges. After that, we see how many oranges are accepted or rejected, then I got the payment directly via cash. However, not most of the time that I deliver my products, sometimes they also can come here to my farm, and we harvested the oranges together." Farmer-Retailer – FR6

Different cases happened in the modern market chain, where written agreements are necessary as some modern national retailers have set the standard to be the best fruit retailers for consumers. Presently, the standards are made by the modern retailer. Over time, the written standards are compromised by the producers/collectors as they are not capable enough to fulfill the demands. In 2004, written agreements had been used between the farmers and the collectors in the traditional market. However, as time goes by, farmers had a hard time to fulfill quality demands.



Figure 9. Memorandum of Understanding between Collectors from Jakarta and Farmers from Sambas (2004)
Response	Q2. How long the duration of your agreement?
One order	19
One season	0
One year	0
More than one years	1

Table 8. Duration of the agreements

Most of the transactions are done orally in a brief time (one order). There are 19 out of 20 interviewees which transactions do not longer than one order. In contrast, the modern retailer is the only response in which agreement applicable for a lifetime, although later, the everyday transactions used are done orally. Most of the actors rely on communication devices or applications, either from handphones, telephones, or WhatsApp. Based on the information gathered, every orders always been fulfilled within 1-2 working days.

Response	Q3. What terms are indicated in the arrangement (can be oral/written)?
Pre-agreed price	20
Specific production practices	2
Specific harvesting practices	0
Certification	1
Pre-agreed volume	14
Pre-agreed delivery time and place	14
Input provision to supplier	2
Credit provision to supplier	2
Clauses that define penalties if deadlines are unmet	4
Quality is not fulfilled	11
Other unincluded variable(s): (Ripeness Level)	2

Table 9. Elements of the agreements used

The elements of the agreements used during transactions by the interviewees can be seen in Table 10 above. Pre-agreed price, pre-agreed volume, pre-agreed delivery time and place, and quality is not fulfilled are the significant elements for the actors. Those elements are always present in both oral and written agreements. The only element missing between those two agreements is certification. The supermarket required its standard (certification) to be fulfilled, in the example are the specific amount of sugar level and minimum diameter of the oranges (grading size). Every product delivered to the modern retailer's storage house is sampled then tested on their Brix level to determine the sugar content. However, the upstream actors hardly fulfill the sugar level of their products. Thus, the modern retailer had no choice to compromise that element because collectors could stop their supply, using their power (oligopsony) by not sending their oranges to modern retailers.

"(...) The size of the oranges should be 'AB,' and the specific amount of Brix level should be reached. For every 500kg order, we sampled three fruits out of it. In Indomaret (the retailer), there are specific certifications that the collectors should follow. Different things are happened on the imported oranges, as the standards had been double checked there before delivery, we do not bother to recheck the quality levels. However, few experiences when the suppliers stopped sending it to us as they know the rejection level here is high. Therefore, we lowered our standard by compromising the sugar level, so the size/grading matters most as the traditional market used the same standard."

Retailer (Modern retailer) – R2

Response	Q4. How important is the need for the contracts (written agreements) for you?
Very Important	7
Important	5
Fairly Important	1
Not Important	5
Not Important at all	2

Table 10. Importance of contract for the actors

When the researcher asked the interviewees about the importance level of the written agreements, 7 out of 20 interviewees found that is **very important**, 5 out of 20 interviewees found that the contract is essential, and 1 out of 20 interviewees responded that it is relatively important. Most actors (farmers, modern retailers, and experts) thought that contracts are essential to guarantee their profit gains as there is an assurance of demand and future transactions. An expert argued that it is better when the agreements form in written contracts. Farmers can raise their bargaining power with downstream actors as the price was decided mutually. Retailers also argued that they could minimize uncertainties in price, quantity, quality, and delivery time of the products with the contract.

On the other hand, 4 out of 6 interviewed collectors responded differently than the remaining actors. They argued that the **contracts are unnecessary**; Most of them said that they are still incapable of managing a written agreement. The collectors' responsibilities are too high to be handled due to the high uncertainties involved within the transactions. Some farmers did not find a contract is essential as well because, with a contract, they cannot behave opportunistically to maximize profit on every transaction.

Summary Analysis:

- Informal, verbal, and short-duration agreements are mostly used during transactions. The contract agreement was made past years ago, but producers found it not flexible and difficult to deliver the agreed demands.
- Price, volume, delivery time/place, and quality boundaries are mostly indicated in the oral agreement.
- Quality certification is necessary during the transaction with the modern retailer to ensure the sugar level and water content (arranged in a written agreement). However, in most cases, collectors were failed to achieve the standard and prefer to stop their business with the modern retailer.
- Farmers and retailers preferred to use written contracts to minimize the uncertainties, fair bargaining power, and safeguarding their investment.
- Small groups of farmers and collectors preferred oral agreement as there were high responsibilities needed during the transaction and more flexibility in switching buyers.

4.3 Relationship Quality

4.3.1 Commitment

Commitment defined as the willingness of business partners to put effort on behalf of the relationship and proposes a future orientation where the firms attempt to build a relationship that can be sustained in the face of unanticipated problems (Gundlach, Achrol, & Mentzer, The structure of commitment in exchange, 1995). Such efforts are the willingness to invest in transaction-specific assets, demonstrating that they can be relied on to perform an essential function in the future (Anderson & Weitz, 1992). During the interviews, three questions about the commitment of downstream/upstream actors were asked.

Response	Q1. Does the buyer/supplier	Q2. Does the	Q3. Does the
	always try to help when a	buyer/supplier always	buyer/supplier always
	technical/managerial	share in the problems	commit to improving
	problem happened?	that arise in the course of	the benefit of your
		dealing?	relationship?
Almost	1	0	1
always			
Often	2	4	7
Sometimes	1	8	1
Rare	3	4	4
Never	13	4	7

Table 11. Response summary on Commitment

The majority of the responses (13 out of 20 interviewees), who mostly comprised of farmers and experts, responded that the buyer/supplier **never** try to help them when a technical or managerial problem happened. Besides, farmers tend to work individually. Their relation with the suppliers/buyers is only about trading without a mutual willingness or effort to build a relationship that can face unanticipated problems together in the future. The majority of collectors and experts also added that commitment is rarely showed between farmers and collectors.

However, different responses are given by traditional retailers and experienced collectors. Both retailers stated that they are willing to put some effort into their relationship with the supplier (collector) or vice versa, signifying a commitment. C4 (a collector) who has working experience of 55 years, said that his loyal buyers are always giving feedback and suggestions whenever the quality is terrible. Such high commitment rarely happened on most of the actors, only between experienced/old players priorly retailers and collectors in the market.

The second question is whether the buyers/suppliers always share in the problems that arise in dealing. Most of them responded '**sometimes'** (8 out of 20 interviewees), then '**rare**' (4 out of 20 interviewees), and '**never'** (4 out of 20 interviewees). From these responses, we can see that the buyers/suppliers **do not always** share in the problems that arise in dealing. Most of these cases happened between farmers and collectors.

"Never, what the collectors do are complaining without sharing in the problems we have together. Whenever it is oversupply, they always whine that there are no orders out there and no buyers. They are not willing to incur the losses together with farmers. During oversupply, we do not reach the turnover evenly. We suffered from the losses. That is why I start retailing by myself during oversupply and not going to sell to the collectors."

Farmer-Retailer - FR6

On the other hand, few farmers, collectors, and the traditional retailer (4 out of 20 interviewees) experienced that their buyers/suppliers **often** share in the problem arise. Most of them have long working experience; they have loyal business partners that put commitment together.

"Well, sometimes the modern retailer gave us some recommendation whenever most of our products do not pass their standards. For example, they suggest implementing waxing technology and packaging to ensure the quality of the oranges. Then, I can improve based on this advice. However, among the traditional retailer, they did not provide any advice for us.

Farmer-Collector – FC10 (40 years of working experience)

The third question is whether the buyer/supplier always commits to improving the benefit of the relationship. The responses are majorly never (7 out of 20 interviewees responded **'never**,' and 4 out of 20 interviewees responded **'rare'**) experienced the commitment given by the buyer/supplier of their relationship.

The majority of farmers and collectors agreed that their relationship with the collectors are just trading without additional effort or commitment to stay in the current relationship. Knowing that the farmers always seek for a higher price among the collectors with oral agreements, signifying that there are less intention to develop a maintain a stable long-term relationship. Also, according to the expert, each party never considers the other's benefit. Both farmer and expert stated that the collectors often deceive the farmers with unsatisfactory sorting/grading to pay a lower price or arbitrary changing the price for the farmers to minimize their cost. That evidence was indicating the high opportunistic behavior among the farmers and collectors.

"Never, we never talk about how to provide benefit for one another. Maybe it only happens between the collector. When we delivered and sold the oranges to the collector, then it is done. We do not care what the collectors will do to our oranges." <u>Farmer – F8</u>

Again, mostly the commitments came from the loyalty between one another in business for a long time. Each business partner is willing to share their profits, information, and resources during the problematic situation such as oversupply, lack of market channel, or fewer market opportunities.

Summary Analysis - Commitment:

- In general, most of the relationship between farmers-collectors and collectors-retailers was only trading without a mutual willingness to build a strong relationship (lack of commitment).
- However, there are few high commitment between old players or experienced buyersupplier between collectors and retailers (rarely happened between farmers and collectors). It has only happened if both of them have transacted between one another for at least 8-10 years. They are willing to share profits, information, and resources during unfavoured condition such as over/lack of supply, and lack of market channels/ opportunities

4.3.2 Communication

Communication is the sharing of meaningful and timely information between firms/actors within formal and informal manners (Anderson & Narus, 1990). Excellent communication, information sharing, and participation are necessary to achieve successful relationships across the supply chain (Lees, 2017). The information exchanged enables actors to respond the customer needs, reduce costs, and gain a competitive advantage (Stank, Crum, & Arango, 1999). In the agricultural supply chain, information such as production volume, timing, quality depends on environmental factors and management decisions. With effective communication, business partners receive relevant information from their trustor. Successful "information sharing" or good communication has been shown to increase the trust levels in business relationships (Fischer C. , 2013). The response summary of communication from three different questions can be seen in Table 13 below.

Response	Q1. Does the buyer/supplier	Q2. How does the	Q3. Do both parties always
	always inform about retail	buyer/supplier always	keep one other informed
	demand and promotions	provide information	about events or changes
	(market information)?	regarding the situation of the	that may affect you?
		supply chain prior to	
		planning your activities?	
Most of the time	1	2	2
Often	15	5	9
Not always	0	2	4
Rare	1	3	0
Never	3	8	5

Table 12. Response summary on Communication

The first question is whether the buyer/supplier always inform the retail demand and promotions, including market information. Most of the interviewees (15 out of 20 interviewees) responded **'often.'** The communication only occurred between one-level above or below the supply chain actor, i.e., between farmers with collectors and collectors with retailers. Commonly, the collector is the only one who actively communicates with farmers about their price, desired grade quality, or a new variant of oranges that create a niche market. From the collectors, farmers could know the desired quality (grade-size or a new variety of oranges) and current demand situations based on given information.

"Always. For example, right now, oranges are hard to find, and the collectors always communicate with me via telephone. During this period, they have likely informed us that there is a rising demand for oranges since they are rare. They will ask whether we have the stock or not, and then they will buy if we have some." Farmer-Retailer – FR6

The collectors are always informed about stocks and oranges' quality to the retailers; thus, retailers can plan their promotional activities. Likewise, the retailers also specified the endusers' desired quality and informed their promotion strategy to the collectors. For example, in West Borneo, the oranges are mostly consumed directly in the households or squeezed into juices by the small-vendors, restaurants, café, or hotels. Both of them have different quality criteria. Directly consumed-oranges should be big-sized (mostly grade AB) and slightly orange in their skins. However, the juice consumed- oranges should be medium/small-sized (mostly grade C, D, and E), which have a higher water content, tasted sourer, and cheaper than the direct-consumed oranges. Retailers informed such information to collectors, but collectors never pass this information to farmers.

On the contrary, few farmers (3 out of 10 farmers) responded that they never get information about current demand, desired quality, or promotion among the collector retailers. The collectors hold power in terms of price information, keeping it concealed to earn a higher profit. From the result, we can see that small farmer depend on the buyer's fairness, who may act opportunistically.

"Never, I think that the demand situation is secret information. The collectors do not want the farmers to know this information as they want to keep buying at a reasonable and cheap price. Therefore, we can only know whether there is high/low demand based on the current price (the collectors) listed on their boards." Farmer – F7

Another interesting finding is that all interviewed actors never communicated with more than one level above or below the supply chain actor. Such communication between farmers and retailers have not occurred. Farmers are unaware of the retail price or demand situation in the local market from the retailer and downstream of the supply chain. The expert argued that farmers are ignorant about retail price and end-users market information. Most of them focus on selling their products to nearby collectors and were not driven by end-consumer demand. They never build communication with the retailers directly.

The second question is whether the buyer/supplier always provides information regarding the supply chain's situation before planning their activities. The majority responded 'never' (8 out of 20 interviewees), 'rare' (3 out of 20 interviewees), and 'not always' (2 out of 20 interviewees). The reasons are quite diverse. Some farmers are not interested in the situation of the supply chain. Even they never planned their activities by first knowing the supply chain information. It could be that such information is not crucial for farmers as they have less marketing channels. Supply chain actors admitted that their relationship is limited to a reciprocal transactional relationship. Therefore, such information is not necessarily relevant in their relationship.

"Never, the situation of the supply chain is not explicitly informed to us. It is only about we sell our oranges, and they buy them from us. It is a very detached relationship." Farmer -F7

The third question about communication is whether both parties always keep one other informed about events or changes that may affect them. More than half of them responded **'often'** (9 out of 20 interviewees) and **'most of the time'** (2 out of 20 interviewees). Although the second question's response showed that most of the actors had a detached relationship, there is also high participation in exchanging information between farmers-collectors and collectors-retailers. Interestingly, in most cases, farmers are the recipient of the information. They do not have information that may raise their bargaining power among the actors.

"I always share information about how to farm a good quality of oranges, how to check the condition of soil based on my own experiences. However, I do not help them directly in the field. (...) mostly I always share information about prices to the farmers." Collector – C4

Information exchanged between farmers-collectors is mainly about market opportunities, market conditions, price, and farming practices that affect the input cost. Some farmers may use that information to gain an advantage and reduce their costs. For example, keprok oranges are gaining more attention than siam oranges variety by consumers. Collectors will inform such information to farmers.



Figure 10. 'Keprok terigas' orange (left) and 'Siam orange' right

After the three questions, the interviewer asked an open question about the vital information that the actors looked for from one another to help their process. The responses are summarized in Table 11 below.

Response	Q4. What is the important information needed from the
	other actors that can help your process?
Price	15 (Farmers 9/11, Collectors 5/6, Retailers 2/3, Expert 4/4)
Market opportunities	2 (Farmers 1/11, Expert 1/4)
Market conditions	6 (Farmers 3/11, Collectors 2/6, Retailers 1/3)
Good farming practices	5 (Farmers 4/11, Expert 1/4)
Buyers information	1 (Retailer 1/3)
Quality of fruits	2 (Farmers 1/11, Expert 1/4)
Quantity of fruits	1 (Retailers 1/3)

Table 13. Type of information needed from other actors

Price, market conditions, and good farming practices are the most crucial information needed. Interestingly, almost all the actors responded that price is essential for them. The prices are fluctuating and depend on different seasons. During the rainy seasons, supply will increase, and the orange quality is better than in the dry seasons. Oversupply often happens in the peak of the rainy seasons, causing suppliers (mostly the farmers) to face difficulties in finding buyers who pay high prices. However, in the dry seasons, stocks are empty that causes a high increment in price. The orange quality is likely inadequate as the dry season did not positively support the fruition of the oranges. However, the rejections are likely compromised as the stocks are low, and the demands need to be fulfilled. With this condition, farmers tend to pile up their low-quality oranges over the good ones in the rattan basket. By doing this, collectors only see the fruits piled up on the top of the basket. Sometimes, farmers had to trick their buyers as it is difficult to reach the desired and uniform quality of delivered oranges.

Market conditions such as the total market available and the market's growth rate are also crucial information for some of the interviewees. Interestingly, some small farmers said that they need to know the market conditions to be not gullible by the buyers. Besides, they also mentioned that farmers could opt for more market channel choices. Within this information, all actors include farmers, could gain competitiveness in the market and raise supply chain transactions. However, farmers are the least informed about the market conditions and market opportunities as they are pre-occupied with upgrading farming activities.

Intermediaries/collectors and retailers are the most informed actors in the chain, as they are directly linked with the chain's marketing part. During the interview, the traditional retailer said that the availability of exotic fruits in the market, such as durian, langsat, mangosteen, and rambutan, is threatening mandarin oranges. The price of oranges went low, and the demands are decreased as the major end-consumers, the households prefer to consume rare-seasoned fruits than oranges that can be consumed every day.

Good farming practices are considered important for some farmers and experts. The government introduced a guide for small farmers to perform good orange farming called PTKJS, assisted by the farmer counselors. In previous years, the orange farm's potential productivity is reduced to half because of the widespread attack of citrus vein phloem degeneration (CVPD). The disease is caused by *Liberobacter asiaticum*, which can be transmitted through CVPD-infected seedlings or infectious *Diaphorina citri* flea. To tackle this problem, PTKJS is defined as the healthy citrus farm's integrated management to control plant-primarily CVPD and optimize the production yield.

However, most individuals of small farmers are unaware of this guidance. Thus, the result of their farm is not satisfying. Farmers had been introduced to PTKJS by farmer counselors. Few of them applied PTKJS because higher costs are needed to implement the technology. The

trade-off was given by the yield, which is a uniform and satisfying quality of the oranges (bigsized, sweet, and healthy).

Summary Analysis:

- The collectors actively communicated with farmers about their price, desired grade quality, or a new variant of oranges that create a niche market. Although, some collectors behave opportunistically against farmers/retailers by concealing some information to gain a higher profit
- The retailers also actively communicated about current stock/demanded quality oranges to collectors
- Collectors gained the most information about market channels/opportunities in the supply chain
- Price, market conditions, and good farming practices are the most important information in communication
- Farmers had never communicated with retailers and unaware of the retail price/demand situation in the downstream chain
- Despite the high intensity of communication between actors, the information regarding the situation of the whole supply chain never being informed to one another

4.3.3 Trust

The level of trust is the last dimension measured for relationship quality. Trust is the degree of perception upon relationship partners as credible and benevolent (Ganesan, 1994). Credibility comes from the belief that the relationship partner can perform his task; meanwhile, benevolence refers to the belief that each partner will act in the best interest. Opportunistic behavior is positively correlated with a lack of trust (Laaksonen, Jarimo, & Kulmala, 2009). The trust between relationship partners can reduce uncertainty and opportunistic behavior and promote openness and shared goals (Nyaga & Whipple, 2011).

Response	Q1. When it comes to things that are important to you, can you always depend on the supplier/buyer's	Q2. Though circumstances change, do you always believe that the supplier/buyer will be ready and willing to offer you assistance and	Q3. Can you always count on the supplier/buyer to consider how its decisions and actions will affect you?	Q4. Does the supplier/buyer always keep the promise they make to you?
	support?	support?		
Almost	2	1	1	2
always				
Often	6	12	11	14
Not always	1	4	2	3
Rare	4	1	1	1
Never	7	2	5	0

$1 u \sigma i c 1 \tau$. Response summuly on 1 msi	Table 14.	Response	summary	on Trust
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The first question is whether the actors could always depend on the supplier/buyer's support for the important thing for them. Most of the interviewees responded 'never' (7 out of 20 interviewees), 'rare' (4 out of 20 interviewees), and 'not always' (1 out of 20 interviews). The unrepeated transaction, which is solely determined based on price, characterizes a 'spot market' governance structure (Williamson, 1985). Such conventional governance showed a low level of trust, reflected in response to the first question. Farmers can not gain support from their supply chain partners. In this case, the farmer's counselor plays a vital role in supporting them with the knowledge and capability to raise their bargaining power in the supply chain.

In the city far from the farms, the orange market is dominated by one collector who has a bigger capacity to supply big modern/traditional retailers and other small collectors, leading to a local oligopoly. The collector is the most powerful actor in the supply chain. Modern retailers had no option to transact with him and admitted that only specific prominent collectors had higher capacity among all collectors, creating a local monopolistic market. Such reduced market competition among intermediaries/collectors will likely result in limited value-added distribution among the supply chain actors.

"My supplier is monopolizing this business. He controlled the price and everything, with zero competitors. Once his fruits are below our standards, and we rejected his goods. Then someday, after we ordered again as usual, suddenly he stopped delivering without any confirmation. It makes me hard to believe them again as a business partner."

Retailer (Modern retailer) – R2

The rest of the interviewees responded **'often'** received such support from their relationship partner (6 out of 20 interviewees) and 'almost always' (2 out of 20 interviewees). Profit-sharing and information exchange about price, order, quality, and sales are made among some interviewees. However, it only happened to the actors who built long-duration relationships and experienced commitment from their partners. With such a level of trust, opportunistic behavior between the actors is safeguarded, and the transaction costs are low.

The second question is whether the interviewee believes that their business partners will be ready and willing to offer you assistance or support in changing circumstances. Contrary to the first questions' responses, most of the respondents who are the supply chain actors (exclude the expert) answered **'often'** (12 out of 20 interviewees) and **'almost always'** (1 out of 20 interviewees), ready to help them in changing circumstances. This result is opposite compared to the first question's response. To some extent, the degree of trust among farmers and their buyers is still growing. However, majorly, most farmers admitted that they had no other choice to transact with the local collectors, who often act opportunistically in their business as they cannot access other collectors far from their place. Most farmers rely heavily on the collector as their only marketing channel, leaving them no choice to trust them. It is quite interesting since their dependencies might be turned to facilitate trust in their relationship. Some farmers also believed that the exchange partner acted according to oral obligations and accepted business practice.

"I should believe in them as I do not have any choice to whom I should sell my crop beside the collectors." Farmer – F8

The next reason is that some farmers/collectors had experienced finance and information help that, in turn, to believe their business partners during the uncertain and profit-risk situation. Over-supply is the common annual problem that risked farmers and collectors. However, as trust is built, transactions are likely to occur in equal fairness with integrity and without injuring the exchange partner.

However, not all interviewees have built their trust upon their relationships as the implication by the spot market governance structure, characterized by transactional relationships. Some farmers prefer to not bounded in their relationship, demonstrating an opportunistic behavior. The mistrust could be derived from the farmer's position- weak in power and show strong dependencies on collectors' 'powerful' position.

"If they are willing to support me financially, I will reject it because later I will be bounded and relying on them as a farmer. However, I prefer to be helped in marketing and to whom I should sell my crops." Farmer – F1

The third question is whether the interviewees always count on the supplier/buyer to consider how supplier/buyer decisions and actions will affect them. The majority of the interviewees responded **'often'** (11 out of 20 interviewees) and **'almost always'** (1 out of 20 interviewees). The results were similar to previous, indicating a high level of trust upon business partners who had maintained their relationship and commitment. However, their putting trust is because they had limited option of business partners and heavily rely on them.). Likely, farmers do not want to admit their lack of trust in collectors. As mentioned before, they forced themselves to put trust in collectors as their business partners.

"Always, although I never received some support from them, our transactions always go smoothly, and they paid directly." <u>Farmer-Retailer – FR6</u>

The results are signified as there are different opinions from half of the interviewed farmers who responded 'never' (3 out of 10 farmers), 'rare' (1 out of 10 farmers), and 'not always' (1 out of 10 farmers). The opportunistic behaviors showed up as the result of spot market governance for unrepeated buyers and lack of commitment. This result convinced the big picture of the transactions entailed on the supply chain: a high degree of risk, minimal cooperation between farmers and collectors, and low trust. In such an environment, actors would expect possible actors to engage in opportunistic behavior and hindering the development of mutual trust between supply chain actors.

The last question is whether the supplier/buyer always keep the promise they made. The result has shown a certain level of trust where interviewees found that their supplier/buyer **always** (**'often'** 14 out of 20 interviewees; **'almost always'** 2 out of 20 interviewees) keep the promises they made. Almost all of the interviewees had the right level of contractual trust where they can expect that the exchange partner will abide by their oral agreement, especially in terms of price, order, and delivery time/place, which significantly crucial for them in their transaction.

"Although we (farmer and collector) never had a conversation on how both of us can be mutually beneficial, they always keep their promise. <u>Farmer – FR6</u>

Among the interviewed supply chain partners, most of them demonstrated high contractual trust. This result is quite interesting as the 'spot market' governance is mostly chosen in their transaction, which leads to possible opportunistic behavior. Farmers who had no option to depend on collectors are forced to trust collectors despite the big difference in their power relationship.

Their relationship is unfavorable to build trust because of their transactional relationship and 'spot market' governance structure. Few results showed that trust could be built between parties who have developed their relationship for an extended time and give mutual expectations that either one would not act opportunistically. As each of them had found their preferred trading partner, perform a repeated transaction, and build a close relationship with them, the level of trust may be increased over time. In conclusion, although three of four responses showed that

they have a high level of trust, it is likely because both farmers and retailers had no choice to put trust in collectors as they rely heavily on them in terms of market channel or access.

Summary Analysis:

- Farmers and retailers are less likely to trust collectors due to a lack of supports being received. Farmers' counselors played a vital role in supporting farmers with knowledge and capability to raise their bargaining power in the supply chain.
- The trust level between farmers and collectors was likely to be low, as farmers heavily rely on collectors and having no choice but to transact with collectors to market their products and gain profits
- The mutual trust development between actors are hindered due to the spot market governance mechanism
- Collectors tend to act opportunistically with minimal cooperation against their business partners
- However, both buyers and suppliers always stick to the payment agreement in terms of price, delivery order, and delivery time/place. In this manner, the trust may be increased over time.

4.4 Horizontal Relationship

4.4.1. Collective Action

At the farmer's organizational-level, collective action is defined as intentional action or investment taken by a group of farmers to achieve the shared objective or benefits associated with improved farming livelihoods (Limnirankul, 2007). Collective action is taken directly or indirectly as a group activity by gathering knowledge and developing business together to enhance the production and marketing of agricultural products (Meinzen-Dick, 2009). Besides, collective action in a farmer's organization could reduce transaction costs and enhance economies of scale (Barham & Chitemi, 2009).

In this research, the horizontal relationship between Indonesian mandarin orange small farmers is assessed from the interview. Eight questions were asked to the farmers who joined the organization, actors who also worked as farmers and experts. The total interviewees are thirteen people consists of nine farmers who joined the association and four experts.

Although the association has existed, farmers were rarely initiating a collective action or performed their organization in the association. They tend to act individually and sometimes sharing some general information. Experts also added they never heard of a farmers association that planned a program to improve the crops' quality. Most of them are accustomed to exchanging information without a formal arrangement. Farmers are highly dependent on the supporting program by the government.

"(...) only by the initiative of the counselor and government, they will gather. If there is no invitation from us, we rarely see them gather and held a meeting formally without us. Initially, the association was created by the government. We collected all of the farmers who worked scattered and individually. It is to make things easier in providing supports for them, and we expect that they can plan, then manage actions/ programs collectively on their own."

Expert (Farmer's Counsellor) – E4

To validate the expert's argument, the researcher also asked why some farmers prefer not to join the association. The reasons are varied, from lack of capacity, not-well-known, and lack of credibility. Some farmers were used to join the association and then decided to quit.

Response	Q1. Do you always gain/exchange benefits from another farmer in the farmer's organization?	Q2. Does your farmer's organization always help to shape the agricultural policy?	Q3. Does your farmer's organization always establish good agreements with input providers at reduced prices?	Q4. Does your farmer's organization always establish good agreements with buyers?
Almost always	1	0	0	0
Often	7	2	0	0
Sometimes	4	1	0	0
Rare	1	3	1	1
Never	0	7	12	12
Not Applicable	7			

Table 15. Response summary on Collective Action (1/2)

The first question is whether the farmers always gain/exchange benefits with another farmer in the organization. Most of the interviewees responded **'often'** (7 out of 13 interviewees), **'sometimes'** (4 out of 13 interviewees), and **'almost always'** (1 out of 13 interviewees). Farmers gained benefits when exchanging information about farming practices, transportation/delivery, price, labor opportunity, pest or disease treatment, and which collectors will pay a higher price with a low rejection rate. The farmers always exchanged information informally in the local café, and often, not all members are presented at that time.

A few farmers help one another manage transportation and delivery of harvested crops from the farm to the collector. By sharing the same transportation, farmers could reduce their cost of delivery. Each farmer organization based on different villages/locations has a coordinator who managed the transportation with the farmers. First, farmers will look for buyers and made a deal. Then, farmers will contact the coordinator who arranged their crops delivery to the chosen collector. The transportation often is done by a local taxi, either using a motorcycle with two baskets attached (max capacity 120kg/motorcycle) or with a cargo car. Finally, the farmer will go to the collector's sorting/storage house with transportation and help with the sortation.

The second question is whether the farmer's organization always helps to shape the agricultural policy. The majority of the interviewees responded 'never' (7 out of 13 interviewees), 'rare' (3 out of 13 interviewees), and 'sometimes' (1 out of 13 interviewees). Most of the farmers did not know where or how to voice their opinion formally. Their complaints and opinions about the unstable price or wide-spread disease on the farm are often stated informally during the farmer counselor meeting.

The head of horticulture in Sambas regency (E1) stated that the farmers' association never initiated a formal meeting with the local government in responding to the oversupply season. Legally, the farmers' association had a legal right to propose price subsidies on fertilizer, pesticide, and other equipment to facilitate farming practices. Despite their advantage as a formal organization, the farmers association did not operate effectively formally and not enough initiative. Only a tiny group of farmers had proposed a cooperative initiation to the local government. The cooperative is meant to solve the marketing problems and open new market channels for the farmers.

The third and fourth questions addressed how the farmer's organization established agreements with suppliers and buyers, respectively. As their agreement was based on informal arrangement, most interviewees responded to both questions with the same result: **'never'** (12 out of 13 interviewees) and **'rare'** (1 out of 13 interviewees). From the previous result, most buyers

(collectors/intermediaries) did not prefer the written based agreement. Most collectors preferred an uncommitted relationship as the turnover is highly subjected to uncertainty, thus favoring opportunistic behavior. The characteristic of the 'spot market' governance structure in the transaction did not support the contractual scheme. Besides, farmers also did not know how to position themselves collectively as an association and arranged a written agreement (contract) to strengthen their incentives and bargaining power towards their supplier and buyer.

Response	Q5. Do you always cooperate with other farmers in terms of exchanging market information?	Q6. Do you think that the farmers' organization always improves the quality of mandarin orange?	Q7. Does your farmer's organization always hold a regular meeting?
Almost always	1	2	0
Often	5	6	2
Sometimes	3	2	6
Rare	0	1	2
Never	4	2	3
Not Applicable	7	•	·

Table 16. Response summary on Collective Action (2/2)

The fifth question asked whether the farmers always cooperate with their colleagues in terms of exchanging market information. Most farmers responded 'sometimes' (3 out of 13 interviewees), 'often' (5 out of 13 interviewees), and 'almost always' (1 out of 13 interviewees). As described before, farmers are cooperating about market opportunities related to the channel choice limited to several numbers of local collectors. Most of the time is about which collectors sold the highest price or buyers from a different location. However, few farmers stated 'never' (4 out of 13 interviewees) exchanged market information. Some of them said that marketing is not their business, as it is the responsibility of collectors. They are accustomed to farming practices but do not consider marketing channels.

The sixth question addressed whether farmers' organization always improves the quality of mandarin orange. Most of the farmers responded 'sometimes' (2 out of 13 interviewees), 'often' (6 out of 13 interviewees), and 'almost always' (2 out of 13 interviewees). Farmers were actively exchanging information about good farming practices. However, there are no common goals with the practical guidelines made by the association. For them, exchanging information is enough to improve the quality of mandarin oranges.

"Exchanging information about farming practices that are our effort to improve the quality of our products." Farmer – F1

Most farmers did not feel that their organization helps in improving the quality of mandarin orange. For example, FR6 stated that collective action taken in farming practices has never been made in his organization. Most of the farmers considered the organization as the forum and channel to receive suggestions from the government and financial aid or support for the farmers. Again, we can see that the farmers' organization did not operate formally as the farmers were accustomed to the informal arrangement.

The last question asked the frequency of farmer's organizations always to hold a regular meeting. Primarily, the responses are 'sometimes' (6 out of 13 interviewees), 'rare' (2 out of

13 interviewees), and 'never' (3 out of 13 interviewees). As shown in the previous result, most of the farmers accustomed to an informal meeting at a local café. Thus, most of them rarely met formally with all of the members.

Most of the time, the farmers' counselor scheduled the monthly meetings twice to four times per year via each farmers' association's head. The farmers' counselor planned their farming needs before the meeting. The meetings mainly discussed the planting season and the distribution of aid from the government. Most of the farmers' association has not organized a regular-formal meeting yet. For them, going to the local café is enough for a place to exchange information about price, market opportunities, and farming practices. The local farmers are more accustomed to that way, although not all association members could attend the meeting.

The farmers' association is created based on different villages, consisted of 25 members per group. They are not only focused on mandarin orange farming practices. Several crops are included, such as vegetables, spices, then primarily rice. Since the government supported the farmers through the association in different commodities, they also grew other crops besides mandarin orange. However, since the farmers still worked individually, collective actions are rarely taken.

Summary Analysis:

- Farmers association rarely initiating a collective action together as farmers tend to act individually
- The activity on the association is limited to information sharing between farmers about farming knowledge and managing the delivery of harvested crops to nearby collectors
- Not all members are actively involved during the meeting
- No written agreements have been established with input providers and collectors
- Farmers association did not know how to deliver their opinion in shaping agricultural policy
- Collaboration with villagers instead of with farmers association in fixing the main road through *gotong royong* communal work instead of relying on the government as it was slow
- The government initially created the association and given to the farmers but remained inactive to promote farmers' welfare.

4.4.2. Service provision to members

Every farmer's organization should provide services to their members with clear and sustainable benefits, such as marketing service, facilitation of collection production activities, financial service, education service, welfare service, policy advocacy, and even managing common properties (*Stockbridge, Dorward, & Kydd, 2003*). In this section, seven questions, including the responses recorded during the interview, were shown below (see Table 18 and Table 19).

Response	Q1.	Does	farmers'	Q2.	Does	the	Q3.	Does	farme	rs'	Q4.	Does	farn	ners'
	organ	ization	always	organi	zation	always	orga	nizatio	n alwa	iys	organ	ization	alv	ways
	help	mem	ibers in	try to	solve the	e unmet	prov	ide tra	aining	to	help	you	with	the
	solvii	ng the	technical	produ	ction crit	teria?	mem	bers			financ	cial serv	vice?	
	probl	ems tha	t occur?	_										
	1													

Almost	1	0	0	0	
always					
Often	3	4	1	0	
Sometimes	2	2	2	2	
Rare	1	3	1	1	
Never	6	4	9	10	
Not	7				
Applicable					

Table 17. Response summary on Service Provision to Members (1/2)

The first question is whether the farmer's organization always helps members in solving technical problems. Most of the interviewees responded 'never' (6 out of 13 interviewees), 'rare' (1 out of 13 interviewees), and 'sometimes' (2 out of 13 interviewees). Farmers are rarely helping out each other practically on the field. Both experts and farmers said that farmers' counselor is the one providing the solution for farmers. Like previous results, farmers tend to work individually on their field and rely more on the counselor. Interestingly, some farmers prefer to ask their input suppliers as experts on technical problems in the field. The farmers' organization showed an inadequate service provision to its members.

"No. I do not think we have ever helped each other formally as a member of the organization." Farmer – F5

The second question is whether the farmers' organization always tries to solve the unmet production criteria. Most of the interviewees responded 'never' (4 out of 13 interviewees), 'rare' (3 out of 13 interviewees), and 'sometimes' (2 out of 13 interviewees). Farmers responded that the organization did not formally support them to achieve the aimed criteria. They tend to discuss informally and never collaborate in a formal arrangement. EF3, for example, stated that when his production criteria are unmet, he will meet his colleague at the local café to discuss his problem. He valued the information given by particular senior farmers, even though without the practical or direct implementation of their supports. This result substantiates with the first question, where the organization has shown an inadequate service provision to its members.

One of the experts (E1) stated that most farmers are confused about the production criteria that should be aimed at. There is no monitor and control of the product's quality of their member in farmers' organizations. Farmers tend to rely too much on individual collectors where the standards are unclear and different based on their selling experiences. Collectors determined the price of mandarin oranges based on the size and ripeness-level. Those are the standard quality criteria that should be met, including food safety by the farmers. It even confused the farmers more as some collectors were longing for the smaller size (C to E grading quality) and rejecting the bigger size (AB grading quality). Sometimes, the buyers also prefer the larger size (AB grading quality) with different ripeness levels. We can see evidence of inexact quality criteria used among the local collectors with validated measurements.

The third and fourth questions addressed whether the organizations provided training to members and help with financial service. Both questions responded similarly, where most of the interviewees answered **'never'** (9 out of 13 interviewees) for the third question and **'never'** (10 out of 13 interviewees) for the fourth question.

Farmer's organization never initiated training for its members; instead, the input companies (fertilizer, pesticide, or seedling companies) did. The input companies are the ones who

provided training for the farmers as part of their marketing activities and promotions. Some farmers found the training benefited themselves in understanding pests, diseases, and treatments. The organization also did not manage treasuries and heavily depend on subsidies from the government. Therefore, financial services are not organized by the organization with a transparent financial system.

Response	Q5. Does the farmer's organization always help the members if there is an oversupply/supply shortage in the overall supply chain?	Q6. Does farmers' organization always help the farmer on marketing their products?	Q7. Does farmer's organization always transfer the information from downstream actors of the supply chain to members and the other way around?
Almost always	0	0	0
Often	2	1	1
Sometimes	1	2	1
Rare	1	0	0
Never	9	10	11
Not Applicable	7		

Table 18. Response summary on Service Provision to Members (2/2)

Summary Analysis:

- Farmers association never facilitate the collection of production activities, marketing service, education service, welfare service, and financial service
- Farmers heavily relied on farmers' counselor to earn knowledge and managing production activities instead of services from farmers association
- Consensus on aimed quality criteria among farmers never been done
- The association did not operate formally with functional and legitimate governing bodies
- The participation of members is meager and unequal as the main focus of the association is not only a mandarin orange commodity but other as well, such as managing common properties used for rice commodity

4.5 Quality Management

4.5.1 Quality Assurance (QA)

In this section, the researcher examined the quality assurance in Indonesian mandarin orange production.

Response	Q1. Has a QA system been implemented?	Q2. Has the QA system been certified?	Q3. Is there any inspection of an external organization on the implemented QA system?
Yes	12	2	2
No	8	18	18

Table 19. Response summary on Quality Assurance (QA)

Base on their responses, more than half of the interviewees have implemented an informal QA system, referred to as the grading system they have used for 30-40 years. However, the system is informal, traditional-approach, uncertified, and no third parties are involved in monitoring or inspection. Most actors referred to the outdated collectors' grading standard created 30-40 years

ago by the old government. The grading criteria were solely based on the oranges' diameter size (shown in figure 6) and the assumption on the appearances to determine whether it is safe to be consumed or not.

Meanwhile, the Indonesian government introduced PTKJS as a standard operational procedure (SOP) for farmers to produce high-quality mandarin oranges to ensure good farming practices and food safety for both local and global consumers. There are five main components in PTKJS: (1) planting disease-free or labeled seeds, (2) control of vector-borne plant disease CVPD and pest, (3) farm sanitation, (4) optimal maintenance of the mandarin orange farm, and (5) consolidation of mandarin farm management.

The system was made to prepare farmers to produce high-quality products sold in the global market and promote mandarin export across the countries with satisfying prices compared to the traditional market. Besides, it also helps farmers adapt to the set of guidelines for agricultural practices to guarantee minimum standards for production. Farmers' counselors promoted PTKJS to all farmers in Indonesia, ensuring them to absorb the best practice technology and information in good mandarin orange production.

To gain acknowledgment and broad access to local or export modern markets, the producers need to obtain the *prima certification*. The certification itself is made by the Ministry of Agriculture in Indonesia as a modern approach to GLOBAL GAP, an international and independent system of food safety assurance for primary agricultural production.

There are three different levels of 'prima certification':

- 1. 'Prima 3' (lowest level) products are safe to be consumed which are mostly used by local modern supermarket
- 2. 'Prima 2' (intermediate level) products are highly graded and safe to be consumed which are mostly used by the local modern supermarket and some export market
- 3. 'Prima 1' (highest level) products are environmentally-friendly, highly graded, and safe to be consumed, mostly used by the export market.

The certifications are granted for the producers who have applied to the respective regional food safety competency authority known as OKPPD (*Otoritas Kompetensi Keamanan Pangan Pusat Daerah*) and fulfilled the requirements. Governments will appoint a group of field inspectors to check and decide whether the applicants have fulfilled the standards or not. Such requirements included product, water, and soil accredited lab test, implementing the GAP (Good Agricultural Practices) SOP, and GPP (Good Pesticide Practice) SOP. The certification is valid for three years, accompanied by routine surveillance every year by the inspector to ensure the products' standards.

Most of the supply chain actors demonstrated the low-awareness of the QA system, where most of them answered '*I do not know*' (9 out of 20 interviewees) and '*I am not sure who has developed it*' (2 out of 20 interviewees). Only big farmers, all of the experts and collectors who transacted with modern retailers who have ever heard PTKJS and '*prima certification*' as the QA system used in the mandarin orange supply chain. Interestingly, only one farmer (F5) among the interviewees has implemented the quality assurance and received a certification of 'Prima 3'.

Response	Q4. Who has developed the QA system?
Ministry of Agriculture (OKPPD)	7
Supermarket	2
I do not know	9

Table 20. The developer of the QA system

I am not sure who has developed it	2
------------------------------------	---

Another example is FC10, who also used to implement the QA system. It acted as one of the pre-requisite before transacting with the modern market. Initially, he had no idea that the government made the certification and misunderstood that the supermarket created the certification. However, as time goes by, he refused to extend the certification as he preferred to do his business in the local market, which found the QA system is unnecessary. He found that the QA system needs more investments and higher effort. On the contrary, the prices are not determined based on the certification level. Instead, the traditional grading criteria are based on size and ripeness-level.

The majority of the small farmers admitted that they rarely heard about PTKJS and 'prima certification'. At present, they have mostly relied on farmers' counselors and experienced-farmers advice. Besides, they also did not find an urgency of having both training and certification, as the local collectors did not reward them based on the QA system (only size and ripeness level). Besides, most farmers claimed that they have a limited capacity to access and learn good farming practices. On the other hand, most buyers use the grading criteria based on size and ripeness-level without validated and precise standards/measurements. The local buyers did not value the certification that was officially established by the government. From here, we can see an apparent disparity in quality rewarding systems during the transaction. It also implies where most of the actors demonstrated a low awareness level of protecting the consumers and ensuring food safety in their supply chain.

Summary Analysis:

- The implemented QA system is an outdated system that has been used for 30-40 years which sorted mandarin oranges based on diameter size-based
- PTKJS is introduced as an SOP for farmers to produce high-quality mandarin oranges, promoting a potential export market with satisfying prices compared to the traditional market based on *prima certification*
- *Prima certification* is a legal quality assurance system that is published by the Ministry of Agriculture in Indonesia
- Most supply chain actors had a low awareness of *prima certification* and PTKJS that ensure food safety for consumers
- Some farmers refused to receive *prima certification* as high investment and effort are required
- Local collectors did not use *prima certification*, but modern supermarkets did in the beginning.

4.5.2 Quality Control

The previous section shows a difference between aimed quality criteria by the actors compared with officially established by the government among the supply chain actors. Also, the researcher found that the governance choice of the transaction is informal without a contract where control mechanisms are unlikely to occur.

In this section, the researchers examined how the quality control is implemented across the supply chain actors, corresponding to the established QA system. The summary of the responses, according to different questions, are summarized in Table 22 below.

Response	Q1. Do you always achieve the aimed quality criteria(s)?	Q2. Do you always compare the actual measurement outcomes with the standard?	Q3. Do you always ensure your process complies with the standard?
Almost always	2	1	4
Often	8	9	7
Not always	8	2	2
Rare	2	1	3
Never	0	7	4

Table 21. Response summary on Quality Control

The first question is whether the supply chain actors always achieve the aimed quality criteria. Half of the interviewees responded **'often'** (8 out of 20 interviewees), **'almost always'** (2 out of 20 interviewees). Most farmers stated that they could achieve the aimed criteria (AB graded quality oranges) because they implemented PTKJS. Although most farmers did not understand the system, they just followed the farmers' guidance in applying good farming practices.

In the case of modern retailers, they rarely meet their quality criteria from the collectors. Most of the products are rejected due to different sugar-levels for every batch delivered, although the crops have passed the size-grading requirements. It happened as the collectors did not implement the sugar-level tests before deliveries. With a high rejection rate of the modern retailer to the collectors, the collectors could not deliver their products to modern retailers. To compensate for the availability of mandarin oranges on modern retailers' shelves, they had no choice but to compromise their quality requirements according to the collectors, thus removing the sugar-level check.

From that example, we can see that the quality criteria are not translated from the endconsumers via retailers, but collectors' power relationship governs the transaction. The traditional retailer also followed the quality requirements based on the collectors and directly sold it to the customer. Collectors tend to transact with the traditional retailer as they showed a low rejection rate compared to the modern retailer.

The second question is whether the supply chain actors always compare the actual measurement outcomes with the standard. The responses also showed a similar trend with the first question, where half of them found it **'often'** (9 out of 20 interviewees), and the rest responded **'never'** (7 out of 20 interviewees). Farmers compared the quality of their crops with other farmers who had a better quality of crops and likely implementing the PTKJS. Most of the farmers focused on the size, healthiness, and uniformity of the mandarin oranges. Collectors had the grading tools to ensure the uniform and satisfying quality outcome after the sortation on the collectors' level. That is reasonable as half of the farmers did not know the PTKJS as their standard. They never measured their actual outcomes. Despite those reasons, this question is biased as there are unclear aimed criteria for the oranges from the upstream actors in the supply chain.

The third question is whether the supply chain actors always ensure their processes complied with quality standards. Most interviewees claimed **'often'** (7 out of 20 interviewees) and **'almost always'** (4 out of 20 interviewees). To grow the desired quality of oranges, farmers strictly followed the farmer counselors' guidance about the quality standards based on PTKJS. However, in reality, not all farmers complied with quality standards due to different reasons. As they also had another job, such as livestock farmers and growing other crops, they are not

focused on growing good quality mandarin oranges. The other reason is that they have no idea about the quality standards mentioned in PTKJS, as they never heard about it, similar to the previous result. This question might also be biased as well due to the same previous reason.

The fourth question is openly asked about what are the important process parameters according to each actor. The results are shown in Table 23 below.

Response	Q4. What are the important process
(More than one answers on each respondent)	parameters during farming/sorting?
Apply GAP	7
Pest control	7
Quality control (sugar level, size, appearance)	2
Fertilizer	9
Irrigation	4
Sanitation of farm	4
Keen eye when sorting for the quality parameters	3
Logistics	1
Good weighing	1

Table 22. Important process parameters during farming/sorting

For the farmers, proper fertilizer usage on the farm is the most important process parameter as it increased the size of mandarin oranges uniformly and improved the plant's healthiness. After that, it is followed by the necessity of implementing good agricultural practices and pest control to ensure the products are taken care of until the harvest season.

For the collectors, the most important parameter during sortation is the keen eye. The collectors hired the experienced sorters who had a good sense of mandarin oranges appearances and size to reduce the rejection rate and possibility of food losses during transportation. Meanwhile, for retailers, quality control is the most important parameter meaning to ensure the size-grading is accurate and precise from the collectors.

Response	Q5. Are there any important quality criteria(s) of the output product that need to be fulfilled?
Size	20
Ripeness level	13
Taste	4
Appearance	5
Packaging	1
Uniform in quality	1
Food safety	1

Table 23. Important quality criteria(s) need to be fulfilled

Based on Tabel 24 above, we can see that size and ripeness level are perceived as the most important by the supply chain actors. This result is reasonable as the price of the oranges is solely determined by the size. Also, it is further confirmed that the actors had a low-awareness of food safety across the supply chain.

Summary Analysis:

- Half of the interviewed farmers had implemented PTKJS resulting in consistent, wide diameter-sized mandarin oranges and healthy plants
- Modern retailers often rejected the batch delivered by local collectors as the sugar-level requirement rarely passed
- As the number of high capacity producers is low, the producers decided no to deliver their products to modern retailers due to the high rejection rate
- Farmers counselor help small farmers along the way in implementing PTKJS, ensuring the quality of the oranges
- Farmers found difficulties to comply with the quality standards as they also focused on other jobs such as livestock farmers or growing other crops
- Applying proper fertilizer is the most important process parameters in farming as it
- The keen eye of sorters on quality parameters (appearance and diameter-sized) is the most critical process parameter in sorting to prevent potential rejection rate from the retailer
- Size and ripeness level are the important quality criteria instead of taste, appearance, and food safety

4.5.3 Quality Improvement

In this section, quality improvement among different actors was also measured as food quality management during the interview.

Response	Q1. Do you always face quality problems?	Q2. Do you always try to overcome the quality problems?	Q3. Do you always seek feedback for your overall output process?
Almost always	0	3	1
Often	5	11	14
Sometimes	7	3	3
Rare	7	2	1
Never	1	1	1

Table 24. Response summary on Quality Improvement

The first question is asked whether the supply chain actors always face quality problems. The majority responded **'sometimes'** (7 out of 20 interviewees) and **'rare'** (7 out of 20 interviewees). In general, farmers transacted their products to the traditional market via intermediaries with low rejection rates than the farmers who sold their products to the modern market. This result is reasonable as the traditional market had lower standards to be achieved (only based on size) than the modern market (size, appearances, and sugar level).

Besides, there are also differences between the farmers who are joined as members of the association. Farmers who are actively coordinating with other farmers in association and farmers' counselors rarely found any quality problems. The shared experiences and knowledge about mandarin orange farming have a positive outcome on their harvest quality. On the other hand, farmers who had low interactions said their products are relatively lower than those of the association. For this reason, some farmers have decided to join the association and enabling them to achieve standards and yields of the crop that can be sold at a profitable price.

On the other hand, some farmers stated that they are not focusing only on growing oranges but other crops such as chili, watermelon, and cucumber, which are relatively stable and profitable. Thus, frequently facing quality problems on mandarin oranges are not in their concern, and improving mandarin oranges quality is not their priority.

The second question identified whether the actors always try to overcome the quality problems in producing mandarin oranges. Based on their response, most of them answered **'often'** (11 out of 20 interviewees) and **'almost always'** (3 out of 20 interviewees). In general, farmers are continually looking for options and solutions to improve their livelihoods from their farming business. Both of them are demonstrating a positive attitude and motivation with their limited capacity and knowledge. Even some of them could learn independently via the internet or public farming seminars. However, such quality control costs are too high to be afforded as the reward system is not fair with the costs' ideal production practices.

Some collectors also tried to invest in storage facilitation and waxing practices to extend mandarin oranges' shelf-life for the export market. However, it did not last long as the collectors stated that the current farmers' oranges' quality is still too low. Most qualities are heterogeneous, especially in terms of sugar level and water content. In the end, the collector stopped invest in quality, improving technology, and end-up transacting their products in a traditional market. It is reasonable why modern retailers prefer to sell imported oranges rather than local oranges due to unachievable standards, and collectors were very ignorant about the standards.

The third question asked whether the actors always seek feedback for your overall output process. Most of them responded **'often'** (14 out of 20 interviewees) and **'almost always'** (1 out of 20 interviewees). Interestingly, both farmers and retailers have shown positive behavior in listening to each actor's feedback in the supply chain, but not in general for the collectors. Only one collector showed a positive attitude toward feedbacks since he started his business as a farmer. The collectors said that each of the actors should have their way of thinking on their business process; therefore, feedback is unnecessary. Both retailers have always suggested that the collectors improve the local mandarin oranges' quality, especially in terms of sugar level and ripeness level. However, such feedback is ignored as collectors like to have strong bargaining power in the supply chain. The result showed a disparity in communication between actors and the collectors in the Indonesian mandarin orange supply chain.

Summary Analysis:

- Improving the quality of mandarin oranges is not small farmers' main priority as they also farm other crops where the prices are relatively stable and more profitable
- However, in a dire situation, farmers will actively ask for feedback from farmers' counselor or experienced farmer or performing trial & error in their farming practices based on their knowledge
- There are few groups of experienced farmers refused to rely feedback on farmers' counselor as they are older and feel more experienced compared to them
- Collectors refused to improve their quality for the modern retailers
- Both farmers and retailers showed a positive behavior in listening to feedbacks from their supply chain partners, but collectors did not

4.6 Quality Performance

4.6.1 Satisfaction

Customer satisfaction exhibited how the delivered product's quality can fulfill the minimum requirement of customers' expectations. A particular governance regime may also influence the reached quality levels of products as every chain actors must cooperate to achieve the pre-

determined quality levels. In this section, six questions were asked to measure customer satisfaction.

Response	Q1. Does the buyer always satisfy with the quality of your fruits?	Q2. Do you often receive customer complaints?	Q3. Do you think the buyers will always buy again in the future?	Q4. Do the sold products always available for the customer?	Q5. Does the standard of the product always been fulfilled?
Almost always	6	0	10	2	2
Often	10	0	8	3	7
Not always	3	5	2	14	9
Rare	1	9	0	1	2
Never	0	6	0	0	0

Table 25. Response summary on Satisfaction

The first question asked whether the buyers were satisfied with the delivered quality of products according to the sellers' experiences. Based on Table 26, most of the respondents (**'often'** responded by 10 out of 20 interviewees; **'almost always'** responded by 6 out of 20 interviewees) found their buyer satisfied with their mandarin oranges' quality. The farmers who followed the farmers' counselor guidance and actively involved in exchanging knowledge or information in the association are given these responses. They argued that they had frequent transactions, and buyers still rely on them, signifying a high customer satisfaction level. On the contrary, few farmers responded 'sometimes' (3 out of 20 interviewees) on the first question as they produce irregular sizes of oranges and quantities due to lack of experience and knowledge. They are the farmers who are not joined in the association or contact with farmer counselors are facing hurdles in terms of product quality.

At the level of collectors, they found that modern retailers are disappointed with their products; therefore, they are also disappointed with farmers' products. Modern retailers established certain sugar levels as their minimum standards; the collectors found difficulties to fulfill them. Due to this reason, collectors tend to sell their products to traditional retailers who did not establish standards and just following the size-based standards from the collector. Thus, during the dry season or difficult period, imported oranges are more favorable than local oranges. In conclusion, it can be understood that farmers are biased with the satisfaction level of collectors. Due to the high frequency of transactions, farmers thought it was their satisfaction that collectors would return. Collectors also did not choose to find farmers who produced high-quality oranges with such an unfair reward system. Therefore, from my point of view, the level of customer satisfaction can be seen as **low**.

The second and third questions asked the buyers' frequency of complaints and how the customer will keep on transacting with them. Both responses are quite positive as customers are **satisfied** with sellers' product quality. Traditional buyers tend to have a lower standard than modern buyers, where they prioritize availability and grade them based on size over the intrinsic product's quality itself (sugar level or water content). However, this result is contrary to the modern market as the modern retailer delivers more complaints towards collectors.

Before transacting, buyers tend to select their trading partners carefully based on known reputations spread in the neighborhood (farmer, collector, and traditional retailer live in the close neighborhood) to prevent dissatisfaction/complaints. Whenever they experienced unsatisfaction with a seller, the reputation will widely be known, and they will stop transacting

then decided to switch to find another seller without any given feedback/complaints. Besides, farmers' associations and collectors had their own trusted business partners or blacklisted business partners. There was a lack of improvement within this business environment for actors who failed to satisfy their customers as there was no feedback/communication after the transaction. It is quite reasonable why the results are positive (customers are satisfied), although many dissatisfactions results are found from previous results.

The fourth question asked whether the sold products always available for the consumer. In general, most of the actors are still facing difficulties with the availability of mandarin oranges throughout the years. It can be seen from the response on the fourth question where most of the respondents (14 out of 20 interviewees) found it **'not always'** available in the market. The government had played a role in improving mandarin oranges' availability by *Bujangseta* technology. This farming technology could control the amount of harvested fruits for a whole year by controlling the buddings in the tree before the fruition period, resulting in a uniform and high-quality mandarin oranges. In the next period, farmers are expected to implement this technology, therefore, upgrading product availability and quality.

The fifth question asked whether the standards of the products have always been fulfilled. From the responses in Table 26, the responses are mostly **'not always'** (9 out of 20 interviewees). Small farmers are struggling to achieve the highest grade standard size (grade A). They argued that the irrigation system and unpredictable climate change are the major problems to achieve the highest standard grade size. Even worse, it could lead to mandarin oranges' unavailability where the oranges are unable to be harvested. Some of the farmers argued that their focuses are divided, and resources are limited to several crops. Thus, it is acceptable for them not to achieve the highest standard as long as they are still producing oranges available for the market. Nevertheless, few farmers who only focused on oranges as their cash crops have an 80% chance of achieving better standards in the modern market.

Farmers who are actively involved with the association/counselor produce a better quality of oranges as they gained information and resources from other farmers/counselors. On the contrary, farmers who are not building their horizontal relationship were struggled to deliver a better and consistent quality of oranges.

Both retailers and collectors also mentioned that sometimes they receive unmet ripeness levels and inconsistent sizes of mandarin oranges from farmers. This argument proved that majority of small farmers are still facing difficulties in fulfilling the standard. It is further signified from the fourth and fifth questions' responses where the standards are not always fulfilled, and the oranges are not always available for the market.

The last question is an open question on how they maintained their consistency in satisfying their buyers. The expert also asked if they positioned themselves as a farmer. The responses can be seen in Table 27 below.

Respondent	Q6. How do you maintain your consistency always to satisfy your buyer?
Code	
F1	Learning the best farming practices from any source, either from the promotion brochure
	of the specific brand of pesticide/fertilizer, then applied them.
F2	Implementing good agricultural practices and always adopt new farming technologies
	that are feasible.
F3	Implementing good agricultural practices

Table 26. How actors maintain consistency to satisfy their buyers

F4	We are implementing good agricultural practices. Always try to look for new knowledge
	and experiences from the other farmer.
F5	Always seek feedback from the buyer. I was looking for a solution to any problems with my resources and knowledge.
FR6	Lalways check all of my produces before selling it to the buyers. Lalso put KCl fertilizers
110	that contain boron to produce sweet oranges. However, I only do this for the produces
	that I retailed by myself. If it is for the middleman, I don't really care about how it tastes
	but the size matters Besides I try to perform good farming practices
F 7	L always monitor my farm and check the condition of the mandarin orange trees there. If
1.1	there are liabilities, I always troubleshoot and solve the problem.
F8	I do not know what the quality attributes that are looked at by the end-consumer are, but
10	for the middlemen is the stock availability.
FC9	I try to aim for the highest standard set by the middleman. Therefore, I always want to
107	learn how to maintain a good farm with good produce. However, I have experienced
	being cheated. When most of the harvests are big-sized fruits, they will cheat me to pay
	a lower price by using unstandardized grading-size tools that have a bigger diameter
	compared to the usual one. That is also my reason to start as a collector by myself
FC10	Lalways do the quality check and control to ensure the desired products for the consumer
CP1	During the rainy season, many fruits are prove to be spoilt due to the water on the fruit's
CKI	surfaces. I used fan equipment to blow the water away. So that is how I try to maintain
	my quality as a middleman. Also, I always communicate and exchange information with
	huvers to deliver the best results for them
CE2	I hired the employees who had good and long experiences in sorting and very keen on
CI2	the appearance and size of the oranges. Therefore, the product quality is uniform and fits
	with the desired qualities for the buyers
<u>C3</u>	Perform proper sorting, ensure that all of the sizes ordered by the customer are delivered
C_{1}	I always maintain a good relationship with the customers and follow their demands
C4	Sometimes we can just most and have a casual conversation. On top of that honest, good
	and accountable sortation should be done
D1	Accurate delivery time for our customers (other retailers) and we always remind our
K1	supplier to perform good sortation of the oranges before they send us here with a friendly
	supplier to perform good soltation of the oranges before they send us here with a mendry
D 2	By doing a good promotion on special occasions such as fruit hazaar with discounted
K2	by doing a good promotion on special occasions such as that bazaar with discounted
	margin for those events, the result is worthy
E1	When the formers are committed to performing good forming practices as the counselor.
LI	instructed so
E2	Instructed so.
E2	in the farmers are committed to performing good farming practices made by the
E2	government (FIKJS)
ES	and size
F 4	and size. When forms and form and forming and (1)
E4	when farmers perform good farming practices made by the government (PTKJS) with
	integrity and accountability, it will bring the best quality of oranges for the consumers.

From the interviews and these responses, it can be seen that farmers showed a positive attitude to learn and perform good farming practices with different resources such as the internet, expert, and even from advertisements by fertilizer/pesticide companies. They aimed to make mandarin orange always available throughout the year with the highest standard (big-sized oranges) that they can achieve. Farmers who had more resources and experience always perform quality control before deliveries to the buyer.

However, most farmers are unmotivated to deliver the best quality that can be achieved since the reward system is unfair. The cost to perform good farming practices and the profit gained from selling the fruits are unequal. For example, FR6 argued that his big-sized and sweet-tasted oranges are paid at the same price as the other big-sized and sour-tasted oranges. Although he put higher effort into his farming practices, he did not receive a comparable reward from the buyers as "size" dictates the price, not "sweetness." Also, few farmers were scammed by the middlemen during the grading and payment of mandarin oranges. Intermediaries are grading with unstandardized tools in order to pay cheaper during transactions. Such practices occurred within the transaction, thus may inhibit farmers from delivering their best quality of mandarin oranges.

The collectors are focused on uniform sortation and grading via skilled human labor or technological facilities/equipment. They can ensure all the mandarin oranges are delivered ondemand based on size and still safe to be consumed. Others also mentioned that they try to maintain good communication and relationship with the buyer (retailer) to understand their desired quality on mandarin oranges. However, most collectors did this for the sake of reputation.

Both traditional and modern retailer has a different approach to satisfy end-consumer with affordable price. Traditional retailers focused on maintaining a stable and affordable price through negotiation with the middleman. On the other hand, the modern retailer focus on giving promotion during special occasions such as Christmas, New Year, or Chinese New Year.

Summary Analysis:

- Traditional market buyers and modern market buyers have different quality standards in fruits, wherein the traditional market was prioritizing the size and appearance, meanwhile in the modern market prioritizing sugar level and water content.
- Low level of complaint and high frequency of buyer purchase again because most of the actors have their long-trusted business partners and never giving feedback if the unsatisfactory transaction occurred
- Product availability and quality is low because most farmers had not implemented *Bujangseta* farming methods that resulted in repetitive fruition along the year
- Farmers lack the motivation to perform good farming practices as there is no price differentiation on taste (sugar content, water content) quality of mandarin oranges. Therefore, the standards of the products are not always been fulfilled due to an unfair reward system, especially when farmers implemented PTKJS

4.6.2 Price

Price measures how well the resources are utilized, including profit and production costs. During this section, interviewers focused on how the supply chain actors manage every cost needed to produce goods, distribution, transportation, and sortation, including their satisfaction with the profit they gained. The results are presented in Table 28 below.

Response	Q1. Do you always satisfy with the price of high-quality fruits from your buyers?	Q2. Do you always try to maintain the lower costs incurred during your primary process (purchase, production, sales)?
Almost always	2	2

Table 27. Response summary on Price

Often	6	12
Not always	9	2
Rare	3	2
Never	0	2

The first question asked whether each actor always satisfies with the price of their products during the transaction. Most interviewees responded **'not always'** (9 out of 20 respondents), majorly given by the farmers and the retailers. Farmers are not always satisfied because the price during harvest season was meager that did not break-even their production cost. Besides, there is no price differentiation based on the sweetness level of the orange. Retailers are rarely dissatisfied as well because collectors always charged unreasonable prices without mutual understanding and the end-consumer purchase power (local oranges is more expensive than imported oranges).

These results showed that both farmers and retailers are restricted from gaining a higher margin as the collectors abused their market power to increase profit margins in transactions. Besides, it is further confirmed that all collectors were always satisfied with the price of oranges.

"I am always satisfied with the price of oranges, and I have no reason to reduce my production costs anymore." Collector -C3

The second question asked whether the supply chain actors always maintain lower costs incurred during your primary process (purchase, production, sales). Most interviewees responded **'often'** (12 out of 20 respondents), majorly given by farmers and collectors.

"I used organic fertilizer from manure that I bought from nearby livestock/poultry farm. It is cheaper and better for our land." Farmer – F5

Few responded that they could not lower the production cost due to knowledge incapacity. Some experts also added that not every farmer is willing to invest their time or energy to lower the production cost; instead, they heavily rely on government subsidies.

Summary Analysis:

- Farmers are not satisfied with the selling price as it was too low (during harvest season) and did not break-even their production cost. Also, there is no price differentiation based on the sweetness level of the orange
- Collectors abused their market power to increase profit margins in transactions as they were always satisfied with the profit and selling price.
- Most small farmers had a lack of knowledge to decrease production costs and heavily rely on government subsidies.
- Educated farmers know how to operate production cost-effectively

4.6.3 Flexibility

Flexibility measures a supply chain actor's ability to respond to a changing environment, and it plays a vital role in the value-added throughout the value chain (Beamon & Ware, 1998). It includes product flexibility (e.g., volume, innovation), process flexibility (e.g., machine, routing, product range), and infrastructure flexibility (an adaptation of company or

organizational structure to changes). During the interview, only product flexibility and process flexibility are included due to limited time.

Response	Q1. Do you always try to adapt to changing demand (i.e., if there is a higher volume needs to be fulfilled)?	Q2. Do you always open to the new process/technology in farming/storing/sorting?
Almost always	5	6
Often	12	11
Sometimes	2	2
Rare	1	0
Never	0	1

Table 28. Response summary on Flexibility

The first question asked about product flexibility, specifically about the degree of adaptation towards changing demand. Most of the interviewees responded **'often'** (12 out of 20 interviewees). It can be seen that most farmers are willing to adapt to changing demand as long as it is feasible and profitable (little penalty in time, cost, or performance). For example, they were gradually switching to other varieties as demanded by consumers. However, few farmers responded that they would rarely adapt to changing demands (mostly age above 50 years old and small farming area). The high degree of product flexibility was only demonstrated by farmers who managed to expand their farm area or young-aged farmers.

The second question asked about process flexibility, mainly to supply chain actors' openness to the new process/technology in farming/storage/sortation. Most of the interviewees also responded **'often'** (11 out of 20 interviewees).

"Almost always, when people are skeptical about PTKJS, I applied it on my farm. A couple of years later, I was delighted that my farm is a huge success and nominated as a role model for small farmers." Farmer – F5

The results demonstrated the high willingness of the supply chain actors to adopt new process technology. All actors, including farmers, collectors, and retailers who accessed the modern market channel has adopted good farming practices, cold storage technology, and information system. For example, F5 decided to follow the PTKJS farming practices accordingly and followed the counselor's suggestions/guidance. During that time, most farmers did not follow all of the PTKJS farming practices accordingly because the cost is very high than common practices. However, after a couple of years, F5 had increased its bargaining power as the product's quality is higher than common mandarin oranges. Since then, many small farmers have decided to learn from PTKJS farming practices and showed a high willingness to adopt new process technology.

However, in the traditional market channel, most farmers have high willingness but fail to adopt uncertainties due to financial constraints or lack of knowledge. Small farmers tend to loan money from the collectors to buy fertilizers, pesticides, and other inputs or to fulfill their family needs (food, shelter, child's education), then pay back the loaned money during harvest season with their crops. It led to the weakening of farmers' bargaining power vis-à-vis their collectors and left them in a disadvantaged situation.

Summary Analysis:

- There is a high willingness to supply chain actors in adopting a new process or new demand
- Traditional market players had financial constraints and limited knowledge to demonstrate their flexibility against uncertainties
- Small farmers had a weak bargaining power as they tend to loan money from the collectors, leading them into a disadvantaged situation during the negotiation

4.7 Summarized results based on the conceptual framework

Indonesian mandarin orange farmers are mostly having small land (0,1-2 ha) and heavily relied on selling their products to the collectors. There are 8 out of 12 farmers who are growing other crops besides mandarin oranges, predominantly rice. Besides, there are also 8 out of 12 farmers who joined the farmers' association. All interviewed farmers only work on local and national market channels (domestic market channels) as an international market channel is rarely found during fieldwork. Most of the supply chain actors had a double role in the chain, for example, the collector who also acted as farmers/retailers and farmers who also acted as collectors/ retailers. They have a double role in gaining more profit, new market access, and market information.

The vertical relationship is characterized by high uncertainties, a very high frequency of exchange, and oral – informal agreements during transactions. The high uncertainty is mainly caused by the instability of the price and unavailability of products throughout a year. Farmers never organized the same harvest schedule between them and the low adoption of farming/harvesting technology and collectors' abusive power to raise price anytime resulted in such high uncertainty. Also, there is a very high frequency of exchange as supply chain actors tend to transact with the same business partners due to their high dependency, the limited number of traders, and ease of accessibility. Finally, the agreement is mostly informal, verbal, and short-duration as most actors preferred a low switching cost with buyers. Downstream actors once made written agreements; however, upstream actors failed to fulfill the required standard and demands.

The horizontal relationship is characterized by low collective action and low service provision to members. Farmers association rarely initiates a formal collective action as they tend to act individually and compete competitively. The association's activity is limited to information sharing between farmers about farming knowledge or managing the delivery of harvested crops to collectors. The association never established a written agreement with input providers and collectors to gain bargaining power during the transaction. As the association is initially created by the government and then given to the farmers, it is understandable why the association tends to be inactive to promote farmers' welfare. The association is only used whenever the government was providing aid or financial support for farmers. Besides, the service provision is given by the farmers' counselor instead of the farmers themselves. The consensus on aimed quality criteria among farmers has never been done as well. Surprisingly, the association did not operate daily and formally as the members' participation is meager.

The relationship quality is generally characterized by a low level of trust, commitment, and a moderately high communication level. In general, the relationship between farmers-collectors and collectors-retailers is only transactional without the mutual willingness to build a deep relationship. Besides, the trust level between farmers-collectors is generally low as farmers have no choice but to rely heavily on and transact with collectors to market their products. Collectors also tend to act secretly opportunistic in raising the price to maximize their profits. Despite such unfavored relationship quality condition, the communication level among supply chain actors

is moderately high. Information such as desired grade quality and the new variety of demand and price are often communicated. However, farmers never had communicated with retailers, resulting in the unawareness of retail price/ consumer demand. Collectors gained most of the information about market channels/opportunities and decided whether to share that information or behave opportunistically.

The Indonesian mandarin orange supply chain's quality management is characterized by an outdated quality assurance system used for more than 30 years, where diameter-size is the only determinant of product quality. Also, due to the unfair rewarding system, as prices are determined solely based on diameter-size, the cost to control the quality of products based on PTKJS is high. Therefore, farmers tend to avoid paying higher costs to conduct PTKJS as the profit gain from such a rewarding system is not profitable. Although there is a legal quality assurance system (*prima certification*), collectors or buyers did not see such certification as value-added. Besides, farmers showed a high willingness to improve the quality and often ask an expert about production method/farming practices. However, collectors are not, and they refused to improve their quality for modern retailers due to high monitoring costs. Therefore, there is an unsynchronized quality improvement between farmers and collectors.

Finally, farmers' quality performance is mainly measured with low customer satisfaction, unreasonable price, and high willingness toward flexibility with many financial constraints. Although most traditional chain actors showed an average level of satisfaction, the modern market is entirely dissatisfied. Collectors failed to deliver a homogenous quality of products with certain sugar levels and decided to stop transacting with such agreement with the modern retailer by not supplying them. As traditional retailers have a lower rejection rate than modern retailers, collectors are most likely transacted with traditional retailers. The product availability and quality level are low, as not all farmers implemented PTKJS or *Bujangseta* technology. Farmers and retailers are unsatisfied with their selling/buying price with collectors as they abused their market power to maximize profit gains. Despite such an environment, there is a high willingness to supply chain actors in adopting a new process or technology to adapt to changing demand. However, the primary constraints are financial issues and unfair rewarding systems.



Figure 11. Summarized results based on the conceptual framework

5. Discussion

This section will discuss the thesis's main findings with previous literature and findings based on the conceptual framework. This research aimed to investigate the implication of the organizational supply chain (governance structure, both vertical and horizontal relationships) on farmers' quality performance in the Indonesian mandarin orange supply chain. The discussion will be divided accordingly in answering the sub-research questions.

In the first section, I discuss how the vertical relationship affects small farmers' quality performance. Then, the influence of farmers' horizontal relationship on farmers' quality performance is discussed in the second section. In the last section, I discussed the relationships between farmers-collectors and farmers-retailers of the supply chain based on the findings. The limitations of this research, policy implication, and necessary further research are also included in this chapter.

5.1 Influence of the vertical relationship between the organization of the supply chain on small farmers' quality performance

Organization of the supply chain, or shortly known as governance, represents the multidimensional phenomenon of ongoing relationships between a set of parties from the initial, termination, and maintenance stage on the relationship (Heide, 1994). There are different theoretical streams to understand the governance mechanism on the supply chain. However, in this research, I used the transaction cost economics (TCE) theory to understand the governance relationship's nature.

Transaction costs could appear in different forms, such as finding a buyer/market, negotiating, signing a contract, controlling contract compliance, and losing opportunities (Bijman, 2008). The type of governance structure will favor the lowest transaction costs that appeared across the supply chain; therefore, the transaction execution will be the most efficient way (Williamson, 1985).

Three constructs are used to assess the vertical relationship's nature in the supply chain, namely, uncertainties, frequency of exchange, and type of agreements. Depending on those constructs' level, governance structures' nature can be determined, ranging from the spot market, hybrid, and vertical integration/hierarchy based on a different type of agreement (Williamson, 1979).

Based on the finding, the vertical relationship in the Indonesian mandarin orange supply chain is characterized by high uncertainties, high frequency of exchange, and oral-informal agreements are often used during transactions. The business transactions are hampered with a high level of uncertainties due to instability of the price, unavailability of products throughout a year, and unbalanced trade relationships between buyer and supplier. In this case, collectors may abuse their power to raise the price anytime to maximize their profit, resulting in unequal value distribution within the chain. This finding is the same as the study of Kilmanun & Warman (2016), where there are high transaction costs, uncertain price value, and local oligopoly market that leads to farmers' low bargaining power.



Figure 12. Conceptual framework on how vertical relationship influence farmers' quality performance (discussion on the relationship of highlighted elements with the red-shaded area)

The instability of price and fluctuating demands is caused by mandarin oranges' regular unavailability every month and the low market power of collectors and retailers (most mandarin oranges are only sold for direct consumption - limited market channel). During harvest season, collectors offer farmers a low price due to a lack of market information, market trends, and alternative markets. Farmers have limited access to market information, too, and strongly depend on the buyers' fairness during the transaction. In this case, collectors may act opportunistically by concealing the information or improper grading/sortation to earn more profit. The opportunistic behavior also happened in vice-versa towards farmers

As governance structure is meant to cope with uncertainty, conflict, and opportunism during market transactions, a relational (or implicit) contract is likely identified in this case. Results showed similar characteristics on relational contract governance structure because the transaction is mostly repeated within the same actors and manifested in the reputation or social ties of supply chain actors (Raynauld, Sauvee, & Valceschini, 2005). However, the findings also signify a spot market contract. The transaction is characterized by low switching costs to find a new transaction partner and focus on the immediate exchange of goods or services. Supply chain actors tend to transact with the same business partners due to their high dependency, ease of access, and a limited number of good reputational traders.

Multiple collectors are found between first producers (farmers) until the end consumers during the interview. The agreement is mostly oral and informal, with a short duration to have low switching costs with trading partners. However, based on the findings, the upstream actors failed to meet the required demand written in a contract. This finding is correlated with Ruben et al.'s (2007) study, where such long intermediaries will result in unawareness of each other's needs, quality issues, constraints, and challenges at both ends of the supply chain.

Then, the research also explored quality management during the fieldwork. Quality management has functioned between different levels of actors in the supply chain, and the level of transaction costs determined how quality management is arranged. The supply chain's key player has its power to enforce specific quality standards of the upstream agents. For example, in the EU, the supermarket chains are the key player; thus, they can enforce GLOBAL-GAP (quality standards) for the upstream players (Ruben, Tilburg, Trienekens, & Boekel, 2007).

However, food quality itself is determined by all actors in the chain. It should be defined as rules and regulations launched by governmental institutions, such as the EU's general food law. As a particular standard is established, it calls for a situation on how the supply chain's organization will be arranged. To upgrade quality performance, it requires governance regimes with strong cooperation, including co-investment between chain partners. The choice for a certain quality standard dictates the structure and organization of the supply chain.

Based on the findings, quality management is characterized by an outdated quality assurance system (used for more than 30 years) where diameter-size is the only quality determinant of mandarin orange price. The QA system is not synchronized with the government's good farming practices. It is also known as PTKJS, where it delivers healthy, safe, and high-quality mandarin oranges (high sugar level and water content) but not mainly on diameter-size. Diameter-size is not a valid quality measurement as the widest diameter can be meant a low water and sugar content. It is unfair to determine the widest diameter of mandarin oranges as the most expensive grade.

According to Tilburg *et al.* (2007), quality and certification schemes lead to increasing control and integrated governance, such as long-term contracts or vertical integration. When applying the standards towards modern market-oriented chains, the market chain becomes shorter because there is an urgency of a direct trading relationship between large producers (or producer association) and downstream agents. With the quality and certification scheme, transaction costs may lower as the uncertainty is reduced, meanwhile ensuring quality output throughout the chain. However, based on the findings, the current quality and certification schemes are synchronized with rewarding/incentive systems.

The findings are positively linked with the literature where the low level of customer satisfaction and unreasonable low price may result in a poor level of farmers' quality performance. As quality performance is affected by the selection of the supply chain organization due to monitoring costs for quality compliance, monitoring costs are too high for supply chain actors. With high monitoring costs, supply chain actors hard to cooperate throughout the chain to achieve the pre-determined quality standards (especially from modern retailers).

Although good farming practices are being disseminated, the monitoring and control costs of such implementation are high and unprofitable with the current rewarding system. This fact is further emphasized when collectors failed to deliver a homogenous quality of products with certain sugar levels in the modern market chain. As the collectors found that such monitoring costs are too expensive, and the price paid by the modern retailer is similar to the traditional retailer, they chose not to communicate them to farmers. In the worst case, they decided to stop supplying or compromising such standards to the modern market; farmers cannot improve their quality during production. These results are further validating the built conceptual framework as it shows a similar correlation between vertical relationship, quality management, and farmers' quality performance.

In this manner, farmers' quality performance was low as there is a massive gap between quality aimed among downstream agents. Quality compliance is not done between farmers and collectors, and there is no explicit cooperation among the agents to achieve pre-determined quality. Governmental institutions should establish a particular standard based on consumers' tastes and involve all chain actors. It is a call for a situation on how the supply chain's organization will be arranged where it should be highly dependent on the choice of specifically aimed quality.

Without synchronized quality certification schemes and fair incentive/rewarding systems, governance is less likely to be more integrated and likely to stay in a short-term contract. It might be difficult for many small producers in developing countries to comply with these quality standards due to high certification and monitoring costs (Vellema & Boselie, 2003).

However, by setting up those standards, there will be a differentiation of products that will lead to emerging competitions that will strengthen vertical relationships in the supply chain (Tilburg, Trienekens, Ruben, & Boekel, 2007). Therefore, established coordination and contractual agreement of supply chain governance is crucial. It enables specific product and process upgrading investments and encourages supply chain partners to adopt common standards and certification procedures for better quality performances.

5.2 Influence of farmers horizontal relationship to the farmers quality performance

The horizontal relationship is the collaboration between actors at the same level on the supply chain to improve their performance. Collective action had a significant role in improving horizontal coordination because it reduced the costs involved in the transaction and improve farmers' bargaining power and their economies by enabling better prices to be sold to buyers (Mutonyi, 2016). Besides, it may also deliver economies of scale that allow them for joint investments in production, marketing, and distribution (Ruben, Tilburg, Trienekens, & Boekel, 2007).

In this research, I observed the horizontal coordination between farmers in the supply chain from collective action and service provision to members. The Indonesian farmers' association associations are also focused on other crops such as rice, fruits, chili, and other vegetables, but mainly rice. The associations are divided per region consisting of 20-30 members with four head committees and a farmer counselor. The farmers' association is initially created by the government for farmers to ease the implementation of supporting programs for farmers and induce them to work collectively.



Figure 13. Conceptual framework how horizontal relationship influence farmers' quality performance (discussion on the relationship of highlighted elements with the red-shaded area)

However, as farmers tend to act individually and sometimes see other farmers as competitors, they rarely initiate a collective action together. It is astounding that although the association is formed, there is no intentional action taken by the group to achieve the shared objective.

Farmers are attached to their cultural norms. For example, when a primary road is broken, and the governments' support is too slow, the farmers will initiate the reconstruction and fixing the primary road through *gotong royong* (collective work with nearby villagers).

The associations' activity is limited to information sharing between farmers about farming knowledge and managing the delivery of harvested crops to nearby collectors. Not every farmer is actively involved during the meeting, and purchase agreements have not been established with collectors. Besides, the association did not participate in shaping agricultural policy through their collective opinions. With these conditions, farmers rarely benefited as they prefer to act individually and see other farmers as competitors.

The service provided to members of the farmers' association is also minimum. The association never facilitates the collection of production activities, marketing services, education services, welfare services, and financial services. They heavily relied on farmers' counselors to gain knowledge and managing production activities. The participation of all members is meager. Farmers only came to the meeting if the counselors' invited them, hoping for some financial support or dissemination of knowledge.

With such a low level of both collective action and a low level of service provided to members, they are positively linked to the horizontal relationship's low level of relationship quality. Farmers tend to work individually and see other farmers competitively. Besides, as the government initially creates the association to provide financial support, it is hard for each farmer to trust one another as a third party group them.

From these results, I can conclude that the farmers' association is characterized by institutional voids, where it is weak/fails to accomplish the role expected from them. If the farmers had established a price agreement and shared goals as a farmers' association, it may improve the value chain's power balance and enhance their bargaining position (Ruben, Tilburg, Trienekens, & Boekel, 2007). Besides, if the contract farming can also be arranged between farmers and collectors, it will shift the governance toward vertical integration that promotes the farmers' quality performance.

Farmers' associations will improve quality performance if there are interactions among a collective group of farmers. The form of such collaboration can be through centralized warehousing, market segmentation, and alliance/partnership. Establishing a formal contract as a collective entity is proved to help farmers raise their bargaining power against collectors (Bijman, 2008). Literature also showed that both farmers' association and a vertical relationship might work together in a contracted manner to improve further quality performance (Dijk & Trienekens, 2015). Therefore, I can argue that a horizontal relationship may be linked to quality management as well. The introduction of quality and certification by monitoring and controlling vertically integrated governance to farmers association has decreased the uncertainties, resolve misalignment; therefore improving quality performance.



Figure 14. Reworked conceptual framework (changes made on red arrows)

5.3 Relationships quality between the farmers-collectors and farmers-retailers in the Indonesian mandarin orange supply chain

Across the vertical relationship among actors in the chain, the relationship quality among them was assessed. During the interview, I found out that farmers never transacted directly to both modern or traditional retailers. Therefore, there is zero communication, and relationship are built among farmers-retailers. However, as this is a semi-structured interview, I have managed to explore the collectors-retailers relationship as well.

Three dimensions are used to measure the relationship quality: commitment, communication, and trust (Nyaga & Whipple, 2011; Fischer C., 2013). Although the most common dimensions used to define relationship quality are trust, commitment, and satisfaction; satisfaction is not always included (Lees, 2017).

Commitment is the willingness of business partners to put effort into the relationship and proposes a future orientation where the relationship can be sustained during unanticipated problems. From the interview, I found a lack of commitment between farmers-collectors as they were only trading without any sign of mutual willingness to build a strong relationship. However, if the relationship between farmers-collectors is built for a long time (for example, 5-10 years old relationship), they are willing to share a fair profit, information/resources during the unanticipated condition (such as CPVD disease that killed most of the mandarin orange plants).

Communication is the key to information sharing between actors within formal and informal manners to achieve a successful relationship across the supply chain (Anderson & Weitz, 1992; Fischer C. , 2013). It has been shown to increase trust levels in business relationships. The information exchange between collectors and farmers were intensive mainly about the price, desire grade quality (diameter-size and ripeness level), or a new variant of oranges for a niche market. However, some collectors also behave opportunistically against farmers by concealing some information to gain higher profit. Such information is the current retail price outside the local region and the market situation on the local area's potential market. Naturally, as the consequences of that action by collectors, farmers were unaware of the retail price/demand situation in the downstream chain.
Among all agents, collectors gained the most important information, such as market channels/opportunities. They always gained new information from potential retailers who actively communicate about mandarin oranges' current stock or demand conditions. From these findings, the communication of collectors between upstream and downstream agents is high. However, both farmers and retailers were unaware of the overall supply chain information as some collectors behaved opportunistically.

Trust is the degree of perception upon relationship partners as credible and benevolent. Credible is the belief that the relationship partner can perform his task; meanwhile, benevolence is the belief that each of them will act in the best interest. The high degree of opportunistic behavior is positively correlated with a lack of trust. During the interview, I found out that there is a high lack of trust between farmers-collectors. Farmers admitted the lack of trust came from the lack of supports being received from collectors. The mutual trust development between farmers and collectors. The lack of trust did not come from the fraud during the transaction as both business partners always stick to the payment agreements (oral) in terms of price, delivery order, and delivery time/place.

In general, the relationship between farmers-collectors and collectors-retailers is only transactional without a mutual willingness to build a strong relationship due to the low level of trust and commitment. Besides, farmers never built communication with retailers, which resulted in unawareness of retail price or consumer demand. The results are similar and positively linked to the low level of quality performance. Mutual trust and commitment are vital variables in moving away from the relationships from power-based bargaining toward a stable relationship between firms positively linked with a higher commitment to quality (Fynes, Voss, & Burca, 2005). As the low trust and commitment are found in this study, logically, poor-quality performance is measured, validating the conceptual framework built from literature.

5.4 Policy Implication

First of all, a clear shared quality objective with fair incentive across the supply chain agents is crucially needed in improving current Indonesian mandarin orange small farmers' quality performance. At present, the quality objective is only based on size and ripeness level as purchase determinant (which is determined by the collectors); meanwhile, the quality desired by consumers is misaligned with that quality characteristics. Farmers pursue to grow the biggest diameter-sized oranges; meanwhile, some collectors prefer medium-sized oranges as they are more likely sweet and have higher water content. Such quality characteristics are what being looked for by the end-consumers, but the outdated quality standards are still used.

The government should immediately enforce the legal quality standard based on PTKJS practices and consumer studies among the supply chain actors, which leads to international quality certification (prima certification). Such certification will help supply chain actors in finding new market access to both national and international trade. Besides, it also provides a fair and better incentive among the supply chain actors. And importantly, the government should strive to provide market access by negotiating lower barriers for international trade.

Given the poor physical infrastructure condition, the government should immediately support physical infrastructure development (roads and distributional facilities, or communication infrastructures) to facilitate seamless flow of mandarin oranges throughout the chain. Better physical infrastructure will attract private companies to lead the parties in the mandarin orange value chain. Therefore, incentives for supply chain actors can be access to better quality materials or products, more efficient production and distribution process, or access to new markets. Second, farmers should act more collaboratively in an association, setting up their bargaining power towards collectors and establish the price agreement with individual collectors. They should act collectively through the formation of legal entities during a business transaction to improve the power balance in their relationships against collectors. Given that the farmers' association has a weak organizational power, the government may lend a hand. With the limited managerial capacity of farmers to run the association, the government may create a public company/organization where the government in charge of managerial responsibilities and include farmers to operate collectively as an entity. Besides organizational support, the government can facilitate farmers by providing technological, political, and educational support. At the moment, farmers' counselors have been assigned to support farmers. However, the counselors should have a proper capacity and experience to help farmers as there are some cases where the counselors are not better than the small farmers.

Third, the high uncertainty in the business environment should be addressed. The government should actively invite the private sectors and international companies to add value to mandarin oranges. Given that most of the mandarin orange is consumed directly, with new additional demand from companies who will add the value of the oranges. In this case, the government gave access to new value chain actors to production technology and other resources, helps reduce the price instability and ensuring an assured demand throughout the year. A key player is needed to lead other parties in the value chain. It can be individual businesses from large companies or groups of smaller businesses from horizontally organized cooperatives or farmers' associations to support product and process innovation linked to market requirements. The development of quality standards needs to be aligned with end-consumers to prevent constraint in improving the quality performance of farmers.

Finally, the government may encourage younger and educated age groups to participate in the farming business. As we can see from the research, most of the farmers are uneducated and see this farming job as their 'last option' in their career after migrating to different places. The government may implement a program that facilitates investors and young farmers to promote local agricultural products or keep educating current farmers. Given that most of the farmers are heavily relying on collectors to invest in their business, collectors may abuse their power in the relationship to purchase the crops in an unfair manner. An educated or young-age farmers might decide rationally to get a loan from a bank rather than from the collector. FR6 the only educated-young age farmer during the interview, also mentioned that for him, he had difficulties with other farmers due to the wide gap of farmers' capacities in managing their farms. Therefore, an educated group of farmers will surely improve collaborative action within farmers.

5.5 Limitation and Outlook for Further Research

In investigating the supply chain's vertical relationship, asset specificity should be addressed as this also influenced the vertical relationship across the supply chain within TCE frameworks. Besides, due to limited time, the number of retailers per category (traditional and modern) may not represent the whole population. Also, this research is limited to West-Borneo's supply chain environment. Different cultures from different regions in Indonesia may affect the different natures of the supply chain organization.

Future research should include more retailers, both traditional and modern retailers, from other provinces on the supply chain to provide a better overview of the Indonesian mandarin orange supply chain. As this research is qualitative and explorative, it could not precisely explain the organizational supply chain's impact on farmers' quality performance. Further research that focuses on in-depth investigations per supply chain actors' in the context of the implication of vertical relationship on farmers' quality performance is needed.

Another point that has not been fully addressed in this research is why all supply chain actors are still relying on an outdated quality system. As presented in the findings, all farmers just follow what is offered by the collectors. It might be interesting to explore the riddle in this problem in further study.

6. Conclusion

This research had explored the Indonesian mandarin orange organizational supply chain based on the transaction cost economic theory perspective. The Indonesian mandarin orange supply chain's nature is characterized by a high degree of uncertainty, lack of trust, unclear shared objective, institutional voids that resulted in poor farmers' quality performance. The organizational supply chain choice had a significant role in improving farmers' quality performance through vertical and horizontal relationships that aim at explicit quality/certification schemes, resulting in more integrated governance.

The relationship between farmers-collectors is characterized by a lack of commitment and trust but moderate communication. Collectors had a more significant power relationship against farmers and retailers, that lead them to behave opportunistically in concealing information and dictating the price of the oranges.

Farmers' association is dysfunctional, where farmers were rarely initiating any collective actions and tend to act individually. The association never established a price agreement, never involved in the discussion to shape agricultural policy, never facilitate the collection of production activities, marketing service, education service, welfare service, and financial service for its members. Furthermore, the most crucial point is that farmers were never argued the unfair price incentive against them as an association to collectors. Even though they had followed the instruction of good farming practices from the government (PTKJS), the current grading system (based on size) is not suited for the results output from PTKJS, where the size is medium but high in water and sugar content.

6.1 How does vertical relationship affect the quality performance of small farmers?

Transaction costs assess vertical relationships via uncertainties, frequency of exchange, and type of agreements. Depending on those constructs' level, the nature of governance structures is determined in a range of continuum from spot market into vertical integration. As the Indonesian mandarin orange supply chain is hampered with high transaction costs; spot market and relational based contract governance are used. Besides, the business transactions are mostly oral and informal arrangements with a short duration. Within such conditions, the relationship quality is likely poor, and no quality standards are specified; therefore, it is hard for supply chain players to enforce specific quality standards. As the monitoring costs are too high and the rewarding/incentive system is unfair, it is difficult to enforce such quality standards to improve quality performance. Therefore, established coordination and contractual agreement with clear synchronization of standards and incentive systems are needed to adopt common standards and certification procedures for better quality performances.

6.2 How does horizontal relationship affect the quality performance of small farmers?

The horizontal relationship between farmers is assessed by collective action and service provision to members. Collective action may reduce the transaction cost of accessing inputs/outputs, linking with potential market outlets, and improving both farmers' bargaining power and their economy by enabling better prices to be sold to buyers and helping farmers decide on their product's quality. Service provision provides production service, financial service, training, or inputs procurement to help farmers achieve consistent quality performance. Through the establishment of horizontal relationships helps the farmer in their training to improve quality control. Besides, it works best when a horizontal relationship is combined with contract formation and vertical coordination to complete control and monitoring quality compliance that resulted in improved quality performance measured via customer satisfaction.

6.3 What relationships exist between the farmers-collectors and farmers-retailers in the Indonesian mandarin orange supply chain?

The relationship between farmers-collectors is limited to transactional without a mutual willingness to build a strong relationship due to the low level of trust and commitment. Moreover, farmers never built communication with retailers. Farmers are unaware of the retail price and how is the end-consumer demand.

6.4 What is the impact of the organization of the supply chain on quality performance according to literature?

Organization of the supply chain act to reduce transaction costs and govern the transaction depending on the level of uncertainty, frequency of exchange, and agreement type. The chain's governance is often enforced by quality management, and the relationship quality is designed to increase quality performance. In doing so, governance enables the supply chain coordination that facilitating a seamless flow of products concerning quality compliance and information. Quality and certification schemes work with integrated governance, with formal and long-term contracts by reducing the uncertainties to meet customer requirements, thus satisfying customer–added quality performance.

Appendix

I. Interview Guidelines

General Questions:

- 1. What is your name, age, and gender?
- 2. How many years have you been living as a mandarin orange farmer/collector/retailer/expert?
- 3. What is your highest level of education?
- 4. What is the final market of your product?
 - o Local
 - National (specify:)
 - Export (specify:)

(For farmers)

- 5. Do you own or rent the land you farm on?
- 6. How big is the size of your farm?
 - \circ 0.1 ha 2.5 ha
 - o 2.5 ha- 5.0 ha
 - \circ > 5.0 ha
- To whom do you sell your products? Collector/Farmer's Organization/Traditional Retailer/ National Retailer/ Export Retailer
- 8. Are you joined as a member of a farmer's organization?
- 9. How many members in the farmer's organization?
- 10. Do members have the option of selling in the market instead of the organization?

During the interview, the respondent will read through the questions and respond to each question with the Likert scale on the table. Based on the scale value graded by the respondent, the interviewer will ask deeply on highly-graded response and the response will be recorded in the comments.

Measured	Question		Li	ikert Sca	ale	
Variable		1	2	3	4	5
Vertical Relationsh	<u>nip</u>					
Uncertainties	Likert scale value categories:					
(Arinloye, 2013;	1 = "Never"					
Bijman, 2008)	2 = "Rare"					
	3 = "Sometimes"					
	4 = "Often"					
	5 = "Almost always"					
	1. Does the mandarin orange price					
	over the seasons always stable					
	every year?					
	2. Does the demand for the product					
	always vary significantly over the					
	seasons?					
	3. Does the product always available					
	for the buyers?					

	4. Does the buyer always stick to the payment agreements?
	Comments:
Frequency of exchange	Likert scale value categories: 1 = "Never" 2 = "Rare" 3 = "Sometimes" 4 = "Often" 5 = "Almost always"
	 How often do you transacting your product with the same downstream actors? How often does the transaction always deal smoothly?
Type of Agreement	Likert scale value categories: 1 = "Not important" 2 = "Slight important" 3 = "Fairly important" 4 = "Important" 5 = "Very Important"
	1. What type of agreement you mostly use in selling your product? • Written 2. How long is the duration of your agreement? • One order • One year • One year • Several years • Several years
	 3. What terms are indicated in the arrangement? 4. Specific production practices 5. Specific harvesting practices 6. Certification 6. Pre-agreed volume 6. Pre-agreed delivery time and place 6. Input provision to supplier 6. Credit provision to supplier 6. Clause that defines penalties if deadlines are not met 6. Quality is not fulfilled 6. Other: (specify)

4. How important is the need for the contracts for you?			
Comments:			

Relationship Quality						
Commitment	Likert scale value categories: 1 = "Never" 2 = "Rare" 3 = "Sometimes" 4 = "Often" 5 = "Almost always"					
	1. Does the buyer/supplier always try to help when a technical/ managerial problem happened?					
	Comments:					
Communication)	Likert scale value categories: 1 = "Never" 2 = "Rare" 3 = "Sometimes" 4 = "Often" 5 = "Almost always"					
	1. Does the buyer/supplier always inform about retail demand and promotions (market information)? 2. Does the buyer/supplier always provide information regarding the situation of the supply chain before planning your activities? 3. Do both parties always keep one other informed about events or changes that may affect you?					

	1	
	4. What is the important information needed from the other actors that can help your process?	Specify: Reason:
	Comments:	1
Trust	Likert scale value categories:	
	1 = "Never"	
	2 = "Rare"	
	3 = "Sometimes"	
	4 = "Often"	
	5 = "Almost always"	
	1. When it comes to things that are	
	important to you, can you always	
	depend on the supplier/buyer's	
	support?	
	2. Though circumstances change, do	
	you always believe that the	
	supplier/buyer will be ready and	
	willing to offer you assistance and	
	support?	
	3. Can you always count on the	
	supplier/buyer to consider how its	
	decisions and actions will affect	
	you?	
	4. Does the supplier/buyer always	
	keep the promise they make to	
	you?	
	Comments:	
Horizontal Relatio	nshin	
Collective Action	Likert scale value categories:	
Concentre riedon	1 = "Never"	
	2 = "Rare"	
	3 = "Sometimes"	
	4 = "Often"	
	5 = "Almost always"	
	1. Do you always gain/exchange	
	benefits from another farmer in	
	the farmer's organization?	
	2. Does your farmer's organization	
	always help to shape the	
	agricultural policy?	
	3. Does your farmer's organization	
	always establish good agreements	

	with input providers at reduced	
	prices?	
	4. Does your farmer's organization	
	always establish good agreements	
	with buyers?	
	5. Do you always cooperate with	
	other farmers in terms of	
	exchanging market information?	
	6. Do you think that the farmers'	
	organization always improves the	
	quality of mandarin orange?	
	7. Does your farmer's organization	
	always hold a regular meeting?	
	<u>Comments:</u>	
Service provision	Likert scale value categories:	
to members	1 = "Never"	
	2 = "Rare"	
	3 = "Sometimes"	
	4 = "Often"	
	5 = "Almost always"	
	1. Does your farmer's organization	
	always help members in solving	
	the technical problems that occur?	
	2. Does the organization always try	
	to solve the unmet production	
	criteria?	
	3. Does farmer's organization	
	always provide training to	
	members?	
	4. Does farmer's organization	
	always help you with the financial	
	service?	
	5. Does the farmer's organization	
	always help the members if there	
	is an oversupply/supply shortage	
	in the overall supply chain?	
	6. Does farmer organization always	
	help the farmer on marketing their	
	products?	
	7. Does farmer's organization	
	always transfer the information	
	from downstream actors of the	
	supply chain to members and the	
	other way around?	
	Comments:	

Ouality Managem	ent	
Quality assurance	Different answering categories:	
(QA)	Yes/No	
	Fill in the blank	
	1. Has a QA system been implemented?	Yes / No
	2. Has the QA system been certified?	Yes / No
	3. Is there any inspection of an external organization on the implemented QA system?	Yes / No
	4. Who has developed the QA system?	
	Comments:	
Quality control	Likert scale value categories:	
	1 = "Never" 2 = "Pare"	
	2 = "Rare"	
	J = "Often"	
	5 = "Almost always"	
	1. Do you always achieve the aimed quality criteria(s)?	
	2. Do you always compare the actual measurement outcomes with the standard?	
	3. Do you always ensure your	
	standard?	
	4. What are the important process parameters during farming/sorting?	
	5. Are there any important quality criteria(s) of the output product that need to be fulfilled?	
	Comments:	

Quality	Likert scale value categories:					
improvement	1 = "Never"					
	2 = "Rare"					
	3 = "Sometimes"					
	4 = "Often"					
	5 = "Almost always"					
	1. Do you always face quality					
	problems?					
	2. Do you always try to overcome					
	the quality problems?					
	3. Do you always seek feedback for					
	vour overall output process?					
	<u>Comments:</u>					
Quality Performan						
Satisfaction	Likert scale value categories:					
	I = "Never"					
	2 = ``Rare''					
	3 = "Sometimes"					
	4 = "Often"					
	5 = "Almost always"					
	1. Does the buyer always satisfy					
	with the quality of your fruits?					
	2. Do you often receive customer					
	complaints?					
	3. Do you think the buyers will					
	always buy again in the future?					
	4. Do the sold products always					
	available for the customer?					
	5. Does the standard of the product					
	always been fulfilled?					
	6. How do you maintain your		•	•	•	
	consistency always to satisfy your					
	buyer?					
	Commentar					
	Comments:					
D :						
Price	Likert scale value categories:					
	I = "Never"					
	2 = "Rare"					
	3 = "Sometimes"					
	4 = "Often"					
	5 = "Almost always"	1				1
	1. Do you always satisfy with the					
	price of high-quality fruits from					
	vour buyers?					

	2. Do you always try to maintain for the lower costs incurred during your primary process (purchase, production, sales)?					
	Comments:					
Flexibility	Likert scale value categories: 1 = "Never" 2 = "Rare" 3 = "Sometimes" 4 = "Often" 5 = "Almost always"					
	 Do you always try to adapt to changing demand (i.e., if there is a higher volume needs to be fulfilled)? Do you always open to the new process/technology in farming/storing/sorting? 					
	Comments:					

II. Vertical Relationship

A. Uncertainties

Res	pondent	lent Likert Scale Response Value				
Co	le	Q1. Does the mandarin orange price over the seasons always stable every year?	Q2. Does the demand for the product always vary significantly over the seasons?	Q3. Does the product always available for the buyers?	Q4. Does the buyer always stick to the payment agreements?	
1	F1	Sometimes	Sometimes	Rare	Often	
2	F2	Never	Often	Often	Often	
3	F3	Sometimes	Often	Sometimes	Often	
4	F4	Never	Often	Sometimes	Often	
5	F5	Never	Often	Rare	Often	
6	FR6	Never	Often	Sometimes	Often	
7	F7	Never	Often	Sometimes	Often	
8	F8	Never	Rare	Sometimes	Often	
9	FC9	Never	Often	Rare	Often	
10	FC10	Never	Often	Often	Often	
11	CR1	Sometimes	Often	Sometimes	Often	

12	CF2	Never	Almost always	Sometimes	Often
13	C3	Never	Often	Sometimes	Sometimes
14	C4	Never	Often	Sometimes	Often
15	R1	Never	Often	Sometimes	Almost always
16	R2	Sometimes	Rare	Sometimes	Often
17	E1	Sometimes	Never	Often	Never
18	E2	Never	Sometimes	Almost always	Almost always
19	E3	Never	Often	Sometimes	Almost always
20	E4	Rare	Rare	Sometimes	Often

B. Frequency of exchange

Respondent Likert Sca		Likert Scale Response Va	llue
Code		Q1. How often do you	Q2. How often does the
		transacting your	transaction always deal
		product with the same	smoothly?
		downstream actors?	
1	F1	Almost Always	Almost Always
2	F2	Almost Always	Almost Always
3	F3	Often	Often
4	F4	Often	Often
5	F5	Almost Always	Sometimes
6	FR6	Sometimes	Almost Always
7	F7	Often	Often
8	F8	Rare	Almost Always
9	FC9	Rare	Often
10	FC10	Often	Often
11	CR1	Almost always	Almost always
12	CF2	Almost always	Often
13	C3	Often	Sometimes
14	C4	Often	Often
15	R1	Almost always	Often
16	R2	Almost always	Almost always
17	E1	Sometimes	Often
18	E2	Often	Sometimes
19	E3	Often	Almost always
20	E4	Often	Almost always

C. Type of agreement

Respondent		Response			
Coo	de	Q1. What type of	Q2. How long is	Q3. What terms are indicated in the	
		agreement you mostly	the duration of	arrangement?	
		use in selling your	your		
		product?	agreement?		
1	F1	Oral	One order	Pre-agreed price (Middleman state the price),	
				Quality is not fulfilled	
2	F2	Oral	One order	Pre-agreed Price, Pre-agreed delivery time and	
				place, Quality is not fulfilled	
3	F3	Oral	One order	Pre-agreed price, Ripeness quality level	
4	F4	Oral	One order	Pre-agreed price	
5	F5	Oral (Sometimes	One order	Pre-agreed price, pre-agreed volume, specific	
		Written)		production practices (hard to be fulfilled), pre-	
				agreed delivery time and place, Clause that	
				defines penalties if deadlines are not met, Quality	
				is not fulfilled.	
6	FR6	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed	
				delivery time and place	
7	F7	Oral	One order	Pre-agreed price, pre-agreed volume, quality is	
				not fulfilled	
8	F8	Oral	One order	Pre-agreed price, pre-agreed delivery time, and	
				place	
9	FC9	Oral	One order	Pre-agreed price, pre-agreed volume, quality is	
10	5610			not fulfilled	
10	FC10	Written (with the modern	One month	Pre-agreed price, pre-agreed volume, specific	
		national retailer), Oral		production practices (waxing), pre-agreed	
		with the traditional		delivery time and place, a clause that defines	
		retailer		penalties if deadlines are not met	
11	CRI	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed	
				delivery time and place, a clause that defines	
				penalties if deadlines are not met (if the quality is	
10	CE2	Oral	One order	Unmet)	
12	CF2	Orai	One order	time and place. Input provision to the supplier	
				Quality is not fulfilled	
13	<u>C3</u>	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed	
15	05	Orai	One order	delivery time and place input provision to the	
				supplier credit provision to supplier	
14	C4	Oral	One order	Pre-agreed price pre-agreed volume pre-agreed	
11			one order	delivery time and place certain quality levels	
15	R1	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed	
10				delivery time and place, credit provision to the	
				supplier. Quality is not fulfilled.	
16	R2	Written	One order (Apply	Pre-agreed price. pre-agreed volume	
			for a lifetime the	certification, pre-agreed delivery time and place.	
			agreement)	quality is not fulfilled	
17	E1	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed	
				delivery time and place	

18	E2	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed
				delivery time and place, quality is not fulfilled,
				certification (grading size)
19	E3	Oral	One order	Pre-agreed price, pre-agreed volume, pre-agreed
				delivery time and place, quality is not fulfilled
20	E4	Oral	One order	Pre-agreed price, certification, pre-agreed
				delivery time and place, quality is not fulfilled,
				ripeness level

Respondent Code		Q4. How important is the need for the contracts for you?
1	F1	Not important
2	F2	Slight important
3	F3	Important
4	F4	Slight important
5	F5	Very Important
6	FR6	Very Important
7	F7	Very Important
8	F8	Very Important
9	FC9	Slight Important
10	FC10	Important
11	CR1	Slight Important
12	CF2	Not important
13	C3	Important
14	C4	Slight Important
15	R1	Fairly Important
16	R2	Very Important
17	E1	Important
18	E2	Important
19	E3	Very Important
20	E4	Very Important

III. Relationship Quality

A. Commitment

Respondent		Likert Scale Response Value				
Code		Q1. Does the buyer/supplier always try to help when a technical/managerial problem happened?	Q2. Does the buyer/supplier always share in the problems that arise in the course of dealing?	Q3. Does the buyer/supplier always commit to improving the benefit of your relationship?		
1	F1	Never	Never	Never		
2	F2	Never	Never	Rare		
3	F3	Never	Sometimes	Often		
4	F4	Never	Rare	Never		
5	F5	Rare	Often	Often		
6	FR6	Never	Rare	Never		
7	F7	Never	Never	Never		
8	F8	Rare	Never	Rare		
9	FC9	Never	Sometimes	Rare		
10	FC10	Never	Rare	Often		
11	CR1	Sometimes	Often	Often		
12	CF2	Never	Sometimes	Rare		
13	C3	Never	Rare	Never		
14	C4	Often	Sometimes	Often		
15	R1	Almost always	Often	Almost always		
16	R2	Often	Often	Sometimes		
17	E1	Never	Sometimes	Often		
18	E2	Rare	Sometimes	Never		
19	E3	Never	Sometimes	Often		
20	E4	Never	Sometimes	Never		

B. Communication

CodeQ1. Does the buyer/supplier always inform about retail always promotions (market information)?Q3. Do both parties always information information information information regarding the stuation of the supply chain prior to planning your activities?Q3. Do both parties always information information information information?Q4. What is the important information information promotions (market information??Q4. What is the important information information regarding the stuation of the supply chain prior you?Q4. What is the important information information protects?1F1NeverOften opentumites, PriceSometimesQ4. What is the imformation information information parties?2F2OftenNever opentumites, PriceOftenPrice, opentumites, Price, Qaod farming practices3F3OftenNeverOftenPrice, Good farming practices5F5OftenNeverNeverOftenPrice, Good farming practices7F7NeverNeverNeverPrice8F8RareRareSometimesPrice, Good farming practices, Market condition9FC9OftenOftenOftenPrice11CR1OftenOftenNeverPrice12CF2OftenOftenNeverPrice14CA1OftenOftenNeverPrice15R1OftenNeverOftenPri	Respondent Likert Scale Response Value					
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2 F2 Often Rare Often Price, Good 3 F3 Often Never Often Price, Quality of 4 F4 Never Never Often Price, Quality of 5 F5 Often Never Never Good farming practices 6 FR6 Often Often Price, Market condition 6 FR6 Often Often Price, Good farming practices 7 F7 Never Never Never Price, Good farming practices 8 F8 Rare Rare Sometimes Price, Good farming practices, Market condition 9 FC9 Often Never Never Price, Good farming practices, Market Condition 10 FC10 Often Often Sometimes Price, Market Condition 11 CR1 Often Often Never Often Onten 13 C3 Often Never Often Price, Market Condition 14 C4 Almost always Almost always Often Price, Market cond						Price
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13C3OftenNeverOftenPrice14C4Almost alwaysAlmost alwaysOftenPrice, market condition15R1OftenAlmost alwaysAlmost alwaysMarket condition16R2OftenNeverOftenPrice, Quantity of oranges, Delivery time and place17E1OftenRareOftenPrice, Quality of oranges18E2OftenSometimesOftenPrice19EF3OftenNeverNeverPrice, Good farming practices20E4OftenSometimesSometimesPrice and Market		012		onen		information
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11 <td>14</td> <td>C4</td> <td>Almost always</td> <td>Almost always</td> <td>Often</td> <td>Price, market</td>	14	C4	Almost always	Almost always	Often	Price, market
15R1OftenAlmost alwaysAlmost alwaysMarket condition16R2OftenNeverOftenPrice, Quantity of oranges, Delivery time and place17E1OftenRareOftenPrice, Quality of oranges18E2OftenSometimesOftenPrice19EF3OftenNeverNeverPrice, Good farming practices20E4OftenSometimesSometimesSometimes	11		i milost always	r innost ur wuys	onen	condition
16R2OftenNeverOftenPrice, Quantity of oranges, Delivery time and place17E1OftenRareOftenPrice, Quality of oranges18E2OftenSometimesOftenPrice19EF3OftenNeverNeverPrice, Good farming practices20E4OftenSometimesSometimesSometimes	15	R1	Often	Almost always	Almost always	Market condition
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Image: sector of the sector	10					oranges Delivery
17E1OftenRareOftenPrice, Quality of oranges18E2OftenSometimesOftenPrice19EF3OftenNeverNeverPrice, Good farming practices20E4OftenSometimesSometimesSometimes						time and place
11 <td>17</td> <td>E1</td> <td>Often</td> <td>Rare</td> <td>Often</td> <td>Price Quality of</td>	17	E1	Often	Rare	Often	Price Quality of
18E2OftenSometimesOftenPrice19EF3OftenNeverNeverPrice, Good farming practices20E4OftenSometimesSometimesPrice and Market	1					oranges
19EF3OftenNeverPrice, farming practices20E4OftenSometimesSometimes	18	E2	Often	Sometimes	Often	Price
20E4OftenNoterNoterNoterNoter20E4OftenSometimesSometimesPrice and Market	19	EF3	Often	Never	Never	Price Good
20E4OftenSometimesSometimesPrice and Market	17					farming practices
	20	E4	Often	Sometimes	Sometimes	Price and Market
opportunities						opportunities

C. Trust

Respondent		Likert Scale Respo			
Code		Q1. When it	Q2. Though circumstances	Q3. Can you always	Q4. Does the
		comes to things	change, do you always	count on the	supplier/buyer
		that are	believe that the	supplier/buyer to	always keep the
		important to you,	supplier/buyer will be	consider how its	promise they
		can you always	ready and willing to offer	decisions and	make to you?
		supplier/buyer's	you assistance and support?	actions will affect	
		support?	support.	you.	
		support.			
1	F1	Often	Sometimes	Rare	Often
2	F2	Rare	Often	Often	Often
3	F3	Never	Never	Sometimes	Often
4	F4	Never	Often	Never	Often
5	F5	Often	Often	Often	Often
6	FR6	Never	Often	Often	Often
7	F7	Never	Often	Never	Often
8	F8	Rare	Often	Often	Often
9	FC9	Rare	Rare	Never	Often
10	FC10	Often	Often	Often	Often
11	CR1	Almost Always	Almost Always	Often	Often
12	CF2	Often	Often	Almost always	Sometimes
13	C3	Often	Sometimes	Often	Often
14	C4	Never	Often	Often	Often
15	R1	Almost always	Often	Often	Almost always
16	R2	Never	Sometimes	Sometimes	Sometimes
17	E1	Rare	Often	Never	Often
18	E2	Sometimes	Sometimes	Often	Sometimes
19	E3	Often	Often	Often	Almost Always
20	E4	Never	Never	Never	Rare

IV. Horizontal Relationship

A. Collective Action

Respondent		Likert Scale Response Value			
Co	de	Q1. Do you always	Q2. Does your	Q3. Does your	Q4. Does your
		gain/exchange benefits	farmer's	farmer's	farmer's
		from another farmer	organization always	organization	organization
		in the farmer's	help to shape the	always establish	always establish
		organization?	agricultural policy?	good agreements	good agreements
				with input	with buyers?
				providers at	
	1			reduced prices	
1	F1	Often	Rare	Never	Never
2	F2	Often	Rare	Never	Never
3	F3	Often	Sometimes	Never	Never
4	F4	NA	NA	NA	NA
5	F5	Rare	Often	Never	Never
6	FR6	Sometimes	Never	Never	Never
7	F7	Often	Never	Never	Never
8	F8	Often	Never	Never	Never
9	FC9	Sometimes	Never	Never	Never
10	FC10	NA	NA	NA	NA
11	CR1	NA	NA	NA	NA
12	CF2	Almost always	Never	Never	Never
13	C3	NA	NA	NA	NA
14	C4	NA	NA	NA	NA
15	R1	NA	NA	NA	NA
16	R2	NA	NA	NA	NA
17	E1	Sometimes	Never	Never	Never
18	E2	Sometimes	Often	Rare	Rare
19	E3	Often	Rare	Never	Never
20	E4	Often	Never	Never	Never

Respondent		Likert Scale Response Value				
Co	de	Q5. Do you always	Q6. Do you think	Q7. Does your		
		cooperate with other	that the farmers'	farmer's		
		farmers in terms of	organization always	organization		
		exchanging market	improves the	always hold a		
		information?	quality of mandarin	regular meeting?		
	1		orange?			
1	F1	Never	Often	Rare		
2	F2	Never	Often	Often		
3	F3	Often	Often	Sometimes		
4	F4	NA	NA	NA		
5	F5	Sometimes	Often	Sometimes		
6	FR6	Sometimes	Never	Sometimes		
7	F7	Often	Often	Sometimes		
8	F8	Never	Almost always	Never		
9	FC9	Never	Often	Never		
10	FC10	NA	NA	NA		
11	CR1	NA	NA	NA		
12	CF2	Often	Never	Never		
13	C3	NA	NA	NA		
14	C4	NA	NA	NA		
15	R1	NA	NA	NA		
16	R2	NA	NA	NA		
17	E1	Often	Rare	Sometimes		
18	E2	Sometimes	Sometimes	Sometimes		
19	E3	Almost always	Sometimes	Often		
20	E4	Often	Almost always	Rare		

B. Service provision to members

Res	spondent	Likert Scale Response Value			
Code		Q1. Does your farmer's	Q2. Does the	Q3. Does a	Q4. Does a
		organization always	organization always	farmer's	farmer's
		help members in	try to solve the unmet	organization	organization
		solving the technical	production criteria?	always provide	always help you
		problems that occur?		training to	with the financial
				members	service?
1	F1	Never	Never	Never	Never
2	F2	Often	Often	Never	Never
3	F3	Never	Never	Never	Never
4	F4	NA	NA	NA	NA
5	F5	Never	Never	Never	Never
6	FR6	Rare	Rare	Never	Never
7	F7	Never	Often	Never	Never
8	F8	Often	Often	Often	Never
9	FC9	Sometimes	Sometimes	Never	Never
10	FC10	NA	NA	NA	NA
11	CR1	NA	NA	NA	NA
12	CF2	Never	Never	Never	Rare
13	C3	NA	NA	NA	NA
14	C4	NA	NA	NA	NA
15	R1	NA	NA	NA	NA
16	R2	NA	NA	NA	NA
17	E1	Often	Rare	Sometimes	Sometimes
18	E2	Sometimes	Sometimes	Sometimes	Sometimes
19	E3	Almost always	Often	Never	Never
20	E4	Never	Rare	Rare	Never

Respondent		Likert Scale Response Value			
Code		Q5. Does the farmer's	Q6. Does farmer	Q7. Does a farmer's organization	
		organization always	organizations	always transfer the information	
		help the members if	always help the	from downstream actors of the	
		there is an	farmer in	supply chain to members and the	
		oversupply/supply	marketing their	other way around?	
		shortage in the overall	products?		
		supply chain?			
	·				
1	F1	Never	Never	Never	
2	F2	Never	Never	Never	
3	F3	Never	Never	Never	
4	F4	NA	NA	NA	
5	F5	Never	Never	Never	
6	FR6	Never	Never	Never	
7	F7	Never	Sometimes	Never	
8	F8	Never	Never	Never	
9	FC9	Rare	Never	Never	
10	FC10	NA	NA	NA	
11	CR1	NA	NA	NA	
12	CF2	Often	Never	Never	
13	C3	NA	NA	NA	
14	C4	NA	NA	NA	
15	R1	NA	NA	NA	
16	R2	NA	NA	NA	
17	El	Never	Never	Never	
18	E2	Sometimes	Sometimes	Sometimes	
19	E3	Often	Often	Often	
20	E4	Never	Never	Never	

V. Quality Management

A. Quality Assurance

Respondent		Response				
Co	de	Q1. Has a QA system	Q2. Has the QA	Q3. Is there any	Q4. Who has	
		been implemented?	system been	inspection of an	developed the	
		•	certified?	external organization	OA system?	
				on the implemented		
				QA system?		
1	F1	No	No	No	Maybe the	
					government has	
					developed it.	
2	F2	Yes. Called PTKJS	No	No	Government.	
3	F3	No	No	No	I don't know	
4	F4	No	No	No	I don't know	
5	F5	Yes	Yes	Balitjestro (Dinas	Ministry of	
				Pertanian)	Agriculture	
6	FR6	No	No	No	I don't know	
7	F7	Yes	No	No	Ministry of	
					Agriculture	
8	F8	Yes	No	No	Government	
9	FC9	Yes	No	No	I don't know	
10	FC10	Yes	No	No	The supermarket	
					officer came and	
					saw our facilities.	
11	CR1	Yes	No	No	I don't know	
12	CF2	No	No	No	Never heard	
13	C3	No	No	No	Never heard	
14	C4	Yes	No	No	I only know the	
					grading system	
					based on size.	
					Maybe from the	
					government?	
15	R1	Yes	No	No	I don't know	
16	R2	Yes	No	No	Quality assurance	
					made by the	
					Supermarket	
17	E1	No	No	No	OKPPD (Quality	
1.5					assurance)	
18	E2	No	No	No	Never heard	
19	E3	Yes	No	No	Ministry of	
					agriculture	
20	E4	Yes (Prima 1,2,3)	Yes	Yes	Ministry of	
					Agriculture	

B. Quality Control

Res	spondent	Response			
Code		Q1. Do you always	Q2. Do you always	Q3. Do you always	
Coue		achieve the aimed	compare the actual	ensure your process	
		quality criteria(s)?	measurement	complies with the	
			outcomes with the	standard?	
			standard?		
	1				
1	F1	Often	Often	Often	
2	F2	Often	Never	Rare	
3	F3	Sometimes	Never	Never	
4	F4	Sometimes	Never	Never	
5	F5	Often	Often	Almost always	
6	FR6	Often	Sometimes	Sometimes	
7	F7	Often	Often	Often	
8	F8	Often	Often	Often	
9	FC9	Sometimes	Never	Never	
10	FC10	Often	Often	Almost always	
11	CR1	Almost Always	Often	Often	
12	CF2	Sometimes	Rare	Almost always (for	
				grading)	
13	C3	Sometimes	Sometimes	Often	
14	C4	Sometimes	Often	Often	
15	R1	Often	Often	Sometimes	
16	R2	Rare	Almost Always	Almost always	
17	E1	Sometimes	Never	Never	
18	E2	Rare	Never	Rare	
19	E3	Almost always	Often	Often	
20	E4	Sometimes	Never	Rare	

Respondent		Response		
Code		Q4. What are the important	Q5. Are there any important quality criteria(s) of the	
		process parameters during	output product that need to be fulfilled?	
		farming/sorting?		
1	F1	Irrigation, Pesticide, Fertilizer,	Size, appearance	
		Good farming practices		
2	F2	Pesticide, Fertilizer, Good	Size, taste	
		farming practices, Irrigation,		
		Sanitation of farm		
3	F3	Fertilizer, Irrigation	Size, ripeness level	
4	F4	Pest control, Fertilizer	Size, taste	
5	F5	Pesticide, Organic fertilizer,	Size, taste	
6	FR6	Climate, Pesticide, Fertilizer	Size, ripeness level, appearance	
7	F7	Pest control, pesticide, fertilizer,	Size, ripeness level	
		Sanity from weeds		
8	F8	Water irrigation, Fertilizer	Size, ripeness level, appearance	
9	FC9	Healthy orange plants,	Size, ripeness level	
		fungicide, pesticide, fertilizer,		
		irrigation,		
10	FC10	Precise and concise weighing	Size, ripeness level	
11	CR1	Keen eye when sorting for the	Size, ripeness level, appearance	
		quality parameters		
12	CF2	Keen eye when sorting for the	Size, ripeness level	
		quality parameters		
13	C3	Keen eye when sorting for the	Size, ripeness level	
		quality parameters		
14	C4	Logistics	Size, ripeness level	
15	R1	Quality control (size,	Size, ripeness level	
		appearance)		
16	R2	Sugar level, Quality control	Size, orange looks	
		(size, appearance)		
17	E1	Climate, Rainfall, Sanitation of	Size, ripeness level, appearance, packaging,	
		farm, Good application of GAP		
18	E2	Seedlings, Good application of	Size, appearance	
		GAP		
19	E3	Apply GAP	Size, taste	
20	E4	Apply GAP, Sanitation of farm	Uniformity in quality, safeness (residue level of harmful	
			substances), ripeness level, sugar level, size grading	

C. Quality Improvement

Respondent		Response			
Code		Q1. Do you always	Q2. Do you always	Q3. Do you always	
		face quality problems?	try to overcome the	seek feedback for	
			quality problems?	your overall output	
				process?	
1	F1	Never	Almost Always	Almost Always	
2	F2	Rare	Often	Often	
3	F3	Sometimes	Sometimes	Sometimes	
4	F4	Often	Often	Often	
5	F5	Often	Often	Often	
6	FR6	Often	Sometimes	Often	
7	F7	Rare	Often	Often	
8	F8	Rare	Almost Always	Often	
9	FC9	Rare	Rare	Often	
10	FC10	Sometimes	Often	Often	
11	CR1	Sometimes	Often	Often	
12	CF2	Sometimes	Never	Never	
13	C3	Rare	Often	Often	
14	C4	Often	Rare	Rare	
15	R1	Sometimes	Often	Often	
16	R2	Rare	Often	Often	
17	EI	Often	Often	Often	
18	E2	Sometimes	Sometimes	Sometimes	
19	E3	Sometimes	Almost always	Often	
20	E4	Rare	Often	Sometimes	

VI. Quality Performance

A. Satisfaction

Respondent		Response			
Code		Q1. Does the buyer	Q2. Do you often	Q3. Do you think	Q4. Do the sold
		always satisfy with	receive customer	the buyers will	products always
		the quality of your	complaints?	always buy again	available for the
		fruits?		in the future?	customer?
1	F1	Often	Never	Almost Always	Often
2	F2	Almost always	Never	Often	Sometimes
3	F3	Often	Rare	Often	Sometimes
4	F4	Sometimes	Never	Sometimes	Rare
5	F5	Often	Rare	Almost always	Sometimes
6	FR6	Often	Rare	Almost always	Sometimes
7	F7	Often	Never	Often	Sometimes
8	F8	Often	Rare	Often	Sometimes
9	FC9	Rare	Sometimes	Almost always	Sometimes
10	FC10	Almost always	Rare	Almost Always	Almost Always
11	CR1	Almost always	Never	Almost always	Often
12	CF2	Often	Rare	Often	Sometimes
13	C3	Almost always	Rare	Often	Sometimes
14	C4	Often	Rare	Almost always	Sometimes
15	R1	Sometimes	Sometimes	Almost always	Often
16	R2	Almost always	Sometimes	Often	Sometimes
17	E1	Often	Sometimes	Almost always	Almost always
18	E2	Sometimes	Sometimes	Sometimes	Sometimes
19	E3	Almost always	Never	Almost always	Sometimes
20	E4	Often	Rare	Often	Sometimes

Respondent		Response		
Code		Q5. Does the standard of the	O6. How do you maintain your consistency always t	
		product always been fulfilled?	satisfy your buyer?	
1	F1	Often	I do the farm maintenance from any source, either	
			from the promotion brochure of the specific brand of	
			pesticide/fertilizer.	
2	F2	Sometimes	By performing proper farm maintenance and also the	
			application of new technology to produce the desired	
			results.	
3	F3	Sometimes	I strive to perform good farming practices. However,	
			our main problem is water availability. During the dry	
			season, water is scarce for about 4-5 months. So, it is	
			quite tricky if the weather does not help.	
4	F4	Sometimes	I try to maintain the farm as I could; however, my	
			economic condition does not help. It is still quite hard	
			to fulfill my daily needs and harder to facilitate my	
			farm maintenance as well. Thus, it is still far for me to	
5	E5	Often	I always look for foodback from the buyer. If there are	
5	Г3	Onen	roblems. Lalways seek a solution and take preventive	
			actions	
6	FR6	Sometimes	I always check my crops before selling it to the	
0	TRO	Sometimes	huvers Lalso put KCl fertilizers that contain boron to	
			produce sweet oranges. However, I only do this for	
			the produces that I retailed by myself. If it is for the	
			middleman I do not really care about how they taste	
			but the size matters. In addition, I try to perform good	
			farming practices.	
7	F7	Often	I always monitor my farm and check the condition of	
			the mandarin orange trees there. If there are liabilities,	
			I always troubleshoot and solve the problem.	
8	F8	Often	I prefer to produce the fruits that can be sold	
			disregarding the size/grading. We, as farmers, did not	
			know what the qualities that are looked at by the end-	
			consumers are. Only the middlemen knew.	
9	FC9	Rare	I try to aim for the highest standard set by the	
			middleman. Therefore, I always want to learn how to	
			maintain a good farm with good produce. However, I	
			have experienced being cheated. If there are a lot of	
			big-sized fruits, they will cheat me by using other	
			grading-size tools that have a bigger diameter of the	
			hole in that tool compared to the usual one. That is	
10	FC10		also my reason to start as a collector by myself.	
10	FC10	Almost Always	I always do the quality check and control in my work	
11	CD 1		to ensure the desired products for the consumer.	
	CKI	Almost Always	During the rainy season, many truits are prone to be	
			spont due to the water on the fruit's surfaces. I used	
			I try to maintain my quality as a middleman Also I	
			I try to maintain my quanty as a minuteman. Also, I	

			always communicate and exchange information with buyers to deliver the best results for them
12	CF2	Often	I hired the employees who had good and long
12	012		experiences in sorting and very keen on the
			appearance and size of the oranges. Therefore, the
			product quality is uniform and fits with the desired
			qualities for the buyers.
13	C3	Sometimes	Perform proper sorting, ensure that all of the sizes
			ordered by the customer are delivered.
14	C4	Sometimes	I always maintain a good relationship with the
			customers and follow their demands. Sometimes we
			can just meet and have a casual conversation. On top
			of that, honest, good, and accountable sortation
			should be done.
15	R1	Sometimes	Accurate delivery time for our customers (other
			retailers), and we always remind our supplier to
			perform good sortation of the oranges before they
			send us here with a friendly price.
16	R2	Sometimes	By doing a good promotion on special occasions such
			as fruit bazaar with discounted prices during
			Christmas, new year, or Chinese new year. Although
			we lowered our margin for these events, the result is
			worthy.
17	E1	Often	When the farmers are committed to performing good
			farming practices as the counselor instructed so.
18	E2	Rare	If the farmers are committed to performing good
			farming practices made by the government (PTKJS)
19	EF3	Often	By always loyal to the same buyers and strive to
			produce good quality of oranges in term of taste and
			size.
20	E4	Sometimes	When farmers perform good farming practices made
			by the government (PTKJS) with integrity and
			accountability, it will bring the best quality of oranges
			for the consumers.

B. Price

Respondent		Response		
Code		Q1. Do you always	Q2. Do you always try to maintain the	
		satisfy with the price	lower costs incurred during your primary	
		of high-quality fruits	process (purchase, production, sales)?	
		from your buyers?		
1	F1	Sometimes	Never	
2	F2	Sometimes	Often	
3	F3	Sometimes	Often	
4	F4	Often	Rare	
5	F5	Rare	Often	
6	FR6	Sometimes	Often	
7	F7	Rare	Often	
8	F8	Rare	Often	
9	FC9	Sometimes	Almost always	
10	FC10	Almost Always	Almost Always	
11	CR1	Often	Rare	
12	CF2	Often	Often	
13	C3	Often	Never	
14	C4	Often	Often	
15	R1	Sometimes	Often	
16	R2	Often	Often	
17	E1	Almost always	Sometimes	
18	E2	Sometimes	Sometimes	
19	E3	Sometimes	Often	
20	E4	Sometimes	Often	

C. Flexibility

Respondent		Response			
Code		Q1. Do you always try to adapt to	Q2. Do you always open to the new		
		changing demand (i.e., if there is a	process/technology in farming/storing/sorting?		
		higher volume needs to be			
	1	fulfilled)?			
1	F1	Often	Almost Always		
2	F2	Sometimes	Often		
3	F3	Often	Often		
4	F4	Often	Often		
5	F5	Often	Almost Always		
6	FR6	Almost always	Often		
7	F7	Sometimes	Often		
8	F8	Often	Often		
9	FC9	Often	Often		
10	FC10	Almost always	Almost always		
11	CR1	Often	Never		
12	CF2	Often	Almost always		
13	C3	Often	Often		
14	C4	Often	Often		
15	R1	Almost always	Sometimes		
16	R2	Almost always	Almost always		
17	E1	Often	Often		
18	E2	Rare	Sometimes		
19	E3	Almost always	Almost always		
20	E4	Often	Often		



Figure 15. Indonesian Mandarin Orange Plantation in Sambas Regency, West Kalimantan



Figure 16. Common facilities in collectors' storage (left: grading tools, right: boxes of sorted mandarin oranges)



Figure 17. Waxing, Sorting, and Grading Equipment of Farmer-Collector 10 (FC10)



Figure 18. After the interview with Farmer 1 (left:F1) & Farmer 2(right:F2)



Figure 19. After the interview with Farmer 3 (left:F3) & Farmer 4 (right: F4)



Figure 20. Before the interview with Farmer 5 (right: F5 is the man with red jacket)



Figure 21. After the interview with Farmer-Retailer 6 (left: FR6) and Farmer 7 (right: F7)



Figure 22. After the interview with Farmer 8 (left: F8) and Farmer-Collector 9 (right: FC9)



Figure 23. After the interview with Farmer Collector 10 (left:FC10)



Figure 24. After the interview with Collector-Retailer 1 (left: CR1) and Collector-Retailer 2 (right: CR2)



Figure 25. After the interview with Collector 3 (left: C3) and Collector 4 (right: C4)



Figure 26. After the interview with Traditional Retailer (R1)


Figure 27. After the interview with Expert 1 (left: E1) and Expert 3(right: E3)



Figure 28. After the interview with Expert 4 who is also a farmer (E4)

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