



Chain performance explained through governance,
social network, information exchange, and industry
attractiveness

Comparative case studies on the Dutch and the Taiwanese orchid
supply chain

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God, I know this is Your perfect plan ordained for me. May Your name be glorified.

Abstract

CHAIN PERFORMANCE EXPLAINED THROUGH GOVERNANCE, SOCIAL NETWORK, INFORMATION EXCHANGE, AND INDUSTRY ATTRACTIVENESS: COMPARATIVE CASE STUDIES ON THE DUTCH AND THE TAIWANESE ORCHID SUPPLY CHAIN

The orchid industries both in the Netherlands as well as Taiwan are growing in both productions as well as export and are thus exemplary representations for floriculture industrial growth. Both Dutch as well as Taiwanese orchid chain actors are gaining and maintaining a competitive position on global markets but each chain is now characterized by uniquely coordinated relationships and their management has resulted in differing chain performance. The objective of this research is to explain differences of chain performance of an orchid chain in the Netherlands with an orchid chain in Taiwan and using governance, social network, information exchange, and industrial factors as conceptual representations to explain differences in performance. Using a case study approach empirical data was collected through documentation (semi-structured) interviews, and direct observations and then triangulated. Expert informants were purposefully selected for interviews according to their expertise of the sector (NL: 4 and TW: 5) whereas direct chain actors because of their chain function (NL: 4 and TW: 2). Interviews were recorded and later translated into English and transcribed or notes were taken to aid coding and the categorization for qualitative analysis. Results show that in the Netherlands the auction dominates the industry and that trade is formalized through contracts which results in a positive impact on efficiency. In Taiwan the orchid industry is like one large social network upon which growers rely upon to access information and the marketing channel. Differences in performance are shown in efficiency and quality and can be attributed to the role of contracts in the Netherlands and the social network in Taiwan. The bargaining power of the buyer stimulates a higher level of chain coordination. This research shows that Dutch orchid actors could extend potential business opportunities by allocating relational investments. Taiwanese orchid actors should develop a more formal incentive to govern transactions.

KEYWORDS: Performance – *Phalaenopsis* - Governance – Social network – Information exchange – Industry attractiveness – Five Forces Model – transaction cost analysis – reciprocal relationships – Taiwan – The Netherlands

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Executive Summary

Introduction

Agri-business actors are facing the challenge of gaining and maintaining a competitive position on the internationalizing orchid industry. This can be achieved by successfully coordinating and integrating their management across supply chain members (Van der Vorst *et al.*, 2007). The perishable nature of agri-food products, the internationalization of its trade, and the changing production and consumer requirements are leading agri-food chains into a closer coordination (Hobbs *et al.*, 2000). Both the orchid industries of the Netherlands as well as of Taiwan are flourishing. However, no previous research has been done to investigate whole-chain performance of the orchid chains of Taiwan and the Netherlands. This knowledge gap is currently limiting the quality and effectiveness of SCM decisions. This research is therefore centered around the below-mentioned problem statement.

Problem statement

“Why have management decisions made by orchid actors in the Dutch and the Taiwanese orchid industries currently shaped two unique orchid chains that perform differently even though actors in both chains have aimed to gain and maintain a competitive position on global markets?”

The following section introduces four concepts that connect different knowledge domains to the problem. Good performance of the supply chain requires actors to gain and maintain a competitive position (Wijnands, 2005). With trade on a global scale needing to comply to increased quality demands, international transactions amongst chain actors have become more complex. **Governance** in this context is emphasized in dealing with the economic exchange behaviours.

Another perspective shaping the interactions is from the informal institute such as the role of norm or social ties. And this part of the interactions amongst the chain actors (i.e. relational investments) occur outside of what is formalized (i.e. economical transactions). Through the inclusion of **social networks** in the conceptual framework, we take the network approach from the field of sociology to investigate relationships of individuals whom are part of a network and whom are engaged in reciprocal, preferential, and mutually supportive actions (Powell, 1990)

Being an important source of information, network mechanisms have shown to be the best available information source when the market information is ambiguous (Burt, 1990). **Information exchange** is therefore the third concept that is concerned with connectivity of actors in the network and their willingness to share relevant information with one another.

Addressed in governance structure was the trend of increased international trade and the need to engage into formal agreements to reach 'best exchanges' in economic transactions. What constitutes 'best exchanges' and 'optimum decisions' requires knowledge of the opportunities and threats the industry offers or poses upon orchid chain actors. This highlights the need of including a fourth concept, namely **industry attractiveness**.

Research questions

“How do governance, social network, information exchange and industry attractiveness explain differences between performance of the Dutch and of the Taiwanese orchid chains?”

To answer the main research questions a set of five sub research questions (SRQ) is derived:

1. *What conceptual elements relate governance, social network and information exchange with chain performance?*
2. *How do governance, social network, information exchange and industry attractiveness affect each other and affect chain performance?*
3. *What are differences between performance of the Dutch and of the Taiwanese orchid chains?*
4. *How do governance, social network, and information exchange affect performance of the Dutch and of the Taiwanese orchid chains?*
5. *How does industry attractiveness affect performance of the Dutch and of the Taiwanese orchid chains?*

SRQ1 constitutes the literature review chapter and helped to answer SRQ2. Based upon the output of SRQ2 (i.e. a set of nine propositions) the empirical research was prepared. The empirical phase was designed to conduct two case studies on the orchid chain in the Netherlands and in Taiwan. Using a case study approach empirical data was triangulated after having collected it through documentation, (semi-structured)interviews, and direct observations. Expert informants were purposefully selected for interviews according to their expertise of the orchid sector (NL = 4 and TW = 5) whereas direct chain actors were selected because of their chain function (NL = 4 and TW = 2). Interviews were recorded and later translated into English and (partially) transcribed or notes were taken to aid coding and the categorization for qualitative analytical purposes. Summaries of transcripts are added into annexes.

Results

Governance --- Dutch growers of young and flowering orchid formalize their transactions through contracts that last one to two years and that are designed to match the grower's production plans. Approximately 95% of all flowering orchid growers sell to or through the auction market to *Clock* (spot market) or *Connect* (a direct marketing channel). Only 5% sales of flowering orchids is directly sold to retailers. The auction stimulates commitment to contracts by

giving all buyers access to the buyers' 'indication records' that use scores to display to what extent past transactions were met.

Taiwanese growers sell young plant and flowering orchids based upon verbal or written agreements which lack any legal sanctions. When orchids are produced after an order is received the grower produces according to the Make-to-order (MTO) system. Growers are informed by their buyers and peers and based upon experiences and their expectation of the market they will produce orchids prior to receiving orders, the so called Make-to-stock (MTS) system. Under MTS the actual transaction may deviate from the order. Such deviations especially occur when part of the batch of orchids failed during production or when market conditions turn out to be unfavorable upon which the buyer decides to buy less orchids. In the last case the grower will try to find other buyers on the export or domestic market but at a lower price. According to experts these deviations therefore raise the information costs because growers need to search for new buyers. Because of these loose enforcements some buyers and many of the small-scale growers lack any interest to try and agree upon orders in advance. Instead, these growers rely heavily on the spot market, on buyers that search exactly the varieties that they can offer. Those growers that do follow MTO are therefore also known to produce extra so that they could fulfill any last-minute order that could come their way. Those growers that follow production patterns of MTS may change later towards MTO according to processes of relational development: if transactions were satisfactory, the relationship between buyers and growers may be selected to become more long-term oriented and is thereby also more associated with trust. Many growers therefore produce orchids under both MTS *and* MTO.

Social Networks --- In the Netherlands social networks are seen in both large and small forms. An example of the larger producer cooperatives is the Auction. Almost all Dutch growers are selling to auctions. The auction takes care of sale activities, promotions, financial issues and marketing opportunities and provides information regarding logistics. Despite the auction to hold a dominating marketing channel, other associations still facilitate forward integration in the sector by taking care of distribution and marketing processes. All grower members sell their products under uniform packages but with their own company name on it. In Taiwan the social network dominates marketing exchange behavior and is a determinant of the information that can be received. According to one grower the orchid industry consists of actors where everybody knows about the reputation about everybody. Once a grower is known for delivering poor quality plants all actors will know it and the notorious grower will be avoided by exporters. Large producer organizations (e.g. Taiwan Orchid Grower Association or TOGA) may provide important intermediary functions. The information spread by this organization has become to be perceived as reliable evidence for grower's processes of decision-making. TOGA facilitates the exchange of information amongst growers, governments and academic institutes.

In the Netherlands smaller, self-organized groups of 10 to 30 members are known as Study Clubs where members all grow similar crops and where knowledge about production technology is exchanged by visiting each other's greenhouse and inviting external advisors. Though Clubs provide an open space to share information freely, a grower indicated that some more sensitive information such as price would be avoided. In Taiwan the social network is therefore built on trust. It is seen as a Circle of Trust where members have formed informal trade alliances.

Information exchange --- The vertical coordination in the Dutch orchid chain reduces transaction costs. The major marketing channel is the auction, a large producer cooperative, where buyers and growers specify a contractual basis. Commitment to contracts is stimulated by keeping track of 'Indication records' where scores are deducted when a party deviates from the agreed contract. Contracts are setup according to the grower's production plan. This contributes to an efficient use of space in the greenhouse, thereby reducing production costs.

In Taiwan most transactions are verbally agreed upon but there is no legally enforced sanction. Opportunism occurs frequently and increases the monitoring costs. When deviations from the contract occur, the grower may waste his overproduction, thereby increasing upon production costs.

Conclusions

What are differences between performance of the Dutch and of the Taiwanese orchid chains? (SRQ3)

Efficiency is determined by costs. During the production phase the Netherlands face high production costs due to energy costs. However, transportation costs are low because of short distances with markets and transaction costs are reduced because of a high level of coordination induced by contracts. In Taiwan has a suitable climate but the impact of opportunism leads to overproduction thereby increasing production costs indicating a low performance in terms of efficiency. Transportation costs are high because of long distances to the international market.

Responsiveness is measured through transportation time which is at most three days for the Dutch case but in Taiwan one week if supplied to Asia, and up to one month when supplied elsewhere. **Flexibility** refers to *volumes* which the Dutch growers regulate by sending finished plants to the auction under the Clock system or by regulating the greenhouse temperature. *Variety* for the Dutch is low-mix-high-quantity whereas high-mix-low-quantity characterizes the Taiwanese sector. The leading species for both cases are the *Phalaenopsis*. The Dutch sector recognizes **quality** standards for flowering plants on appearance as well as for flowering characteristics.

4. How do the governance, social network and information exchange affect performance of the Dutch and of the Taiwanese orchid chains?

Governance structure likely has an impact on transaction and production costs. Formal contracts specifying price, quantity, quality and other aspects of economic transactions are a common way for Dutch growers and buyers to trade orchids. This behaviour reduced information costs. Growers aim to increase production efficiency by keeping to pre-agreed conditions. In Taiwan the formal sanctions are lacking or not enforced leading to overproduction. Growers then face increased information costs searching for new buyers, and production costs because some produce may be wasted. The consequence of overproduction seems to pose a negative impact on the Taiwanese orchid chain performance in terms of efficiency.

The governance structure affects the information flow in the Netherlands by facilitating the exchange of information that can be specified through contracts. In Taiwan growers base their information on their Circle of Trust and their own observations of market trends. Verbal agreements initially do not influence decision-making processes when producing under MTS. When the transaction has been satisfactory, relational investments are likely to let the relationship become long-term oriented. Accordingly, the grower will shift towards production under MTO, leading to reduced transaction costs and increased production efficiency.

5. How does industry attractiveness affect performance of the Dutch and of the Taiwanese orchid chains?

Efficiency and product quality is influenced by the easiness with which buyers switch from growers. In the Netherlands the contract binds the relationship whereas a grower in Taiwan will aim to strengthen a relationship through product differentiation.

“How do governance, social network, information exchange and industry attractiveness explain differences between performance of the Dutch and of the Taiwanese orchid chains?”

Differences of chain performance in terms of efficiency is contributed to the role of governance in the Netherlands (i.e. production and transaction efficiency) and to the role of social network in Taiwan (i.e. reduced transaction costs). Quality homogeneity is achieved through governance in the Netherlands (i.e. coordination of production to meet contractual agreements) whereas the opposite is seen in Taiwan, where quality is heterogeneous (i.e. verbal agreements are not translated into a more coordinated production). Furthermore, uniqueness as the result of product differentiation is a quality trait whereby growers try to attract buyers.

Recommendations

1. A baseline study on the Dutch orchid sector should be done to bring solid knowledge on the sector. Though horticulture is a prominent industry in the Netherlands, there is a lack of experts for the orchid industry.
2. Quantitative research on cost efficiency should be done to provide convincing evidence that can compare and evaluate different performances
3. In-depth investigation on each concept (e.g. marketing channels, power asymmetry) that includes all chain actors.
4. The role of social networks has been highlighted. It will be useful for Dutch orchid buyers (and the Taiwanese industry) to identify triggers that attract Taiwanese growers to commit to meet specified agreements.

Chapter One - Introduction

The first chapter of the report begins with a description of the floricultural industry in the Netherlands and in Taiwan followed by the problem statement, research objective and research questions. The chapter ends with the research framework and an outline of the report.

1.1 Background of a globalizing floricultural orchid industry in the Netherlands and Taiwan

Being international in scope the floricultural industry deals with the cultivation and trade of cut flowers, cut foliage, potted plants and bedding plants (Sheela, 2008). Cut flowers and potted plants account for approximately 80% of the value of global trade in ornamental plants. Over the period 2001 – 2010 the import and export values of ornamental horticultural products has increased from around 19 billion to 28 billion Euros (Figure 1.1), signifying that trade on a global scale is increasing. Traditionally, Europe has been a production and trading centre for the flower industry. It is the largest flower and potted plant producer, with 10.8 billion Euros and a share of 44% of the world production in 2009 (EC, 2011). Europe hosts three out of five leading importing countries, accounting for 67% of world import values of cut flowers and potted plants in 2007 (AIPH, 2008). The market preferences in these leading importing countries influence greatly the movement of the entire industry. Europe also shares 58% of export values of world trade in 2007, followed by a 15.3% share from Latin America. The orchid flower is a typical example of an internationally traded crop. The supply chain involves several stages including breeding, propagating, and the cultivation of both young as well as flowering orchids. These different stages are usually dispersed over multiple countries (Griesbach, 2003).

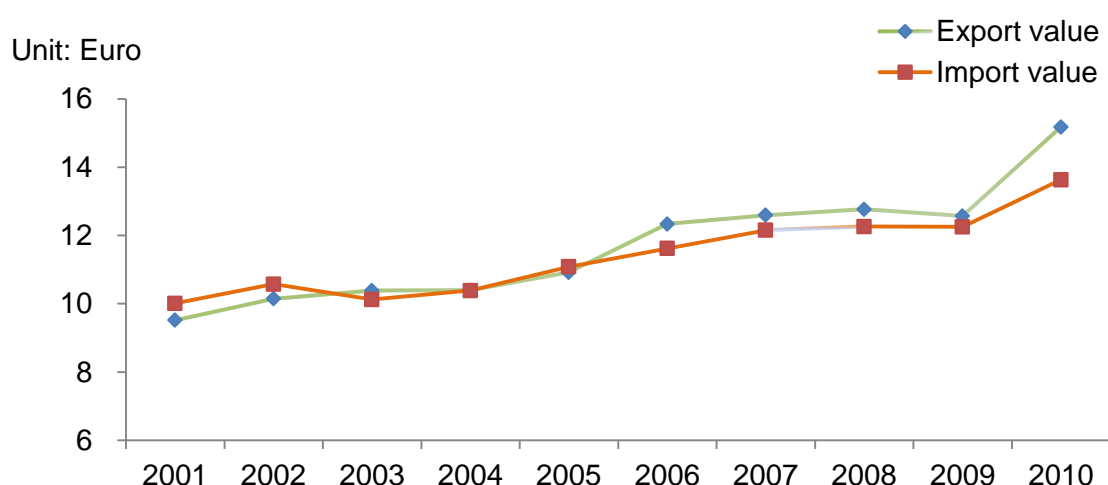


Figure 1.1 World trade value of floricultural products from 2001 to 2010

Source: ITC

It is important to realize that agri-business supply chains are characterized by perishability. The productions phase usually lasts for a long time and yields are varying in both quality as well as

quantity. These fluctuations are amongst others caused by weather conditions, pests and other biological hazards. Before the produce reaches the consumer, quality is subjected to decay as storage and transportation conditions may be improper (Van der Vorst, 2007; Aramyan *et al.*, 2006). Product safety and sustainability concerns continue to influence processes of production and market expectations. This perishable nature of produce, the increasing internationalization of trade, the growing expectations of consumers and the dynamic nature of the industry are influencing the way actors interact and relate to one another. Also actors in the orchid industries in the Netherlands need to balance themselves continuously as they try to deal with forces of power over the organization of the chain and with competitiveness. The same counts for actors in the Taiwanese orchid industries. A successful coordination, integration, and management across supply chain members is therefore a crucial determinant to be competitive in agri-business chains (Van der Vorst *et al.*, 2007). These trends have lead the chain into a closer coordination, a prevalent feature in many countries (Hobbs *et al.*, 2000). This all means that business competition is no longer confounded within individual companies, it has become a matter of the entire chain (Lambert *et al.*, 2000) where actors are dependent on the ability to capture the synergy from the network of business relationships.

Taking advantages from an excellent climate zone, Taiwan has become one of the largest providers of marketable, young orchid plants across the globe. The orchid started to be traded as a commodity on the Taiwanese hobbyist market but has now become the most thriving commercialized, ornamental product in Taiwan. Orchids account for up to 77% of Taiwan's flower exports, totalling 59.68 million Euros in 2009 (COA, 2011). With strong export-oriented characteristics, orchids are distinguished from other flowers and plants. Moreover, it is estimated that 70% of domestic orchid production aims for foreign markets. In the period 2005 to 2009 the exporting value has more than doubled. In the same period domestic production increased with approximately 44%, with the U.S. and Japan being Taiwan's leading importing countries that account for 33% and 30% of exported orchid value respectively.

On the other hand there is the Netherlands which, situated in the prestigious 'Hub of Europe', dominates the European orchid market. The integral marketing channels enabled by auctions together with highly automated production systems make the Netherlands the largest provider of flowering orchids throughout the European Union. Orchid cultivation in the Netherlands has approximately tripled over the past five years (Post, 2008). While in 2005 the most frequently produced orchid *Phalaenopsis* had generated a turnover at the auction of 143.7 million Euros, in 2010 it had increased to 455 million Euros. It is estimated that 95% of orchids grown in the Netherlands are sent to the Auction while only 15% of auction sales stay within Dutch market.

1.2 Problem statement

A successful coordination, integration, and management across supply chain members are therefore a crucial determinant to be competitive in agri-business chains (Van der Vorst *et al.*, 2007). These trends have led the chain into a closer coordination, a prevalent feature in many countries (Hobbs *et al.*, 2000). This all means that business competition is no longer confined within individual companies; it has become a matter of the entire chain (Lambert *et al.*, 2000) where actors are dependent on the ability to capture the synergy from the network of business relationships.

Letting business enterprises find more effective cooperations and interactions on a global scale, and having them meeting the needs and growing expectations of end-consumers, is the aim of *supply chain management* (SCM). Aramyan *et al.* (2006) indicated that much effort has been done to measure performance but little attention has been given to measure the agri-food chain performance because the interwoven nature of intrinsic and extrinsic quality attributes. Aramyan *et al.* (2007) then later re-designed a measurement system where four performance indicator categories were operationalized and subsequently pilot-tested to measure whole-chain performance of a Dutch-German tomato supply chain using a case-study approach. To my knowledge no research has of yet considered to investigate and compare whole-chain performance of the orchid chains of Taiwan and the Netherlands. Even though orchid industries in both Taiwan and the Netherlands are flourishing and rapidly growing, there still exists a knowledge gap of the constituting factors that influence and determine whole-chain performance. This knowledge gap is currently limiting the quality and effectiveness of SCM decisions. This research is therefore centred around the following problem:

“Why have management decisions made by orchid actors in the Dutch and the Taiwanese orchid industries currently shaped two unique orchid chains that perform differently even though actors in both chains have aimed to gain and maintain a competitive position on global markets?”

Good performance of the supply chain requires actors to gain and maintain a competitive position (Wijnands, 2005). With trade on a global scale needing to comply to increased quality demands, international transactions amongst chain actors have become more complex. **Governance** in this context is emphasized in dealing with the economic exchange behaviours. The actors with most bargaining power are also likely to influence and shape the governance structure of the chain, setting regulations, leading to power asymmetry and changed production methods and delivery conditions. This first concept of governance structure gives ample theoretical opportunities to give a well-informed representation of chain performance.

Another perspective shaping the interactions is from the informal institute such as the role of norm or social ties. And this part of the interactions amongst the chain actors (i.e. relational investments) occur outside of what is formalized (i.e. economical transactions). In fact, Sporleder *et al.* (2006) revealed that a shift in the agri-food chain is occurring, an evolution from transaction-based networks into alliance-based networks. They showed that social ties and networks complement the weaknesses of the governance structure (e.g. in the case of incomplete contracts) by discouraging actors to engage in opportunistic behaviour. Therefore, to understand chain performance we need a second concept, one which reaches into the foundations of trust, reputations, and relations. Through the inclusion of **social networks** in the conceptual framework, we take the network approach from the field of sociology to investigate relationships of individuals whom are part of a network and whom are engaged in reciprocal, preferential, and mutually supportive actions (Powell, 1990).

As highlighted in the above-mentioned concepts, a proper coordination of relationships amongst chain actors is crucial for good chain performance. In a network different connections are characterized by reciprocal interdependence. Being an important source of information, network mechanisms have shown to be the best available information source when the market information is ambiguous (Burt, 1990). To gain access to this information a well established coordinated network of chain actors that are willing and able to share information needs to be established. Paradoxically, it is exactly this lack of coordination amongst chain actors that is occurring when information moving between stages in the chain is delayed or distorted (Chopra *et al.*, 2009). Again, the perishable nature and the many requirements for agricultural produce (e.g. food safety, quality assurance, product differentiation) cause uncertainty in the agri-food industry, aggravating the need for actors in this dynamic and competitive industry to gather relevant and timely information from other chain actors. Having now connected information asymmetry directly with poor chain performance the crucial role of **information exchange** is highlighted. This third concept is therefore concerned with the connectivity of actors in the network and their willingness to share relevant information with one another.

Addressed in governance structure was the trend of increased international trade and the need to formalize economic transactions. Where formalized activities are not well governed actors tend to be part of an informal network based on reciprocal and preferential relationships. The fourth concept needed here is **industry attractiveness**. What constitutes 'best exchanges' and 'optimum decisions' requires knowledge of the opportunities and threats the industry offers or poses upon orchid chain actors. As rivalry amongst actors is influencing the willingness to share relevant information and as entrepreneurial success is largely dependent on maintaining a competitive advantage, it is important to understand the dynamics of competition which different chain actors face, individually, as well as collectively. Thus, there is a need for the inclusion of an

analytical scope wider that focuses on the relationship between the (network of) actor(s) and the industry. The widely used 'Five Forces Model' developed by Porter (1980) was designed to understand the competitive forces and the underlying causes so that the industries' current profitability as well as the anticipation of the competition over time could be revealed (2008).

1.3 Research objective and questions

The objective of this research is to compare the chain performance of a Dutch and a Taiwanese orchid chain by studying *governance, social network, information exchange, and industry attractiveness*. It addresses the main research question:

“How do governance, social network, information exchange and industry attractiveness explain differences between performance of the Dutch and of the Taiwanese orchid chains?”

To answer this main research question the following sub research questions (SRQ) are developed. The sub research questions are presented together with research framework in Figure 1.2:

1. *What conceptual elements relate governance, social network and information exchange with chain performance?*
2. *How do governance, social network, information exchange and industry attractiveness affect each other and affect chain performance?*
3. *What are differences between performance of the Dutch and of the Taiwanese orchid chains?*
4. *How do governance, social network, and information exchange affect performance of the Dutch and of the Taiwanese orchid chains?*
5. *How does industry attractiveness affect performance of the Dutch and of the Taiwanese orchid chains?*

This report follows two approaches to answer these questions. The first two sub research questions (SRQ1 & SRQ 2) concern the *theoretical knowledge* of concepts and their interrelations to generate well-defined propositions to achieve Silverman's requirement that '*qualitative research should be based on the relevance between the selected case and its theoretical position*' (2006). Then the relationships are tested by the empirical study. The aim of this report is to explain differences in chain performance. So the third sub research question (SRQ3) investigates the variance in performances amongst chains. With the fourth sub research question (SRQ4) a relationship between concepts and performance is to be established. The industry of any particular chain is dynamic. Also actors in the agri-business industry need to balance themselves continuously as they try to deal with forces of power over the organization of the chain and with competitiveness. The assessment of industry attractiveness is vital to gain an

insight of the external factor on the performance. The fifth sub research question (SRQ5) is therefore particularly considering the relationship between performance and the industrial environment.

Using insights from technical, economic, and social science domains offers a holistic perspective on the functioning of the chain. Such perspective offers ample opportunity to observe the effects of those three underlying concepts on the functioning of the chain. Moreover, as rivalry amongst actors is influencing the willingness to share relevant information and as entrepreneurial success is largely dependent on maintaining a competitive advantage, it is important to understand the dynamics of competition which different chain actors face, individually, as well as collectively. The two viewpoints, supply chain concepts and environmental forces therefore constitute this report.

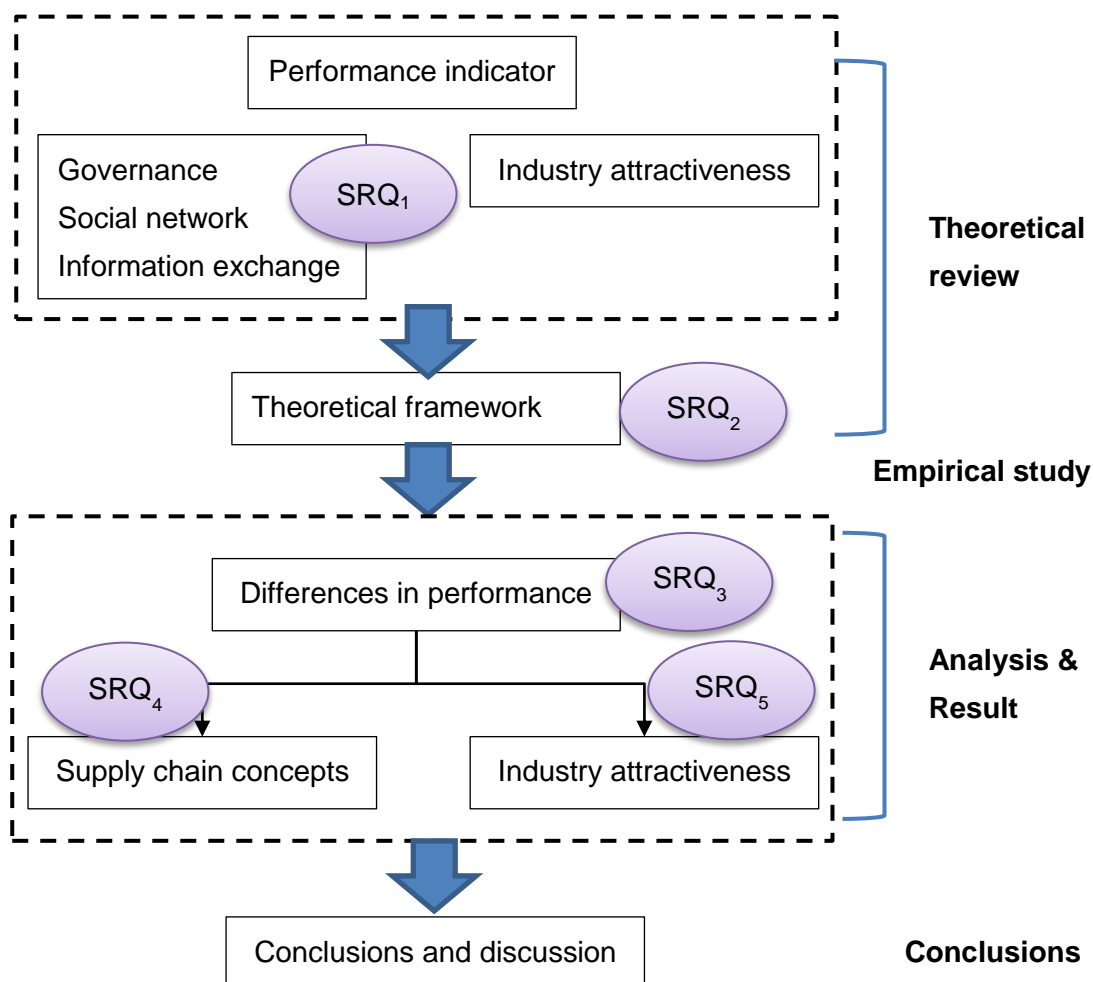


Figure 1.2 Research questions with research framework

1.4 Report outline

The outline of the report, divided into five chapters, is structured in line with the research framework. **Chapter One** introduces general information regarding the industry background to

create the context for this research (§1.1), followed by the problem statement (§1.2), the research objective and research questions (§1.3). **Chapter Two** reviews the literature of performance measurements and industry analysis. The key concepts introduced in detail are governance (§2.3), social network (§2.4), information exchange (§2.5), and industry attractiveness (§2.6). The chapter ends with the theoretical framework and a set of propositions (§2.7). **Chapter Three** describes the research designs. It presents the research as a case study (§3.1) and how data was collected via research strategies and tools (§3.2 – 3.3). It also discusses the research validity and reliability (§3.4). In **Chapter Four** the results of this study are presented by dividing into four sections: orchid sector (§4.1), performance for each case (§4.2), conceptualization of performance (§4.3), and finally in the analysis section, the results are interpreted and discussed according to the propositions (§4.4). In **Chapter Five** the further discussion on the results is presented (§5.1). Research questions are answered as conclusions of this research (§5.2). Finally, **Chapter Six** consists of the limitations along with future research (§6.1), theoretical contribution (§6.2) and managerial applications (§6.3).

Chapter Two - Literature Study

Having given short argumentations for the inclusion of each concept in the problem statement (§1.2), the following sections review the literature on agri-food supply chain performance (§2.1), governance (§2.3), social network (§2.4), information exchange (§2.5) and Five Forces Analysis (§2.6). Through the review an understanding of interrelated concepts is built. What may be useful here is the visualization of the impacts concepts pose on supply chain performance (Figure 2.3). Following and derived from the literature review is the theoretical framework where also research propositions are given (§2.7).

2.1 Agri-food supply chains performance

Generally, two types of agri-food supply chains can be identified: *fresh food products* (e.g. vegetables, flowers and fruits) and *processed food products* (e.g. dried and canned food). The nature of perishability and seasonality of the products requires optimum chain performance. A set of indicators has been developed to define and measure good performance. By using these performance indicators it becomes possible to measure according to agreed standards and thereby to evaluate the products, services, and production processes (Aramyan *et al.*, 2007). Aramyan *et al.* (2006) summarized that *efficiency, flexibility, and responsiveness* are the three most common categories that constitute the measurement systems. However, no clear system provided an integrated view for measuring agri-food chains. They explained that little attention has been given to measure the performance of agri-food chains because intrinsic and extrinsic quality attributes are interwoven. This observation has therefore led to include *product quality* as the fourth category. Efficiency relates to the minimization of costs of inputs used to produce output. Flexibility measures the capability that the supply chain can respond to a changing environment. The last classification of responsiveness aims at a high level of customer service such as customer response time, short leading time. These four categories were then operationalized by taking and assigning measurable indicators which previously were used in empirical research and of which it was proven to be applicable to the entire chain performance. This model was tested on a Dutch-German tomato supply chain using a case-study approach (Aramyan *et al.*, 2007). Figure 2.1 represents this framework.

In the category of *efficiency*, costs include production and distribution costs (e.g. raw materials, labour, transportation and handling cost). It is defined as the total costs of inputs used to produce outputs and services. *Flexibility* measures the ability to deal with change in demand or supply. It indicates the ability to change the output volume (volume flexibility) and the product varieties (mix flexibility) in order to achieve customer satisfaction on quantity and diversity request. The measurement on total required time to complete a unit of product and service and on registered customer complaints can show the level of *responsiveness*. The last category of *food quality* takes into account the specific characteristics of fresh products. Appearance contains the sight

observation on colour, size and other attributes which influence the quality perception. Safety concerns on pathogenic organism, chemical and physical hazard are regarded the important quality attribute. These performance categories are further linked with the concepts in the theoretical framework (Figure 2.3).

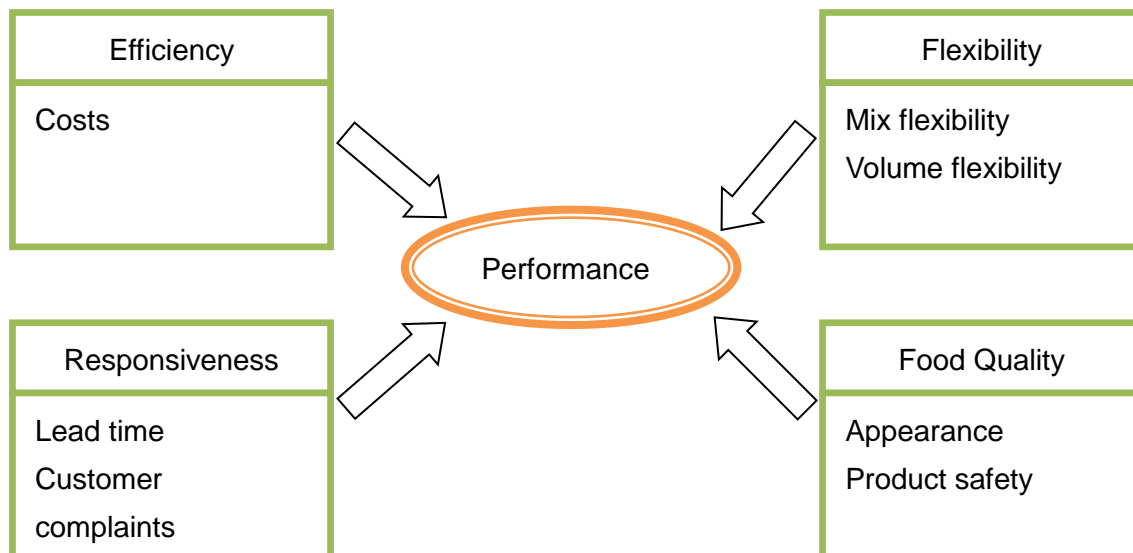


Figure 2.1. Agri-food supply chain performance measurement with categories and key indicators.

Source: Aramyan *et al.* (2006b, 2007).

2.3 Governance of supply chain

Two types of governance concepts are introduced in this section. *Transaction cost analysis* aids to provide insight into economic transaction activities, a major constituent of the governance mechanism. From a value chain's perspective, *global value chain governance* reveals the nature of the inter-firms linkages and asymmetric power relationships between actors.

2.3.1 Vertical coordination

The characteristics of perishability, seasonality, and the constraints of variability of quality and quantity requires the flower industry to operate in the limits of high responsiveness through flexible cooperation. Vertical coordination embodies these requirements as it describes the nature of product movement from suppliers to consumers (Hobbs and Young, 2000). A chain is always characterized by aspects found in different forms of vertical coordination. At the one hand vertical coordination is found in *spot market*. Here goods are exchanged between multiple sellers and buyers at the same period of time, with the price being determined by the final transaction (Hobbs, 1996). On the other hand, *full vertical integration* occurs where chain activities are incorporated in the same value chain. In other words, the spot market is driven by price signals only and the full vertical integration is arranged by predetermined factors in a contractual basis. When supply chain relationships are formally more arranged, the chain model is vertically more

coordinated (Hobbs, 1996). In fact, the agri-food industry is changing by becoming vertically closer coordinated. To analyse this change, the theory of Transaction Cost Analysis (TCA) provides useful insights to the development of more formal vertical relationships amongst the actors.

2.3.2 Transaction Cost Analysis

Broadly speaking, transaction costs occur when economic exchanges are carried out. Three main categories of transaction cost can be identified: *information costs*, *negotiation costs*, and *monitoring (or enforcement) costs* (Hobbs, 1996). The cost of information refers to information actors need to obtain prior to the transaction (e.g. concerning the products, the price, and the quality). The negotiation costs refer to costs made during the physical act of the transaction (e.g. negotiating, writing contracts). Monitoring (or enforcement) costs arise after the transaction has been negotiated (e.g. safeguarding contracts, monitoring to ensure the terms of the transaction are met). TCA tries to explain how actors choose the arrangements with their trading partners prior, during, and after the transaction as they aim to have low costs whilst the highest protection against hazards (Shelanski *et al.*, 1995).

The hazards come from technical attributes of *asset specificity*, *human limitation of bounded rationality* and *behavioural nature of opportunism* (Groenewegen, 1996). Asset specificity refers to a specific investment on a particular transaction whereas the investment has little value in alternative use (Hobbs, 1996). The asset specificity shows through various forms, such as physical, relationship, site, etc. Human behaviours can be characterised by bounded rationality and opportunism. According to Williamson's theory, the capacity of making rational decisions is limited even though they intend to do so. The opportunistic search in self-interest recognizes the risk that the parties act in keeping with their own advantages. It is because of the existence of these human behaviours which cause the risk of not fully executing the previously agreed contracts (Hobbs, 1996, Peris-Ortiz, 2011).

In the context of TCA, vertical coordination depends on the type and level of transaction costs. As transaction costs are higher and more uncertain, relationships tend to be more coordinated. The *frequency*, the *uncertainty*, the *asset specificity*, and the *complexity* of transactions are the four characteristics that influence the costs involved with the transaction (Hobbs 2000, Shelanski *et al.*, 1995). These four characteristics and their influence on the level of vertical coordination are shown in Table 2.1. The high uncertainty over aspects of the transaction generally results in higher information and monitoring costs. Less vertical coordination is found when two actors value their reputation and therefore not act opportunistically (e.g. in the case of frequent transactions between a buyer and seller). Asset specificity in particular is considered to be the ultimate determinant for the transaction level. When products are not involving any specific investment, they tend to have multiple alternative uses. Thus such products tend to be

transacted through a spot market coordinated chain. With the high level of asset specificity, the movement goes to more formal contractual arrangement. The fourth transaction characteristic is the complexity of transaction. When the complexity increases, contracts tend to become more specified. As a result the coordination moves away from spot market towards full integration.

Table 2.1. The influence of transaction characteristics on vertical coordination.

Characteristics of transactions	Vertical coordination ¹
High Frequency	Low
High Uncertainty	High
High Asset specificity	High
High Complexity	High

¹ More formal type. Source: Adapted from Hobbs, 1996; 2000.

In the context of TCA, partners along the chain build economic arrangements based on mutual interests. The particular characteristics of the relationship whether any appropriate governance structure can be employed (Shelanski *et al.*, 1995). The governance mechanism also serves as the safeguard that a “better off” exchange can be achieved at the minimum cost (Dyer, 1997 in Shelanski *et al.*, 1995). The choice of governance structure will vary depending on transaction characteristics.

There are several types of governance structure. At one end lies the pure market where anonymous and simple transactions take place. Buyers and sellers are sensitive to price. On the other side, the form of pure hierarchy represents the unified ownership and control of involving actors (Shelanski *et al.*, 1995). Shifting along the continuum from spot market (least vertical coordinated) to hierarchy (full vertical integration) of governance structure implies a reduction of transaction costs (Bijman, 2008). Numerous forms of formal contractual relationships exist along the continuum between these two extremes. These governance structures are called *hybrid*, a typical type in agri-food industry (Bijman *et al.*, 2010). The contracting arrangement is commonly used to guarantee the product quality.


2.3.3 Global value chain governance

The in-between forms of governance structure were further identified by Gereffi *et al* (2005). From global value chain’s point of view, the shifts of the network form of governance between the spot market and fully vertical integration depends on both the coordination beyond the firm boundaries, as well as the influence from global buyers on the production and distribution network (Gereffi *et al*, 2005). The term “buyer-driven chain” used by Gereffi (1994 in Gereffi *et al.*, 2005) describes how global buyers control key parameters along the supply-based chain without having direct ownership. Three extensive network categories were added besides *market* and *hierarchy* (e.g. fully vertical integration): modular, relational and captive. In *modular* type,

suppliers produce products or services according to customers' specifications. Suppliers tend to take full responsibility for process technology and use genetic machinery to prevent from asset-specific investment. When the mutual interest is regulated through reputations and social ties, *relational* type is formulated. The last type happens when the small suppliers depend on dominant buyers. *Captive* type thus refers to the situation where suppliers are led by major buyers because of significantly high switching cost.

Except for defining typology, Gereffi *et al.* (2005) argued that the structure of global value chain governance is dependent on the following three determinants: "1. The **complexity** of information and knowledge transfer required to sustain a particular transaction, particularly with respect to product and process specifications; 2. The extent to which this information and knowledge can be **codified** (i.e. standardization) and, therefore, transmitted efficiently and without transaction-specific investment between the parties to the transaction; 3. The **capabilities** of actual and potential suppliers in relation to the requirements of the transaction." The five types of governance structure in combination with three underlying determinants are thus summarised in Table 2.2.

Table 2.2 Types of global value chain governance

Governance type	Complexity of transactions	Ability to codify transactions	Capabilities in supply-base	Degree of explicit coordination and power control
Market	Low	High	High	Low
Modular	High	High	High	
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	High

Source: Gereffi *et al.*, 2005.

Governance is about the relationships amongst the actors and institutional mechanisms which influence the chain activities. From an industrial economics perspective, governance mostly refers to formal contractual relationships with the intention of avoiding opportunism and bounded rationality and involving specific asset investments. Global value chain depicts the inter-firm relationships on the basis of power and the ability to control along the chain with setting or enforcing parameters along the chain. The difference can be recognized by the third determinant, capabilities in supply-base as an additional factor comparing to TCA approach. The capabilities to meet the set requirements by the industrial leading organizations represent the power asymmetry between the two sides of chain. The shift is recognized by the increasing power of retailers (Humphrey, 2006). Large buyers have transformed themselves from sellers of products produced by others into regulating suppliers to conform product specifications according to the market preferences. This is particularly the case with the fresh products industry.

2.4 The social network

A trend is seen in the agri-food sector where spot market concept is more and more replaced by contracts, based in alliances, characterized by other formal transactional activities (Robison *et al.*, 2002). However, tighter coordination does not exclusively result from contractual arrangements. In fact, any firm is connected in a network with reciprocal patterns of communication and exchange. The network approach investigates the business relationships by looking into the network of individuals engaged in reciprocal, preferential and mutually supportive actions (Powell, 1990). Network associates with sociology and depends on trust, relationships and reputations. The social network tends to strengthen the weaknesses caused by incomplete contracts. Thus, the formal structure of authority has comparatively little impact on the formation of social network.

2.4.1 Incomplete contracts

Various forms of formal agreements exist. All the coordinating parties balance between utilizing individual incentives and monitoring relationships in order to achieve the economically efficient transactions, within a context of various monitoring procedures under legal institutions (Peterson *et al.*, 1999). This alignment based on mutual interests is to minimize the cost of transactions generated from opportunism and bounded rationality. However, the contracts are still incomplete because the mutual interest is presumed weak in real world. Incomplete contractual arrangements may reduce the effectiveness of creating value (Sporleder *et al.*, 2006). Therefore, if there are other mechanisms which could be used to reinforce the reliability of mutual interest, the efficiency of the chain would be increased.

Relational agreements function as powerful, informal incentives for actors not to forgo the agreements or to engage in opportunistic behaviours (Sporleder *et al.*, 2006). The theory behind relational contract is that *“when two parties can jointly create value by doing business together and these parties can transact repeatedly over time, then each party will not engage in opportunistic behaviours for fear of causing the relationship to unravel.”* The kind of relationships that both supports the continuance of the agreements and simultaneously provides the expectation of a better-off future for both sides is referred to as *“self-enforcing agreements”* (Telser, 1980). Therefore, self-enforcing agreements provide more benefits in the long-term than opportunism would provide in the short-term. The only penalty imposable in self-enforcing relationships is to stop the agreement. Thus, a certain level of *trust* appears: each party believes that the other party is faithful to the agreements as long as the future gains remains. Trust can be based on the positive experiences from repeated cooperation over time. It can also occur based on the generalised reputations amongst the trader groups (Sporleder *et al.*, 2006). However, self-enforcing agreements are not constrained by the legal system. There must be some mechanism to facilitate the obligations of agreed contracts. Social capital thus plays an important role in such a way that reliability can be maintained (Sporleder *et al.*, 2006).

2.4.2 Social capital

There are no precise definitions for social capital (Sporleder *et al.*, 2002). But the essential concept of social capital is the valuable resource embedded in the network of social relationships. Holding a certain position in the structure can be an asset by itself (Burt, 2000). In a network everyone is connected to each other so that no one can escape the notice of other. The flow of information within the network serves as a monitoring tool to report parties' behaviours to other members (Sporleder *et al.*, 2006). It ensures that it is less risky for people to trust one another. When an actor breaks an agreement or would engage in opportunistic behaviour, it would get acknowledged in the network. So the reputation is tarnished. The informal sanction is thus imposed in this way. In the context of TCA, social capital enables actors to forego opportunistic behaviours so that transaction costs can be reduced (Peterson *et al.*, 1999). Furthermore, switching costs for a new partnership will be incurred if trust within the network is well established (Sporleder *et al.*, 2006). Switching costs is mainly occurring when having to establish trust with new partners to generate relationships again.

Social capital may be embedded in networks of mutual interests. The access to this resource through social capital depends much on the types of network structure which influences cooperative behaviours and performance (Lazzarini *et al.*, 2001). Two main types of network structures are distinguished, each offering benefits from the social capital. The network can be *dense*, meaning each actor is well connected to one another (Coleman, 1988 in Burt, 1990). This closure network is associated with strong ties and defined as repeated, affective and relational exchanges (Lazzarini *et al.*, 2001) that facilitates the formation of trust and cooperation among economic agents (Sporleder *et al.*, 2006). This type of network is suitable for firms embedded in a competitive environment where specific know-how is required (Sporleder *et al.*, 2002). Involved with systemic, joint efforts to create or refine the knowledge, dense networks provide the conditions for the emergence of coalitions within their own industry (Lazzarini *et al.*, 2001).

In contrast, the theory of structural holes argues that social capital functions as brokerage opportunities in *spares* network (Burt, 1990). The holes separate non-redundant sources of information and thus provide an opportunity to broker the flow of information between people with *weak ties*, which refers to occasional, market-like exchanges (Lazzarini *et al.*, 2001). Creativity and learning becomes the centre of competitive advantages in this type of network because new information is generated and triggers innovation (Burt, 1990; Lazzarini *et al.*, 2001). This creates knowledge diversity.

The closure and brokerage networks facilitate different competitive advantages. To decide best resource generated from social capital depends fundamentally on the competitive environment itself (Sporleder *et al.*, 2002). The research showed agri-food supply chains are evolving from weak ties and sparse network to strong ties and dense network (Sporleder *et al.*, 2006). One reason to provoke the evolution is the growth of intangible assets in food products, especially the product brands. Furthermore, Powell (1990) suggested that an organization's network structure depends on relationships, mutual interests, and reputations. This type of structure highly utilizes and enhances the intangible assets such as knowledge and innovations. These two phenomena imply the emphasized role of social ties in agri-food chains and networks. Analysing these sociological concepts enriches the understanding of agri-food chains and networks. The networks comprising of interdependent agents are not only linked to economic contracts, but also to basic social relationships carrying human emotions that can be invested.

2.5 Information exchange

A network is an important source of information, and perhaps the most important source when the market is uncertain and its information ambiguous (Burt, 1990). A smooth *information flow* is necessary because of the earlier discussed transition (e.g. from a spot market environment towards a more collaborating alliance-based networking environment). Besides, the public's concerns regarding food safety and quality assurance systems bring in issues of tracking and tracing capabilities vertically along the chain. *Uncertainty* in the agri-food industry is caused by the perishable nature of products and the requirements of product differentiation. Thus, these shifts evoke the necessity of information sharing in different stages of the chain. The increasing value of information also indicates the change from tangible assets as the traditional basis of rivalry to the intangible assets as a new fundamental core value (Sporleder *et al.*, 2002).

2.5.1 Information sharing: connectivity and willingness

Fawcett *et al.* (2007) identified two dimensions of information sharing on supply chain performance. It is suggested that connectivity and willingness influence the operational performance and to be critical to the development of information sharing capability. *Connectivity* generally refers to the level of investments made on information technology that aims to gather, analyse and disseminate accurate and real-time information along the chain. But compared to connectivity, the dimension of willingness to share was often overlooked. The openness to

sharing relevant information honestly and regularly (Fawcett *et al.*, 2007) builds trust and creates a comfortable environment for sharing of sensitive information. It is said that the great determinant of information sharing is *trust* (Li, 2011). The importance of willingness was further affirmed by the poultry chain (Peng *et al.*, 2010) which was regarded as the potential support for the inter-organizational relationships.

The relationship related to the sharing of information with others is also referred to as a partnership (Yu *et al.*, 2001). Partnerships reduce uncertainty because information is flowing and transparent along the chain. This is the investment of intangible resources (e.g. a dedication of partners to a long-term orientation, trust and good-will) to facilitate information flow (Patnayakuni *et al.*, 2006). In practice, accurate and in-time information sharing is depending on ICT technologies. Through these technologies the physical flow is enhanced and empirical findings show that they reduce the inventory level (Yu *et al.*, 2001) and that they even lead to a reduction in costs for the whole chain performance (Patnayakuni *et al.*, 2006).

2.5.2 Information sharing measurement

Hsu *et al.* (2008) proposed three components to measure information sharing: *information system integration*, *decision system integration*, and *business process integration*. *Information system integration* refers to the exchange of knowledge with chain actors. The sharing of information contains both downstream market preferences as well as upstream brands and reputations. This exploitation of combinations of existing and newly created knowledge provides a foundation for competitive advantage (Sporleder *et al.*, 2002) as it aids coordinating transaction-related activities, thereby enabling the chain to serve final consumers in an effective way. *Decision system integration* aids with reducing uncertainty and thus provides visibility along the chain (Hsu *et al.*, 2008). This involves operations perspectives of information flow integration which then directly influence the flow of materials or information (Patnayakuni *et al.*, 2006). The shared information includes inventory-holding information and production and delivery schedules. The availability of operational information enables chain partners to achieve efficiencies through the improved allocated resources. Because of transparent information exchange, the cost associated with the variance in the upstream demand can be reduced. The access of information sharing requires the establishment of information infrastructures. *Business process integration* is the third component of information sharing and measures the capability of processing and transferring data amongst chain actors. The development of information technology has been one of the key drivers to enable the information flow (Patnayakuni *et al.*, 2006) as it allows data to be shared in a rapid and accurate manner.

2.6 Five Forces Analysis

Five forces determine the structure of the industry and influence the competitiveness of the sector. The five forces are: the *threat of entry* into an industry, the *threat of substitutes* to the industry's products and services, the *power of buyers* of the industry's products and services, the

power of suppliers into the industry, and *the extent of rivalry* between competitors in the industry (Figure 2.2). These forces determine the intensity of competition and hence assess the attractiveness of an industry (Johnson *et al.*, 2009).

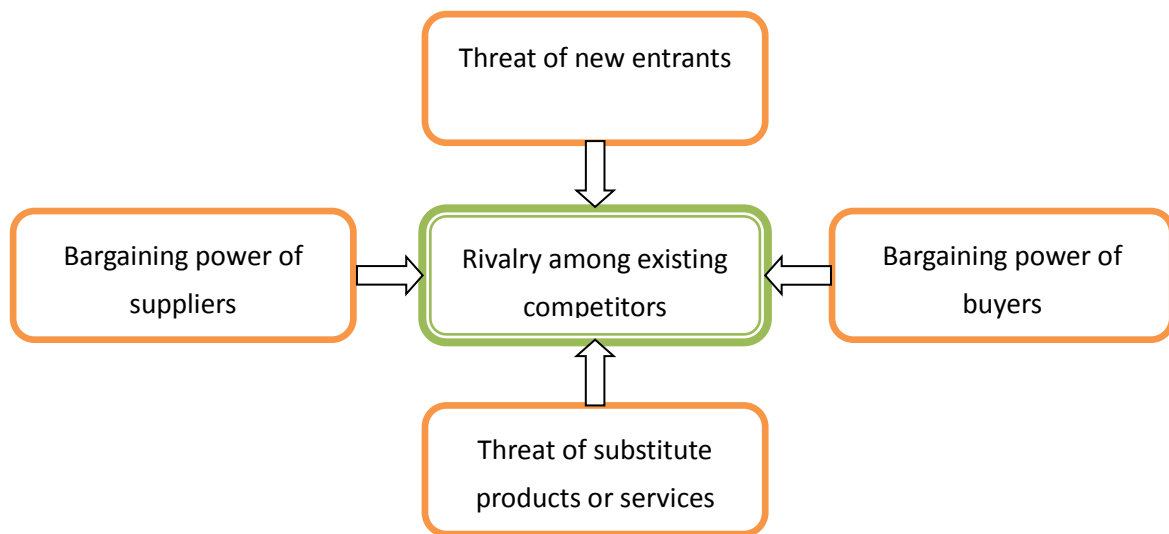


Figure 2.2. The five forces analysis framework.

Source: Porter, 2008.

The easiness of entering an industry influences the degree of competition. The *threat of entry* depends on the height of entry barriers. The competition is higher when the entry barriers are low. When the entry barriers are low, the new entrants expect little pressure from established actors and thus bring more competition. The barriers include economies of scale, customer switching costs, capital requirements, access to supply or distribution channels and restrictive government policy. When the *threat of substitutes* is high, the potential profitability of an industry is low. Such a threat occurs when there are alternative products that offer a similar benefit. These substitute products attract the market share and hence reduce the potential sales volume for current actors. The substitutes sometimes are easily overlooked because they appear to be very different from the industries' own products. Powerful customers can impose pressure on the price or other requirements in such a way that it is hard for suppliers to make profit. The *power of buyers* is higher when they have negotiating leverage relative to industry actors especially if they are price sensitive. High power of buyers likely occurs when the buyers are concentrated, when supplier's switching costs are low and when the possibility is high for buyers to have backward integration. Similarly, powerful suppliers capture more value by charging higher prices or limiting the quality of service. The *power of suppliers* is high when there are concentrated suppliers, high switching costs for buyers and when there exist a high probability to have forward integration. Finally, the *rivalry amongst competitors* describes the intensity of competition among established actors. A low barrier to entry increases the level of competition because of the increasing number of competitors. It thus drives down an industry's potential profits. A high degree of competitive rivalry is likely to be found when competitors are approximately of the same size, when industry

growth rates are low, fixed costs and exit barriers are high and where product differentiation is low. In sum, it is an attractive industry when entry is difficult, power of buyer and supplier is weak, substitute threat is low and the rivalry is less intensive. The important elements from SCM and industry analysis have been introduced. Next, the construction of theoretical framework is based on the relationships amongst these concepts.

2.7 Theoretical framework and propositions

Now a theoretical framework is built to match the orchid industry (Figure 2.3) alongside the performance measurement framework of Aramyan *et al.* (2007). Consider that for flowers that appearance identifies the importance of perceived quality. Flowers are mainly used for ornamental purposes and safety issues resulting from pathogens or other hazards is not a significant concern. It is proposed that the concepts have a direct and indirect impact on chain performance. Governance explores contractual relationships amongst chain actors. Information exchange includes the actor's ability and willingness to communicate along the supply chain. Social network provides perspective on informal aspects of relationships amongst partners and is regarded to strengthen governance mechanism and information exchange. The Five Force Analysis is used to assess the industries' structure with their respective determinants. The theoretical framework along with the propositions is thus illustrated in Figure 2.3.

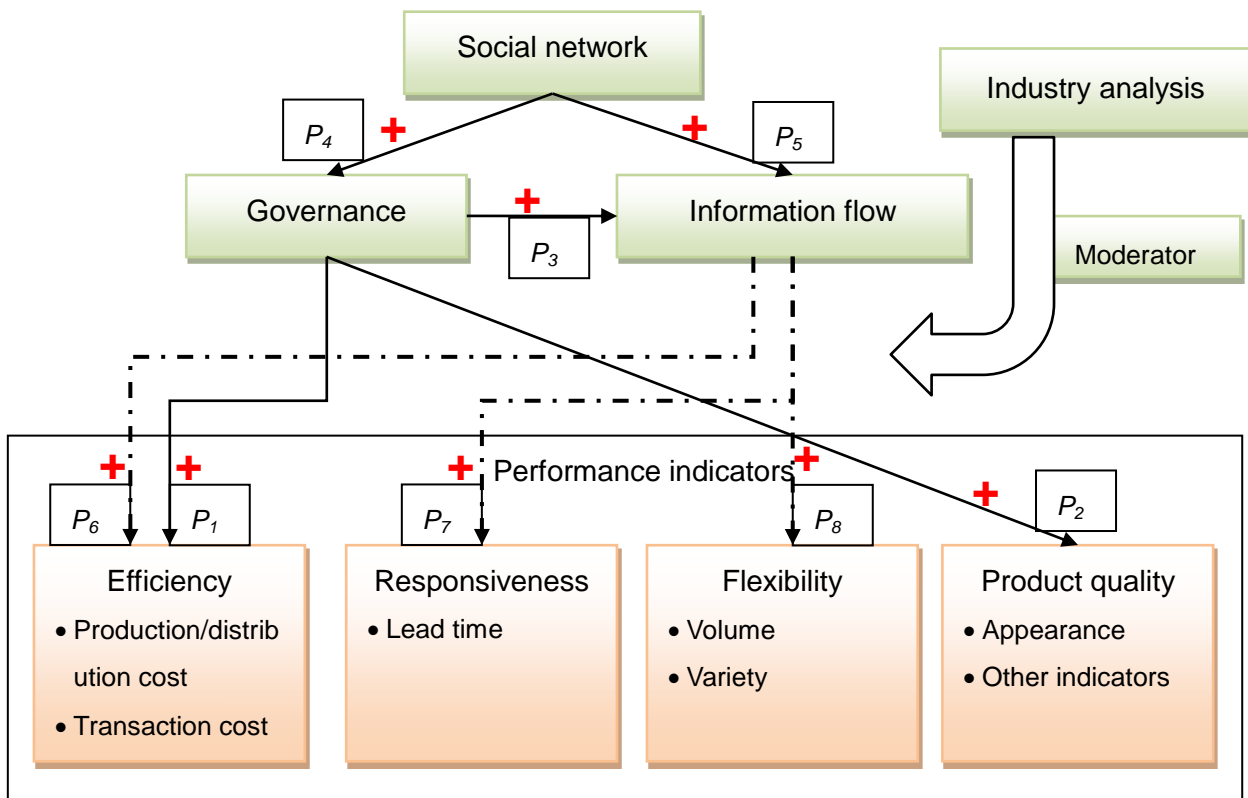


Figure 2.3 Theoretical framework.

P_1 : A higher vertical coordinated relationship positively affects supply chain performance

on efficiency.

When the chains are more vertically coordinated, the requirements on quantity, quality and other specifications are more specified. This can improve assets utilization by reducing the unnecessary waste on non-required products. Moreover, the transaction costs of looking for buyers or market information can be minimized. Therefore, if the type of vertical coordination is more formal, the supply chain cost will most likely be reduced. Subsequently, this increases the efficiency of supply chain performance.

 P_2 : A higher vertical coordinated relationship positively affects supply chain performance on product quality.

Owing to the nature of plants requires the actors to collaborate in both tangible and intangible flows. Take perishability as an example. The quality decays with the time after harvesting. Through the contracts, the indication on the delivery time can make sure the product flow is well connected. It is assumed that the governance structure has impact on product quality.

 P_3 : A higher vertical coordinated relationship positively affects information flow.

A strategic partnership with long-term orientation encourages the chain partners to trust each other and thus they are more willing to share information with each other (Patnayakuniet *al.*, 2006). The partners also dedicate more on sharing production, inventory data and delivery schedules by investing into linking information systems. A more formal contractual relationship enables the information integration along the supply chain, ranging from physical goods flow to intangible resources such as knowledge and market information. Thus, it is proposed that a closer contractual partnership facilitates information flow through the chain.

 P_4 : Social network reinforces the more coordinated relationships. **P_5 : Social network facilitates the information exchange amongst the supply chain partners.**

As contracts aim to coordinate chain activities, social network is emphasised as another mechanism to obtain coordination. Social network functions as an informal incentive for actors to build business relationship. This relationship generates trust through the belief of achieving mutual gains in the long-term. The expectations of the long-term partnership encourage the partners to have the joint decision making. Thus, this leads the proposition that social ties and reputations facilitate the more coordinated relationships among the chain actors (P_4). Furthermore, a willingness to exchange information openly and transparently amongst chain partners depends on the level of trust. If the relationships are perceived short-term and opportunistic, the partners may not choose to share information (Patnayakuni *et al.*, 2006). Hence, it is likely that the flow of information exchange is facilitated by a social network which is characterized by trust and by future gain (P_5).

P_6 & P_7 & P_8 : Information flow positively affects supply chain performance on efficiency (P_6), responsiveness (P_7) and flexibility (P_8)

Supply chain uncertainty arises when there is asymmetry information (Van der Vorst, 2000). The uncertainty can be reduced by accurate and fast flow of information. Such a flow helps decision makers to locate resources in an adequate way. A better planning can be designed to minimize the amount of materials and facilities used and other costs made in the facilitation of information flow. The chain performance on efficiency associated with production/distribution costs is thus enhanced (P_6). Furthermore, a more streamlined flow can be achieved, for example, through the philosophy of Just-In-Time (JIT). The accurate information on the product quality, quantity and timing of delivery reduces the time on waiting. In this sense, the higher level of information exchange amongst the actors increase the responsiveness in terms of decreasing the total amount of time (P_7).

The characteristic of seasonal market demand in flower industry requires the flexibility on volume and variety. For example, the high demand of flowers is clearly shown on holidays. The peak and low demand may bring the issue of demand uncertainty. The available information concerning market demand, and consumer preferences helps the supply chain partners in their decision making process. With the adequate information, the actors are assumed to be more able to adapt the volume and variety flexibility (P_8).

P_9 : Industry attractiveness negatively moderates P_1 .

One determinant of high industry attractiveness is when the power from buyer is low. It is because there are large numbers of buyers or the switching cost among the buyers is low. In this sense, the transaction cost of finding buyer is low. Even though there is no formal type of vertical coordination, the efficiency of transaction costs does not increase heavily. So the negative effect on P_1 is likely supported.

Chapter Three - Methodology

This chapter describes how the research was conducted. The chapter begins with the research design as a case study and then research strategies are introduced. Section 3.3 explains the construction of the research instrument. Finally, the reliability and validity of this report are discussed.

3.1 Case study

An appropriate research strategy enables a researcher to generate valid findings, a thorough analysis and logical conclusions. As a case study is designed to answer the “*how*” and “*why*” questions about *contemporary phenomena* where the researcher has *little or no control* over behaviour events (Yin, 2003), there I intend to thoroughly explore into *how* differences in chain performance could be explained by underlying causes in an orchid supply chain. Considering that the intensive investigation is exploiting multiple sources to acquire data, the case study approach is most suited to avoid manipulation of data through triangulation (Yin, 2003). In line with the main research question, sub questions were developed (first chapter) and linked to the methods that differ to collect data, taking into account availability of data related sub question.

Interviews were selected as a method because it guides this study to follow the line of inquiry to the depth of the questions. The complexity and interactions of direct and indirect links are interpreted through the eyes of the selected informants, by visiting the field sites. The opportunity using a direct observation approach is then created as a support to findings from interviews. Observation here involves watching and listening to events or phenomena as they take place (Kumar, 2005). Observing at an informal lunch meeting or the events in the fields manifests the interactions among sector stakeholders. This is particularly valuable for the understanding of social network.

3.2 Research strategies

The next section describes these three methods, documentation, interview and direct observation in details.

3.2.1 Research methods

The **documentation** method is to use existing documents as the source of information in different ways to have a general overview of the trading patterns and production status. It is also known as secondary data. This type of information plays an explicit role in case study research (Yin, 2003). There are three main categories for documentary data collection. The first one is *public records*. This includes credible statistics and official published documents from international organizations (e.g. ITC), national governments (e.g. COA, CBS, USDA), and authorities (e.g. FloraHolland, CBI). Secondly *academic research output* is applied by using some existing research studies that have already been done by others on the orchid industry

(Runko, 2007, Hew & Yong, 2004, Wei *et al.*, 2010). The validity of these sources may have been lost because of time differences. By asking confirmation from the respondents, through the interview approach, the validity issue is solved. The last one regards to the *mass media*. This classification contains newspaper clipping, community newsletter, industry journals and vast internet articles. Information encompassing various aspects from the market preference to production process can be relevant. The link with performance and five forces is obtained mostly by this method.

The second method, referring to **interview**, is to obtain the information with the structured queries. It is a conversation toward the researcher's particular needs for data (Green & Thorogood, 2004). The interviews used in this study are characterized by being open-ended, semi-structured and face-to-face. In this sense, it allows the respondents having enough time to elicit the answers with their subjective experiences guided by the predetermined topics. Having direct face-to-face contact with the respondents gives the interviewer a good position to judge the quality of the responses and interact on it immediately. The predetermined topics were constructed before the interview started. The formulation and the related concept behind the questionnaire are elaborated in section 3.3. The questionnaire was pilot tested by the first respondent, an expert. After that, the questionnaire was sensitized according to the expert's feedback. If topics in different sections would generate similar data they were eliminated so that the interview time could be kept to around one hour.

In-depth interviews are particularly useful when inquires emphasize deep and complex explanation to phenomena, rather than to generate broad understanding. Here it attempts to explore the underlying concepts and the impacts on chain performance. After collecting answers from both internal and external actors, the information generated constructs a deeper understanding of the topic. The interviews were recorded and transcribed into written documents for the next analysis stage.

The third approach to generate qualitative data is through **direct observation**. It is a purposeful and selective way of watching and listening to an interaction or phenomenon (Kumar, 2005). The intention here is to gain insight in the interactive behaviours among growers as well as with other actors. This took place when participating in seminars, informal meetings and after interviews. Through the natural occasions, the social ties and horizontal information sharing behaviours were observed. This reinforces the understanding of the concept of social network and information exchange from another perspective. However, this method carried out mostly in Taiwan as the opportunity arose. In the Netherlands, this drawback was supplemented by conducting an interview with an expert from the WUR specialized in producer organizations. In Taiwan, two fairs were visited (i.e. Taiwan International Orchid Show (TIOS) and Taipei

International Flora Exposition (TIFE)) during the months of March and April. All observations were recorded by making fieldnotes. The notes were worked out directly after finishing interviews, informal meetings and fair visiting. It recoded what the researcher observed, the first impression in terms of research questions, and the reflection on raising questions and the interactions. The notes provided abundant sources and were regarded as raw data that were recorded for later analysis.

3.2.2 Sampling

Unlike the quantitative method of picking up a representative sampling for whole population, a qualitative research does not attempt to quantify diversity in an issue (Kumar, 2005). Non-random sampling designs were thus used. *Purposive sampling* allows a researcher to select a sample based on respondents' specialist knowledge on the field. This sampling is very useful when the researcher wants to describe a phenomenon which is relatively unknown (Kumar, 2005). Respondents' were first selected by purposive sampling. They are considered important stakeholders on the horticultural chain, especially involved with orchids. The way to contact the first interviewee differed from each location. An association was such an important actor to exchange information along the chain in Taiwan. Therefore, the first attempt is to get connected with the Taiwan Orchid Grower Association (T.O.G.A.). In the Western part of this research, taking advantage of the learning environment, the researcher started by interviewing academic experts from Wageningen University and LEI institute. Another used sampling design is the snowball sampling, by using respondents' network. Having established first contacts interviewees were asked to suggest other persons for the later interviews. Then the introduced interviews were first conducted by telephone or email. After that, the appointments were made. The interviews carried out either in the offices or in the nursery farms. Most of the places locate in the national agricultural centres. The concentration of industry cluster is observed during field research. Additionally, to reinforce the understanding of the operation of agricultural associations in the Netherlands, a targeted interview was conducted with an expert in this field.

While sampling the growers, the first attempt was to look for the growers export the young plants. However, this is almost not accessible. Firstly, the young plants grower is very protective in the sector. Requests to interview these actors were rejected except for one. Second, The Netherlands is the major orchid supplier to Europe and therefore growers who supply finished potted plants were contacted. Three other interviews with such growers were carried out.

In the end, there were eight in-depth interviews conducted in the Netherlands and seven in Taiwan. They are either from public or private sectors. Considering the critical roles of Auction and associations in these two respectively areas, one interview with an expert from the auction and two interviews with experts from associations were carried out. The arrangements of

interviews are shown in the following Table 3.1.

Table 3.1. The list of interviews.

	No.	Institute	Position	Location
Academic and research centres		NL (3)		
	1.	LEI, research centre	Researcher, Chain performance section	Den Haag
	2.	Wageningen University	Professor, Horticultural Production Chains	Wageningen
	3.	Wageningen University	Assistant Professor, Management studies	Wageningen
		Taiwan (3)		
	4.	Floriculture research centre	Associate Researcher, Chief of Flower Environment Department	Yunlin
Auction	5.	National ChungHsing University	Professor, Department of Bio-industrial Mechatronics Engineering	Taichung
	6.	National Chiayi University	Professor, Department of Horticulture	Chiayi
		NL (1)		
	7.	FloraHolland	Manager	Naaldwijk
		Taiwan (2)		
	8.	Taiwan Orchid Grower association	Secretary	Tainan
Associations	9.	Taiwan Orchid Grower association	Chairman	Tainan
		NL (4)		
	1.	Grower	Owner	Nieuwe Watering
	2.	Grower (Young plant)	Manager	De Lier
	3.	Grower	Manager	Moerkapelle
	4.	Grower	Owner	Wateringen
Private sector		Taiwan (2)		
	5.	Grower (Young plant)	Manager	Tainan
	6.	Grower (Young plant)	Owner	Chiayi

Note: ¹The names of the private growers are omitted to ensure confidentiality.

² The details of the expert interviews can be found in in annex 3.

3.3 Operationalization of questionnaire

In this research, qualitative data collection was applied. The qualitative research is based on relevant relationships between the selected cases and their theoretical positions. Questionnaire is the instrument used in this report. Since the research uses the deductive reasoning to test the propositions, the questions should be able to relate to the theories in order to gather concrete investigation. In line with theoretical framework (Figure 2.3), the abstract theories were operationalized to the concrete components. Three selective supply chain concepts

accompanying with chain performance are converted into topics which may be raised in the interview. The steps in between are the formulation of variables and indicators. The construction of questionnaire is exhibited as Table 3.2, with the references for each concept.

The first part of questionnaire aims to gain an insight of how do the two chains perform in terms of the four categories (Table 3.2). Specifically, efficiency and flexibility are additional explained here. Efficiency is about costs. Instead of inquiring sensitive quantitative cost, it is expected to measure efficiency by inquiring the qualitative cost structure of each case. Flexibility asks the ability to adapt the volume and variety requirements caused by seasonal demand pattern.

With regard to the second part, it attempts to have the knowledge of the current situations in governance, social network and information exchange. Buyer-supplier relationship is firstly explored by indicating the market channel. In this way, the holistic exporting channel structure can be known. Secondly, the contractual relationship is the centre of governance structure in this report. So the use of contract and types of contract are imposed to the respondents. Social network starts with the questions regarding to the affiliation to the social relationships. Then, the importance of social network can be revealed by its influence on farmers' decision making process. In line with theoretical framework (Figure 2.3), information exchange can be identified by information infrastructure and information flow. Thus, the communication means including basic telecommunication and advanced information systems are put into the questions. Finally, semi-opened questions about information flow by three dimensions: willingness, timely and accuracy are also selected.

The questionnaire was developed for the purpose of interviewing. Two types of questionnaires were targeted for two different groups. The question one is for experts who are considered to have a broad and in-depth understanding of the chain (Annex 1). They have the knowledge about the relationships within the orchid chain or experiences in working with in-or-external orchid sector. The other questionnaire is for the grower, aiming at informants actually working in the nursery farms (Annex 2). The information from each interviewed grower is triangulated with other sources to make sure that it can be generalized with other farmers.

Table 3.2. Operationalization of the concepts.

Indicators	Variables	Operationalization
<i>Chain performance</i> ¹		
• Efficiency	Cost	<ul style="list-style-type: none"> What is the highest cost regarding to production process (Labour, energy, marketing, and transportation)? Is there any new technology to decrease the cost
• Flexibility	Volume	<ul style="list-style-type: none"> How to react any seasonal fluctuations demand in quantity?
	Variety	<ul style="list-style-type: none"> How many orchid varieties do you plant (Phalaenopsis, Oncidium, Cattleya, etc.)
• Responsiveness	Lead time	<ul style="list-style-type: none"> How many days are required to deliver flowers from growers to the foreign retailers
• Quality	Appearance	<ul style="list-style-type: none"> How do the consumer perceive the quality in terms of appearance (colour, size, one-/two-spiked)
	Other measurements	<ul style="list-style-type: none"> What are the other quality indicators
<i>Governance</i> ²		
• Buyer-supplier relationship	Types of market channel	<ul style="list-style-type: none"> To whom do you sell to for export purposes (exporter, wholesaler, auction, direct sale) Who is the most important buyer
	Power asymmetry	<ul style="list-style-type: none"> Certification/specification requirements from buyers (MPS, ICC, Eurogap, Organic, fairtrade) Specific investment for the buyer (certification, production system)
• Contract	Use of contract Types of contract	<ul style="list-style-type: none"> Do you use contract What types of contract do you use (written, verbal, no contract) What do you specify in the contracts (length, price, volumes, variety, frequency, certification, product specification, quality) Why using (certain type of) contract
<i>Social network</i> ³		
• Social relationships	Farmer association	<ul style="list-style-type: none"> What type of cooperation (production, transportation, and marketing) Why joining the farmer association (supports, the relationships with others, following others) Are there formal/informal meetings
• Decision making process	Influenced by other farmers	<ul style="list-style-type: none"> Where is the major source of information (buyer, other farmer, government, auction) Are the decisions influenced by other farmers
<i>Informationexchange</i> ⁴		
• Information infrastructure	Communication means	<ul style="list-style-type: none"> How do you communicate with the buyers (face-to-face, phone, email) Is it supported by any information system
• Information flow	Willingness	<ul style="list-style-type: none"> Are you willing to share information
	Timely	<ul style="list-style-type: none"> How often do you share information
	Accuracy	<ul style="list-style-type: none"> Do you have accurate information to react from the changing market or to support you to perform better

Sources:¹, Aramyan *et al.*, 2007;², Zhang, 2009;³, Lin, 2007;⁴, Peng *et al.*, 2010

3.4 Validity and reliability

Validity refers to the degree that the researcher has measured what he has set out to measure (Kumar, 2005). Two validity measurements can be distinguished. The first one is *internal validity*. Internal validity deals with the establishment of a causal relationship and that enables the researcher to draw conclusions from the results (Yin, 2003; De Vaus, 2001). The research method comprises three approaches to gather data. The three approaches, documentation, observation and interviews all *triangulate* on the same set of research. Different experts from different background as well as farmers are interviewed to give their insights to the questions. The answers from informants are analysed along with the documentations and field notes. Using various data sources is one way to make sure the data collection reaches high validity. The second one refers to *external validity*. External validity deals with the issue of generalization. A single case cannot provide a basis for valid generalization beyond that particular case (de Vaus, 2001). The results derived from the research are merely applicable in these two orchid chains. It is hard to be generalized to other sectors which may be under the same horticultural industry. However, generalizations are justified to be extended to other countries that show a strong exporting orientation of orchids, such as Thailand.

Reliability tests whether the operations of a study can be repeated with the same results under the same procedures (Yin, 2003). The report uses the interviews as the main method to collect data. Respondents interpret the phenomenon from their own perspectives. However, the perspectives may change over time when there is new information obtained. The documentation of questionnaire allows the researcher to gather data in the same way when conducting interviews. But this reliability is constrained by the characteristics of semi-structured questionnaire since the answers lead to different directions.

Chapter Four - Results

This chapter is mainly divided into three parts. First, the structure of the orchid sector is introduced, covering the production chain and exporting channel, followed by the Five Forces Analysis. The results of the orchid sector's structure and the Five Forces Analysis come from existing research literature as mentioned in Chapter Two. Secondly, the performance and current situation of governance, social network and information exchange in the Dutch and Taiwanese sectors are explained according to interviewees' perceptions. Thirdly, the analysis section is structured in accordance with the propositions.

4.1 Orchid sector structure

The supply chain and sector of potted orchids are the focal point of study of this report. The production chain involved with different stages and actors is described in the first part. Then the marketing channels of each case are shown in the second part.

4.1.1 Orchid production chain

Orchids were once a rare, tropical, and expensive crop. The contribution of advanced technology aiming towards high productivity had made orchids the floricultural species with the highest value (Griesbach, 2007). The current orchid sector has evolved from a hobbyists' market into a commercial market. Containing favourable consumer attributes, such as long flowering period and large assortments, orchids are increasing their market share (Runkle, 2007). In recent years, the orchids have increased the international trade both in volume and value. For example, there were 143.7 million Euros of *Phalaenopsis* sold in 2005 but the amount increased to 328 million Euros in 2009 in Dutch flower auction, the largest auction market in the world (AIPH, 2007; FloraHolland, 2011).

Phalaenopsis orchids are in year-round supply and commercial production chains can mainly be divided into three stages as indicated by Figure 4.1. One might notice that orchids are produced in different forms respectively and that they can be sold as a product during each production stage. This is a unique trait of the orchid industry. Moreover, the physiology of orchids requires a high temperature and humid growing environments during the cultivation stage. Yet consumption markets are located mostly in temperate areas, putting orchid production chains into the global context.

The first stage concerns breeding and propagation. The output of this stage is flasked plantlets of new varieties. The propagation stage is either through the methods of tissue culture (cloning from meristem) or sexual reproduction (Runkle, 2007). Orchid propagators tend to apply tissue culture for mass production because its advantage is that each meristem is uniform and thus plant variation during the cultivation period is minimized. The mericlone process is usually performed by breeding companies, especially in Germany, the Netherlands, Taiwan and

Thailand.

Among the four mentioned countries, **Taiwan** is particularly renowned for the innovation on crossing and improving orchids. Much of Taiwan's competitive advantage in the international competition comes from its ability to offer new varieties (Wei *et al.*, 2010). The advantage comes firstly from favourable climatic conditions that have made the country to be abundant in orchid biodiversity. Moreover, the historical fondness of orchids facilitates the interest for the development of varieties. In fact, it is the advantage of varieties prospers the development of the orchid industry (Wei *et al.*, 2010). However, the property rights of new varieties are not always granted back to the owner¹ (COA, 2011). Controversies of new varieties being propagated but its breeder losing the rights and royalties seem to occur regularly.

The middle stage is involved with the cultivation period, from young to finished plants. The cultivators in this phase are referred to as growers. Two phases are distinguished in the cultivation state. The first growing phase begins where the tissue culture process ends. The baby plants are transplanted from flasks into pots accompanied with growing media (Runkle, 2007). They are grown at warm temperatures to initiate leaf development. As soon as plants have a desired number of leaves and leaf span, they can be transferred to stimulate flower initiation. The second phase thus starts. During this phase, a low-temperature treatment is needed to control the timing for flowering. It then takes another 14-18 weeks and then the flowering plants are ready to deliver.

Orchids are worldwide distributed with the concentration in tropical and sub-tropical zones (Hew & Yong, 2004). It is thus suitable for growing in the sub-tropical or tropical areas. To meet the major consumers locating in temperate zone (i.e. Europe, US and Japan), the trend of importing the young plant materials before the second cultivation phase from (sub) tropical areas is formulated (CBI, 2007). The first reason behind it is the high energy consumption for the non-(sub) tropical growers. Growers situating in the area thus have the advantage of low energy costs. Furthermore, the relative small distance explains the growth in export of young plant materials instead of finishing plants. Comparing to flowering orchid, it is easier to transport young plants across long distances. Taiwan thus follows this pattern that it supplies the young plant material to the nurseries in importing countries. This has thus well explained why most orchids exported from Taiwan are in the form of young plants (COA, 2011).

In the Netherlands however, Dutch growers seem to be able to be involved with the entire cultivation stage without relying heavily on importing young plants. These growers use space

¹UPOV (International Union for the Protection of New Varieties of Plants) is an international organization to ensure its member will grant the breeders the property rights. Not being a member of it (due to the political issue) brings the competitive disadvantage (Wijnands, 2005).

optimally by using automated systems so that production efficiency can be increased (Runkle, 2007). The energy used for each product unit in the greenhouse is also reduced. In this way, Dutch growers take advantage of sophisticated production facilities to produce uniform orchids at lowest costs for labour and energy inputs. Actually, the Netherlands is the major producer of young plant material, as the demand for this material is directly related to the EU demand for finished plants from the Netherlands (CBI, 2007).

The last stage is the distribution to end market. In this stage, the finished flowering plants are either present as potted plants or cut flowers. After harvesting, orchids are packed and delivered through the distribution channels. In the Netherlands, the destination is mostly within the Europe (CBI, 2007). The transportation goes by cargo. Taiwan is an island country, located on the other side of the final market in South-East Asia. When considering the export channel, the time and means of transportation are limited by the geographic environment. The exporting products can only be conveyed by shipping and flights (Huang, 2006). Air transportation is common for perishable products. Flowering orchids and cut flowers are therefore usually delivered by this way. But young plants are heavy and are resistant to darkness, so sea transportation is an economic choice for growers. Besides the natural limitation, the distribution system is influenced greatly by the intermediaries. In the following section I elaborate further on the exporting channels as well as the involved actors.

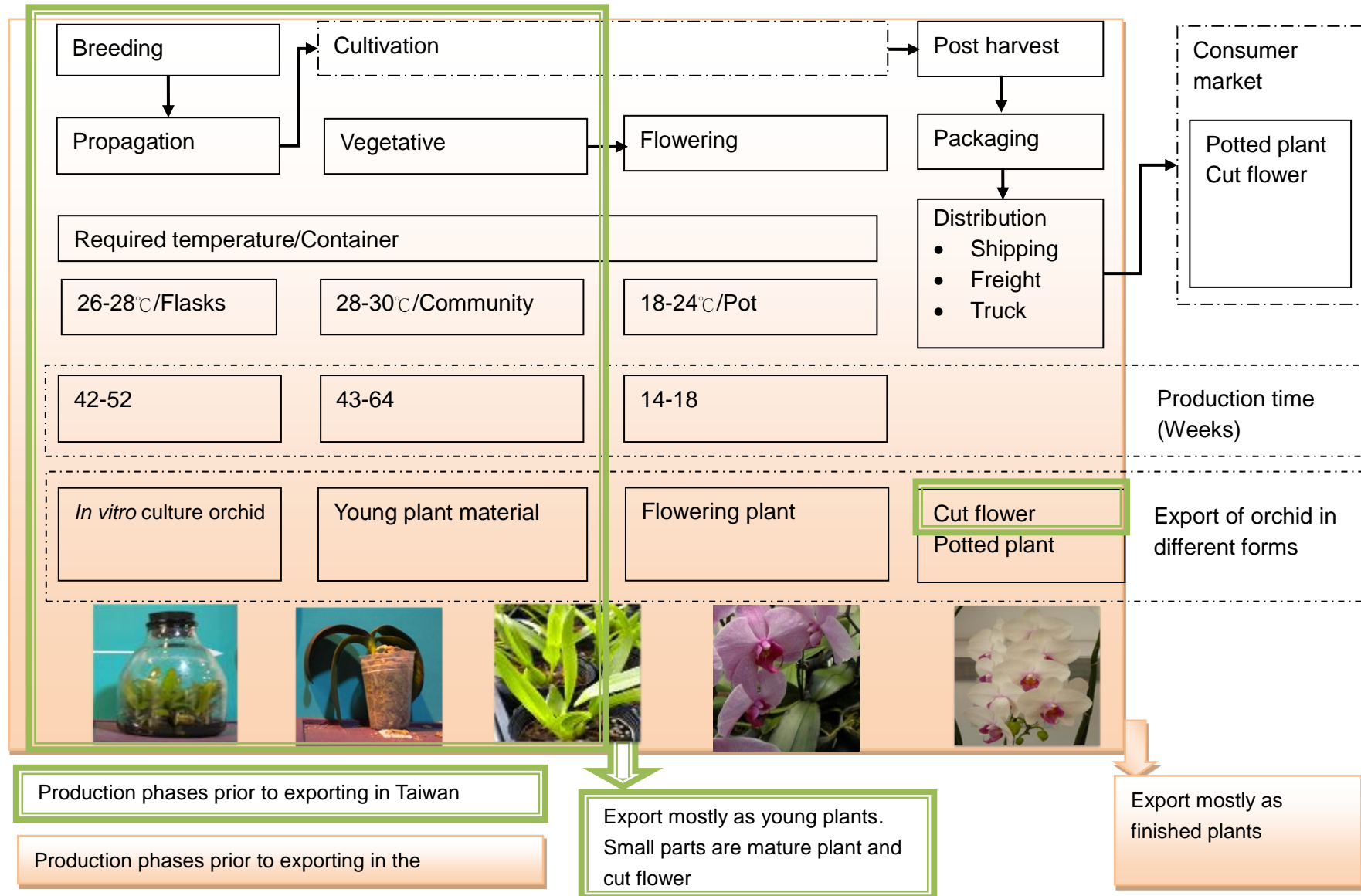


Figure 4.1 *Phalaenopsis* orchid production chain

Note: *Phalaenopsis* is the most dominant orchid in the world. Other potted orchid might differ in duration and temperature but basically the same production chain.

Source: Runkle, 2007

4.1.2 Exporting channel structure

Figure 4.2 depicts the exporting channels of the two cases. The various forms are produced respectively along the production system and then exported to international markets. The two supply chains distinguish each other from exporting channels and the forms to be exported. Potted flowering orchids are the main product to be sold in the Netherlands. The channel between growers and buyers (i.e. traders and exporters) is mainly through the auction (Claro, 2004). Two systems are offered by the auction for the flower sales, namely *Clock* and *Connect*. *Clock* is characterized by spot-market transactions while *Connect* is the direct deal with buyers (Claro, 2004). These two services distinguish themselves in the governance structure which is further elaborated upon in section 4.3.1. The direct channel with buyers but without the intermediate auction is also observed. Then products flow to foreign retailers for the final consumption stage. For young plant materials the channel is relatively simple. Dutch growers sell the baby plantlets to foreign orchid farms for the final cultivation stage. After becoming mature flowering plants they are ready to be sold to consumers.

Considering the geographic constraints and the nature of perishability, 79% of the orchid produced in Taiwan is exported in the form of young plant (COA, 2011). Large-scale growers can directly deliver orchids to foreign farms without exporters. Contrarily, small-scale growers rely on exporters for the market opportunities (Chen, 2011). Exporters may collect young orchids from several small growers and then trade to the foreign nursery. Sometimes large-scale farms function as exporters and bring together their own produced plantlets as well as from other farms. The collection from different farms raises quality issues of uniformity. On the other hand, finished orchids just go through the exporter and then reach the foreign retailer.

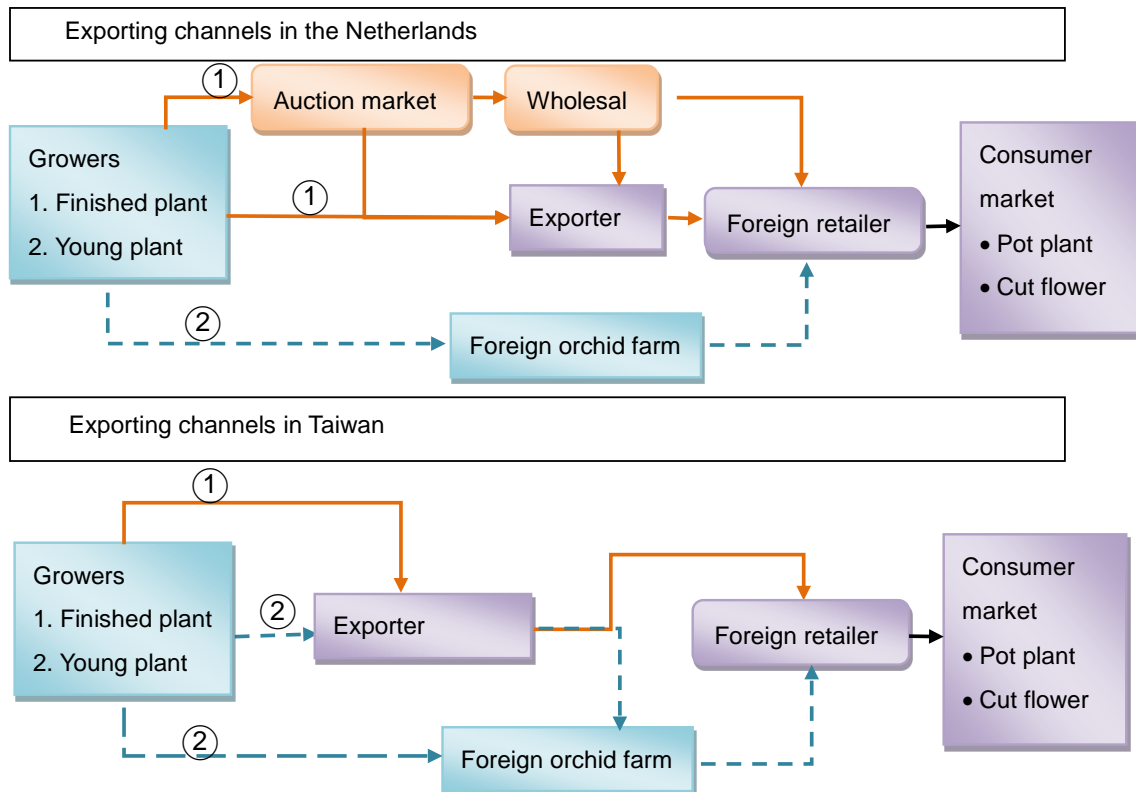


Figure 4.2 Exporting channels of orchids

Note: ¹ Cut flower orchid is not included in this study context, ² Straight line presents the product flow of finished plant; dotted line represents young plants.

Concluded from the production chain and exporting channels, the two chains vary in several aspects due to the climatic and geographic differences (Table 4.1).

Table 4.1. Main differences in production chain, exporting channel and natural environment.

Aspect	Dominant production stage	Exporting form	Distribution channel
The Netherlands	Cultivation stage High production efficiency	Finished plant	Leading role of auction
Taiwan	Breeding stage Abundant new varieties	Young plant material	Reliance on exporter/large-scale farm
Natural environment	<i>Climate</i>	<i>Location</i>	
The Netherlands	Temperate zone	Close to consumption market (i.e. EU)	
Taiwan	Sub-tropical zone	Far away from EU and USA	

4.1.3 Five Forces Analysis

The distinction between the two cases, which was made in the previous section in terms of production and exporting structure, also applies to the competition environment. This part analyses the external factors which shape the industry structure by Five Forces Analysis.

Threat of entry

Acting upon the expectation of a soon prospering orchid sector **in the Netherlands**, many horticultural farmers changed from other crops to orchids with the expectation of making a profit. The results of over-production were the drop of the price and low quality of the orchids. This was the case in the Netherlands before the year of 2009 (Chen, 2011). After the same year, new entrants stopped coming in because of production costs were high when nurseries would not reach economies of scale. Simultaneously, the incumbents continue to expand production capacity by advancing its production facilities. This has created barriers for new entry by setting up requirements for huge capital investments (e.g. capital needing to include costly land, greenhouse structures, highly automated systems). Therefore, currently new entrants in the Dutch orchid industry will need to face higher unit costs until they, with large-scale and highly automated production systems, reach similar standards comparable to those of their competitors.

On the other hand, only a relative few nurseries have the large-scale production² **in Taiwan**. The majority of Taiwanese orchid growers is hindered by a language barrier and (consequently) by a low access to distribution channels to reach the final market. Unless going through exporters and large growers, it will be difficult for Taiwanese orchid growers to reach final consumers. The current main challenge that new entrants need to face is to develop proper channels that allow them to bring their products successfully to markets. In other words, the access to supply or distribution channels thus becomes the main barrier for new competitors.

The threat of entry is also determined by other aspects, such as knowledge of products and product differentiation. A good knowledge on the physiology of orchids (e.g. flowering characteristics, growth cycles) is essential to improve the orchid quality and production process (Hew & Yong, 2004). Flowers are differentiated by unique varieties. Breeders are working innovative flowers in both chains so that new growers can have the advantage due to the proximity of them (Wijnands, 2005).

²The assumption is made based on the greenhouse area. 60% of the Taiwanese growers producing *Phalaenopsis* have greenhouse area less than 0.33 hectare in Taiwan (COGA, 2010).

Rivalry

As mentioned before, huge capital investments create barriers for new competitors to enter the orchid sector **in the Netherlands**. The initial investments became a fixed cost that is also shaping the competition amongst incumbents. The growers need to reach economies of scale to attain the unit costs. The large volume of product in the market leads to the increased competition for market share. Besides the high fixed costs on investment in machinery, one should keep in mind that buying plant materials are expensive (Wijnands, 2005). Production requires one to two years before produce can be sold. A grower would choose to remain in the sector even when it is not profitable, making the exit barrier on the short run to be very high (Wijnands, 2005).

The orchid sector appears to be attractive because of its industrial growth (Matsui, 2008). The average orchid acreage of nurseries continues to increase along with the market share. With approximately 150 growers, dominant producers are not present in the Netherlands. This is because every grower has the same opportunities to sell the products to the auction. This results in intense competition among the incumbents (Johnson *et al.*, 2009). The major reason still belongs to the presence of open distribution channels through auctions so that competitors have the same opportunity to access markets. An astonishing 47% of all *Phalaenopsis* greenhouse area in the whole of Taiwan is taken by only 6% of the growers (COGA, 2010). This shows that the Taiwanese orchid industry is heavily dominated by only a few entrepreneurs. The powerful farms are able to reduce the unit costs due to economies of scale and hold the exporting channel at the same time. Accordingly, the large growers dominate the sector. The difference of the two cases thus lies in the competitor structure.

Threat of substitutes

Orchids contain some outstanding characteristics that only a few other floricultural products can offer. The long-lasting flowering period of more than eight weeks is common for *Phalaenopsis*. There is a large assortment of colours and patterns along with a trait allowing easy-care that represents orchids' uniqueness (Runkle, 2007). Within the floricultural industry there is no other product that can compare to orchids. Moreover, the market for potted plants performs better than its substitution because the consumers perceive more economic value from its longer plant life (CBI, 2007). However, when the economy performs weak, the threat is external from the industry as consumers tend to spend money on daily necessities rather than on decorative products.

Power of buyer

Generally speaking buyers are sensitive to price. Buyers can easily shift among the fragmented growers in the Netherlands when they find a more price-competitive grower. This is clear when the trades are through Dutch flower auction where the transactions are facilitated. For Dutch growers, costs are low because the auction facilitates the transactional processes such as finding growers or contract enforcements. Nevertheless, buyers' price sensitivity decreases when a grower is able to provide high quality or unique varieties. Likewise, when a Taiwanese grower supplies the differentiated product in a reliable way, the buyer is not willing to switch amongst growers (Chen, 2011). A buyer might make a special effort to search for a supplier again in an environment where the buyer-supplier relationship can be based on the social network without legal arrangements. But the strong bargaining power of Taiwanese buyers mainly lies on the information that buyers could provide. The growers rely heavily on buyers' provision on the market preference or price information.

Concentrated buyers are not observed in both cases. One grower always works with several buyers at the same time and thus splits the total volumes to smaller portion. Backward integration to sources of supply is not expected because the sector is so specialised in each stage. But the move up closer to the ultimate customer is applicable by the cooperation among the growers. For example, the auction takes some step on marketing and distributing function, instead of merely collecting crops from the growers.

Power of supplier

Cooperation between growers increases the power of suppliers. This phenomenon can be observed **in the Netherlands** with the Dutch flower auction being a good example to discuss here. The grower-owned auction organizes logistics and sale processes on behalf of the growers (Bijman, 2009). It attracts numerous buyers, thereby creating efficient marketing opportunities for growers. With large quantities, the auction can bargain on costs, particularly on the transportation. It even integrates the forward activities, such as marketing and distribution functions. Forward integration is observed also in Taiwan but under different circumstances. Some large-scale growers are able to create direct contact with foreign growers without exporters (Chen, 2011). This places them in a better negotiating position with the foreign buyers without the interference of any intermediaries. However, the weak power of growers is still present because of a homogeneous characteristic of numerous growers (Johnson *et al.*, 2009). Buyers base their decisions mainly on price.

According to one perspective growers are regarded to be the supplier of the orchid chain. But from another perspective the most upstream actor is the breeder. Breeders play an important role in the floricultural chain as flower breeding is specialised work and requires high technology and knowledge competence (Wijnands, 2005). Breeders stimulate innovation by bringing in new varieties according to consumer preferences and they have the right to sell plant materials. Growers rely on their provision of material inputs as well as the cultivation consultancy (Anthura, 2007). Even though they are more concentrated by number, breeders and growers cooperate in such a way that new varieties are tested on growth cycles and fondness with consumers (Chen, 2011).

The summarized differences of the Five Forces are listed in Table 4.2. Except for the threat from substitutes, the two sectors appear to show different intensities on the forces. The attractiveness of Dutch orchid sectors is decreased because of high barrier for capital requirement, a roughly equal size of firms and a relatively low switching cost for buyers. On the other hand, Taiwanese orchid sector has a high threat from entry and strong power of buyer which also decreases the attractiveness.

Table 4.2. Main differences in Five Forces Analysis amongst the two cases.

Forces	The Netherlands	Taiwan
<i>Threat of entry</i>	High capital requirement	Access to supply or distribution channels
<i>Rivalry</i>	Intensive competition	Dominated by large grower
<i>Threat of substitutes</i>	Not strong, unless in times of financial crisis.	Not strong, unless in times of financial crisis.
<i>Power of buyer</i>	Low buyer switching costs	Reliance on buyer's information on market
<i>Power of supplier</i>	Cooperation between growers	Forward integration to exporters (for large-scale farms)

4.2 Supply chain performance

Four performance categories are analysed respectively in the two cases in this section. The categories are: efficiency, responsiveness, flexibility and quality. Some performance is closely related to the production chain. The section ends up with comparing main differences.

4.2.1 Efficiency

The high costs occurring in the production process are resulting from energy and labour expenses in Holland. Orchid cultivation requires warm temperatures to induce growth. For the Dutch growers, the energy cost on maintaining greenhouse in such a temperature is enormously high (Expert 2). Labour cost is also mentioned by the respondents (Grower 2). To deal with high costs, Dutch growers depend on high efficient greenhouse systems. As Expert 2 stated, *“Dutch growers focus on the efficiency by using greenhouse space optimally... and by using high-tech automation systems in cultivation”*.

But then, there is a different cost construction in Taiwan. Even though Expert 5 argued that there is no precise cost structure available in Taiwan, most respondents still indicated the cost mainly comes from transportation and production costs. *“Taiwan is an island, the export depend on air and sea freights to deliver products to faraway consumption markets”*, stated by Expert 4. The long delivering days induce high transportation costs, especially in the case of air freight. However, the technology breakthrough on sea transportation made it an alternative (Expert 4). In addition to the physiological resistance to the darkness of young plant, appropriate storage technology for a long transportation period had been developed. The cargo shipment by sea thus allows the young plants to travel for weeks without damaging the quality. The maritime transport has become more favourable for growers because of cost reduction (Expert 6).

The second major cost refers to oversupply. Unlike the contractual growers, Taiwanese growers have the tendency to produce orchids to meet the demand on spot markets. It is often followed by supply in excess. This situation is closely interrelated to governance (see Section 4.3.1) and also influences transaction costs. The unsold products increase production costs as well as transaction costs on finding buyers. Transaction costs are often overlooked in the sector. But its importance can be revealed by the fact that many growers have difficulties on finding right varieties to the right traders (Expert 5).

4.2.2 Responsiveness

Producing an orchid plant compromises time needed for production and transportation. The whole production can take two years from a baby flasked plantlet to a flowering orchid plant (see Figure 4.1). Taking into account the years on breeding and testing, a commercial cultivar may even take ten years to become an enjoyable houseplant. The commercial orchid production time is already introduced through production chain. But again, limited by the natural environment, the time to deliver the products is quite different from one another.

The flower sector is clustered around the auction locations (i.e. Aalsmeer, Naaldwijk). With the truck, the transportation time lies within a few hours to reach the auction or exporters after growers deliver the flowering plants. The longest time, said by the Expert 7, from auction to the farthest location such as Moscow or Italy is within three days.

The short transportation time is not the case in Taiwan. Depending on chosen means of transportation and selected destinations, the delivering duration varies from several days up to one month. First, the sea transport, *“mainly for young plants takes approximately one week to the nearby countries such as Japan and Korea while three to four weeks to the North America and Europe* (Expert 6).” Secondly, the air freight is sometimes used to deliver to neighbouring, Asian countries, requiring three to five days to send young plants (Expert 5).

4.2.3 Flexibility

The market in the Netherlands shows strong fluctuations of **volume**. In special seasons, such as Mother’s Day or Eastern demand strongly increases. The lowest season is during summer holidays (Expert 7; Grower 3). Growers know this according to historical figures or experiences. However, the orchid nursery requires a continuous manufacturing. *“It is difficult to decrease the production volume just in a short period of time in a year. The nursery is like the factory, with year-round supply. In this situation, less demand causes a low selling price. (Auction)Clock selling number during this period of time is by the way rising* (Expert 7).” When in the low season buyers’ direct orders is less, growers can just deliver the flowering plants to auction *Clock*. This channel thus plays a moderating role on the excess in supply. The second way to react from such fluctuation is by controlling the greenhouse temperature (Grower 3). By regulating the greenhouse temperature, it is possible to control the growth speed in order to avoid the oversupply in the market.

The far distances from consumption markets along with young plants oriented export, the production volume in Taiwan does not respond greatly from the market demand fluctuation (Expert 6). However Expert 4 argued that when an order comes on a short notice Taiwanese growers are well able to respond to various volume requirements. This is because the growers anticipate for situations of high quantity demand by tending to produce *more*. The resulting overproduction however increases the production costs but allows for flexibility in meeting quantity requirements in a short time span³.

³However, volume flexibility refers to the ability to change the volume but still in a profitable level (Aramyan *et al.*, 2007). Oversupply can be profitable only when it *happens* to be sold.

The most similar part on performance of the two chains is the **variety**. *Phalaenopsis* is the most dominant species amongst all orchids. Other types like *Cymbidium*, *Dendrobium*, *Oncidium* and *Vanda* are also indicated by growers. Within the species of *Phalaenopsis*, there are also large varieties created from hybridization technology. Generally growers mentioned that they are able to supply various assortments according to colour, size and number of spikes at a certain period of time. It can be noticed that Dutch growers tend to produce less varieties but instead reach a commercial production level of low mix and high volume production. On the contrary, Taiwanese growers are apt to have high mix, low volume cultivation (Expert 4). The difference is made because on the one hand, Dutch growers pursuit the economies of scale but on the other hand, Taiwanese sector has the tradition of innovation on new varieties.

4.2.4 Quality

The export of orchids from Holland is mostly in the form of finished flowering plants. Thus, the quality standards, according to the respondents are the appearance attributes such as no fading/wilting flowers, and some non-fully open bud (Expert 2). The same importance falls on the flowering characteristics like colour, size, and number of spikes (Expert 7). Even though the quality is perceived from young plant, still, uniqueness which means that young plant induce exclusive flowering characteristics is mentioned by grower 6 as indicator.

Naturally, the interviewees indicated the quality aspects more on young plants in Taiwan. However, the industry standards to measure young plants quality are not developed yet (Experts 4, 5, and 8). Yet, some respondents still named some quality indicators. One is the short growth cycle which shortens the production period (Expert 4). Expert 8 mentioned the other indicator to be '*consistency of what has been agreed upon*', referring to consistency between varieties characteristics and oral agreements.

4.2.5. Concluding remarks

The two chains show variance on each performance indicators (Table 4.3). Subject to the natural constrains, responsiveness in terms of transportation time distinguishes the two chains. The results of quality from young plant material and finished plant perspectives also reflect the difference substantially.

Table 4.3. Main differences of performance in the Netherlands and Taiwan.

Category/indicators	The Netherlands	Taiwan
Efficiency		
Cost	High energy and labour cost	High transportation cost

		Oversupply and high transaction cost
Responsiveness		
Transportation type	Truck (Within the Continent)	Shipping Air freight
Duration	Within three days	Shipping: one week to one month Airfreight: 3-5 days
Flexibility		
Volume	Low demand season in summer. Send plants to Clock, or control the temperature in greenhouse	No strong fluctuation.
Variety	Mostly only <i>Phalaenopsis</i> . Low mix, high volume production	Mostly only <i>Phalaenopsis</i> . high mix, low volume production
Quality		
Young plant material		Growth cycle Variety consistent with oral agreements
Finished plant	Appearance: no fading/wilting flowers, non-fully opening buds Flowering characteristics: colour, size, number of spikes	

4.3 Chain concepts in two cases

4.3.1 Governance

As described in the previous section, orchid production can be divided into several stages. In each stage, products differ in terms of form. In the cultivation stage, two phases are distinguished. For a better understanding of this section, growers involved in only the first phase are classified as 1st growers and when involved in the second cultivation stage are classified as 2nd growers. The contractual relationships in the Netherlands and Taiwan can be depicted through Figure 4.3.

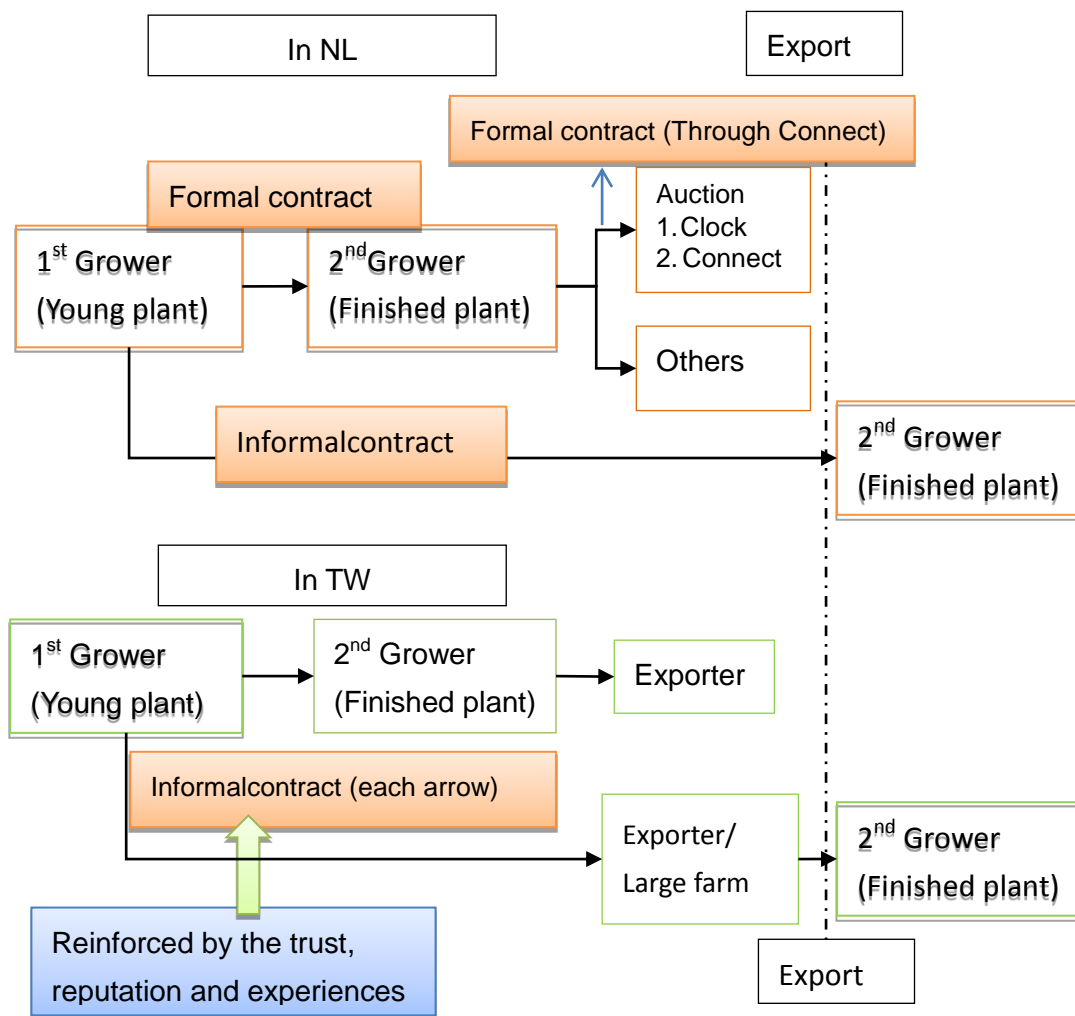


Figure 4.3. Contractual relationships among the actors.

In the Netherlands, 1st stage grower uses the formal (written) contract with the domestic 2nd stage grower. The length of the contract is, both mentioned by grower 2 and expert2 between one to two years. The contracts specify at least price, quality, quantity, varieties and product specifications. Nevertheless, when 1st grower export the young plants to foreign countries (e.g. Brazil), the informal agreement is the way to arrange the transactions. “*Unlike Dutch growers, they don’t have the habit to have contracts*”, expressed by Grower 2. Informal contracts in this context refer to verbal agreements. This verbal contract is agreed after the production plan has been made. For example, a 1st grower establishes a one-year production schedule based on the contracts he has signed with local (Dutch) 2nd growers. The 1st grower would then start to produce the young plants according to contract specifications (e.g. volume, quality, etc.). After six months of operation, a 2nd grower (i.e. a foreign buyer) would call and ask for the possibility of having young plants supplied. The 1st grower would supply if he has overproduced.

According to an informant from FloraHolland (Expert 7), 95% of all 2nd growers sell flowering orchids to or through the auction market. The Dutch flower auction is a cooperative and almost all of the Dutch growers of young or flowering orchid are members of the cooperative. There are two types of service that the auction provides. The first one is the renowned *Clock* system. It is a daily operational system dealing with supplying and selling. Growers deliver their crops to the auction site. After selling via *Clock*, the products are distributed centrally to the customers. The second type is an intermediary service, called *Connect*. The auction facilitates direct contracts between a grower (seller) and an exporter/wholesaler (buyer). The contract includes price, quantity, quality and delivery details of the product. The specifications of the contract are jointly determined by both sides. "There are two types of contracts that can be distinguished by their length. *The first one is one-year long and sometimes be as specific as dealing with seasonal requirements for public holidays. The other type is just within one single day. A buyer makes an order by fax or email in the morning on a daily basis* (Expert 7)".

Auction provides both the spot market channel (*Clock*) and direct marketing channel (*Connect*).

However, the figure shows that 82% of turnover of *phalaenopsis* in FloraHolland is through *Connect* service, according to Expert 7. It is also confirmed by Grower 1 that they tend to have the contracts with buyers because "*through Connect service, price is determined by the supplier.*" Moreover, the auction stimulates commitment to agreed terms by letting each grower have an indication record which is visible for auction members. Points are deducted from the indication record whenever false information is supplied or whenever a delivery is conform the agreement. This thus monitors the execution on the contracts (Expert 7).

Less popular and accounting for merely 5% of sales is when a 2nd grower sells flowering orchids directly to retailers (e.g. Ikea) through contracts or directly export products without any intermediary, like Grower 3. Joining farmer associations (e.g. Decorum) is another way to promote and sell jointly to the retailers as suggested by Grower 2.

In Taiwan formal contractual relationships amongst actors are not common. Verbal agreements or written agreements⁴ without the legal sanctions are ways growers use to trade with buyers. "*There is no tradition to have written contracts in Taiwan. If a grower requires a formal contract, he/she will lose the business,*" highlighted by Expert 9. Every

⁴A written agreement cannot be enforced by legal authorities while a written contract specifies the legal sanctions. An informal contract refers to a verbal and written *agreement*.

flow that occurs in Taiwan belongs to the informal contract type. The flows include transactions between growers and between growers and traders.

Several experts indicated that growers work according to two modes of production. The Make-to-order system (MTO) is when plants are produced after an order has arrived. The production is scheduled according to customers' orders on quantity, product specifications and delivery date. Secondly, growers produce flowering orchids before they receive orders, so not based on agreements but based upon their understanding of the market and their estimated demand. The grower's understanding and estimates is based upon information from their buyers, their peers and their experiences. This system is referred to as Make-to-stock (MTS) system and it is applied by the majority of growers.

The MTS system is closely connected with the nature of informal contracts. Because there is no regulated execution of the contract, the predetermined order, especially on quantity can be changed (Expert 4). In other words, the actual delivery is allowed to be different from what has informally been agreed upon. The deviation can be both due to the buyer's (e.g. during unfavourable market conditions less quantity would be required) but also the supplier's side (e.g. a lack of control over variation in production allows to supply only less-than-demanded). An example from Grower 6 shows how the buyer deviated the transaction from prior agreed quantity: *"An exporter ordered ten thousand plants from a MTO supplier and asked to deliver after six months. When the time is due, the buyer may require the supplier to deliver only seven thousand plants because of the change of market condition. As to the remaining three thousand plants, the supplier needs to search for other exporters by himself."* In this example given by Grower 6 the supplier had to search for other exporters lest the young, perishable orchids would go lost. Other experts added to the discussion by mentioning that for these remaining orchids growers would also sell at a lower price on domestic markets. Nevertheless, experts noticed that because of these deviations the information costs for searching for new buyers is increased (Expert 5; Expert 9).

Because of this loose enforcement of the verbal agreements, some exporters and growers lack any interest to try and agree upon orders in advance. The products are thus exchanged like in a spot market where transactions are non-negotiable and sold as they are on that moment. This generally happens among small-scale growers. They depend heavily on just those exporters or those large farmers that happen to search exactly those varieties of orchids that are offered. Taking this into account, some MTO growers do follow verbal agreements but they tend to produce *more* to satisfy any other

order coming on a short notice from the spot market Expert 4.

For orchid growers, the choice between MTO and MTS depends on the type of buyer-supplier relationship because *“When the relationship is long-term oriented, the partnership is generated. The grower thus tends to produce orchids according to the received orders (Expert 5).”* Thus, though a grower may start to produce according to MTS, as the relationship grows, the production may shift to MTO.

4.3.2 Social network

In the previous section the buyer-supplier relationship was viewed from an economic point of view. However, business exchanges are also involving the relational aspects amongst actors. The social network approach looks into the influences of individual behaviours on actors' interactions among each other. In a network each actor is connected with other actors. Actors are therefore both horizontally positioned through a network layer as well as vertically through one supply chain. So in this section both the formal and informal social network relationships are described.

In the Netherlands social networks are observed in the form of producer cooperatives. The auction itself is a cooperative. All respondents claim that almost every orchid grower belongs to the Dutch flower auction. *“It (the auction) takes care of sales activities, promotions, financial issues and marketing opportunities so that we rely on it very much (Grower 1).”* The expert from FloraHolland mentioned that another important service which the Auction provides is the sharing of transparent information regarding logistics. *“FloraHolland guarantees that every buyer receives quality. Aiming at this, the timely and accurate logistic information should be controlled very well ...It does not only track and trace the logistical flow, but it also puts controls over the appointments made between actors. The quick logistics from growers to exporters are very important,”* stated by Expert 7.

Even though the auction holds a dominant marketing channel, similar associations are observed to still facilitate forward integration in the orchid sector. One example is the umbrella institute *Decorum*, mentioned by Expert 1. Decorum is a marketing organization consisting of heterogeneous plant growers. The association takes care of the distribution process and the marketing to retailers using one uniform package. According to Grower 2 each grower can still have his own name on the package. The cooperation is facilitated in this social structure and also highlighted by Grower 2 *“The power from buyers is not so strong. I would rather say it is the cooperation. If we work together with other growers, the market share will increase which is beneficial for all of us.”*

Besides larger grower organizations, some smaller self-organized groups, consisting of 10 to 30 members, support processes for sharing production knowledge in the sector. This type of network is known as Study Club. *“The small group is formed naturally, mainly focusing on production technology,”* said Grower 1. The importance of Study Clubs on sharing knowledge is also emphasized by Expert 3: *“The most important determinant of formulating a Club is the homogeneity. This means that the group members grow the same specific crop. In this way, the knowledge of the production is possible to be transferred. The Study Clubs facilitate the knowledge exchange amongst its group members through visiting each other’s farm, sharing production techniques and learning from members’ experiences.”* Study Clubs are also supported by external facilitators, explained by Expert 1. For instance, DLV Advisory Group is often involved with Study Clubs. It provides consultancy services on how to optimize production technically and economically. Besides production knowledge, Expert 2 mentioned that Study Clubs provide an open space to share any information honestly so that market information is transparent. However, Grower 3 argued that some sensitive information such as price is the one he would avoid.

In Taiwan relationships building have a meaningful cultural implication. The network implies a strong social tie that formulates autonomous groups naturally. Expert 9 calls this type of group a Circle of Trust. A Circle of Trust, as suggested by its name, is established upon trust and commitment. The circle consists of both the horizontal ties between heterogeneous growers and their successive linkages along the value chain. The building of relationships is built and that facilitates the integration within the Circle. The following example indicates how the Circle operates: *“The growers produce different types or varieties of orchids according to their capabilities and facilities. In this way competition among the group members remains weak. The growers also work together vertically in terms of sequential production stages. Let’s say, Circle members A and B involve with 1st and 2nd phases of cultivation stage respectively. Grower B certainly purchases the young plants from grower A if A grows the one that B needs. They can be regarded as an informal alliance without legal regulations (Expert 9).”* The transactions among them are hardly arranged by formal contracts.

The implicit social network is clearly shown by the Circle of Trust. Even though not every actor is within one circle, the relational network still dominates marketing exchange behaviours, based on reputation in the sector (Expert 9; Grower 6). As stated from grower 6:

“The orchid sector is a small network in Taiwan. For instance, an exporter may have three types of supplier lists. Suppliers in type A belong to who always supply high quality plants and have good reputations. Type B is a bit inferior, but the quality is still acceptable. Type C lists those who are notorious for delivering poor quality plants. Everybody in this sector knows which suppliers belong to type C. They are the ones that the exporters try not to trade with.”

Being in the same Circle also determines the information that a grower can collect (Expert 9). A clear example was my participation in an informal lunch meeting with growers where the impact of the earthquake and tsunami on the Japanese orchid market was discussed. And later discussions moved to how to cope with certain consumer responses. Information shared here is not open to every grower but only to those who are in the same group.

There are still formal and large producer organizations (e.g. Taiwan Orchid Grower Association or TOGA) that may serve as an important connection point amongst growers. This is especially true when the market is so uncertain. The information that organizations spread has become to be perceived as reliable evidence taken up in the growers’ processes of decision-making (Expert 5). Moreover, these large producer organizations are like the brokerage organizations that exchange information among growers, government and the academic institutes. As stated by Expert 8, *“The grower association communicates the current market information and market needs on behalf of growers to the government. The related policies, activities or academic breakthroughs are transmitted to the growers from the other two parties as well.”*

Social network has different functions and different implications in the Netherlands and in Taiwan. One form is built on formal, horizontal ties and connects individual growers so that they may become one group and have a better position. Yet another form suggested here is that the social network has an important role in vertical ties as well by strengthening verbal contracts as well as serving as a source of information for the actors.

4.3.3 Information exchange

In the Netherlands interviewed growers emphasized the high importance of the information sources from buyers, the auction and other growers⁵. Except for growers that aim at knowledge exchange, the buyers and auction provide market information.

⁵Only Grower 4 works alone without any cooperation from other growers. He said to not exchange information with others, neither would he join any Study Club. He is called a free rider (expert 1).

The communication with buyers goes on a daily basis, through emails and telephones (Grower 3). *“Buyers also visit the nursery regularly, on a monthly basis, so that we can discuss about market preferences and future plans together,”* said Grower 1. The information flow is also facilitated through the flower auction. *“Through the auction, I can have timely and accurate information to react upon the market,”* Grower 1 stated. Moreover, information systems built by auctions contribute with real-time information sharing between supplier and buyer from an operational perspective. For example, a recent development on a logistic system called “KissIt,” is applied to track the products delivering phase (Expert 7). Price information through another system (i.e. Floanet) was also indicated by the Grower 3.

Strategic information sharing (e.g. demand forecasts) is also shared through collaborating actors. Breeders and growers work together by selecting on new varieties and flowering characteristics. Then, growers have informal meetings with buyers regularly to test the the new orchid varieties’ acceptance by the market. Downstream product information and upstream market preferences are thus exchanged (Grower 3).

In Taiwan long distances makes that growers cannot obtain market information directly. *“Because of the long distance with consumer markets, producers are not able to have direct contacts with consumers. Most of the exporting products are semi-finished orchids (young plants) which are delivered to foreign orchid farms for the final growing process. Only through the foreign orchid growers, it is possible to know which sales channels are used and how markets are responding. Information regarding orchids after they have arrived abroad becomes the most invisible and uncertain part for Taiwanese growers,”* explained by Expert 9.

Generally, systematic information infrastructure is not developed in the sector. The most common means of communication are through emails and telephones. The characteristic of industry clusters allows the growers visit other farms as well. Unlike in the Netherlands, the role of the auction in Taiwan provides little information regarding foreign markets⁶. Although grower associations still play a critical role by providing reliable information to its member, the main information sources for growers in Taiwan are from buyers and growers that are part of the same informal alliance, as highlighted also by (Expert 9):

“When the supplier-buyer relationship is based on the short-term, the buyer is not willing

⁶In Taiwan, the auction is domestic oriented. Only 10% of total turnover is related with export to foreign markets.

to provide information. Because it also happens that the suppliers easily be switched. But when they are in the same group, the relationship is strengthened. Buyers are willing to share the market information ... Information exchange among the growers is very common, but the openness depends on whether you are in the same group."

4.3.4. Concluding remarks

Summarised from the above-mentioned findings, the characteristics of the two sectors in terms of governance, social network and information exchange are present in Table 4.4.

Table 4.4. Differences in chain concepts between the Netherlands and Taiwan.

	The Netherlands	Taiwan
Governance structure	More vertical coordinated with formal contracts	Less vertical coordinated with verbal agreement
Social network	Formal network: auction Informal network: Study Club for knowledge exchange	Formal network: grower association Information network: Trust of Circle based on trust and reputation
Information exchange	Timely and accurate information from auction and buyer Auction facilitates information systems	Open information available from grower association Valuable information from informal network

4.4 Analysis

This section uses interview results and the literature review to interpret the relation between the concepts and performance by discussing the propositions one by one.

4.4.1 The impact of governance

Three relations are investigated here: efficiency, quality and information exchange.

P₁: A vertically higher coordinated relationship positively affects the performance of supply chains in terms of efficiency.

In the Netherlands, the use of contracts as a way to trade orchids was observed. *Connect* requires both sides to specify price and other aspects on a contractual basis, thereby excluding this service from the spot market (Hobbs, 1996). These formal contractual relationships decrease the information cost on searching for buyers, price and other specifications as well as the monitoring cost on ensuring the pre-agreed terms. This indicates a certain level of vertical coordination among the actors. In Taiwan

on the contrary, most transactions are governed by verbal agreements. The agreements are easily broken by buyer's own interests. The searching for its own interest without keeping the promises refers to opportunism (Bijman, 2008). Thus, the growers face uncertainty in price, quality and suitable partners. Monitoring costs are high because there is no legal enforcement on arranged agreements, raising the transaction costs.

The impact of formal contracts when designing a production plan is also explicit in the two cases. The execution of formal contracts with 1st growers or propagators ensures that growers receive the promised young plants in the right quantity and quality at the right time. When growers know the precise information of the materials, the production plan can be scheduled beforehand in such a way that all of the greenhouse space is used. The optimal use of every greenhouse unit is therefore reducing production costs. This is particularly the case in the Netherlands. In Taiwan, a grower may turn out to have produced in excess of what was required because in the end the buyer could violate the agreement. A grower may also grow his orchids in the hope that he receives an order but in the end may not receive any. As a result, the costs on production rise due to the waste of overproduction.

To sum up, governance structure likely has a positive impact on transaction and production costs. A more formal contractual relationship implies a reduction in transaction costs. It is because of reduced uncertainty over information and less room for opportunistic behaviours. Benefiting from the enforcement of the contracts, the production plan can be precisely executed. The costs on wastes such as space and overproduction can thereby be reduced.

P₂: A vertically higher coordinated relationship positively affects the performance of supply chains in terms of product quality.

For commercial orchid growers, predictability and reliability of flower production are crucial requisites (Hew & Yong, 2004). Predictability refers to the ability to predict the probable harvesting time by understanding and controlling the growth cycle so that the postharvest activities can be managed. Growers also rely on uniform (identical) and stable (continuous) supply of young plants for each batch. In this way, every plantlet can have a similar growth speed and flowering rate. Thus the quality on each flowering plant can be ensured.

When the vertical link is governed by verbal agreements, the obligation upon the agreed items cannot be guaranteed. Buyers thus face the uncertainty in finding stable suppliers. When the growers in Taiwan are not able to deliver the agreed quantity, a buyer needs

to search for other suppliers. It is always possible to have an adequate amount of plants but from different suppliers. Consequently, the quality may not be identical throughout all growers. This is causing inconsistency in the uniformity of plantlets from within the same batch.

Right quality aspects include delivering the desired flowering characteristics to the market. When the buyer-supplier relationship is based on contracts, growers follow the specialized quality requirements to grow plants. The contractual coordination is to ensure that the products are of right quality and quantity and that they are produced and delivered. This type of specification can be found in the formal arrangements between the growers and the buyers in the Netherlands. So the growers are able to grow what the market requires through the contracts.

In this line, a vertically more coordinated link between the grower and the buyer ensures that the quality is reaching the desired characteristic and uniformity better. The positive relation in proposition two is thus supported.

P₃: A vertically higher coordinated relationship positively affects information flow.

A partnership between a buyer and supplier is a long-term oriented relationship characterized by a process of trust development (Patnayakuni *et al.*, 2006). This kind of partnership facilitates the information flow through the chain. Formal governance mechanisms such as using contracts are thereby safeguarding the partnership. On the other hand, market information can be identified in contracts because product specifications are required. Information exchange happens in such a way that a contract contains the information on demand, time and price. In other words, a better information flow can be obtained through contractual provisions.

Buyers often have better information on market conditions than growers (Bijman, 2009). When growers are located far from the consumer market, the information obtained from buyers is considered valuable. The obstacle to access information is often caused by the distance but also by loose grower-buyer relationships. The common verbal contracts do not always guarantee the partnership by itself because they are easily broken by opportunism. Information flow is thus affected.

The positive impact of more coordinated contractual relationship on the intangible flow along the chain is likely confirmed as revealed by the two cases. A grower who has a higher coordinated relationship with the buyer through a contract can have better access on market conditions than the one who has a loose relationship with the buyer.

4.4.2 The impact of social network

The main distinction of social networks between the two sectors can be recognized by the formal and informal network constructions. In the Netherlands, the personal interactions are likely based on bilaterally agreements (e.g. joining the auction) while in Taiwan they are guided by common norms (e.g. Circle of Trust). Nevertheless, the impacts of social networks on governance and information exchange are observed with both formal and informal networks. Two propositions are explored in this part.

P₄: Social network reinforces the more coordinated relationships.

The informal agreement is the way to have vertical linkages in Taiwan. In fact, the process of formulating the agreements is greatly influenced by the construction of the informal network. The common use of informal contracts among the actors originates from traditions. Since there is no official enforcement upon the execution of agreements, farmers tend to do business with the buyers whom they *trust*. The trust is based on the buyer's reputation in the sector or the positive experiences with the buyer. This kind of agreement, called *self-enforcing agreement*, counting on social relationships thus safeguards actors against opportunism. Both sides expect a better-off future by supporting the continuous partnership. The choice for the marketing channel can be accessed on the basis of the social network. Negotiation and decision making processes concerning quantity, delivery schedule and others are more a more formal exchange relationships (Hobbs, 1996).

This type of network of social interactions which is constructed and reinforced through cultural rituals and interpersonal ties is called *community* (Gilchrist, 2000). These interpersonal relationships are strongly associated with trust which is generated through the threat of sanctions (Burt, 2000). This refers to the typical characteristic that is embedded in a closure network. It contains effective sanctions that make it easy for people in the network to trust one another and thus reduces the effects of opportunism and uncertainty in verbal agreements.

Social network influences governance in terms of vertical integration in the Netherlands. The formal network of producer cooperatives may display forward integration with successive actors. For example, the auction takes care of post-harvest activities on behalf of growers and has been considered to be an essential organization for providing marketing opportunities (Bijman, 2009). *Decorum* brings the processing (i.e. packaging) and marketing activities together under the grower owned organization. Since it has a direct channel with the retailers, it bargains with customers over the price. In this way, it

strengthens the bargaining, such as negotiating contracts with buyers and increases the produce power of quality branded products by jointly selling orchids (Bijman, 2009). A more vertical integration chain is observed through the formal social network. The emergence of intra-industry coalitions of firms is a typical example of a *dense network* phenomenon (Lazzarini *et al.*, 2001).

Concluded from the findings, the positive impacts of social network on the more coordinated chain relationship are likely confirmed in the case of both the Netherlands as well as Taiwan.

P₅: Social network facilitates the information exchange amongst the supply chain partners.

Selecting optimal decisions depends on the available information. When the market situation is ambiguous, people use their social network as the best available source for information (Burt, 2000). The role of the auction is particularly emphasized from this perspective in the Netherlands. The auction provides various types of information to growers. It includes current industry trends and market analysis, consultancy of market opportunities, and sales statistics (FloraHolland, 2011). By having these types of information collected and exchanged, growers obtain genetic market conditions as well as specific requirements of some customers. The information also flows upstream. The grading system and quality control methods reveal hidden information about product quality to the customers (Bijman, 2009). The indication record system designed by auction safeguard the information transmitted by growers is precise. This information exchange reduces the effect from asymmetric information.

Network also creates value by facilitating processes of learning through its members' interactions with each other and with experts (Lazzarini, 2001). Dutch Study Clubs are aiming at this function and operate well when sharing production experiences. Study Clubs facilitate processes of information exchange around cultivation practices and of learning through visiting other production sites of group members and getting acquainted with their experiences. Through sharing and exchanging, industrial specific knowledge is further refined. The engagement in *knowledge exploitation* generates competitive advantage from this dense network structure (Sporleder *et al.*, 2002).

On the other hand, it is crucial for an individual in Taiwan to be involved with a social network for accessing market information. As the closure network generates trust, the actors are more willing to share information. Applicable to the Taiwanese case is when buyer-supplier relationship are encompassed in the Circle of Trust, buyers are more

willing to share information with the partners. This special relationship between people is also referred to as “*guanxi*” in literature (Fan, 2002). Guanxi is a social investment to access the resources of the network. It suggests strong social ties and high connectivity. Much of the capital is embedded in guanxi network which creates social capital.

These findings of a positive impact of social network upon information exchange amongst the studied actors support the proposition. The large producer cooperatives provide open information for their members but the access of specific information still depends on the groups that a grower is affiliated with.

4.4.3 The impact of information exchange

As explained in the previous sections, information exchange is greatly influenced by the governance structure as well as the social network. The analysis of propositions 6, 7 and 8 are presented below.

***P*₆: Information flow positively affects supply chain performance on efficiency.**

The lack of information sharing and the resulting information asymmetries leads the chain into operational inefficiencies and transaction risks (Patnayakuni *et al.*, 2006). As aforementioned, the production efficiency can be achieved by contracts with accurate information (section 4.4.1). Transaction costs can be reduced by pre-agreed marketing arrangements as well as informal incentives from social network. Moreover, the knowledge shared in Study Clubs can improve productivity. Through the contractual relationship and the social network, information regarding buyers, markets and cultivation can be accessed. In this way, the impact of information flow on efficiency is seemingly confirmed.

***P*₇: Information flow positively affects supply chain performance on responsiveness.**

The information systems facilitated by the auction monitors the logistic flow of the products. The accurate timing can make sure that the connections amongst actors are tight. The concept of JIT is thus applied here: to decrease the transport and waiting time (Chambers *et al.*, 2007). However, the reduction of the lead time is not observed in this case. One possible explanation is due to the proximity between the suppliers and growers. Because the duration of transport lie within several hours in the Netherlands, the effect of time reduction through information flow is not clearly shown. On the extreme point, the long lead time in terms of delivery duration is limited by the distance. Concluding from the statements, information flow positively affecting responsiveness is not likely supported.

P_8 : Information flow positively affects supply chain performance on flexibility.

Considering the non-stop production characteristics, the ability to change the output level in a short notice is difficult. Results show that volume flexibility can be known based on past experiences, instead of upon market information. Information carrying market demand can influence the suppliers' decision on planting the various varieties. This is especially true when the varieties are specified in the contracts (NL). The information may also come from the other growers (TW). However, one should notice that the *ability* to have the varieties rely also on the availability of the young plant (or flasket plantlet) and the specific cultivation knowledge of those specific varieties (Wijnand, 2006). Still, the positive relation between information flow and variety flexibility is likely supported. In summary, the impact of information flow on *variety* flexibility is supported but the impact of information flow on *volume* flexibility is not likely supported.

4.4.4 The impact of industry attractiveness

P_9 : Industry attractiveness negatively moderates P_1 .

Regarding the industry attractiveness, this proposition is answered in terms of the power of buyer. Strong bargaining power of buyers brings down the industry attractiveness. The orchid flower industry contains numerous homogeneous growers with relatively concentrated buyers. This suggests that the bargaining power of buyers is strong. Buyers are able to switch suppliers easily. Facing uncertainty, growers tend to have a safe relationship with buyers on the marketing channel. This encourages coordination in the hope of reducing transactional uncertainty. The common use of contracts by guaranteeing orchid sales in a certain period of time balances the bargaining power of buyers (Claro, 2004). Therefore, the strong power from buyer evokes a more coordinated relationship by using contracts to control transaction costs. The ninth proposition (P_9) is likely supported in the Netherlands.

On the other hand, buyers' willingness of switching among growers decreases when the grower is able to provide high quality or unique varieties (Claro, 2004). Likewise, when a Taiwanese grower supplies the differentiated product in a reliable way, the buyer is not willing to switch from the grower (Chen, 2011). This also suggests that a more coordinated relationship is necessary to respond to more demanding requirements.

4.4.5 Concluding remarks

Concluding from the analysis, the propositions are either supported or not. Broadly speaking, governance and social network are highlighted in the performance indicators.

They work in different ways in the two cases but suggest the similar direction of impacts on the performance. The only distinction of the two places is because of the different industry structure. Overall, Table 4.5 presents the analysis of propositions.

Table 4.5. Summary of the propositions.

Propositions	Results
P_1 :Governance->efficiency	Supported
P_2 :Governance->quality	Supported
P_3 :Governance->information flow	Supported
P_4 :Social network->governance	Supported
P_5 :Social network->information exchange	Supported
P_6 :Information exchange->efficiency	Supported
P_7 :Information exchange->responsiveness	Not supported
P_8 :Information exchange->volume flexibility	Not supported
P_8 :Information exchange->variety flexibility	Supported
P_9 :Bargaining power of buyers-> P_1	Supported (in NL)

Chapter Five – Discussion and Conclusion

5.1 Discussion

5.1.1 The role of social networks in Taiwan

Along the governance continuum, hybrid forms are most prevalent in the agri-food industry. Contracts belong to one of the hybrid structure. Some authors taking an economical point of view point out that informal contracts are closer to market-based coordination than formal contracts (Raynaud *et al.*, 2005). Others argue that formal and informal contracts are governed through authority and social mechanism respectively (Bijman, 2008). Patnayakuni *et al.* (2006) even suggested that the buyer-supplier relationship does not need to be governed by formal contracts. In fact, both formal institutes and informal ones influence transactions when social theories are taken into account. In this report, I elaborated on the current governance structure in Taiwan and its impacts.

One fundamental factor that leads Taiwanese orchid sector into the use of informal contracts can be the culture of strong social relationships. Actually, agricultural contracts are always simple and oral (Bogetoft *et al.*, 2004 in Bijman, 2008) because oral agreements are respected. Social relationships are considered to be investments which generate transaction opportunities and access to information. Relational investments go beyond the legal authority. The role of formal regulations thus becomes smaller and it does not drive the governance structures towards more formal contract form. The best way to monitor transactions is therefore certainly influenced by cultural considerations. Guo *et al.* (2005) also pointed out that contracting farming tends to bypass the small-scale producers and that may give another reason why Taiwanese growers do not use contracts.

5.1.2 The role of auctions in the Netherlands

The importance of Dutch flower auction goes without saying. It can be seen as a marketing institute (Wijnands, 2005) and information centre. Growers can focus on production because the distribution and information functions are provided by the auction (Bijman, 2009). A grower in the Netherlands that aims to supply orchids on the spot market through the auction faces little uncertainty in finding buyers. But this certainty is lacking in Taiwan as it does not apply to the grower producing according to MTS. Furthermore, the Dutch flower auction is a prominent market place which attracts numerous international buyers. Having the limitation by a relatively small population, Dutch growers can deliver their products in an international scope through the help of

the auction. In summary, the role of the auction significantly influences the orchid sector and the sectors development in the Netherlands. It involves with transactional behaviours and brokerage of information which has direct association with the three main concepts discussed in this study.

5.1.3 Unique industry conditions

Although this report takes the environmental factors into account, it is important to note that the two industries are in different industrial growth stages. The orchid is one type of floricultural crops in the well-developed Dutch floricultural industry. Even though the orchid is an emerging crop, Dutch orchid growers can easily follow patterns which already exist in the industry. The best example is the marketing channel provided by the auction which attracts enormous trades each day. In the contrary, the orchid sector in Taiwan is one of the most export oriented ornamental crops. The sector is still in its initial step to the maturity stage. That might explain the difference in information infrastructure.

5.2 Conclusions

Increased internationalisation and competition in the orchid industry steered the initial motivation to bridge the knowledge gap concerning the relationship between chain performance and constituting factors. The main concern has become facing uncertainty, meeting changing growing requirements, and gaining sustainable advantages from the chain (vertically) and network (horizontally). Using concepts from different scientific disciplines the following research question was established:

“How do governance, social network, information exchange and industry attractiveness explain differences between performance of the Dutch and of the Taiwanese orchid chains?”

In order to answer the main research question five sub research questions (SRQ1 - SRQ5) were logically derived in order to answer the main research question. The literature review is the result of answering the first two sub questions (SRQ1 and SRQ2) and generated theoretical knowledge that guided the empirical investigation. These questions are:

- 1. What conceptual elements relate governance, social network and information exchange with chain performance?*
- 2. How do governance, social network, information exchange and industry attractiveness affect each other and affect chain performance?*

The literature goes through the elements of transaction cost and vertical coordination

that constitute the governance concept. Acknowledging the importance of network theories, social relationships, social ties and network structures are explained. The concept of information exchange is elaborated upon using the connectivity and the willingness dimensions. A wider perspective that reaches in the external environment of the supply chain, Five Forces Analysis was conducted to determine the industry attractiveness. From this body of theoretical knowledge a set of propositions was generated to specify the relations between chain performance and the four mentioned concepts. Chapter Two can therefore be seen as a systematic attempt to answer SRQ1 and SRQ2.

To answer the main research question an empirical study was conducted upon the orchid industry. SRQ3 to SRQ5 concern the empirical investigation and test the theory and industry. What systematically follows here are the conclusions to answer the three empirical research questions, starting with SRQ3:

3. What are differences between performance of the Dutch and of the Taiwanese orchid chains?

Four performance categories are evaluated in the two chains. Firstly, **efficiency** is determined by measuring costs. The orchid sector in the Netherlands faces high energy and labour costs during production processes. Expensive energy costs are due to the requirement of warm temperature during the growth of the orchids. Taiwan has the advantage of a suitable climate but bears huge costs on transportation. Low performance in terms of efficiency is also indicated because of overproduction and transaction costs on finding buyers and markets.

Secondly, two chains perform distinctively different in terms of **responsiveness** by measuring transportation time. For a Dutch flowering orchid plant it takes at most three days to arrive from growers to markets. In Taiwan, delivering young plants by maritime cargo requires one week (to Asia) to one month (to America and Europe).

The third performance category **flexibility** is viewed by two indicators. Reacting strongly from market demand fluctuation, Dutch growers modulate the *volumes* in the low season by sending finished plants to auction *Clock* or by regulating the greenhouse temperature. In the other case, Taiwanese growers are not greatly influenced by the market requirements in terms of volume because it supplies mostly young plants. The other indicator measures *variety*. *Phalaenopsis* is the leading species in both cases. The distinction between the two is that Dutch growers have the efficient production reaching large volumes but with fewer varieties whereas Taiwanese growers have

hybridization skills on cultivating various varieties but in low quantities.

The last performance deals with **quality**. In line with the different forms of export, the Dutch orchid sector recognized quality standards for flowering plants on appearance attributes (e.g. fading flowers) as well as on the flowering characteristics (e.g. colours, size). Even though there are no standardised measurements on the quality of young plants, short growth cycles and consistency are still indicated.

4. How do the governance, social network and information exchange affect performance of the Dutch and of the Taiwanese orchid chains?

Dutch growers use formal contracts to formulate economic transactional behaviours with their buyers. The predetermined agreements on price, quantity, quality and other items decrease growers' transaction costs on finding information and buyers. Moreover, because contracts are executed, the production can run exactly as it has been scheduled beforehand. The good connection of each batch can eliminate the wastes associated with space and time. In this way, the production efficiency is improved. On the other side, the governance structure belongs to verbal contracts in Taiwan. But then the agreements are not always enforced on the agreed quantities. This leads to the overproduction because the actual delivery might be less than the agreed one. Then the growers take efforts to search for other buyers to sell the excess of supply. Production costs and transaction costs are therefore negatively impacting performance of the orchid chain in Taiwan in terms of efficiency.

The establishment of contracts affects Dutch growers' decisions when selecting orchid varieties to be produced. In this way, quality is ensured because the production is according to the market demand. The governance structure also affects information exchange. The coordination facilitates information exchange on aspects that can be specified through contracts such as market preferences (e.g. size, colours), the delivery schedules and prices. On the other hand, the relationships governed by verbal agreements do not guarantee a long-term orientated relationship in Taiwan and that lowers down the information exchange along the chain.

The direct impacts of social network on chain performance are not discovered. However, its influence is shown on the more coordinated governance structure and the provision of the valuable information to the members. When both sides are satisfied with the transaction, the grower will aim to become more efficient by shifting MTS into MTO. Hereby, the grower and buyer will informally agree to let the relationship become

long-term oriented. From now on relational investments will drive both parties to monitor and enforce the agreements of the transactions because the relationship itself has become the object of the unwritten sanctions. Relationships governed by verbal agreements in Taiwan are still accessing similar pieces of information that the auction would provide in the Netherlands. This information flow goes through social networks.

The last finding of the impact is the relationship between information exchange and variety flexibility. The ability to have various assortments according to market expectations lies on the accurate information.

5. How does industry attractiveness affect performance of the Dutch and of the Taiwanese orchid chains?

The industry attractive is influenced by buyer power. Buyers are easily able to switch among the growers. To sustain the market channel, growers choose to have the contractual relationship (NL) or differentiate themselves from homogenous suppliers (TW). The efficiency and product quality aspects are thus influenced.

As concluded from the last sub question, we can now answer the main research question. Chain performance on efficiency has a relationship with governance and social network. In fact, the difference on efficiency can be interpreted in the context of the role of governance in the Netherlands and of the role of social network in Taiwan. In the Dutch case, production and transaction efficiency is achieved because of the execution of formal contracts. Governed by the contracts, actors commit themselves on predetermined agreements and that formulates transaction behaviours. In Taiwan however, the underlying social relationship shapes the economic exchanges. In other words, it is the respect on informal networks so that actors can depend on relational contracts. Instead of facilitating the obligation on agreed quantity, social network mechanisms reinforce the information and social benefits, allowing a reduction of transaction costs for both parties. From the perspective of industry attractiveness, high buyer power drives growers to seek for more coordination in order to lower down transaction costs. The high production efficiency is continuously improving so that an entry barrier for new competitors is built.

With regard to quality as a performance indicator differences in types of orchids are seen between flowering orchids and young plant orchids. Despite these categories, different forms of governance also lead to different performance as bad quality also suggests a non-uniform quality of each batch. In the Netherlands, the production is

scheduled in accordance with agreed contracts, leading to more homogeneous quality within a delivery of one consignment. Contrary to that, the inconsistent quality of exported young plants exported from Taiwan is because the economic exchanges are regulated by informal agreements. The dependency on the buyer for market information and for distribution access strengthens the buyer's power. This implicitly evokes the development of product differentiation which may be an indicator of product quality.

Chapter Six - Recommendations

The final chapter starts with the description of the limitations of this research, followed by the suggestions of future research. Then the theoretical contribution on the concepts used in this report is present. Lastly, the chapter ends with the managerial recommendations.

6.1 Limitations and future research

The results should be considered by the following limitations with suggestions of future researches.

Firstly, the focus domain of this report is the orchid sector. Although horticulture is a prominent industry in the Netherlands, there is lack of experts who have specialised knowledge regarding the orchid chain. Even the topic is made clear, some findings from external experts may be generalised to the other horticultural products without the specific considerations on the orchids. A future research on baseline study on the Dutch orchid sector will provide a more solid knowledge of this sector.

The qualitative research does not give any number indication. Therefore, that does not give convincing evidence that one performance is better than the other. The conclusions can only be drawn from the difference. This is particular the case when assessing cost efficiency. The cost data is also not accessible because of its sensitivity.

The unit of the report is the orchid supply chain. The investigations on the topics such as marketing channel, and power asymmetry are from grower's point of view. The other actors in this chain have not been examined. Furthermore, the range of the concept is from economic and social perspectives under two unique environments. It gives a broad understanding of the sector but limits the depth of each element. It is therefore suggested to conduct a more into depth investigation on each concept. Acknowledged in the special role of social network in Taiwan, an interesting study may contain the relations between social network and the marketing channel. On the other hand the findings reveal that Dutch orchid growers tend to have contracts (instead of Clock) by using the auction service. Therefore, a future research on the choice between contracts and spot market can be another point.

Any underlying factors (e.g. cultural preferences and historical backgrounds) that could constitute certain transactional decisions are not discussed in this report.

6.2 Theoretical contribution

This thesis explores the chain performance by looking into economics, social theories

and the components of information exchange. It is proposed that the three concepts have impact on performance. At the same time, the concepts are interrelated to one another. The results from empirical studies imply contributions to the theories of contractual relationships and social network theories on governance structure. Specifically, the formal mechanism (i.e. contracts) and informal mechanism (i.e. social network) both assure the transaction cost efficiency. Formal and relational mechanisms are both highlighted as a tool to coordinate and safeguard the transactional behaviours and that gives empirical evidence to the governance structure.

The four categories of chain performance are meant to evaluate agri-food supply chains. The application is already done to a Dutch-German tomato chain. Considering the ornamental function of flowers, the importance of uniqueness is mentioned repeatedly during the interviews. Therefore, the performance model can consider separating the eatable fresh products and decoration fresh products by adding uniqueness as a quality indicator for ornamental fresh products. Another consideration is the long transportation time in the Taiwanese case. In this sense, the indicator of lead time contributes little to assess the responsiveness although the indicator would be more meaningful when applied to international or intercontinental transportation.

Industrial attractiveness contains some similar elements with transaction costs theories. One aspect is the link between buyer power and coordination because of the raise of transactional uncertainty. This gives explanations to the more coordinated phenomenon on an industrial level that influences transactional decisions.

6.3 Managerial implication

Maintaining sustainability on the world stage, a long-term buyer-supplier relationship is the key factor to perform well. But the underlying factors of a stable supplier-buyer relationship are case specific. The factors come from economic, social and environmental dynamics that continuously shape the transactional background. The commitment to a business relationship can be either shown by tangible contracts or intangible networks. These two should be able to complement each other. As social capital is emphasized to be an appropriate tool to increasing coordination, Dutch actors can invest on this intangible capital to prevent the effects of incomplete contracts. Reputation and respect go further than the contracting period. Good social investments can create more connections which extend potential business opportunities.

Since the common pitfall on the failed promise on the agreed volume in Taiwan, social sanctions only safeguard the quality of the plants. Growers should not become used to it since it relates to the production costs. The transactions are suggested to be governed

by the formal incentive (e.g. price) or formal institute (e.g. strategic alliance).

Transaction costs are often overlooked by Taiwanese actors. But the importance should be recognized by the difficulties on finding marketing information. The thesis gives a theoretical explanation on the current situation by the transaction theory in the hope that the actors are able to identify the problems. One of the problems is the uncertainty. Without the integral distribution system, most small-scaled growers fight to survive in the competitive environment. However, the cooperation can substitute the competition by forming a marketing cooperative. In this way, the aggregate power can place them in a better negotiation position.

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Annex 1. Questionnaire for expert

Questionnaire 1, for expert (semi-structured)

County:

Name:

Position:

Interviewing time: date_____, hour_____

1. How is the physical flow in floricultural chain structured? In other words, what are the main activities along the chain in terms of product flow and actors?
2. How are the following aspects performed in your opinions?

Efficiency

- a. What is the cost structure in terms of the producing orchids? E.g. Labour, energy, marketing, and transportation.
- b. Is there any new technology to decrease the cost in recent 5 years?

Flexibility

- c. Does the quantity demand show seasonal fluctuations?
- d. In what way do you meet the volume requirements?
- e. Do the customers require a lot of variety? How do they require?
- f. How do you adapt to provide the different varieties to the customers?

Responsiveness

- g. How many days are required to deliver flowers from you to the foreign growers/retailers?

Quality

- h. What are the quality indicators? In what way do you guarantee these quality aspects?
3. Do the farmers usually have contractual relationships with the buyers? What kind of contract?
4. Why do the farmers choose the certain contractual relationships/spot market? (Lower cost of production, ability to adapt the changing market, ability to respond quickly, better quality)
5. Do the buyers have a lot of control over the farmers? For example, the variety, quantity, price? Do farmers need to pay a significant amount of cost when switching the buyers? How about the switching costs of suppliers for buyers?
6. Generally speaking, does the chain have an information system which enables operational process? For example, the delivering schedule regarding time, quantity and quality? Is it supported by ICT?

7. Do the chain share market information with each other? Such as price, market preference, new technology etc?
8. If yes, how do you think information exchange benefits the following aspects: lowering the cost of production/transportation costs and reducing delivering time?
9. Is it normal for farmers to participate the grower organizations? Why the farmers choose to join it?
10. Generally speaking, does the grower organization or other farmers' behaviours have impact on farmers' decision making or behaviours?
11. What is the bottleneck in this industry in terms of exporting channel? (High unit of cost, unable to meet the quantity and variety requirements, long lead time so less responsive on customer demand, quality issues)
12. For the following aspects, what do you think are the barriers for new competitors to enter?
 - Distribution cost (long and just-in-time logistics)
 - The capital investment on technology, land etc.
 - Economics of scales (joining marketing, logistics)
 - Product differentiation
 - The knowledge on the products
13. Considering the orchid industry, is there a forward integration (extended to downstream) or backward integration (extended to the suppliers side)?
14. Are orchids easily seen as the substitute of other ornamental flowers? Or is it considered unique?

Annex 2. Questionnaire for grower

Questionnaire 2, for grower (semi-structured)

County:

Name:

Position:

Interviewing time: date _____, hour _____

Section One: General information

1.1 How many orchid species do you plant?

Types of orchid	Units (_____)
Cymbidium	
Phalaenopsis	
Dendrobium	
Oncidium	
Doritaenopsis	
Cattleya	
Others	

1.2 Did you invest in any equipment/machines/production system in your farm over the last 5 years?

Types of investment	
Greenhouse	
Storage/cooling room	
Transportation	
Other farming system (irrigation, spraying etc.)	
Certification system	
Others	

1.3 What was the largest investment?

Section Two: Market channel and buyer relationship

Market channel

2.1 To whom do you sell the products, and can you indicate the use of contracts with them?

Young plants.

Ready-for-sell pot orchids.

Are the contracts based on the written contract?

2.2 To whom do you sell to the flower for **export purposes**? How much do you export to foreign market (percentage)?

Young plants. _____%

Ready-for-sell pot orchids. _____%

2.3 Are there any differences between the domestic and foreign market? Who is the majority of your sales?

	No differences	Some differences	Many differences
Price			
Quality demand			
Varieties			
Requirement of certification			
Providing support from buyers (on technology, equipment etc.)			
Others			

Governance structure

Please consider **the most important buyer** in exporting channel and indicate the relationships with this buyer.

2.4 Complexity

This buyer is _____	
Our transactions are based on written contract	
The following items are pre-arranged with this buyer	
Length of the contract	
Price	
Quality requirement	
Volumes to deliver	
Varieties	
Frequency of delivering	
Delivery time	
Certificate system	
Product specification	
Others	

Codification of industry standard/certification

2.5 Are you certified with any quality assurance systems?

(MPS, ICC, Eurogap, Organic, fairtrade, other domestic certifications.)

2.6 Do you follow any industry standards, such as labelling, packaging, etc.?

Capability of meeting requirements

2.7What is the relationship between you and your buyers? Do you think they have stronger power over you?

2.8Are you required to meet any specifications by your buyers?

Transaction specific investments

2.9Did you make large investments for this specific buyer? In what aspects did you invest?

2.10 Is it easy for you to switch this buyer? Why or why not?

Section Three: Social relationships

Networks

3.1Are you a member of any producers' organization (association/ cooperative)? Please indicate the name.

3.2What type of cooperation (production, transportation, and marketing)?

3.3Why did you join the organization?

For the support (see 3.9)	
Relationship built with other growers	
Following others	
Others	

3.4Do you produce the same kind of flower/orchid?

3.5How many years are you a member of this organization?

3.6In total, how many members does this organization have?

3.7Do you know them all?

3.8What kind of support do you receive from the organization?

Production management/Knowledge transferring	
Market information	
Market selling channel	
Benefit from loans	
Benefit from materials	
Benefit from welfare	
Easy to get government support	
Others	

3.9How regular is the meeting in the organization?

3.10 How do you interact with the members in the formal meeting?

Regularly. I participate every meeting.	
Sometimes. I show up when I need some assistance.	

Seldom. I just joined the organization, but don't have real relationships.	
Others.	

3.11 Do you have other gatherings except the regular meetings? For what purposes? (Informal meeting, Training, marketing plan etc.)

Decision making

3.12 How do you select the specifications of the product when considering the balance between the long production period and market preference?

3.13 Where is the major source of your information? (information includes market preference, production, transportation and in general)

Producer association/cooperative	
Buyer	
Other farmers	
Government	
Others (Auction etc.)	

3.14 Can you rate the importance of your information source?

Items	Less important				Very important
Producer association/cooperative	1	2	3	4	5
Buyer	1	2	3	4	5
Other farmers	1	2	3	4	5
Government	1	2	3	4	5
Others (Auction etc.)	1	2	3	4	5

3.15 Are your decisions influenced by other farmers' behaviours, for example, changing the species, investing on new technology?

Section Four: Information exchange

Information infrastructure

4.1 In what ways do you communicate with your buyer and how often?

Means of communication		Frequency
Face-to-face		
Phone		
Email		
ICT (information system)		
Others		

4.2 Please specify and describe the information systems (ICT) you use to communicate with your customers.

Information flow

4.3 Do you share the information with each other in the chain (vertically or horizontally)? What kind of information do you share? Why do you share this information? Does it help to meet the market demand?

4.4 Do you think you have timely and accurate information to react from the changing market or to support you to perform better? In what way?

Section Five: Performance indicators

How are the following aspects performed in your opinions?

Efficiency

5.1 What is the cost structure in terms of the producing orchids? E.g. Labour, energy, marketing, and transportation.

5.2 Is there any new technology to decrease the cost in recent 5 years?

Flexibility

5.3 Does the quantity demand show seasonal fluctuations?

5.4 In what way do you meet the volume requirements?

5.5 Do the customers require a lot of variety? How do they require?

5.6 How do you adapt to provide the different varieties to the customers?

Responsiveness

5.7 How many days are required to deliver flowers from you to the foreign growers/retailers?

Quality

5.8 What are the quality indicators? In what way do you guarantee these quality aspects?

Annex 3. Summaries of expert interviews

Summaries of expert interviews⁷

Interview 1

County: The Netherlands

Place: Den Haag

Name: Michiel van Galen

Position: Researcher, Chain performance section

Interviewing time: date 12th May, 2011, hour: 15.30-16.30

1. There are several organizations within the growers. The information flows among the growers affect the decisions making processes, particularly the study clubs. This kind of group has a long history in the Netherlands and thus influences growers very much. During the discussion with the fellows, the growers may adapt other techniques such as the use of pesticide. One study club specialize with one species of orchids but may contain several types (like colour, length). There are usually no more than 10 people in a study club. They visit each other and solve the problems together. As a group, the study club is advised by an advisor group called DLV. DLV provides horticulture specialists who advise the growers on cultivation knowledge. So that production can be improved. There are also free riders who do not join any clubs.
2. Because of the auction system, the intermediary splits the market information. In this case, the information does not flow through the chain completely. Two types of service are used in the auction. One is clock which the sales are daily basis. The other one allows placing orders beforehand. It links growers and buyers with contracts. But most of the time, growers do not know who they are dealing with. But another type of model might enable the information sharing more transparent. One example is Decorum organization. It is a producer organization, exporting directly to the wholesalers, retailers or exporters. Decorum is not only specialized in orchid but also other potted plants so it can provide varieties as a group. This kind of intermediary service is important for growers. If a grower needs to deal with the transactions issues, that takes a lot of time. So growers prefer to work with the organizations to take care of the transactions.
3. There is no direct upstream information flow in the chain, unless through the auction. Usually, the communication between retailer/wholesaler through intermediary with the growers is by telephone.
4. There is forward integration from growers to distribution and marketing because of the functions of the auction, but many growers can recognize. But the backward integration is not possible because the sector takes so specialized knowledge. The investments and knowledge in cultivation is very high, so the breeder will not integrate forward to the growers as well. The brand identity is not required, especially for potted plants. Even though there are

⁷ The sequence is according to the interview list on Table 3.1.

some brands like Decorum but that will be only used for business to business recognition. There will be more and more similar organizations organized by growers themselves and that can present the brand identity. The growers might feel that they are constrained by the auction since they don't have power at all. Through the organizations, price will be better at least. Also, growers have the ambitious to market to the consumers, not only growing. The greatest barrier to enter as a grower is the capital requirement.

Interview 2

County: The Netherlands

Name: Olaf van Kooten

Place: Wageningen

Position: Professor, Horticultural Production Chains chair group

Interviewing time: date: 23rd May, 2011, hour: 10.30-11.30

1. The main form of exporting orchid is the flowering pot in the Netherlands. The growers are mostly provided young plants by Dutch young plant providers (i.e. 1st grower) who are usually as breeders as well. The reason that Dutch young plant provider is more willing to sell to domestic growers is safer in such a way that the growers do not reproduce the materials without paying them. If the transactions happen in the Netherlands, the sellers can control it very well. Another reason is also because the majority of the orchid growing in Europe is in the Netherlands.
2. Between the young plant providers and cultivators, there is a lot of communication. The breeders provide information of how to cultivate their cultivars and invite growers to visit the new innovation or genotype. They also visit the farms and advise when there are problems. But this kind of consultancy is usually provided by DLV (i.e. Consultancy service). The growers are very much dependant on the material price.
3. There are usually long-term (one to a couple of years) contracts between the young plant provider and growers. It is to ensure the deliver is always with the right quantity and quality at the right time. Every square centimetre costs money so the Dutch growers focus on the efficiency, using greenhouse space optimally. They are production oriented, instead of market oriented. The precise information from the breeders and the high-tech automation system in the cultivation help the growers control the production process so the efficiency can be achieved.
4. The majority of the (flowering) plants still go to Auction market. The growers still enjoy the auction system in the Netherlands. They don't need to worry about the market or customers. That also explains why they can concentrate on their own processes. Auction can control the quality very well. When consumers pick up the flowering orchids, they will check the appearance attributes such as no fading/wilting flowers with some non-fully open bud.
5. There are grower associations which used to be study groups but now become associations. It functions similar to cooperatives, such as jointly marketing, packaging or buying materials collectively. If the growers gather together, they become a bigger party in the chain. Within the study groups, they share everything, learn from each other and compare with each in order to improve.
6. The energy cost can be the bottleneck in this sector. The heating costs in winter will be dramatic since they are tropical plants.

Interview 3

County: The Netherlands

Place: Wageningen

Name: Jos Bijman

Position: Assistant Professor, Management studies chair group

Interviewing time: date: 27th May, 2011, hour: 14.00-14.30

1. 95% of farmers choose to join the study clubs. The function of study clubs is for knowledge exchange. Farmers learn from each other in the group so the production, quality can be improved. The number of member depending on each club, usually, it ranges from 10 to 30 members. The most important determinant of formulating a Club is the homogeneity. This means that the group members grow the same specific crop. In this way, the knowledge of the production is possible to be transferred. The Study Clubs facilitate the knowledge exchange amongst its group members through visiting each other's farm, sharing production techniques and learning from members' experiences.
2. Besides study club network, grower association is another way to connect with the farmers. More than just knowledge sharing, grower association provides promotion and marketing function. The members source out from the same supplier and market the products as a group. In this way, farmers are stronger in bargaining power. They order the input materials, such as seedling, tools etc. in a larger volume so that the cost can be down. They represent as a group to the traders. However, the physical product flow still mostly goes through the auction market. It is because of the auction mechanism which enables the transparent information exchange within the growers. Auction itself is a significant cooperation, belonging to farmers.
3. This social network in the farmer groups helps the farmers to achieve cost efficiency and better quality products. The lower cost comes from the aggregate the purchase from the input suppliers while the higher quality benefits from the knowledge sharing activities. Within the group, farmers trust each other. The trust facilitates the transparency.

Interview 4

County: Taiwan

Place: Yulin

Name: Ting-En, Dai (戴廷恩)

Position: Associate Researcher, Chief of Flower Environment Department

Interviewing time: date: 7th April, 2011, hour: 10.00-11.00

1. Cost efficiency differs, depending on which mode growers choose. Theoretically, the production should be scheduled according to customers' orders on quantity, product specifications and delivery date, called MTO. But there are not many growers do this. Mostly, Taiwanese growers produce orchids before they receive orders. This is called MTS system. MTS increases the production costs. Because of the nature of perishability and uncertainty of the market, the unsold products become the production loss. They depend on just those exporters or those large farmers that happen to search exactly those varieties of orchids that are offered. However, the flexibility lies on this. MTO growers tend to grow more to satisfy any other order coming on a short notice from the spot market. The mode of MTS makes it possible that the growers can respond to the different quantity demand when various quantities are required. However, there is no formal enforcement on the execution of the contract, the agreed items; particularly the quantity can be changed.
2. Taiwan is an island, the export depend on air and sea freights to deliver products to faraway consumption markets. However, the high cost drives the sector to urge for the development on the sea transportation. So the improvement on technology mainly comes from on the sea transportation. Depending on the area, sea transportation to Japan takes 3-4 days, USA for 20 days and Europe around 27 days. The transportation is the main cost for growers.
3. Taiwan orchid sector is far from the consumer market. So it is difficult for the actors to reach market preference directly. The other reason is that the export is in the form of the young plants, instead of final product. Therefore, there is the lack of communication between the upstream and downstream. Thus, they rely heavily on the information obtained from the buyers.
4. The measurements on young plants quality is still need to be developed. One way for foreign buyers to look the quality is the growth speed. The mass production requires a fast production cycle. A beautiful species might also be eliminated from the market of it takes a long time to be cultivated. Dutch growers have high automation system so that the production efficiency is achieved. But the drawback of it is the small variation on the variety. On the other hand, Taiwanese sector is able to provide different varieties to the market.
5. There is not systematically information system supported still. The communication along the chain is through the emails and communication. The experiences through the years make the connections among the actors smooth.

Interview 5

County: Taiwan

Place: Taichung

Name: Chia-chung, Chen (陳加忠)

Position: Professor, Department of Bio-industrial Mechatronics Engineering

Interviewing time: date: 8th April, 2011, hour: 10.00-11.00

1. There is no precise cost structure available in Taiwan. For example, the low climate might take more energy on heating up the greenhouses. However, the growers do not understand how much it costs. This suggests the growers, even the sector do not have the precise information about the costs. However, the cost does increase because of the energy cost (for transportation), labour costs and input materials.
2. The young plant orchid is the main export. So the transportation period should be calculated from the nursery in Taiwan to the nursery in importing countries. The air flight to Japan takes 3-5 days. The sea transportation to USA is between 14-21 days and 28 days to Europe. The quality aspect should also indicate the young plant. There is no standard commonly used in the industry. Most growers check visually on the maturity.
3. Whether MTS or MTO system, the verbal agreements are the way that growers trade with their buyers. There is not any guarantee on the contract execution. It turns out that the production is often in excess. The growers have to find the other buyers by themselves. The motivation of a grower to choose MTS or MTO depends on the relationship with the buyer. If the relationship is long-term oriented, the grower tend to produce in accordance with MTO. Another advantage for MTO is the availability of the information from buyers. Buyers requires growers to produce according to the very specific information on colour, variety etc. and that exchanges the market information.
4. MTS growers usually have weak power because they rely on the buyers for the market. In this sense, they do not have a target market and consequently, they produce based on their own perception. When the market requires more, the production will gradually out of the market.
5. The greatest barrier for a new competitor in this sector is the access to the market. This also shows the information is not flowing so the market is not visible. When the market is very vague, the role of grower association is highlighted. Growers believe the information very much and that influence growers' decision making processes.

Interview 6

County: Taiwan

Place: Chiayi

Name: Tsai-Mu, Shen (沈再木)

Position: Professor, Department of Horticulture

Interviewing time: date: 13th April, 2011, hour: 10.40-11.20

1. The original growing place for orchids is in the mountain in sub-tropical to tropical areas. The cultivation requires warm temperature, between 20-28 degrees. Taiwan locates in such an area which is suitable for the growth of the orchids. The suitable temperature also creates many original varieties. Together with the prominent production of flaked culture orchid, Taiwan is a perfect place for orchid production. Besides, Taiwan has the leading advantage on the varieties. Orchid is unique from the other flowers in a way that every form can be traded along the production stages. The different forms of export influence the cultivation costs, transportation requirements and market.
2. The export accounts for around 70% of the total production. The major markets are in USA and Europe or the closer neighbour countries such as China, Japan and Korea. But the majority market is USA. Because of the long distances and the advanced technology on sea transportation, growers prefer to deliver the products in this way to reduce the costs. The advanced technology refers to the quality control technics. From the perspective of the young plants, it takes one week to reach Japan and three to four weeks to USA. The nearby countries are around 3-5 days in Japan and one week in Korea. After arriving at the nurseries, the plants need some several days to recover from the long and dark transportation. This process is called acclimatization.
3. There is a critical consideration when exporting the young plants: the adaptability of growth speed, local temperature and phytosanitary management. The current bottleneck for the growers is the ability of reliable supply. When a buyer gives an order, the challenge for the growers is to supply the same quality plants reliably and continuously. The small-scale growers are not capable to reach the requirements from the foreign market because of the small quantity and language ability. They rely on large ones on marketing channel, and at the same time the large ones collect the orchid plants from the small-scale growers. The quality of each batch is thus not homogenous.

Interview 7

County: The Netherlands

Place: Naaldwijk

Name: Anne-Jan Steenbeek

Position: Markt manager, FloraHolland

Interviewing time: date: 26th May, 2011, hour: 13.30-14.30

1. Auction plays an important role for the Dutch growers. There are around 150 orchid growers and 95% of them send the products to the Auction. In the auction sales, only 15% of the orchids stay in the Netherlands and others go abroad. Even though The Dutch market is not so big comparing to the foreign market, but it is an important indicator for sensing the market preference and trend. The Dutch production of total European orchid production is 85%. The transportation is by truck. The longest transportation is to reach Moscow in Russia or northern part of Italy around 3 days. Almost all of them are within Europe.
2. For the orchid production, 82% of turnover in auction is through the Connect service (intermediary office). Auction facilitates the contracts between exporters and growers. In this service, the products mostly go directly from growers to exporters. So even the service is provided by Auction, the physical flows do not pass through Auction. The contract is about the delivery of the plants, and other specifications like price, volume, specification, packaging and truck type. The contract can be within a-year long which sometimes specifies the special seasonal requirements for holidays. At this moment, some exporters already order for Christmas or woman's day next year. The other type is much shorter in terms of its contract length. A buyer makes an order by fax or email in the morning on a daily basis. Some growers prefer the contractual relationships with the exporters because that reduces the uncertainty from the price.
3. However, in summer time, it is not easy to have the direct sale, so more flowers are sold through Clock system than the holidays such as Mother's day. It turns out that the selling price is lower than the cost price in summer. Farmers know the volume fluctuations, according to the historical figures. But for Phanaenopsis, it is very difficult to decrease the volume just in a short period time in a year. The nursery is like the factory, year round supply. So that is why there are more flowers in clock in summer.
4. There is no vase life guarantee for orchids. The quality aspects include spikes, pot size, colour, number of flower and height of the plants (length). FloraHolland also provides quality control services. The quality has the minimal control on the quality such as broken spikes, falling of flowers which will fall into an inferior quality level. Auction applies an indication record. Each grower has an indication record. When the record is 100 points of a certain grower, it means the grower's credit is good. But whenever there is a mistake, the point will be deducted, e.g. 99 points. The grower will try to maintain 100 points.

5. FloraHolland guarantees that every buyer receives quality. The quick logistics from growers to exporters are very important. The timely and accurate logistic information should be controlled very well. A new logistic information system (KissIt) is now applied by Auction. It is a logistic system between the growers and exporters (via Auction). From the system, it is possible to know which deliver phase is at this moment, what time is expected to arrive. It provides the function of tracking and tracing system that the logistic flow is more transparent among the chain actors. It also puts controls over the appointments made between actors.

Interview 8

County: Taiwan

Place: Tainan

Name: Jyun-Bi, Zeng (曾俊弼)

Position: Secretary, Taiwan Orchid Grower Association (TOGA)

Interviewing time: date: 29th March, 2011, hour: 10.00-11.00

1. The orchid production takes a long period of time. Considering the transportation costs and mortality rate, many orchid plants are exported in the form of semi-products. Then the production stage continues until the flowering plants. Taiwan thus follows this pattern. Taiwan possesses the advantage of production and labour costs as well as the varieties. For Taiwan orchid sector, it is not difficult to cross different cultivars and innovate a new one. However, the innovated cultivar is not always suitable for the market requirements.
2. The quality aspect should focus on the young plants. However, there is no standardized quality indicator for the young plants. One thing can indicate the quality can be the *consistency of what has been agreed upon. This is because the buyers cannot judge the flowering characteristics from the young plants.*
3. There is no systematic information system available yet. This becomes a weakness. However, benefiting from the internet, fairs and the growers who invest in the importing nursery (e.g. USA), the information flow is active. Another information source is from the grower association/organization. Actually, receiving the information is the main motivation that growers join the organizations. Taking this association as an example, it is like the connection point of three parties: government, private sector and academic institutions. *The grower association communicates the current market information and the need on behalf of the growers to the government. The related policies and activities or academic breakthrough are transmitted to the growers from the other two parties as well. These all influence growers' decision making processes.*
4. Growers are able to plan the production schedule according to the orders. Currently, growers mostly follow MTO model, based on the agreements. Growers thus have less uncertainty with the market and the reduction of the production costs. Buyers can also have a better quality and reliable supply. It happens that a small-scale grower supplies to only buyer. Generally, there are less than five buyers for one grower.
5. USDA approval of orchids in growing media contributes significantly to the exporting quantities to USA since 2005. The shipped orchids with media can be less damage and consequently have a better quality. This also increases the handling costs. However, there are some regulations to follow such as the greenhouse design and the requirements of production management. This kind of change requires the involvement of government.

Interview 9

County: Taiwan

Place: Tainan

Name: Ji-Cing, GAO (高紀清)

Position: Chairman, Taiwan Orchid Grower Association (TOGA)

Interviewing time: date: 30th March, 2011, hour: 14.00-14.30

1. There is no tradition to have written contracts in Taiwan. If a grower requires a formal contract, he/she will lose the business. The verbal agreement is the prevalent way. For the MST growers, when it is almost harvest, they will call to the buyers and introduce their products. So the marketing channel for the growers is always from their social networks. However, the traders sometimes do not buy all the quantities from the growers as they promised. Because the agreements are lack of legal enforcements, growers wither search for other foreign buyers or sell to the domestic market at a lower price.
2. Growers obtain the market information from the buyers and the peers. They always locate in the same area (i.e. industry cluster) and that makes it easy to exchange market information. But how valuable information they share to each other depends on whether they are in the same Trust of Circle. A Circle means an informal group which is naturally formulated. It contains the horizontal integration as well as vertical integration. The group members cooperate instead of compete with each other. There is no legal enforcement in the group as well. A complete Circle even includes one or two people who collect information.
3. Because of the distance, growers are not able to contact with the consumers directly. Therefore, most growers do not have the information of market preference. In the short-term, growers might be able to predict the market for the near future, but not for the long-term (more than two years). Growers are not able to have the direct contact with the final customers because of the long distance from the market. In this sense, growers try to obtain the information through the first tier buyers, or even the second tier buyers. The other reason is that most of the exporting products are semi-finished orchids (young plants) which are delivered to foreign orchid farms for the final growing process. Only through the foreign orchid growers, it is possible to know which sales channels are used and how markets are responding. Information regarding orchids after they have arrived abroad becomes the most invisible and uncertain part for Taiwanese growers. Besides, when supplier-buyer relationship is based on the short-term, the buyer is not willing to provide information. Because it also happens that the suppliers can be easily switched. In this sense, the information embedded in the informal network is very important.

