Essays on Agricultural Co-operatives; Governance Structure in Fruit and Vegetable Chains

Coöperaties en beheersstructuur in groente- en fruitketens

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Voorwoord

Ketens en coöperaties, daar gaat dit proefschrift over. Ketens zijn cool! Zowel vanuit beleid als wetenschap worden ondernemingen in de agrosector geadviseerd hun verticale samenwerking te intensiveren. Betere afstemming tussen ondernemingen leidt tot kostenbesparing en tot flexibeler kunnen inspelen op veranderingen in de vraag. Coöperaties zijn daarentegen niet cool. Velen zien coöperaties zelfs als een belemmering voor intensievere samenwerking in ketens. Dit is vreemd, omdat coöperaties juist een vorm van verticale coördinatie in zich dragen, namelijk tussen boeren en tuinders enerzijds en de coöperatieve onderneming die de producten van de leden verwerkt en verhandelt anderzijds.

Het idee dat de coöperatie niet geschikt is voor intensievere ketensamenwerking heeft deels te maken met perceptie en deels met reële tekortkomingen. Vaak wordt de coöperatie gezien als een institutie die bij het traditionele ontwikkelingsmodel van de (Nederlandse) landbouw hoort. In dit model lag veel nadruk op verhoging van productiviteit en productie. Nu er echter vraaggestuurd moet worden geproduceerd, wordt al snel gedacht dat de coöperatie niet meer voldoet. Daarnaast is het waar dat de coöperatie bepaalde organisatorische eigenschappen heeft, die het voor haar moeilijker maken om snel en flexibel in te spelen op veranderingen in markt, beleid en technologie. Voor zover deze eigenschappen voortkomen uit de specifieke eigendoms-structuur van de coöperatie zullen ze in dit proefschrift aan de orde komen.

Toch denk ik niet dat we de coöperatie als ondernemingsvorm moeten afschrijven. Wel zal er op tenminste twee uitdagingen een antwoord geformuleerd moeten worden. Ten eerste zal elke coöperatie opnieuw de gemeenschappelijkheid van belangen moeten definiëren. In een wereld die steeds individualistischer wordt en in een markt die steeds meer waarde hecht aan differentiatie, neemt ook de heterogeniteit van belangen van de leden toe. Coöperaties gedijen echter vooral goed bij homogene belangen. Homogeniteit is gunstig voor de betrokkenheid van de leden, die weer nodig is voor efficiënt bestuur en voor voldoende prikkels tot financiering van de coöperatieve onderneming. Ten tweede zal de coöperatie haar rol in de keten moeten bepalen. Als intermediair tussen producenten en klanten kan de coöperatieve onderneming een spilfunctie vervullen in de keten. Dat betekent dat zij niet alleen de belangen van de leden moet behartigen, maar die van de keten als geheel. Ook hier is de uitdaging het zoeken naar homogene belangen, en vervolgens het organisatorisch inbedden van deze gemeenschappelijkheid.

Dit proefschrift is het resultaat van een zoekproces naar de economische reikwijdte van de coöperatieve ondernemingsvorm. Zoals in een wetenschappelijk proefschrift gebruikelijk is, kan maar een klein deel van het totale probleem bestudeerd worden. Ik heb gekozen voor onderzoek naar de specifieke eigendomsstructuur van de coöperatie en het effect daarvan op investeringsbeslissingen die efficiënt zijn voor de keten als geheel.

Toen ik vijf jaar geleden aan dit proefschrift begon, was alleen duidelijk dat het over ketens zou gaan. In de loop van het traject kwam de coöperatie steeds duidelijker in beeld, niet in de laatste plaats door een gemeenschappelijke belangstelling tussen mijn begeleider, George Hendrikse, en mij. George, ik wil je graag bedanken voor de vele dingen die je mij hebt geleerd. Wellicht het belangrijkste is het onderscheid tussen een economische benadering die uitgaat van volledige contracten en een die uitgaat van

onvolledigheid van contracten. Erkenning van die onvolledigheid staat centraal in de institutionele economie.

Gemeenschappelijke belangen lagen er ook tussen mij en mijn opdrachtgevers, Stichting AKK en LEI. Van Stichting AKK wil ik graag Jan van Roekel, als directeur, en Marco Vernooij, als contactpersoon naar de AKK-promovendi, bedanken voor het gestelde vertrouwen en de goede samenwerking. Van het LEI wil ik Vinus Zachariasse, Jaap Post en George Beers, als manager van respectievelijk instituut, afdeling en programma, bedanken voor de mogelijkheid die zij hebben geboden dit promotie-onderzoek uit te voeren. Daarnaast zijn er tal van andere LEI-collega's die mij op enig moment in de afgelopen vijf jaar hebben geholpen of aangespoord. Speciale vermelding verdienen Paul Diederen, Siemen van Berkum en Ida Terluin. Paul heeft alle stappen van het promotie-onderzoek van dichtbij meegemaakt, en voortdurend reflectie gegeven op mijn ideeën, voorstellen en concept-stukken. Bij Siemen en Ida, mede-promovendi, heb ik vooral een gewillig oor gekregen voor al mijn zorgen en frustraties. Dat zij mij in de race naar de promotie-datum hebben verslagen gun ik ze van harte; ze hebben er hard voor gewerkt.

Ook buiten het LEI zijn er velen die ik dank verschuldigd ben voor hun kritische maar constructieve opmerkingen op papers, artikelen en presentaties, in het bijzonder Onno-Frank van Bekkum, en alle andere AKK-promovendi verenigd in de Chain Brain. Verder wil ik alle groente- en fruittelers bedanken die ten behoeve van dit onderzoek een vragenlijst hebben ingevuld. Ik wens hun veel succes met hun telersvereniging. Daarnaast hebben mevrouw Van der Riet van VTN/The Greenery, de heer Verwoert van Fruitmasters en de heer Mulders van Veiling ZON belangrijke informatie geleverd. Waarvoor mijn dank.

Als promovendus verkeer je in een luxe positie, vooral in een beleidsgericht onderzoeksinstituut als het LEI. De promovendus is een soort vrijgestelde. Zo kwam het dat ik op een mooie lentedag zat na te denken over de opzet van mijn promotie-onderzoek, op een bankje in het Vondelpark. En toen kwam jij, Jacqueline, in mijn leven. Ook van jou heb ik veel steun ontvangen. Maar wat veel belangrijker is, jij hebt mij er op gewezen dat er meer is in het leven dan promotie-onderzoek. Samen zijn we inmiddels een volgend en veel belangrijker project begonnen, al zie ik er tegenop mijn studeerkamer te moeten opgeven.

Ik wil dit proefschrift opdragen aan mijn ouders, die mij geleerd hebben dat je samen meer kunt bereiken dan alleen.

Jos Bijman
Amsterdam, april 2002

Contents

1. Introduction

1.1 Background and problem statement

In recent decades, the organisation of transactions with agrifood products has undergone major changes. The most fundamental one is the shift from production orientation to market orientation in the strategy of producers. Related changes are the substitution of spot market transactions by contractual arrangements; increasing information exchange among the firms participating in an agrifood chain; and introduction of quality assurance programmes. At the same time we see further increases of scale and internationalisation among producers, processors and traders of agrifood products. Finally, product innovation has become much more important in the agrifood sector. Often, this type of innovation will only be successful if firms at several stages of the production and distribution chain adjust their business activities and make the necessary investments. All these changes can be grouped under one heading: increasing vertical co-ordination in the agrifood sector.

There are a number of reasons why these changes in the organisation of agrifood transactions take place. First, consumers are demanding higher quality products, more variety and more convenience. Moreover, they have become more concerned about food safety and about production conditions. Environmental protection and animal welfare have become issues not only for single-issue interest groups but also for consumers. Second, the structure of food processing and food retail has changed. Processors and retailers have become larger and more internationalised. Particularly in the European food retail market, concentration has substantially increased. Third, restructuring of agricultural policies at national and EU level has lead to decreasing levels of market protection and to shifting priorities in spending public funds. Fourth, new technologies like ICT and biotechnology have enabled better information exchange throughout the whole production and distribution chain, but have also induced controversies over the particular production methods used in farming and food processing. These changes in market conditions, technologies, and state policies influence the relative efficiency of the various ways of organising transactions with agrifood products. Thus, changes in the institutional environment may lead to changes in the institutional arrangements for agrifood transactions.

One particular type of institutional arrangement often used in the agrifood sector is the farmer-owned co-operative. A co-operative is a collectively owned firm, established to further the economic well being of its members. Co-operatives provide particular services to their members. For instance, a marketing co-operative takes care of the marketing of the products produced by its members. In case the farm product is a very perishable product, the marketing co-operative also carries out the processing. A dairy co-operative, for example, processes the milk supplied by dairy farmer-members, and then sells the dairy products. For perishable products that do not undergo processing before reaching the final consumer, fast and efficient sales and logistics are needed. Here the co-operative auction provides important services.

By its very nature a farmer-owned co-operative is user-oriented. The primary customers of the services are the members of the co-operative. For a marketing co-operative this means that it has to find a market for the products supplied by the members. In most cases, it also means that the co-operative has to sell everything the members produce. As a result, the activities of the marketing co-operative are supply-driven.

The above-described developments in the institutional environment of agrifood transaction place farmer-owned co-operatives for several challenges. One such challenge relates to innovation. How do co-operatives deal with the combined innovation in product and marketing? Where does innovation take place: on the level of the member firm or at the level of the co-operative firm? Does the co-operative have the capabilities to carry out new activities, and if so, do the members have sufficient knowledge to control the managers executing these new tasks? In addition, can members – as owners of the co-operative firm – raise sufficient equity capital to make the necessary investments in innovation and marketing? Can co-operatives build sufficient market power vis-à-vis large food processors and large food retailers? Finally, on the issue of quality assurance and information exchange, are co-operatives able to organise the co-ordination in the whole production and distribution chain needed for information exchange, for market orientation, and for quality assurance programmes?

These challenges pose difficult strategic choices for co-operatives. For instance, increasing size for obtaining a better position in horizontal and vertical competition may not be compatible with promoting and facilitating innovation and differentiation by members. Supporting the differential interests of members may require a small-scale organisation, where information exchange (such as on quality characteristics) and co-ordination may be easier to achieve. In this thesis we will show there is a trade-off between the competitive advantages of large size and centralised organisation on the one hand and the innovation advantages of a small-sized decentralised organisation on the other hand.

The co-operative has been a successful arrangement for carrying out transactions with agrifood products. With changes in the institutional environment, is the co-operative still an efficient arrangement? This issue will be dealt with in this thesis, and will be studied from different theoretical and empirical perspectives.

1.2 Objective and research questions

The main objective of this thesis is to analyse, both theoretically and empirically, the efficiency of the marketing co-operative as a specific governance structure in fruit and vegetable production and distribution chains. The theoretical part of the thesis is on efficient governance structures in agrifood chains and the scope of the co-operative under various conditions. The empirical part of the thesis focuses on the interaction between governance structure and other attributes of the co-operative firm, as well as on the trade off between efficiency of the chain and the strategy of the individual firms.

The main goal has been translated into four individual tasks, each treated in a separate chapter. These four tasks are:

- to survey the literature that provides explanations for farmers seeking vertical integration in the agrifood chain and choosing the co-operative as the particular governance structure for carrying out transactions with farm products (Chapter 2);
- to analyse, from the new property rights theory perspective, the impact of governance structure on efficient investments in a three-tier supply chain (Chapter 3); this chapter is theory driven and generates propositions about efficient governance structures in a three-agent-three-assets agrifood chain;
- to describe and analyse, from a system of attributes perspective, the transformation of an auction co-operative to a marketing co-operative (Chapter 4); presenting a case study, this chapter is empirically driven as it focuses on problem finding and diagnosis;
- to describe and analyse the formation of new marketing co-operatives in Dutch food horticulture (Chapter 6); this chapter, too, is empirically driven in its focus on presenting data on new producer organisations and on diagnosing problems these new organisations encounter.

The final chapter, Summary and Conclusions, links the answers to the various subquestions, and presents conclusions on the main research objective.

Five research questions have guided the study. The various chapters of the thesis provide answers to the following questions:

- What have been the efficiency explanations for farmers to vertically integrate into processing and marketing of farm products (Chapter 2)?
- Are these explanations still valid and/or have other efficiency reasons appeared for establishing marketing co-operatives (Chapter 2)?
- How does the particular ownership structure of the marketing co-operative affect investment incentives for member firms and the co-operative firm (Chapter 3)?
- What impact do changes in the market and institutional environment for Dutch food horticulture have on the efficiency of the traditional auction co-operative (Chapter 4)?
- What reasons explain the establishment of new marketing co-operatives in Dutch food horticulture (Chapter 5)?

1.3 Core concepts

The agricultural co-operative (or farmer-owned co-operative) is the central concept in this thesis. As there exist much confusion and much ignorance about what exactly is a co-operative, we will first briefly discuss several descriptions of agricultural co-operatives and present our own definition. Other important concepts used in the thesis are ownership and the agrifood chain, which will also be defined below. Finally, a few words are spent on efficiency, as this concept occupies a central place in economic organisation theory.

The (marketing) co-operative

All over the world, farmers have formed co-operatives that provide them with services that can be more efficiently produced on a scale beyond the size of the individual farm. These services are provided by a firm – the co-operative firm – that is owned by all members collectively. There are several ways of defining a co-operative. One way is to look at its goals and activities; another is by studying its governance structure (or economic organisation characteristics). The main function of an agricultural co-operative is to further members' income by providing specific services that align with the activities of the member-firms. On the basis of the activities carried out by the co-operative, NCR (1993) distinguishes five categories of agricultural co-operatives:

- co-operatives purchasing and producing inputs for farming;
- co-operatives processing and marketing agricultural and horticultural products;
- co-operative banks providing credit;
- co-operative auctions;
- co-operatives providing other services such as insurance, contract work, accountancy and farm relief.

Because farmers are broadening the their range of economic activities, as part of the shift towards multifunctional agriculture, new types of co-operatives are being established. One example is the so-called environmental co-operative (Slangen and Polman, 1999). Its function is to provide an organisational structure (as a service to its members) for the commercialisation of such 'non-marketable' goods as wildlife and landscape.

Another perspective on describing a co-operative is looking at who has control over and who receives income from the co-operative firm (i.e., how are control rights and income rights allocated). From this economic organisation perspective the following three characteristics of a co-operative firm are essential (LeVay, 1983; Staatz, 1987a):

- the owners of the firm are the users of the firm's services;
- the benefits of the firm accrue to the owners through and in proportion to their use of the firm's services;
- control over the firm lies with all users together and decisions are taken democratically.[1]

To clarify these characteristics, many authors compare a co-operative firm with an investor-owned firm (e.g., Staatz, 1987a; Hendrikse and Veerman, 1997). First, having the users of a firm's services as the owners is an important difference compared to having investors as owners. It leads to a restriction on the kind and number of owners. It also means that equity needed for the activities of the co-operative firm comes from the users. Compensation for this equity will be in the form of a limited (if any) dividend and appreciation of stock is not a major benefit of ownership. Second, in a co-operative owners benefit by using the services of the co-operative firm, while in an investor-owned firm (IOF) owners benefit by return on investment. While in an IOF the investors hold the residual income rights, in a co-operative these rights are held by the users. The more a member of a co-operative uses the co-operative firm's services, the higher his benefits. Net margins of the co-operative firm are distributed among the members in proportion to their patronage with the firm. Third,

[1] In the USA it is common to define a co-operative as a user-owned, user-benefited and user-controlled business (Barton, 1989).

voting power in a co-operative is not proportional to equity investment, as in an IOF, but to patronage. Some co-operatives, particularly in the USA, even use the one-member/one-vote rule. When voting rights are tied to patronage, a maximum number of votes per member applies. The democratic decision-making structure of a co-operative also implies there are strict limitations on the number of non-members who can serve on the board of directors.

Staatz (1987a) emphasises that each of the three characteristics results in differences between incentives faced by participants in a co-operative and those faced by participants in an IOF. These differences in turn may lead to variations in the behaviour of the two types of organisations. An example can make this clear. If the market for the products produced by an IOF becomes too competitive, the owners will urge management to shift to more profitable activities, which may lead to a discontinuation of trade with its traditional suppliers. For the owners of the co-operative firm this option does not exist, because they are the suppliers. Unless they themselves shift production, they will urge the management to lower cost, to add value and to find alternative markets. In other words, the co-operative firm sticks to its core activities even when competition increases.

The type of co-operative we study in this thesis is the marketing co-operative, that is, the co-operative carrying out the processing and marketing of the goods produced by the members. We define the marketing co-operative as follows: *A marketing co-operative is a special type of economic organisation; it consists of a firm (the co-operative firm) that is collectively owned by the members (the member firms); the co-operative firm provides processing and marketing services to the member firms; the member firms benefit from the co-operative firm through and in proportion to their use of the services; and the member firms collectively control the co-operative firm.*

Ownership and governance structure

A co-operative presents a particular type of ownership: farmers collectively own assets in another stage of the production and distribution chain. As said above, member firms (i.e., the farmers) collectively own the co-operative firm. Hansmann (1996) discusses several forms of ownership of the firm. He defines the owners of a firm as those persons that have the formal rights to the assets of the firm. These rights are commonly divided in the right to control and the right to residual earnings. Barzel (1997) defines (economic) ownership of an asset as the combination of three rights: the rights to use the asset, the right to earn income from the asset, and the right to alienate the asset. When we combine the right to use and the right to alienate the asset we get the right of control as defined by Hansmann.

Grossman and Hart (1986) further specify ownership.[2] They make a distinction between specific control rights and residual control rights. Specific control rights are those

[2] In institutional economics often the term 'property rights' is used. Property rights have a broader scope than ownership rights. Furubotn and Richter (1998:5) define property rights as follows: "Property rights, in the economist's widest sense of the term, embrace the right to use and gain benefits from physical objects or intellectual works and the right to demand certain behavior from other individuals." These authors make a distinction between absolute property rights, such as ownership of physical and intangible assets, and relative property rights, such as contract rights. In fact, ownership rights can be considered as absolute property rights to physical objects.

rights that are specified by contract or law. These rights (and the accompanying obligations) can be observed and verified, for instance by a court of law. The residual control right (or residual decision right) is the right to make any decisions concerning the asset's use that are not explicitly controlled by law or assigned to another by contract. In this thesis we use the Grossman/Hart definition of ownership: *Being owner of an asset means holding the residual control rights and the residual income rights to that asset.*

The economic importance of ownership relates to the incentives it carries. A person having the residual right of control to an asset also has the right to the residual return from the asset. Residual return is the net income generated by the asset, that is, the amount of revenues left over after all contractual and legal obligations have been paid. Residual returns may be direct, current cash flows or changes in the future flows, which then are reflected in changes in the current value of the asset. Tying together residual returns and residual control is the key to the incentive effects of ownership. These effects are very powerful because the decision-maker bears the full financial impact of his or her choices.

In this thesis we take the perspective of the chain, and seek efficient ownership structures for carrying out the transactions in this chain. The chain perspective implies looking at ownership of various assets that can be distributed over several actors involved in the transaction. Because it is the allocation of ownership that is of interest and not ownership per se, we use the concept *governance structure*. Hansmann (1996) has defined a governance structure as the allocation of decision rights and income rights over all relevant assets. Which assets are relevant depends on the specific transaction.

Agrifood chain

The term *agrifood chain* or *chain* is often used to describe the various stages of production and distribution that an agricultural product goes through before reaching the final consumer.[3] The traditional approach to the agrifood chain focusses on processes, such as product flows and information flows. In this thesis, we use an institutional approach to the agrifood chain (Meulenberg and Broens, 1996), focussing on actors, incentives and institutions. We use the following definition: an agrifood chain consists of three or more actors and three or more assets involved in producing and distributing agricultural products. One of the central questions here is how ownership of the various assets is allocated to the actors in the chain. These actors are independent firms collaborating with other firms in the chain or they are dependent units belonging to a vertically integrated firm.

Efficiency of organisation

In this thesis the co-operative is studied from an efficiency perspective. In neo-classical economic theory, efficiency relates to resource allocation. An efficient allocation of

[3] See Van der Meulen (2000) for a brief discussion on the various meanings of the concept agrifood chain in the international economics, management, marketing and sociology literature.

resources is one such that there is no other available allocation that makes someone better off without making another person worse off. Such an allocation is Pareto optimal.[4]

This thesis is not about efficient allocation of resources but about efficiency of organisation. We are not so much concerned with efficiency of *the* organisation, but primarily with efficiency of organising a particular transaction. Since we focus on asset ownership, we are concerned with the efficiency of the particular governance structure chosen for carrying out a transaction. Analogous to the definition of efficient resource allocation, efficiency of organisation means there is no other way of organising a transaction that generates a better outcome for the people involved (Milgrom and Roberts, 1992: 22). Studying the efficiency of organisation means that economic arrangements will be evaluated on the basis of how well they satisfy the wants and needs of the people (or firms) involved. In this thesis we study the efficiency of the co-operative as an economic arrangement for transactions in the fruit and vegetable market. We use a chain-perspective in the sense that the people (or firms) involved in our efficiency evaluation are all the firms constituting the particular agrifood chain that the co-operative is part of.

Measuring efficiency of organisation is not easily done. The main strategy of measuring is comparing outcome by outcome. Particular economic arrangements (for instance a co-operative and an investor-owned firm) can be compared in a variety of circumstances. If one arrangement always yields a better outcome (in the eyes of the people involved in the arrangement), then that arrangement is efficient. For instance, if arrangement A supports incentives for surplus-generating investments, while arrangement B does not support such incentives, then arrangement A is efficient and arrangement B is inefficient.

Besides using efficiency as a normative concept, by which we can evaluate existing arrangements, efficiency can also be used as a positive concept, with explanatory and predictive power. We assume that people seek out and settle upon efficient choices. Inefficient decisions, whether about resource allocations or organisational arrangements, are always vulnerable to being overturned. There is, however, an important condition for reaching efficiency: parties must be able to bargain effectively to effectively implement and enforce any agreement they reach. Milgrom and Roberts (1992: 24) have summarised this argument in the *efficiency principle*: "If people are able to bargain together effectively and can effectively implement and enforce their decisions, then the outcomes of economic activity will tend to be efficient (at least for the parties to the bargain)." Using efficiency as a positive concept means understanding existing arrangements as efficient choices, and interpreting changes in these arrangements as efficiency-enhancing responses to changes in the environment within which the arrangements exist.

[4] The concept of efficiency certainly has its shortcomings; it is a weak predictor of outcome (because there are many efficient allocations of a given collection of resources) and it cannot be used as an ethical criterion. Still, efficiency is both an important device for organising ideas and a useful criterion for evaluating performance.

1.4 Positioning the thesis

The economic organisation theories used in this thesis are part of new institutional economics. The fundamental idea animating this branch of economics is that transaction costs exist and necessarily influence the structure of institutions and the specific economic choices people make (Furubotn and Richter, 1998: xiii). Major parts of new institutional economics (NIE) are transaction costs economics, property-rights approaches, and contract theory.

Institutions that influence economic choices can be studied at different level of aggregation. Williamson (2000) offers a comprehensive scheme of four levels of institutional economic analysis (Figure 1.1). The top level is the social embeddedness, where norms, customs, mores and traditions are located. Institutions at this level change very slowly, on the order of centuries or millennia. Most institutional economists take this level as given. The second level is referred to as the institutional environment. The 'formal rules of the game' observed here are partly the product of evolutionary processes, and partly the result of political action. The definition and enforcement of property rights and of contract laws are important features of the structures at this level. Adaptation of the institutional environment often takes dozens of years. The third level is where the institutions of governance are located. Governance should be considered as "an effort to craft *order*, thereby to mitigate *conflict* and realise *mutual gains*." (Williamson, 2000: 599; italics in original). Analysis at this third level is about the efficiency of different governance structures (such as contracts and vertical integration) for carrying out specific transactions. Possible reorganisation of transactions among governance structures is done periodically, on the order of a year or a decade, often at contract renewal or equipment renewal intervals. Finally, the fourth level is about resource allocation and employment; this is the level at which neo-classical economic analysis works. At this level of analysis, adjustments to prices and output occur more or less continuously.

This thesis fits in the third level of institutional analysis. The agricultural co-operative will be studied as a particular governance structure, that, because of its incentive effects, may be more or less appropriate for carrying out specific agrifood transactions. In fact, as the institutional environment (level 2) for agrifood transactions is changing we may expect institutional arrangements (level 3) to change as well.

Another way of placing this thesis in the institutional economics and economic organisation literature is using the perspective of the 'theory of the firm'. Economists have developed several perspectives on what is essential to a firm. A major part of defining and describing the firm is about its limitations. In other words, where do the boundaries of the firm lie. Hart (1989) briefly describes four established theories of the firm and then presents a fifth one for which he himself has made a major contribution. The four established theories of the firm are neo-classical theory, principal-agent theory, transaction costs economics, and the firm as a nexus of contracts. The fifth and new theory of the firm is called the new property rights approach to the firm. In this thesis, that studies the boundaries of the co-operative, we will make use of the transaction costs theory, the principal-agent theory and the new property rights approach. In addition to these five theories, in Chapter 4 we will use another theory: the firm as a system of attributes.

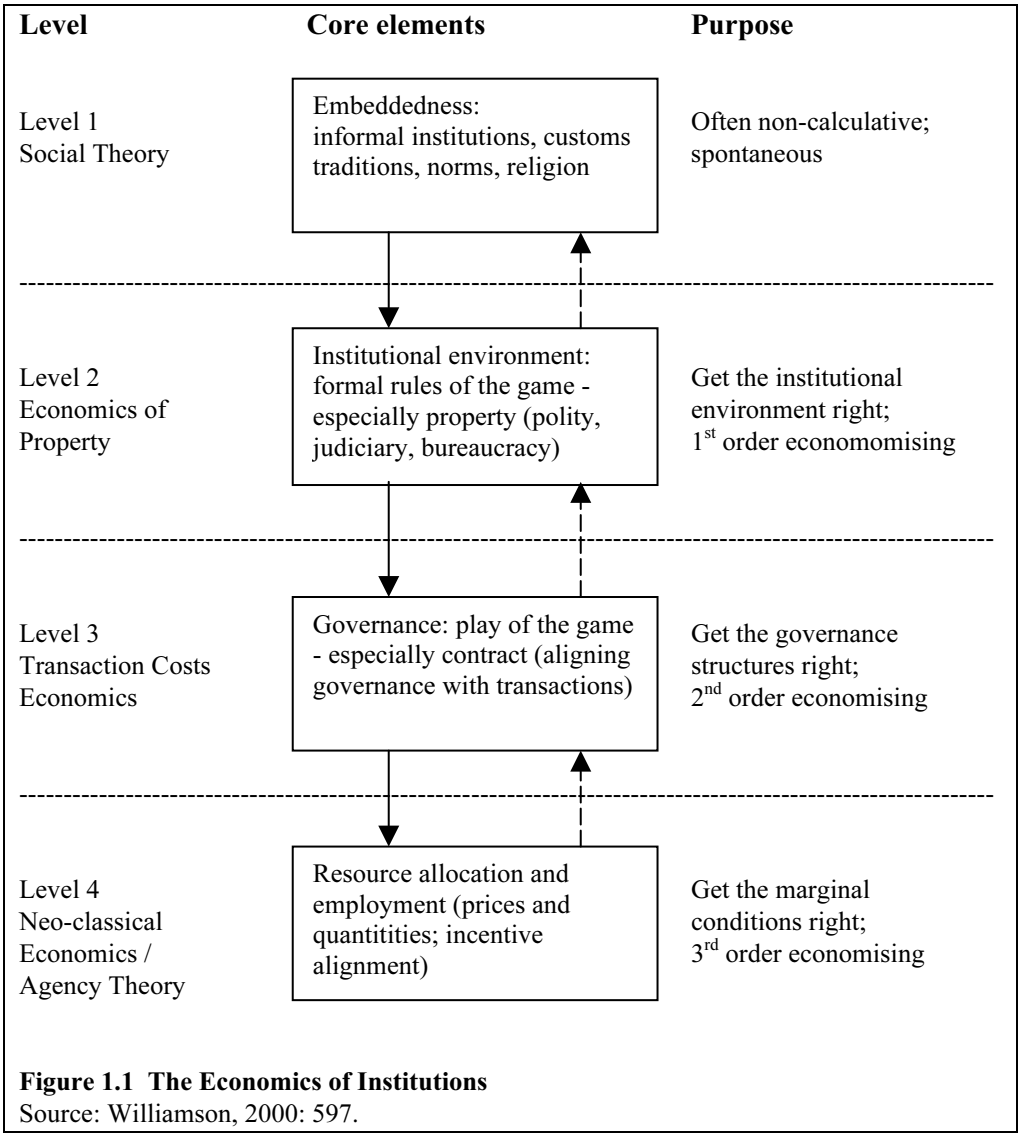

Figure 1.1 The Economics of Institutions
Source: Williamson, 2000: 597.

This thesis is part of an ongoing effort in describing and analysing changes in the organisation of the agrifood chain. Structural changes in food production and distribution have lead to increased attention of agricultural economists and agribusiness scholars for the organisation of agrifood transactions. Two catchwords in the body of literature on restructuring of the agrifood chain are 'industrialisation of agriculture' and 'vertical co-ordination' (see Royer and Rogers, 1998). Industrialisation of agriculture refers to the changing nature of linkages between the various stages of the production and distribution

chain as well as to the consolidation of firms in this chain (Urban, 1991; Barkema, 1993; Boehlje and Schrader, 1998).[5] Vertical co-ordination is one particular aspect of the industrialisation of agriculture. Frank and Henderson (1992: 941) give the following definition: "Vertical coordination encompasses all means of harmonizing vertically interdependent production and distribution activities, ranging from spot markets through various types of contracts to complete integration".

By studying the agrifood chain from an institutional economics perspective, the emphasis of this thesis is on the impact of incentives on individual behaviour and on efficient governance structures. Efficiency is the optimal social surplus in the equilibrium situation. Another perspective on studying efficiency in the agrifood chain is taken by Supply Chain Management. This perspective, with it background in operational research and engineering, studies how logistic processes, information processes and quality guarantee processes can be improved. In recent years, this process perspective has also received broad attention from scholars of management of the agrifood chain (e.g., Trienekens, 1999, and Van der Vorst, 2000).

1.5 Outline of the thesis

This thesis consists of an introduction (Chapter 1), four essays on the role of co-operatives in the agrifood chain (Chapters 2 to 5), and conclusions (Chapter 6).

In Chapter 2 we present a survey of economic literature on the co-operative as a form of economic organisation. A marketing co-operative is a particular organisation for carrying out transactions between farmers and a marketing firm. In a marketing co-operative, the marketing firm is collectively owned by all members. Because farmers own assets in two stages of the production and distribution chain, the co-operative is a form of vertical integration. However, it is a special form of vertical integration because ownership of the marketing firm is collective. The combination of collective ownership and voluntary membership leads to a decision-making structure characterised by democracy and consensus. In this chapter we will describe these implications of the special characteristics of collective ownership of the co-operative firm.

One of the implications of ownership relates to investment incentives. According to Transaction Cost Economics and New Property Rights Theory, ownership of assets may be necessary to protect relationship-specific investments. In Chapter 3 we present a model

[5] Recently, the concept of 'agroindustrialisation' has been introduced to describe the related changes taking place both among primary producers and between primary producers and other firms in the production and distribution chain. According to Reardon and Barrett (2000), agroindustrialisation consists of three sets of related changes: (1) the growth of agroprocessing, distribution, and farm input provisions off-farm; (2) institutional and organisational change in the relation between agrifood firms and farms such as a marked increase in vertical co-ordination; (3) concomitant changes in the farm sector, such as the changes in product composition, technology, and sector and market structures.

on the effect of changes in the asset ownership structure on the incentives to invest for three agents participating in a production and distribution chain. We will show that when the market conditions for food products change, the co-operative may become a less efficient type of organisation for agrifood transactions.

While Chapter 3 focuses on one particular attribute of a co-operative, that is, asset ownership and its effect on investment incentives, Chapter 4 studies the combination of several functional and organisational attributes. This chapter contains a case study of co-operative restructuring in response to changing market conditions. This case study deals with the transformation of several auction co-operatives into one marketing co-operative. The new co-operative - VTN/The Greenery - is the largest marketing organisation for fresh produce in the Netherlands. We will describe the changes in functional and organisational attributes, and analyse the coherency of the new organisation.

Restructuring existing co-operatives is not the only response of growers to changing market conditions. Establishing new co-operatives is the other side of the same mirror. In Chapter 5 we present the findings of an empirical study into new producer organisations (POs) in Dutch food horticulture. The new POs unite growers of a specific crop or crop variety. The tasks of the new POs include bargaining with customers, setting up a quality control system, carrying out sorting and packaging, and implementing a marketing programme. Which tasks a particular PO carries out will depend its the relationship with the traditional and restructured auction co-operatives (such as VTN/The Greenery). Several types of POs will be distinguished, and the pros and cons of the various types will be assessed, both theoretically and empirically.

Chapter 6 presents both a summary and the main conclusions of the thesis.

2. The Agricultural Co-operative as a Form of Vertical Integration

2.1 Introduction

In this chapter we present a survey of the theoretical and empirical literature on vertical integration in co-operatives. The main question we want to answer is under what conditions do farmers seek vertical integration in co-operatives instead of contracting with independent firms? In answering we will make use of economic organisation theory. This branch of institutional economics seeks to explain which kinds of organisation are most efficient in particular environments. The basic unit of analysis in economic organisation theory is the transaction, where goods or services are transferred from one person (or firm) to another. The main tasks of economic organisation are to *co-ordinate* the actions of the various individuals who (want to) transact so that they form a coherent plan and to *motivate* the actors to act in accordance with the plan. Issues of co-ordination and motivation play a central role in economic organisation theory (Milgrom and Roberts, 1992; Hendrikse, 1998b). We will survey several branches of economic organisation theory - such as transaction costs economics, new property rights theory, and principal-agent theory – and discuss their application to agricultural co-operatives.

The goal of this chapter is twofold. First, to present economic organisation theories that will be used in the subsequent chapters of this thesis. Second, to present a comprehensive overview of the advantages and disadvantages of vertical integration in an agricultural co-operative. Once we know the conditions that make vertical integration in a co-operative an efficient organisation for carrying out transactions with farm products, we can start to assess the effect of current conditions in the agrifood sector on the efficiency of the co-operative for those transactions.

This chapter is structured as follows. In Section 2.2 we present a brief discussion on vertical integration. There are several theoretical explanations for vertical integration, and they have all been applied to explain co-operatives. Section 2.3 describes how incomplete and asymmetric information causes measurement problems in transactions. These information problems may be reason for vertical integration. Information problems can also explain why farmers vertically integrate into other stages of the production and distribution chain while other firms do not integrate into farming. Section 2.4 presents Transaction Costs Economics (TCE). This theory explains the governance structure chosen for carrying out a particular transaction from the characteristics of the transaction. After presenting TCE in general, we will survey applications of this theory to co-operatives. In Section 2.5 we present the new property rights theory (or incomplete contract theory). Building on TCE, the new property rights approach focuses on the shift in investment incentives that happens if two firms are vertically integrated. This theory shows there are advantages and disadvantages to the integration process. Applications to the co-operative are still rare. In Section 2.6 we discuss co-ordination issues and there relationship with vertical integration. Section 2.7 discusses several issues of collective ownership in a co-

operative. Collective ownership may negatively affect the incentive to invest, and it may lead to laborious decision-making processes. This brings about certain disadvantages, which makes the co-operative less flexible compared to its non-co-operative competitors. In Section 2.7, finally, some conclusions are drawn on the state of the theoretical and empirical literature explaining vertical integration in agricultural co-operatives.

2.2 Vertical integration

In Chapter 1 we have argued that the main function of the co-operative firm is to provide services that align with the economic activities of the member firms. In a marketing co-operative these services are processing and marketing. If we study the agricultural co-operative from the perspective of the production and distribution chain, we find that the co-operative firm and the member firms occupy different stages. Firms in one stage of the chain - such as production - are involved in activities in another stage - such as processing and marketing. As such, a co-operative can be considered as a form of vertical integration.

Traditionally, vertical integration is defined as the organisation of two successive production processes by a single firm (Riordan, 1990: 94). Inherent in the traditional notion of vertical integration is the elimination of contractual or market exchange and the substitution of internal exchanges within the boundaries of the firm.[6] Vertical integration also means the ownership and complete control over neighbouring stages of production and distribution. For instance, a vertically integrated firm has complete flexibility to make the investments decisions of all stages encompassed within the firm.

There are three broad determinants of vertical integration: technological economies, transactional economies and market imperfections (Perry, 1989: 187). Vertical integration arises from technological economies if the combination of two separate transformation processes leads to lower input costs. A typical example is the production of iron in a blast furnace and the production of steel sheets by the same company. By placing the production line for steel sheets next to the blast furnace, energy savings can be obtained.

Market imperfections, or market failure, are caused by imperfect competition, externalities, and imperfect or incomplete information. The effect of market imperfections is commonly studied from a neo-classical perspective. Neo-classical analysis of vertical integration assumes that all the relevant dimensions of the good are chosen unilaterally by either upstream firms or downstream firms. The firms make choices so as to maximise their individual profits, rather than joint profits. The focus is upon the production and distribution choices themselves. Examples of incentives for vertical integration in neo-classical models are price discrimination, rent extraction, entry deterrence, eliminating double mark-up, internationalisation of service externalities, assurance of supply, acquisition of information, and reduction of agency problems.

[6] Even within firms some kind of market may exist, for instance between two business units trading with each other. However, there is always an authority (i.e., the top management) that can unilaterally set the conditions under which the business units must trade.

The third perspective on determinants of vertical integration takes the costs of the exchange process as the focal point. Firms choose to integrate to economise on transaction costs.[7] The transaction costs analysis of vertical integration discusses the relative advantage of contracts versus internal organisation for the joint determination and enforcement of exchange. Examples of reasons for vertical integration in transaction cost models are co-ordination (or information exchange), protection of investments, guarantee of supplies, and solving agency problems, such as the reduction of the need for strong performance incentives (in case of monitoring problems).

Grossman and Hart (1986) have argued that essence of vertical integration is the ownership and thus complete control over assets (see also Section 2.5.2). They take the position that the nature of the firm's relationship with labour is not relevant for distinguishing vertical integration. Riordan (1990) has shown that a definition of vertical integration solely based on asset ownership becomes problematic when considering renting and leasing assets, for instance in the case of franchising. Williamson (1975) has emphasised the relationship with labour. Vertical integration would encompass a switch from purchasing inputs to producing those inputs by hiring labour. Perry (1989) concludes that neither the asset ownership perspective nor the labour perspective provides a complete description of vertical integration. He emphasises that vertical integration is control over the entire production or distribution process, rather than control over any particular input into that process.

Applying these ideas about vertical integration to the (marketing) co-operative leads to the following questions. What drives farmers to vertically integrate into neighbouring stages of the production and distribution chain? To what extent are farmers vertically integrated into other production or distribution stages? To start with the second question, we can note that vertical integration in an agricultural co-operative has two special attributes. First, the integration of the member firms and the co-operative firm is only partial. The relationship between the member firm and the co-operative firm consists of a market element (the transaction relationship) and an administrative element (the control relationship). Second, the co-operative firm is owned by all member firms together. Ownership of the co-operative firm is collective; member firms have no individual right to decide over the activities and the assets of the co-operative firm. This collective ownership character brings about special challenges for the control relationship.

Which one of the three determinants of vertical integration - technological economies, transactional economies, and market imperfections - applies to the formation of agricultural co-operatives? Technology is not an issue. Since the member firms and the co-operative firm are not integrated in a technical sense - they carry out separate production processes - technological economies cannot be the reason for farmers to vertically integrate.

Market imperfections are the most common reason for vertical integration mentioned in the economics literature on co-operatives (e.g., LeVay, 1983; Schrader, 1989). Agricultural markets fail for a number of reasons. A very important reason is the (large) difference in efficient size between agricultural production on the one hand and processing and marketing of farm products on the other hand. Because most farms continue to be organised as family farms (see Section 2.3.4), the optimal size of the farm is

[7] To be precise: to economise on production **and** transaction costs.

determined by the labour and management capacity provided by the farm household (Schmidt, 1991). Production of inputs and processing of farm products, however, experience substantial economies of scale. Therefore, only a small number of suppliers and processors will exist in a particular farming region, leaving the farmer with only very few sources of supply or markets. These oligopolistic and oligopsonistic market structures give suppliers and processors market power and may lead to higher prices for inputs and lower prices for farm products than in a competitive market situation. By establishing a bargaining co-operative (or bargaining association) for the collective purchase of inputs or collective sale of farm products, farmers establish a countervailing power vis-à-vis the market power of a supplier or processor.[8] However, the existence of market power in neighbouring stages of the production and distribution chain is in itself no sufficient explanation why farmers carry out these economic activities themselves (Bonus, 1986). A bargaining association combining the sales decisions of a large number of farmers would be able to neutralise asymmetric market power. There must be other reasons why farmers have vertically integrated into processing of farm products or manufacturing of inputs.

This brings us to the third reason for vertical integration - transaction costs. Here the perspective of the exchange relationship between two firms is taken (as opposite to the neo-classical explanations of vertical integration that focus on the individual firm). In this thesis we will use the transaction costs perspective on vertical integration to explain the existence of (marketing) co-operatives. We will study the co-operative as a special instrument to organise the exchange between farmers and processing and marketing firms. Table 2.1 summarises the explanations for vertical integration in co-operatives, and links them to the level of analysis as presented in Figure 1.1. Economic models explaining vertical integration from technological economies and market imperfections are based on neo-classical economics and agency theory, and focus on getting right the marginal conditions for production and distribution. This is level 4 of Williamson's scheme of institutional analysis. In this thesis we focus on transaction costs reasons for vertical integration in co-operatives. At this level 3, the purpose is to get the governance structure right. In other words, the co-operative is a specific governance structure chosen to economise on transaction costs.

Before we discuss (in Section 2.4) the transaction costs explanation of vertical integration, we will briefly discuss information problems leading to vertical integration. Information problems are commonly studied from the market imperfections perspective, using neo-classical economic models (e.g., Riordan, 1990). The reason for including this complete contract perspective on vertical integration is that information and motivation problems figure both at the third and fourth level of institutional economic analysis (as presented in Figure 1.1). Thus, they form a steppingstone between complete and incomplete contract theoretical explanations of vertical integration.

[8] While countervailing power suggests a defensive strategy, farmers can also co-operate to build up market power themselves.

Table 2.1 Explanations for vertical integration in co-operatives

Driving forces behind vertical integration	**Explaining vertical integration in co-operatives**	**Level of institutional analysis** (see Figure 1.1)
Technological economies	No	4
Market imperfections	Yes	4
Transactional economies	Yes	3

2.3 Information Problems

2.3.1 Introduction

Information problems can be studied from two perspectives: conflicting interests and common interests. Incomplete and asymmetric information in combination with conflicting interests leads to suboptimal motivation of people and thus to motivation costs. To solve the motivation problem, different organisational forms and contractual arrangements have been designed. Incomplete and asymmetric information in situations of common interests leads to co-ordination costs. The co-ordination problem can be solved be choosing an appropriate co-ordination mechanism, such as price, contractual agreement or authority. In this section we focus on organisational solutions to information problems under conflicting interests. Co-ordination problems will be dealt with in Section 2.6.

Motivation costs arise when parties to a potential or actual transaction do not have all the relevant information needed to determine whether the terms of an agreement are mutually acceptable and whether these terms are actually being met. If information is incomplete or asymmetrically distributed among transaction parties, mutually advantageous transactions may fail to occur, because one or the other party fears being victimised, or costly arrangements will be made to protect against opportunistic behaviour. Another type of motivation costs relates to imperfect (or limited) commitment, that is, the effect of parties recognising that their partner may not fully comply with the agreement. If no full commitment can be achieved, efficient investments may not be made or costly measures might be needed to defend the investments.

In this section we will focus on a particular motivation problem that determines whether a transaction will be carried out within the boundaries of the firm or not. This is the difficulty of measuring the performance of contract partners. In additional, we will use the incidence of motivation problems to explain the typical organisation of agricultural production in family farms. Given the highly idiosyncratic information in farming activities and the large size differences between farms on the one hand and processing and marketing firms on the other hand, it is not efficient for the processor to own the farms. Then, a

farmer-owned co-operative processing firm may be the only viable vertical integration solution.

2.3.2 Difficulty of measuring performance

Motivation problems may arise in transactions characterised by asymmetric information, diverging interests, and differing risk preferences. In such transactions, there is risk of opportunistic behaviour by one or both of the transaction partners. This problem of motivating the parties to a contract to fully live up to the agreement is the central element in the so-called agency theory (Eisenhardt, 1989). This theory studies the design of efficient contracts governing a principal-agent relationship characterised by asymmetric information and diverging interests. Principal-agent relationships provide room for opportunistic behaviour of two kinds: moral hazard and adverse selection. First, moral hazard, or post-contractual opportunism, refers to a lack of effort on the part of the agent (i.e., the agent is shirking). Second, adverse selection, or pre-contractual opportunism, refers to the misrepresentation of ability or quality by the agent. Agency theory presents two general solutions to the problem of unobservable behaviour. One is the alignment of the interests of the principal and the agent, by using outcome-based contracts. The other is improving the information available to the principal, by using input-based contracts, such as employment contracts. As to the difficulty of performance measurement, agency posits that outcome measurability is negatively related to input-based contracts and positively related to outcome-based contracts (Eisenhardt, 1989: 62).

Contract arrangements have been developed to reduce the cost of performance measurement and to prevent opportunism in case of measurement problems (Barzel, 1982). For instance, a share contract relieves transaction partners from having to spend resources on finding out whether the other partner has put in the amount of effort agreed to. With a share contract both parties will strive to maximise surplus, as they both receive a share of that surplus. In agriculture, share contracts are known as share cropping, and are quite common for crops that require difficult to measure tillage practices (Allen and Lueck, 1996).

When performance measurement problems cannot be solved by outcome-based contracts, input-based contracting may provide the efficient solution. Going from an outcome-based to an input-based contract implies vertical integration. The choice between outcome-based and input-based contracts is reflected in the organisation of the sales function of a firm: internal sales force or hired sales agents. Anderson and Schmittlein (1984) found that when the performance of the salesman can be measured relatively easily, the salesman will be an independent agent; when measuring the performance of the salesman is costly, he will most likely be an employee. Also when particular tasks for which performance is difficult to measure become relatively more important (e.g., services), shifting from a market contract to a labour contract between the firm and the salesman can be expected. It is hard to measure whether a person who is hired for giving advice has done the best she can do. In general, transactions that involve idiosyncratic information or knowledge create special performance measurement difficulties.

Holstrom and Milgrom (1991, 1994) have broadened this problem of measuring the performance of (sales) agents. They have developed a model of multi-task agency, in which sales people carry out three tasks: making current sales, cultivating long-term customer satisfaction, and gathering and relaying information on customer needs. If the latter two activities are important and if the three activities compete for an agent's time, then the marginal rewards to improved performance on each must be equal in strength; otherwise, the ill-paid activities will be slighted.[9] Because performance in non-selling activities is arguably hard to measure, it may be best to provide balanced, necessarily lower-powered incentives for all three activities. In that case, the sales function will be carried out within the firm. In other words, the firm will vertically integrate production and sales activities.

2.3.3 Difficulty of measuring performance and the co-operative

A co-operative can be a solution to moral hazard and adverse selection problems in transactions with particular agricultural products (Staatz, 1987b).[10] The problem of difficult performance measuring may arise when a producer of a branded product hires a firm to distribute the products. If the product is a high-quality perishable product that requires special handling in subsequent stages of the distribution system, negligent handling of the product by the distributor firm can damage the producer's brand name (and reputation). Because such negligent handling may be very difficult to measure, the producer has an incentive to vertically integrate forwards to gain tighter control over the distribution system. If the producers of these branded products are farmers, a co-operative distribution firm seems to be a suitable type of organisation for vertical integration. Similarly, farmers may have an incentive to vertically integrate backwards into the manufacturing of inputs, if the quality of these inputs is difficult to determine ex ante. In the 19th century, the difficulty of measuring the quality of inputs has been the main reason for farmers in the Netherlands to establish co-operatives for the production of compound feed, seeds and fertilisers (Van Stuijvenberg, 1977).

Hennessy (1996) shows that asymmetric information about product quality between farmer and customer may be reason for vertical integration.[11] When identifying quality is uncertain, difficult or costly, customers will not pay the highest price for the highest quality product (this is the adverse selection problem). For the farmer the incentive to invest in ensuring quality is reduced relative to the perfect information scenario because the difference in market revenues is lower than that which would maximise social surplus. As a result, underinvestment in the provision of quality occurs. Vertical integration may

[9] This equal compensation principle will be elaborated in Section 4.2.3.

[10] Because transactions with agrifood products are almost always repeated transactions, the pre-contractual problem of adverse selection and the post-contractual problem of moral hazard are both present.

[11] The author does not specify the type of vertical integration. As we will explain in Section 2.3.4, the co-operative is the most likely type of vertical integration for the farmer-processor transaction.

solve this problem because it removes the need to test for quality. The problem may be particularly relevant for products where quality is hard to identify in raw material, or is at a premium. Examples may be produce for niche markets, produce for processors who need consistent inputs, and produce prone to food safety problems.

Kilmer et al. (2001) have studied the relationship between a particular food quality attribute and vertical integration. In an empirical study on the incidence of pesticide residues and the organisation of production and marketing in the Florida strawberry and tomato industries, they found a significant negative relationship between vertical integration and fungicide and insecticide residues in strawberries and insecticide residues in tomatoes. The authors do not refer to the co-operative as the specific form of vertical integration. However, they seem to have studied grower-owned co-operatives because they define vertical integration as the common ownership by growers of one or more of the packing, distribution or marketing stages of the production and distribution chain.

Measurement difficulties can also explain the establishment of 19th century rural credit co-operatives (Bonus, 1986). Before these co-operatives existed, credit to small farmers was only available at high interest rates. These high rates were both a reflection of the monopoly power of the local money lenders and the very high information costs they incurred. Because of the difficulty collecting information needed to judge the small farmers' creditworthiness, commercial banks (often located in the cities) were not interested in providing credit to farmers. The rural credit associations solved the information cost problem by utilising the detailed information available to people who asked for credit - the members themselves. Given that the members were jointly responsible and indefinitely liable for each credit granted, they had every interest to feed their personal knowledge into the decision process.

By solving motivation problems, a co-operative can improve the efficiency of agrifood transactions. Koenig Balbach (1997) presents a case study of how co-operatives have improved efficiency in the US sugar beet industry. In the 1970s, co-operative processors developed a complex beet purchase contract, the extractable-sugar contract. Under this contract, each grower is paid the actual amount of recoverable sugar he delivers. This contract differs from previous contracts in that a more precise measurement is made of the quality of each grower's sugar beets. The extractable-sugar contract contains incentives for growers to supply higher-quality sugar beets, which has resulted in growers supplying 12 percent more sugar per ton of beets processed. In contrast, IOF processors do not use the extractable-sugar contract, and their growers did not supply beets with a higher amount of sugar per ton. These independent processors have an incentive to misreport beet quality and underpay growers. As the costs of monitoring the processor's quality measurement are too high for growers, they do not accept these contracts. Sugar beets processed by IOFs continue to be of lower sugar content. Thus, vertical integration of growers into processing via a co-operative firm limits misreporting incentives and allows for improved efficiency.

Asymmetric information is also present if a processor or marketer has better information on the demand in the final consumer market. The processor/marketer may exploit his information lead to the disadvantage of the farmer. A partial solution may be to employ a sales agent (by a group of farmers collectively). However, measuring the effort of the agent continues to be difficult. When both production and demand are volatile, incomplete commitment by the sales agent is hard to establish. In the marketing of Dutch

horticultural products the double information problem (on the market conditions and the effort of the sales force) was solved by establishing co-operative auctions. The auction co-operative performed the marketing function for all growers together, thus benefiting from economies of scale. More importantly, by using the auction clock as a price determination mechanism, sales agents were no longer needed. Thus, the co-operative auction can be considered as an efficient solution to incomplete and asymmetric information problems.

2.3.4 The family as the centre of idiosyncratic information

Why is it more common for farmers to integrate forward into processing than for processors to integrate backward into farming? This is not a hypothetical question, as backward integration of processors into farming does exist in plantation-type of agriculture in crops like rubber, banana, coffee, tea, and palm oil (Pryor, 1982). The explanation for forward vertical integration by farmers can be found in the motivation problem that results from incomplete and asymmetric information in combination with incomplete commitment.

The omnipresence of the family farm as the dominant unit of economic organisation is one of the most interesting characteristics of the agricultural industry. While in the marketing and processing of agricultural products (as well as in the manufacturing of farm inputs) nowadays large corporate-type firms predominate, the biological growth stages of production are still carried out within a relatively small operation that is owned and exploited by one family (Allen and Lueck, 1998). Most explanations for the continued dominance of the family farm stress the role of incentive problems that result from the constraints nature places on growing food and fibre.

Pollak (1985) argues that the family farm is a response to the difficulty of supervising workers. The family is an organisational solution to the difficulty of monitoring workers who, for technological reasons, cannot be gathered together in a single location. Pollak also emphasises the idiosyncratic information and knowledge of local conditions (for instance about the quality of land) that family members are likely to possess, which is favouring family labour above non-family labour.

Allen and Lueck (1998) relate the viability of the small-scale family business in agriculture to the randomness of nature and the seasonality of production. First, random production shocks from nature generate opportunities for moral hazard. Measuring and rewarding effort by hired labour may be difficult due to the unpredictability of nature. This incentive problem provides a reason for the ownership of the farm by a single family. Second, seasonality of production means that production stages are short, infrequent, and require few distinct tasks. Gains from specialisation are limited, while the importance of timing of (successive) activities makes wage labour especially costly to monitor. Again, family labour is the solution. By focussing on the effect of nature on the trade-off between moral hazard and the gains from specialisation, Allen and Lueck also provide an answer to the question why in some branches of agricultural production the family farm is disappearing. They argue that only when “farmers are successful in mitigating the effects of seasonality and random shocks to output, farm organisation gravitate toward factory processes, developing large-scale corporate forms found elsewhere in the economy” (Allen and Lueck, 1998: 347).

Bonus (1986) also explains the existence of small independent farms from idiosyncratic knowledge of the farm assets in combination with the unpredictability of nature. These characteristics favour independent operation. “Obviously, farming is subject to local and meteorological imponderabilities. Operational decisions are risky because the outcome often depends on the weather, the quality of the local soil, etc. What is best done (or avoided) in a given situation cannot formally be stipulated in advance; nor can a decision made by a farmer under certain circumstances fully be appreciated afterwards by persons who were elsewhere at the time. The farmer’s economic performance depends strongly on his experience, if not on his instincts; and he must therefore act on his own discretion as a matter of daily routine” (Bonus, 1986: 324).

Schmidt (1991) and Hansmann (1996), in explaining the optimal size of the farm, make explicit distinction between labour and management. While contracting non-family labour may be difficult, it may be even more difficult to measure the performance of a hired manager. This may explain why the farmer-owner does all management himself. Even at farms with permanent hired labour, as is the case in (greenhouse) horticulture, there is no separation between owner and manager. While these farms may no longer be family farms in the traditional sense, they are still family businesses, and their scale of operation continues to be much smaller than in the production of inputs and the processing and/or marketing of farm products.

Bonus (1986) establishes a connection between the family farm and the farmer-owned co-operative. He explains the typical relationship between farmers and their co-operative from the idiosyncratic knowledge of the farm. “Idiosyncratic experience is characteristic of many skills acquired while performing difficult tasks. During their work, people develop a task-specific know-how that is indispensable for doing a good job; yet this know-how cannot be formalised and written into work instructions” (Bonus, 1986: 328). Seen from the perspective of the processing firm, the idiosyncratic knowledge of the farmer can be central or peripheral. It is central when connected to (or non-separable from) the activities of the processing firm; it is peripheral when not connected. Because the idiosyncratic knowledge of the farmer is not connected to the production processes at the processing firm (i.e., it is peripheral), there is no reason to bring the transaction fully within the boundaries of the firm. Thus, a co-operative combines the advantages of farmer control over the processing level with the advantages of independent operation at the production level.

Hansmann (1996) explains the link between family farm and farmer-owned co-operatives by combining motivation problems and scale economies. By establishing co-operative firms, farmers can benefit from the economies of scale at the processing level while maintaining the benefits of small scale in farming. “Through appropriate use of both consumer and producer cooperatives, small family farms have remained the basis unit of agricultural production while, at the same time, those farms have been vertically integrated with very large firms both above and below them in the stream of production. This neatly articulated system of ownership manages to economize on the costs of market contracting while simultaniously providing effective monitoring of managers where economies of scale are large and, where economies of scale are small, maintaining the strong incentives of owner-entrepreneurship” (Hansmann, 1996: 142).

2.3.5 Conclusions

This section has focussed on information problems in combination with incomplete commitment. Solutions for the resulting motivation problems can be found in detailed contracts. If the costs of measuring the performance by contract partners become too high, vertical integration may be the only viable option. Thus, a co-operative as a form of vertical integration may be a solution to the information problems in agrifood transactions.

Most of the information problems that give rise to vertical integration in co-operatives focus on measuring the quality of the agricultural product and on measuring the effort of the processor/marketer. Quality issues have become much more important in agrifood transactions, resulting in the development of many quality assurance programmes. If these programmes concern easy to measure quality characteristics, contracting schemes may do. However, when they concern difficult to measure quality characteristics, vertical integration may be the solution. Also, the effort of the processor/marketer has become more important in agrifood transaction due to the need to differentiate, to innovate and to develop sophisticated marketing programmes. Here, too, difficulty of measuring performance may be reason for vertical integration.

Motivation problems also explain why agricultural production continues to be dominated by the small-sized family farm. High contracting costs due to the impossibility of measuring the performance of hired labour strongly favours the deployment of family labour. The difficulty in measuring and rewarding the effort of the farmer-employee does not only come from the randomness of nature, but also from the idiosyncratic character of many farm-assets. The quality of a particular piece of land depends on its unique location in combination with long-term cultivation. Measuring and administrating the quality of each lot on each farm, giving the right instructions to the farmer-employee, and doing all this for a large number of farms is an impossible task.

Agency theory posits that information problems can be solved by designing appropriate contracts. Vertical integration is considered a suboptimal solution. However, other reasons than information problems exist why certain activities and certain transactions are carried out within the boundaries of the firm. As soon as we release the assumption of complete contracts, and acknowledge that people are characterised by bounded rationality and opportunism and that the world is full of uncertainty, many more reasons for vertical integration appear. These reasons have been put forward by transaction costs economics. The next section discusses the transaction costs explanations of vertical integration.

2.4 Transaction Costs

2.4.1 Introduction

The agricultural co-operative is a form of economic organisation designed to accommodate the specific characteristics of transactions between farmers on the one hand and suppliers or processors on the other hand. These specific characteristics determine the size of transaction costs that in turn determine whether the transaction will be carried out within a firm (i.e., vertical integration) or by way of contract between two independent firms.

In this section we use Transaction Costs Economics (TCE) to assess the agricultural co-operative. First we will present the basic argumentation of TCE. Three characteristics of transactions play a major role in the analysis: asset specificity, frequency and uncertainty. These characteristics can also be found in transactions with agrifood products. This explains why a co-operative (as a form of vertical integration) has been chosen as the governance structure to carry out agrifood transactions. We will also introduce studies that have used TCE to explain the dominance of co-operatives in particular branches of the agrifood industry.

2.4.2 Transaction Costs Economics (TCE)

In his classical article on *The Nature of the Firm* Coase (1937) asks the fundamental question why firms exist in an economy that uses markets and prices for co-ordination of production and exchange. In his analysis, Coase distinguishes between co-ordination through markets and co-ordination within firms. That certain transactions are co-ordinated within a firm can be explained by the cost of using the price mechanism. Co-ordination through markets entails costs of collecting information about products, prices and partners, costs of designing a contract, and costs of making sure the contract is complied with. All these costs together are called transaction costs. Williamson (1985: 19) considers transaction costs as the economic equivalent of friction in a mechanic system. He refers to Arrow (1969) who has defined transaction costs as the "cost of running the economic system". How transaction costs determine the choice of carrying out a transaction within a firm or through some kind of contract is the central theme of Transaction Costs Economics (TCE). In the words of Williamson (1985: 20): "Transaction cost economics poses the problem of economic organisation as a problem of contracting"

Transaction costs are the costs associated with designing, signing and enforcing contracts. Williamson distinguishes two types of transaction costs: *ex ante* costs and *ex post* costs. *Ex ante* transaction costs are the costs of drafting, negotiating and safeguarding an agreement (as suggested by Coase). *Ex post* transaction costs only rise when the contract has been put to work. These costs result from changes in the environment of the transaction which make adaptation of the contract necessary and open the door for conflicts of interests. *Ex post* transaction costs come in four different types: maladaptation costs when transactions drift out of alignment, haggling costs during correction of misalignment, set-up of dispute settlement, and bonding costs of effecting secure commitments. Preferably, ex

ante and ex post transaction costs should be considered together, because they are interrelated (e.g., higher effort in contract design may lower the cost of renegotiation). TCE focuses on ex post transaction costs resulting from an (asymmetric) dependency relationship. When a party to a bilateral contract has made transaction-specific investments, he will incur costs when the relationship is prematurely discontinued. The costs resulting from a loss of transaction-specific investments are called switching costs.

TCE employs two critical behavioural assumptions: human agents involved in transacting are characterised by bounded rationality (or bounded cognition) and opportunistic behaviour. Because of the complexity of the world no human being has full information on current and future events.[12] Actions of economic agents are rational, but only within the boundary set by limitedly available information and limited cognitive capabilities. Opportunistic behaviour means that partners to a transaction can renege on the contract, or can take advantage of the asymmetric dependency or asymmetric information. Opportunism does not necessarily mean that economic agents are deliberately cheating. It means that economic agents choose to follow their own interests which may conflict with the interests of the transaction partner. Masten (1996: 6) distinguishes two types of opportunistic behaviour: (1) deviations from joint-surplus maximising behaviour that produce a *de facto* redistribution of gains from trade within the terms of the existing agreement (this is the problem of *moral hazard*), and (2) efforts designed to force a renegotiation and thus a *de jure* modification of the terms previously agreed to (this is the problem of *hold up*). The two behavioural assumptions – bounded rationality and opportunism – have profound ramifications for economic organisation. "Given bounded rationality, *all complex contracts are unavoidably incomplete*. Given opportunism, *contract-as-promise unsupported by credible commitments is hopelessly naive*" (Williamson, 1990: 12; italics in original).[13] As a result, transactions are organised so as to economise on bounded rationality while simultaneously safeguarding them against the hazards of opportunism.

Transaction costs are caused by the combined effects of characteristics of human agents and the characteristics of transactions. Williamson (1985) distinguishes three characteristics of transactions that determine the level of transaction costs and thereby the choice of governance structure: the presence of transaction-specific assets (*asset specificity*), the uncertainty surrounding the transaction, and frequency of the transaction. These three characteristics will be further elaborated in separate sections below. When transaction costs are low, the transaction will be carried out through the governance structure *spot market*. When transaction costs are high, it becomes efficient to set up a

[12] In transactions three types of information problems may occur: (1) one party has information that the other party does not have (i.e., asymmetric information), (2) future contingencies cannot always be foreseen, and (3) not all information that is observable is also verifiable (and therefore usable in conflict resolution).

[13] Bounded rationality makes it impossible for contract parties to foresee all the relevant contingencies; to calculate and agree upon each course of action and payments for each contingency; and to write down exactly what is to be done in each contingency. Contracts that do not (precisely) describe what is to be done in each contingency may also encounter difficulty in enforcing the agreement. To sum up, all contracts are incomplete.

specific governance structure for carrying out a transaction. Originally, Williamson (1985) only made a distinction between two governance structures: *spot market* and *hierarchy*. Later he distinguished a third type - *hybrid* - in between market and hierarchy (Williamson, 1991). Other authors have emphasised the continuum of governance structure, ranging from spot market as one extreme to hierarchy as the other extreme (e.g., Mahoney, 1992; Frank and Henderson, 1992). Hierarchy (or vertical integration) means that a transaction is carried out within the boundaries of a firm. In between the extremes of the continuum lie several forms of contractual relationship.

TCE has been a major element of economic organisation theories, and a starting point for many further efforts into theorising organisational efficiency. The importance of TCE lies in the explanation its provides for the existence of various governance structures. The choice of governance structure for embedding a specific transaction depends on the size of transaction costs, which are determined by the characteristics of the transaction. TCE posits that, in a world of incomplete contracts and potential hold-ups, transactions requiring substantial transaction-specific assets will be carried out within the governance structure 'hierarchy' or 'vertical integration'. This relationship between transaction-specific investments and efficient ownership structures has been further elaborated by the new property rights theory. This theory will be presented and assessed in Section 2.5.

TCE has encountered quite some criticism, particularly on its bias towards contracting. As TCE focuses on the costs of contractual transactions, it largely ignores the costs of internal organisation[14] (Masten et al., 1991). Also, taking the transaction as the unit of analysis runs into problems when one starts to consider the costs of organisation more generally, because these costs do not relate to one single transaction (Milgrom and Roberts, 1992: 32). The other side of the same coin is that the market is treated as the default[15], without spelling out why market governance would be preferential. "In transaction cost economics, the functioning market is as much a black box as is the firm in neo-classical microeconomic theory" (Holstrom and Roberts, 1998: 77). Another criticism on TCE relates to the information problems in the transaction. For instance, if the performance of the agents involved in the transaction cannot easily be measured, this may be reason to bring the transaction within the boundaries of the firm (Mahoney, 1992; Milgrom and Roberts, 1992).

2.4.3 Asset specificity

Asset specificity refers to durable investments that are undertaken in support of particular transactions, the opportunity cost of which investments is much lower in best alternative uses or by alternative users should the original transaction be prematurely terminated (Williamson, 1985: 55). The specificity of an asset is measured as the percentage of

[14] Although Williamson (1985) acknowledges the limitations of the firm, such as low-powered incentives and bureaucracy costs, these features do not play a significant role in TCE analysis.

[15] In (non-economic) organisation theory usually the organisation is taken as the default (cf., Clegg and Hardy, 1996).

investment value that is lost when the asset is used outside the specific setting or relationship. As a result of the presence of transaction-specific assets, the specific identity of the parties to a transaction matters. Therefore, transaction-specific assets are also called *relationship-specific* assets.

Williamson (1989: 143) distinguishes five types of asset specificity:

- site specificity: for instance if a supplier and customer are located close to each other in order to economise on transport and inventory costs;
- physical asset specificity: investment in capital goods that are done specifically for the transaction; for instance in the automobile industry a supplier of parts invests in a production line for making specific parts for one car manufacturer;
- human asset specificity: particular knowledge and capabilities that have developed for use in specific transaction (with a specific partner);
- dedicated assets: investment in generic assets that far exceed the level of investment the firms would do if it did not engage in the specific transaction-relationship;
- brand name capital: investment in a brand name becomes worthless if the product to which the brand name is tied is no longer available.

A sixth type may be distinguished: temporal asset specificity (Masten et al., 1991). When timely performance is critical, delay becomes a potential effective strategy for exacting price concessions. Transactions are characterised by temporal asset specificity when the value of a product is time-dependent, like a newspaper; when activities have to be carried out subsequently, like in construction; and when products are highly perishable, like many farm products.[16]

Transaction-specific investments affect the level of transaction costs and therefore the choice of governance structure. When firm A wants to carry out a transaction, it can choose its contract partner from a large range of potential partners. Then A chooses B and makes an investment specific for the transaction with B. Because of this specific investment by A, the transaction between A and B generates a higher surplus than a transaction with any third party (in other words, A and B have a bilateral monopoly). Now A has become dependent on B (to a certain extent), and a new negotiation situation has arisen. This shift in negotiation power, called the fundamental transformation (Williamson, 1985: 61), has a far-reaching impact on eventual negotiations on contract compliance and contract renewal (i.e., ex post). An expected shift in negotiation power affects the investment incentives when preparing the current contract (i.e., ex ante). The fundamental transformation weakens the negotiation power of the party with the highest transaction-specific investments, and (thus) opens the possibility of various sorts of (ex post) opportunistic behaviour by the other party. The general business problem in which a party to a contract worries about being forced to accept disadvantageous terms later, after it has sunk an investment, or worries that its investment may be devalued by the actions of other, is called the *hold-up problem*.

In a situation of hold-up and renegotiation the party with the transaction-specific assets will accept new contract conditions and continue the relationship as long as using the assets in this specific relationship generates a higher surplus than using the assets in the

[16] Williamson (1991) considers temporal asset specificity as a special type of site specificity.

next best alternative. The difference between the benefits of using specific assets in this relationship and using them in the next best alternative is named the quasi-surplus. [17]

Consider the following stylised example from the dairy industry (Figure 2.1). A farmer invests in a dairy herd, a dairy barn and milking equipment. The farmer agrees to deliver his milk to the nearby milk processing company that enjoys a local monopsony. The investments by the farmer are not only specific to producing and delivering milk (i.e., transaction-specific), they are also specific to trade with this particular dairy company (i.e., relationship-specific). Assume that the annual rental-equivalent price of the farmer's assets (calculated with respect to their acquisition price) is 200.000 Euro. The farmer has made these investments based on the processor's promise to pay 250.000 Euro per year for the milk, yielding the farmer a profit of 50.000 Euro. Further assume that the most those assets can yield in the next best alternative use is an annual rental-equivalent price of 100.000 Euro. This implies a quasi-surplus of 150.000. Once the farmer has invested in the specific assets, the processor may be tempted to renege on the agreement and strategically lower the price because it realised that as long as it offers at least 100.001 Euro it will still pay the farmer to deliver the milk to it, even though its action imposes a capital loss of up to 100.000 Euro on the farmer.

Thus, the quasi-surplus is made up of the surplus plus that part of the investment that is sunk in the relationship (with the surplus being the revenues as agreed in the contract minus all costs). The larger this quasi-surplus, the larger the gain of hold-up for the opportunistic party. The risk of hold-up leads to two efficiency problems. First, investing agents will take costly measures to protect their investments and the expected revenues. Second, agents may refrain from making ex ante efficient investments. Both entail a loss of social welfare. [18]

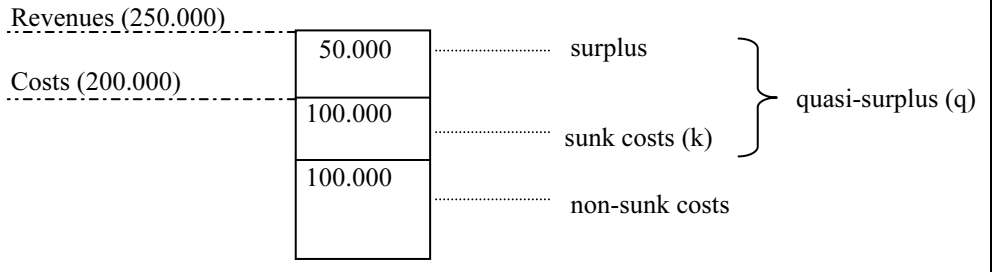

Figure 2.1 The quasi-surplus of the dairy farmer

[17] Klein et al. (1978) have called this the *appropriable specalized quasi rent*. The quasi rent of an asset owned by one individual and rented to another individual is "the excess of its value over its salvage value, that is, its value in its next best *use* to another renter. The potentially appropriable specialized portion of the quasi rent is that portion, if any, in excess of its value to the second highest-valuing *user*." (Klein et al., 1978: 298)

[18] TCE is dealing with the efficiency (or social cost) problem of hold-up, that is, with the loss of total value when specific investments are not made. The question how the total value is divided between the partners to a transaction is not an issue in TCE.

TCE hypothesises that transactions requiring substantial transaction-specific investments will not be carried out through the governance structure 'market' but through 'hierarchy' (i.e., vertical integration).[19] In the words of Klein et al. (1978: 298): "(…) as assets become specific and more appropriable rents are created (and therefore the possible gains from opportunistic behaviour increases), the costs of contracting will generally increase more than the costs of vertical integration. Hence, *ceteris paribus*, we are more likely to observe vertical integration". This hypothesis has been confirmed in many empirical studies (e.g., Shelanski and Klein, 1995; Lyons, 1996; Crocker and Masten, 1996; and Rindfleisch and Heide, 1997).

A special case of asset-specificity is *co-specialised assets* (Milgrom and Roberts, 1992: 135). Two assets are co-specialised if they are most productive when used together and lose much of their value if used separately to produce independent products and services. Co-specialised assets are mostly owned by one company. For instance, a trade name or brand name is almost always owned by the firm producing the products that are sold under that name (Klein et al., 1978).[20] Some brand names are so tightly connected to a specific product that separation of (investments in) the brand name and (investments in) the product would make no economic sense (e.g., *Coca-Cola* as the brand and cola as the product).

Although asset specificity is important for determining transaction costs, individually it does not provide sufficient explanation for the choice of governance structure. Asset specificity has to be studied in combination with other characteristics of the transaction like uncertainty and frequency (Williamson, 1985: 53). For instance, in a world without uncertainty, no post-contractual hazards exist. These other characteristics are frequency and uncertainty.

2.4.4 Frequency

Some transactions are one-time affairs, others are repeated frequently. When similar transactions occur frequently over a long period of time involving some of the same parties, the one who interacts repeatedly may find it valuable to design and introduce low-cost routines to manage the transactions. Frequency of a transaction is a relevant dimension in determining the organisation of a transaction, as the "cost of specialized governance structures will be easier to recover for large transactions of a recurring kind" (Williamson, 1985: 60). Frequency is particularly relevant when asset specificity is high.

When transactions are carried out frequently the element of reputation becomes relevant. Parties involved in a long, close relationship with frequent interactions have many opportunities to grant or withhold favours to one another. The ability to reward faithful partners and punish unfaithful ones in a long-term relationship greatly reduces the need for

[19] In fact, the choice is not between market and hierarchy, but among various positions between the spot market and vertical integration extremes of the continuum of governance structures.

[20] There is an exception, however, as franchising can be thought of as leasing a brand-name.

any kind formal mechanism to enforce agreements between them. Here, reputation serves as a safeguard against ex post opportunism. The short-term gains from opportunistic behaviour may be offset by the risk of losing future possibilities for profitable transactions, not only with the current transaction partner but also with other potential partners. Thus, reputation entails positive incentives to honour a contract

Which effect of frequency predominates - establishing a specialised governance structure or relying on reputation - depends on the other characteristics of the transaction and on the business culture, which determines the scope of reputation effects.[21]

2.4.5 Uncertainty

Uncertainty affecting the transaction can be of two types (Williamson, 1985). The first type of uncertainty rises if changes in the environment of the transaction can lead to disturbances in transactions. These environmental risks (Lyons, 1996) include physical disturbances caused by nature, and societal disturbances such as caused by shifts in consumer preferences and changes in government policies. The second type of uncertainty is of a strategic type and concerns the behaviour of the transaction partner. The two types of uncertainty are interrelated, as behavioural uncertainty would not pose contractual problems if transactions were known to be free of exogenous disturbances.

Milgrom and Roberts (1992: 31) point to a third type of uncertainty, that is, about the result of the transaction. If a transaction is complex and it is impossible to determine in advance what should be done in every possible contingency, the type of contract will reflect these difficulties. “Generally, when uncertainty and complexity make it hard to predict what performance will be desirable, contracting becomes more complex, specifying rights, obligations, and procedures rather than actual performance standard” (Milgrom and Roberts, 1992: 32). The types of contracts used in these situations are relational contracts, such as labour contracts.

Mahoney (1992) has surveyed economic and strategic management literature on the relationship between uncertainty and vertical financial ownership. He distinguishes the following types of uncertainty: demand or volume uncertainty, technological uncertainty, measurement uncertainty, and quality uncertainty. He concludes that the various types of uncertainty have differentiated impacts on the make-or-buy decision.

In TCE, the influence of uncertainty on the choice of economic organisation is conditional (Williamson, 1979; 1985). An increase in uncertainty has little effect on transactions that are non-specific. Only when transaction-specific investments have been made, uncertainty has consequences for the organisation of the transaction. Figure 2.2 shows how uncertainty influences the choice of governance structure.

[21] Reputation is managed by relational contracts, that is, implicit contracts with non-integrated parties (Baker et al., 1997).

		Uncertainty	
		Low	*High*
Asset Specificity	*Low*	Market	Market
	High	Long-term Contract	Vertical Integration

Figure 2.2 Choice of governance structure for frequent transactions
(Source: Hendrikse, 1998b: 219)

There is also a connection between uncertainty and frequency of the transaction. A long-term experience with a particular transaction partner reduces uncertainty about his/her behaviour. Behaviour uncertainty can also be reduced by culture, more particularly by norms and values that prevail in particular business environments. Finally, laws, rules and other types of public and private regulation limit the possibilities for opportunistic behaviour.

2.4.6 TCE and the co-operative

So far, we have discussed the central elements of TCE. Asset specificity in the transaction plays a prominent role in this economic organisation theory, while frequency and uncertainty of transaction play a co-determining role. In the following we apply TCE to agrifood transactions and explain vertical integration in co-operatives. We will pose the question whether transactions with agrifood products are characterised by asset specificity, frequency and uncertainty. If so, in what type of governance structures are agrifood transaction embedded to lower transaction costs.

In farming substantial up-front investments are needed before production can take place. Most of these investments are sunk costs, as the resulting assets cannot easily be used for other purposes. These sunk investments become relationship-specific if the farmer sells his products in a market characterised by small numbers. In farm product markets, oligopsony or even (local) monopsony is quite common due to substantial economies of scale in processing (Rogers and Sexton, 1994). Asymmetric market power in combination with relationship-specific investments confronts the producer with the risk of being held-up by the processor.

Opportunism from the side of the processor and marketer is often mentioned as one of the main reasons for farmers to set up a co-operative and carry out the processing

and marketing of farm products under own control.[22] Farmers can prevent being held-up by internalising the transaction, that is, by integrating forward via the creation of a proprietary co-operative firm. Whether farmers will do so, depends on the type of farm product (perishable or not) and the size of relationship-specific investments (in relation to total investments). "The incentives for farmers to integrate vertically via a cooperative firm to avoid opportunistic behavior are greatest where the proportion of sunk costs to total costs at the time of the transaction is high and the product is highly perishable, making its transfer to alternative markets on short notice very difficult. Fruits, certain vegetables, and dairy products are examples." (Staatz, 1987b: 89).

Not only the farmer is investing in specialised assets that become relationship-specific, also the processor firm may make investments that are specific to the relationship with its suppliers. According to Olilla and Nilsson (1997), it is typical in food production that there are transaction-specific assets on both sides, in production and processing. Take the dairy processor from the example above. He cannot easily (i.e., with low switching costs) turn to other suppliers, because they do not exist in his supply area or because they are unwilling or unable to supply for the same price as the original suppliers (for instance when they are contractually tight to another processor). In this case the assets of the farmer and the assets of the processor are co-specialised. This raises the question whether the farmer should own the processing firm or the processing firm should own the farms. In Section 2.3 we have concluded that it is more efficient for the farmer to own the processing assets than for the processor to own the farming assets.

Many transactions in the agrifood sector are of a recurrent kind, with a high frequency and a long duration. A typical example is the production of milk and its delivery to the dairy processor every (other) day. High frequency of transaction is, by itself, not a sufficient reason for vertical integration. Frequency often comes in combination with relationship-specific assets. The combination of continuous production, a perishable product and a thin market makes dairy farmers very vulnerable to potential opportunistic behaviour by a dairy processor. It is not surprising that co-operatives are particularly dominant in the dairy industry, both in Europe (Van Bekkum and Van Dijk, 1997) and in the USA (Ling and Liebrand, 1994). More farming activities are characterised by the combination of continuous production and perishable products, notably horticultural products. When no processing is needed, fresh products are sold to wholesalers and retailers. In some countries (notably the Netherlands) the sales process is organised by co-operative auctions. Asset specificity cannot explain the existence of co-operative auctions, as relationship-specific investments are minimal. Information problems as discussed in Section 2.3 may explain the existence of the co-operative auction.

Uncertainty is the third characteristic that determines – together with asset specificity and/or frequency – the choice of governance structure. In section 2.4.5 we have discussed three types of uncertainty: intra-transactional, behavioural and environmental. Not all three types of uncertainty are equally important in the agrifood sector. Uncertainty due to complex transactions seems to be least important, as agrifood transactions are of low

[22] One of the reasons to set up the very first dairy co-operative is the Netherlands (in 1886), was opportunistic behaviour by the firm purchasing the raw milk: it was not paying for the proper volume each farmer had delivered (Bakker, 1992).

complexity. Behavioural uncertainty does play a role because of asymmetric market structure and asymmetric information between farmers and their trading partners. This type of uncertainty induces farmers to set up bargaining associations and marketing co-operatives. Environmental uncertainty is very important, because agricultural production is strongly influenced by nature. Volatility in production will be reflected in the variation in quantity and quality of farm products. Furthermore, demand can fluctuate due to volatile consumer preferences and changes in income. The long-term investments of farmers in combination with short-term volatility in production and prices leads farmers to seek organisational solutions to weather the (financial) risks of this environmental uncertainty. When prices are low due to abundant supply or low demand, the co-operative processing firm must guarantee a market for the farmer's product. When prices are high, all benefits should accrue to the farmers. Co-operative processors provide these guaranteed market and full transfer of high market prices to producers. The co-operative auction is also a reaction to the combined effect of behavioural and environmental uncertainty. Asymmetric information about the effort of the sales agent as well as about (consumer) market conditions lead to high transaction costs for growers. Establishing an auction co-operative, where products of many growers are sold together, where prices are determined by the auction clock, and where collective insurance guarantees growers against buyer default, leads to substantially lower transaction costs for growers.

TCE hypothesises that for transactions characterised by asset specificity an increase in uncertainty creates an incentive to shift from institutions like the spot market to contingent contracts[23] and vertical integration (see Figure 2.2). Because a farmer co-operative combines elements of both vertical integration and contingency contracting, it may offer various ways of dealing with uncertainty (Staatz, 1987b: 94). The combination of transaction relationship and governance relationship provides opportunities for full co-ordination between the production activities of the member firms and the processing and marketing activities of the co-operative firm.

Because of uncertainty in production and demand, firms purchasing and processing farm products use contingent pricing. Some firms have extended contingency pricing to the point where payment for the whole crop may be spread out for a year or longer following the harvest, with the amount of the total payment contingent on the earnings of the *pool* in which the crop participates. More generally, through pooling of grower returns and expenses across products, time and space, an agricultural co-operative can reduce the variability of farmers' income. Pooling is mostly prevalent in co-operatives handling highly perishable products whose prices fluctuate widely (and hence generate very unstable income streams) and for which there are no organised futures markets. Although both an IOF and a co-operative firm use contingent pricing and pools, Staatz (1987b: 94) argues that contingency contracting is likely to operate more smoothly in a co-operative. Because farmers own the firm, have access to its financial accounts and can discipline the manager through the board of directors, they are less likely to believe that the co-operative firm is using contingency contracting to act opportunistically toward them.

[23] Contingent contracts leave some flexibility in quantity to be delivered. In these contracts, prices are determined by market conditions, and producers can adjust their production and delivery to these prices.

2.4.7 Conclusions

The three main characteristics of transactions that determine transaction costs – asset specificity, frequency and uncertainty – are present in most agrifood transactions. In TCE, asset specificity is the most important characteristic explaining vertical integration, with frequency and uncertainty in a co-determining role. Thus, asset specificity also explains vertical integration in co-operatives.

Changes in the environment of agrifood transactions, like shifting market conditions, new technologies and public policy reform, affect the characteristics of the transactions and thereby the efficiency of the various governance structures. Take for instance the increasing concentration among the large food processors and retailers. As the number of customers declines, the small number bargaining problem appears and the problem of asset specificity may increase. This would suggest more vertical integration.

Asset specificity is also present in the marketing of products of regional origin. Because the production is limited to a specific region, investments in marketing assets for these regional specialities (like in a brand) are necessarily specific to the production assets. The co-specialised character of the production and marketing assets in combination with production being dispersed over many (small) firms leads us to the proposition that the marketing of products of regional origin will be organised in producer-owned co-operatives. An example may make this clear. If *Obdam cheese* were the brand name for cheese made from milk only produced in the municipality of Obdam, then the investment of a processor in establishing this brand name is specific to the relationship with the dairy farmers of Obdam. Just as the processor could hold up the dairy farmers because they have no alternative outlet for their milk (at least in the short term), the farmers collectively could hold up the processor by denying him the supply of milk from Obdam. A co-operative of all dairy farmers of Obdam would solve the hold-up problem.

While asset specificity continues to be an important explanation for vertical integration in co-operatives, the special production and market conditions for agrifood products justify more attention to the characteristics frequency and uncertainty. Frequency is ubiquitous in continuous production of perishable products, and uncertainty is present both in the unpredictability of nature and the volatility of consumer demand. Environmental uncertainty provides room for behavioural uncertainty. These uncertainties lead to information problems such as incomplete and asymmetric information, which lead to inefficient choices. The motivation and co-ordination problems that result from incomplete and asymmetric information, and the role the co-operative (as a form of vertical integration) in solving these problems, have been dealt in Section 2.3.

2.5 Property Rights

2.5.1 Introduction

In the sections above we have explained under what conditions farmers seek vertical integration by establishing a co-operative firm that provides them with specific processing and/or marketing services. However, vertical integration not only brings benefits; costs are also involved. There are several disadvantages to bringing formerly independent assets (or firms) under single ownership. These disadvantages relate to the problem of controlling managers (the so-called agency problem), to the costs of bureaucracy, to the loss of high-powered incentives that are characteristic of market-transactions. These disadvantages result from changes in property rights.[24] "As changes in the effective allocation of rights occur with integration (with institutional change), the opportunities for different individuals to appropriate rewards change correspondingly. As a consequence, incentives and motivations are restructured - with inevitable change in behavior (and costs)." (Furubotn and Richter, 1998: 340).

In this section we will study one particular incentive effect of changes in property rights when firms integrate. Following new property rights theory[25] (also named incomplete contract theory), we will focus on the ex ante investment incentive effects of vertical integration. Like TCE, new property rights theory emphasises the importance of asset specificity for explaining the boundaries of the firm. However, where TCE suggests vertical integration as a solution to protect relationship-specific investments, new property rights theory explicates the adverse effects of vertical integration on the investment incentives of the transaction partners.

In this section we will present the main propositions of the new property rights theory and discuss whether is its useful for the analysis of vertical integration in a co-operative. First we describe the main elements of the theory (Section 2.5.2). Then, we make an assessment, comparing the theory with TCE (Section 2.5.3), and present recent extensions to the theory (Section 2.5.4). Next we will discuss one application of this theory to co-operatives (Section 2.5.5). Finally, in Section 2.5.6, we make a few remarks on the use of new property rights theory for studying the efficiency of co-operatives for organising agrifood transactions.

[24] See note 2 for the difference between ownership rights and property rights.

[25] Economic analysis of property rights studies the economic incentives of ownership in scarce resources. The 'old' property rights approach, as developed by Coase, Demsetz, Alchian, and others, showed that alternative institutional arrangements typically confront individual decision makers with different rights to the use of resources, which then has efficiency effects. Foss and Foss (2001) make a comparison between the 'old' and 'new' property rights theories.

2.5.2 New Property Rights Theory

The starting point of the new property rights theory is, like in TCE, the impossibility to write enforceable comprehensive contracts (Hart and Moore, 1999). Real world contracts are almost always incomplete in the sense that there are inevitably circumstances or contingencies that are left out of the contract, because they were either unforeseen or simply too expensive to enumerate in sufficient detail. As contracts are incomplete, actions and payments must often be determined *ex post*, either unilaterally or through negotiation.

Relationship-specific investments create the opportunity for hold up, that is, for *ex post* appropriation of revenues by the non-investing contract party. If a firm cannot sufficiently protect his investment against hold up, it will not invest. Therefore, incomplete contracts may lead to under-investment in the economic relationship. Klein et al. (1978) and Williamson (1979, 1985) have suggested that vertical integration (i.e., bringing both trading partners under common ownership) may solve this inefficiency problem.

However, vertical integration brings costs as well as benefits, because a shift in ownership affects the incentives to invest by the firms concerned (Grossman and Hart, 1986). The costs lie in the inefficiency problem of ex ante investments. The risk of ex post renegotiation about the use of relationship-specific assets affects the incentive to make ex ante investments. When these investments generate relationship-specific assets, they create the opportunity for *ex post* appropriation of quasi-surplus by the non-investing agent to the transaction. The anticipation of possible hold-up may lead to under-investment in the economic relationship.

Grossman and Hart (1986) and Hart and Moore (1990) define a firm as a collection of non-human assets under common ownership, where ownership means holding residual rights of control. Residual rights are all rights to an asset that are not expressly assigned to another agent (including the state). The allocation of residual rights of control influences the bargaining position of agents to a contract after they have made relationship-specific investments. In the absence of comprehensive contracts, property rights largely determine which *ex post* bargaining position will prevail. An agent owning assets that are essential for value creation in the relationship is in a position to reap at least some of the benefits from the relationship that were not explicitly allocated in the contract by threatening to withhold the assets otherwise. Thus, a shift of ownership affects the *ex ante* investment incentives of contracting agents. The implication of this incentive effect of asset ownership is that agents negotiating a contract about asset use may make ex ante investments that are suboptimal (or inefficient) if they have a weak bargaining position about ex post use of the asset. The solution that Grossman and Hart and Hart and Moore (GHM) have presented for this inefficiency problem is the following: make the agent working with an asset, for which output cannot be contracted for, the owner of that asset if he is responsible for the largest part of the output. Here, vertical integration is defined as gaining residual control over specific assets.

If follows that vertical integration has differential effects on investment incentives. “In summary, the benefit of integration is that the acquiring firm’s incentive to make relationship-specific investments increases since, given that it has more residual control rights, it will receive a greater fraction of the *ex post* surplus created by such investments. On the other hand, the cost of integration is that the acquired firm’s incentive to make

relationship-specific investments decreases since, given that it has fewer residual control rights, it will receive a smaller fraction of the incremental *ex post* surplus created by its own investments" (Hart, 1995: 33; italics in original).

The basic GHM model can be illustrated as follows.[26] Two agents - a buyer B and a seller S - make (non-contractible) investments in human capital that are complementary with a set of non-human assets. Each agent necessarily owns his own capital. The ownership of non-human assets, however, affects the incentives to invest in human capital. Once the investment is made, ex post bargaining determines the allocation of the returns from the investments. This bargaining is assumed to give each party what it could have obtained on its own, V_B or V_S, plus a share of the surplus created by co-operation. Pay-offs to the parties take the form of

$$P_i = V_i + ½ (V - V_i - V_j), \; i,j = B,S,$$

where V is the capitalised value of the co-operation. Ownership influences the reservation pay-offs V_B and V_S since the owner of a particular asset gets to deny the other party the use of it if co-operation is not achieved. Ownership does not influence V, since all assets are in use when the parties co-operate. Neither party's investment affects the other's reservation pay-off, because if they do not co-operate then neither has access to the other human capital and the investment in it. Individual incentives to invest are driven by the derivatives of the pay-off functions P_B and P_S. If $V = V_B + V_S$ for all levels of investment, then individual returns to investments coincide exactly with the social returns, as measured by the derivatives of V. This case corresponds to a competitive market, because no extra value is created by the particular relationship between B and S; both parties would be equally well off if they traded with outsiders. In general, however, the social returns and the individual returns differ, resulting in inefficient investments. In particular, if the pay-off functions are supermodular[27], so that the pay-off to incremental investments by one party is increasing in both the volume of non-human assets available to that party and the amount of the other party's investment, then there is underinvestment. One can strengthen the incentives of one party by giving that party control over more assets, but only at the expense of weakening the incentives of the other party. There is a trade-off, because ownership shares cannot add up to more than 100 percent. This trade-off determines the efficient allocation of ownership.

The main GHM conclusions on optimal asset ownership in a two-tier vertical relationship (i.e., buyer-seller relationship) are the following:

1. as investment by the buyer B becomes more important (for generating surplus V) relative to investments by the seller S, B should be given more assets;
2. B should be given those assets that make V_B most sensitive to B's investment;

[26] This summary description is taken from Holstrom and Roberts (1998: 78).

[27] Supermodularity of a function means that an increase in one argument increases the incremental return from all the other arguments. In the GHM model, supermodularity refers both to human capital and to assets, so that having more assets implies a higher marginal return to all investments.

3. if an asset has no influence on B's investment it should be owned by S; for this reason, no outsider should ever own an asset;
4. joint ownership - meaning that both parties have the right to veto the use of the asset - is never optimal; as a consequence, highly complementary assets should be under single ownership.

2.5.3 Assessment

Hart (1989) compares the new property rights theory with other branches of economic organisation theory. "It is based on maximising behaviour (like the neo-classical approach); it emphasizes incentive issues (like the principal-agent approach); it emphasizes contracting costs (like the transaction cost approach); it treats the firm as a 'standard form' of contract (like the nexus of contracts approach); and, it relies on the idea that a firm's owner has the right to decide who uses the firm's assets and who doesn't. Its advantage over these other approaches, however, is its ability to explain both the costs and benefits of integration; in particular, is shows how incentives change when one firm acquires another one." (Hart, 1989: 1771).

Holstrom and Roberts (1998) compare the new property rights approach to TCE, and give the following three differences. First, TCE makes no reference to the direct costs of up-front, ex ante investments. There need not even be any up-front expenditures at all: the original, ex ante "investment" could just be an initially costless choice of partner or standard or something similar that limits a party's later options. The theory's indifference to the level of initial investments is consistent with the assumption that the carrying out of such investments is fully contractible and hence poses no incentive problems. In contrast to TCE, the new property rights approach focuses fully on ex ante investments, and assumes that these are non-contractable. On the other hand, all bargaining, including any that occurs after investments are made, is efficient. (If the parties can contract on the ex ante investments, the assumption of efficient bargaining means that they will be made at the efficient levels, irrespective of ownership patterns). Second, in contrast to Williamson's three-factor framework, there is no uncertainty and no frequency in the GHM model. Third, in Williamson's approach the implicit measure of asset specificity is the aggregate level of quasi-rents created by the investment. With two parties, say a buyer B and a seller S, asset specificity and aggregate quasi-rents are measured as $V - V_B - V_S$, where V is the capitalised value of the jointly controlled assets in a continued relationship and V_B and V_S are the go-alone values of the individually controlled assets in case B and S separate. In this expression, only the sum of $V_B + V_S$ rather than the individual values V_B and V_S matters. On this account, an asymmetric relationship with one party in a dominant position is no different from an asymmetric one with the same level of aggregate asset specificity. In the new property rights approach, the level of asset specificity has no influence on the allocation of ownership: the predictions of the model remain unchanged if one increases the

total surplus V by adding an arbitrarily large constant to it, because investments are driven by marginal, not total, returns.[28]

A virtue of the property rights approach is that it simultaneously addresses the benefits *and* the costs of ownership. This approach clarifies the institutional role of the market and stresses its value in providing entrepreneurial incentives: markets are identified with the right to bargain and, when necessary, to exit with the assets owned. A limitation of the GHM approach is its definition of the firm. In the model, the buyer and seller are single individuals, who make (unobserved) investments in human capital. While it seems to be applicable to the owner-operator type of firm, it is unclear how the model should be interpreted in a firm consists of more than one individual.

According to Holstrom and Roberts (1998: 79), the GHM conclusions on joint ownership, outside ownership and co-ownership of perfectly complimentary assets are easy to overturn by slight changes in the assumptions. For instance, joint ownership may be desirable when investments improve non-human assets. Third-party control can be desirable if parties would otherwise invest too much in improving their outside opportunities to strengthen their bargaining positions. These authors conclude their critical assessment of the new property rights approach by saying that "(...) this approach also needs to expand its horizon and recognize that power derives from other sources than asset ownership and that other incentive instruments than ownership are available to deal with the joint problem of motivation and coordination" (Holstrom and Roberts, 1998: 92). The next section shows that some of these shortcomings have already been treated.

2.5.4 Extensions

While GHM focus on holding property rights to physical (i.e., non-human) assets as the essence of ownership, Brynjolfsson (1994) has extended the model by incorporating human capital, specifically the productive knowledge of agents. This information can be considered as an asset that is "owned" by the agent. If the non-contractable information asset is complementary to a physical asset, the inalienability of the information asset affects the optimal allocation of the physical asset(s). This allocation will determine firm boundaries and organisational structure. For instance, an entrepreneur with information essential to the success of a firm is more likely to own the firm than are other people who work inside or outside the firm. The importance of non-contractable information assets that are complementary to the physical assets of a firm implies that ownership of the firm may be of little value when the complementary information assets are not also controlled. By definition, the purchaser of a firm only gets control of the alienable assets owned by the firm.

Rajan and Zingales (1998), in their exploration of the sources of power (or authority) in the firm, have built on the GHM framework. Following GHM, they define

[28] This is problematic for empirical work, partly because margins are hard to observe when there are no prices and partly because some of the key margins relate to returns from hypothetical investments that in equilibrium are never made. See also Baker and Hubard (2001) for a discussion on the empirical difficulties of the GHM model.

power as the ability to exercise residual rights of control. The role power plays within the firm is to foster and protect relationship-specific investments in an environment where contracts are incomplete. However, where GHM argue that power stems from ownership of physical assets, Rajan and Zingales identify an alternative mechanism to allocate power: access. They define access as the ability to use, or work with, a critical resource (p. 388). Control over this critical resource is a source of power. The authors argue that access is even a better mechanism to provide incentives than ownership, because the amount of surplus that an agent gets from having access is often more contingent on her making the right specific investment than the surplus that comes from ownership. In other words, an agent who is given access to a resource gets the opportunity to specialise her human capital to that resource and make herself valuable. This, in turn, gives her the ability to create a critical resource that she controls: her specialised human capital.

In comparing their own approach with the GHM results, Rajan and Zingales (1998: 390) find at least four important differences as to the theory of the firm. First, a firm can be defined both in terms of unique assets (which may be physical or human) and in terms of people who have access to these assets. Not only does this bring people other than owners within the boundaries of the firm, it also introduces a separate role for the firm in creating an ex ante environment that encourages investment. Second, access allocates power without relying on future outside enforcement. Consequently, a firm, or more broadly, an organisation, can be defined even absent legal enforcement. Third, insecurity may encourage rather then discourage specific investments, because the security of ownership may breed complacence. Fourth, the essence of internal organisation is the differential access agents within the firm have to the unique physical and human assets that compose the core of the firm. Internal organisation enables a firm to co-ordinate, and enhance, overall specialisation. The authors conclude that taking access instead of ownership as the source of power (and thus as a mechanism to motivate relationship-specific investments) provides a better explanation for a number of real-world institutional arrangements.

2.5.5 New property rights theory and the co-operative

Hendrikse and Veerman (2001a) have used the new property rights theory to answer the question whether a (processing and marketing) co-operative is still an efficient organisation for carrying out agrifood transactions that require substantial relationship-specific assets at the processing stage of the production and distribution chain. They conclude that a marketing co-operative "may not be the most efficient governance structure in differentiated product markets where high levels of asset specificity at the processing stage of production are required" (idem, p. 62).

The main value the Hendrikse and Veerman paper is that it analyses the relationship between farmers and a marketing firm with the GHM model of vertical integration. The relationship between the farmer and the firm is presented as a situation with two agents - a farmer (F) and a processor (P) - and two assets (A_1 and A_2). For organising the farmer-processor transaction, three different ownership structures (or governance structures) are possible:

I: agent F owns asset A_1 and A_2, and agent P owns no assets;
II: agent F owns asset A_1 and agent P owns asset A_2;
III: agent P owns both asset A_1 and asset A_2, and agent F owns no assets.

Situation I is forward vertical integration with the farmer owning the assets at both the production level and the processing level. This is the farmer-owned processing and marketing co-operative. Here, agent P is an employee of the co-operative firm. Situation II presents a market where the agents are independent and each agent owns one asset. Situation III is backward vertical integration, where the processor owns both assets. Here, the farmer is an employee of the processing firm.

Hendrikse and Veerman's prediction of optimal asset ownership is in line with the GHM conclusions. Which one of these three ownership structures is most efficient depends on the size of the relationship-specific investments each agent has to make. If the investment[29] of the farmer is most important for generating total surplus V, than the farmer should own both assets. This is the forward integration of the farmer-owned co-operative. If the investment of the processor is most important for generating total surplus, than the processor should own both assets. This is the backward integration of a processor-owned plantation. If the relationship-specific investments of both agents are equally important for surplus generation, then the ownership structure with each agent owning one asset is the most efficient. In this case, the transaction is carried out through a market-type governance structure.

2.5.6 Conclusions

The new property rights theory, as developed by Grossman, Hart and Moore, studies the impact of asset ownership on investment incentives in a two-tier vertical relationship (like a buyer-seller relationship). If for asset specificity reasons two stages of the production and distribution chain are vertically integrated, asset ownership is shifted from one agent to another. This can take two forms: agent A takes over the asset of B, or B acquires the asset of A. Each option has a different effect on the incentives of both agents to make investments that are complementary to the assets. Ownership of (or access to) the relationship-specific asset determines the incentive to make ex ante complementary investments.

Applied to a farmer-processor relationship, new property rights theory posits that both the farm asset and the processing asset should be owned by the farmer if the farmer's investment is most important for generating surplus in the farmer-processor relationship. The farmer-owned co-operative is an example of such integrated ownership. However, if the (non-contractable) investment of the processor is most important for generating surplus in the farmer-processor relationship, then the processor should own both assets. This suggests that as the investment of the processor becomes more important, for instance when market conditions demand the development of special marketing tools, one would see (1)

[29] It is important to restate that the ex ante investment is non-contractable, in human capital, and complementary to the (physical) asset the agent works with.

co-operative transactions being replaced by market transactions, and (2) processors acquiring farm assets. The latter, that is, backward vertical integration of the processor into farming is not likely to occur for reasons we have discussed in Section 2.3.4.

The new property rights theory of the firm, particularly when incorporating information assets, can provide an explanation for the organisation of agricultural production in relatively small, family-owned firms. The essence lies in the complementarity of physical and informational assets, in combination with the difficulty of contracting. GHM posit that complementary assets should be under single ownership. The farmer has idiosyncratic knowledge of the farm assets, given the natural conditions at the farm (soil quality, weather, animal and plant health, etc). This knowledge cannot be contracted for, as the problems of adverse selection and moral hazard are too large. The efficient organisation for agricultural production is giving ownership of farm assets to the person who has the idiosyncratic knowledge on how to use best these assets. This person has the strongest incentive to invest in the acquisition of additional knowledge about improving the productivity of the farm assets.

In this chapter we have discussed the theory of GHM in some detail because it will be used in Chapter 3 to develop a model of investment incentives in a three-agent agrifood chain, that is, a model with three agents and three assets. We will show that if all three agents in a chain have to make relationship-specific investments to maximise chain surplus, only a very limited number of ownership structures will be efficient.

2.6 Co-ordination

So far we have explained vertical integration in a co-operative from the need to overcome the motivation problem caused by the combination of diverging interests, asymmetric information, and the risk of being held up after having invested in relationship-specific assets. As we have already mentioned in Section 2.3.1, even with common interests there may be a reason for vertical integration. This reason lies in the need for co-ordination of transactions carried out by different people.

2.6.1 Co-ordination among transactions

Individual transactions are often connected to other transactions (involving other people). Connectedness between two transactions means that carrying out one transaction is not efficient if the other transaction is not carried out. It is no use for the dairy farmer producing a large amount of milk if there is no one to process this milk. If two connected transactions are carried out by two independent people or firms, investment decisions can

be distorted by the threat of hold-up.[30] However, asset specificity is not the only cause of transaction costs in connected transaction. The other cause is incomplete co-ordination.

Co-ordination costs are the transaction costs associated with co-ordinating activities of various individuals or organisations. Under a market system, co-ordination costs arise from the need to determine prices and other details of the transaction, from finding potential buyers and sellers, and from bringing together buyers and sellers. If co-ordination takes place within a firm, the costs are the collecting and transmitting of locally available information, making a plan, and communicating the plan to those responsible for implementation.

If different people or firms have to choose the amounts of the various activities and assets needed for transactions that are connected, then there is need for explicit co-ordination. When all those involved have divergent interests, the co-ordination problem becomes even more difficult because incentive problems can interact with them. This suggests that, other things being equal, strongly complementary assets should be brought under common ownership (Milgrom and Roberts, 1992: 312). Vertical integration can be a solution to the problem of co-ordinating connected transactions, because it aligns the incentives of several decision-makers and it offers more facilities for information exchange.

Williamson (1991) argues that one of the advantages of carrying out a transaction within a firm is better co-ordination of adaptation of various transactions that are connected. "The authority relation (fiat) has adaptive advantages over autonomy for transactions of a bilaterally (or multilaterally) dependent kind" (p. 270).

Milgrom and Roberts (1992: 90) distinguish two types of co-ordination problems: those with design attributes and those with innovation attributes. A co-ordination problem with design attributes deals with situations where there is, at the local level, sufficient information available about carrying out a particular task. By appointing a co-ordinator, alignment of the various tasks is obtained. Examples of such co-ordinators are the coxswain determining the rhythm of the rowing crew, and the central dispatcher for taxi's telling which cab to go to what client. Co-ordination problems with innovation attributes are most commonly present when an organisation is trying to do something that is outside its experience, such as introducing a new kind of product, entering a new market, or adopting a new approach to manufacturing. In these situations, effectively solving the co-ordination problem commonly involves someone gathering or developing the needed information and then communicating it to decision-makers in the organisation. Generally, resources needed for gathering and developing information are assigned to the co-ordinator. Within a firm, it is usually the responsibility of the management to decide on innovation. It follows that co-ordinating innovations consisting of transactions by different people may be easier obtained within a firm than among several independent firms. In other words, an innovation involving a number of connected transactions may require vertical integration.

[30] Connectedness of transactions can be the result of the need for timely performance in each transaction. When the timing of performance is critical, possibilities for opportunistic behaviour arise. In these situations of temporal asset specificity, delay becomes a potentially effective strategy for exacting price concessions.

2.6.2 Co-ordination problems and the co-operative

Connectedness of one transaction with agricultural products to another transaction with the same (or derived) products exists for agricultural products that are highly perishable. Milk is such a product, but also certain fruits and vegetables. The co-ordination of activities of several people or firms involving transactions with perishable products is a co-ordination problem with design attributes. Generally, the processing firm carries out the co-ordination task. For instance, the harvesting of vegetables for canning or freezing has to be co-ordinated with the canning or freezing process itself. As the quality to the product rapidly deteriorates after harvest, the activities of the farmer and preserves industry are time-critically connected. While the co-ordination task is taken up by the canning/freezing company, it does not follow necessarily that this company has to be a farmer-owned co-operative. The governance structure most often found is a detailed contract between growers and company.[31] In the dairy industry the co-ordination task is also taken up by the processing firm, which is often a farmer-owned co-operative, but for other reasons than co-ordination.

Co-ordination problems with innovation attributes require alignment of changes in several connected transactions.[32] An historic example of such a co-ordination problem is the introduction of the on-farm-cooling tank for milk at dairy farms. Not only the farmer had to invest (in new equipment, new facilities, new knowledge and new tasks), but also the milk hauler, and the processing plant (van Hooff and Rutten, 1992). They all had to change their operations and had to invest in new equipment in order to make this new system of milk storage and delivery possible and efficient. The co-ordination of this innovation was taken up by the dairy companies together, the majority being farmer-owned co-operatives. A more recent example of a co-ordination problem with innovation attributes is the introduction of quality assurance systems in the agrifood sector. Such a system will only be successful if all participants in the production and distribution chain co-ordinate their activities.

Staatz (1987b) has argued that a co-operative may be in a better position – compared to an IOF – to introduce innovations that require adjustments at several levels of the production and distribution chain. Within a co-operative there is, at least in principle, no conflict of interest between the farmer planting a new crop and the firm processing and marketing the new crop. Both agents do not have to fear opportunistic behaviour by the other. This facilitates negotiations about the introduction of new crops, new production methods and new quality assurance schemes. Common interests may also make the exchange of information between farmers and the processing and marketing firm more efficient in a co-operative than in an IOF. Finally, the incentive structure in a co-operative (both financial and social) reduces or eliminates free rider behaviour among the co-operating farmers. Staatz' arguments could lead to the hypothesis that the existence of

[31] Detailed contracts where the processor not only prescribes production methods but also provides critical inputs like seeds are called resource-providing contracts (Mighell and Jones, 1963).

[32] An innovation where several people or firms have to change their tasks or activities simultaneously has been called a systemic innovation (Teece, 1988).

processing and marketing co-operatives in a particular agrifood industry greatly facilitates the introduction of quality assurance systems in this industry.[33]

Royer (1995) also argues that co-operatives have several potential advantages above IOFs in organising efficient supply chains and intensive information exchange among the various partners of the chain. Improving efficiency in the production and distribution chain often requires better alignment of activities in the various stages of the chain. As co-operatives already cover two stages, they may be in a good position to achieve the needed efficiency.

Caswell and Roberts (1994) argue that co-operatives may have an advantage over the IOFs they compete with in designing and operating vertical quality control systems that aim to produce products with improved safety and nutritional attributes. The sources of potential comparative advantage for co-operatives may lie in their ability to influence input and production practices; to organise food handling and processing practices; and to credibly communicate quality assurance programmes to consumers.

Co-ordination of activities in two or more stages of the production and distribution chain has become more important in the agrifood sector in recent years. Traditionally, the marketing of agricultural food products was a derived function of the farmers' production activities. Current market conditions force producers to be innovative and more responsive to consumer needs. Therefore, production and marketing activities become more closely connected. This requires alignment of individual decisions and information exchange, which may be easier to organise in a co-operative (Staatz, 1987a). Production and marketing may even become so closely connected that assets in production and in marketing become co-specialised. Again, this makes the co-operative a preferential governance structure.

2.6.3 Conclusions

With the growing importance of innovation activities involving adaptations at several stages of the agrifood chain the need for co-ordination has increased. This co-ordination problem typically has innovation attributes, which means that new information has to be gathered and developed and that this information has to be communicated to the appropriate decision-makers. Riordan (1990) has shown that vertical integration conveys better information about upstream variable costs. Although he focussed on motivation problems, his argument may be extended towards other information that is locally available and should be transfered to a central level for making optimal (innovation) decisions. Thus, we may hypothesise that the growing importance of co-ordinating innovation activities in the agrifood chain will lead to more vertical integration of the co-operative kind.

[33] For instance, we may hypothesise that the co-operative nature of the largest part (> 80%) of the Dutch dairy industry has been very helpful in introducing a quality assurance programme for milk (the KKM system).

2.7 Collective Ownership

2.7.1 Introduction

In Sections 2.3 and 2.4 we have presented the reasons why farmers vertically integrate forward into processing and backward into inputs production, and why farmers do this collectively. In Section 2.5 we have discussed a particular disadvantage of vertical integration, using the new property rights theory. However, there are more disadvantages related to vertical integration in co-operatives. In this section we will discuss disadvantages that relate to the collective ownership character of the co-operative.

In Chapter 1 we have defined ownership as the combination of income rights and control rights. The owner of an asset is entitled to receive income generated by the asset and to decide over the use of the asset. In a co-operative, income rights and decision-rights are held collectively. Both collective income rights and collective decision rights may lead to inefficiencies. For instance, democratic governance in co-operatives generally requires longer decision-making processes, which may hamper the co-operative in its competition with an IOF. Particularly in situations of increasing heterogeneity among the membership, decision-making may require more time and resources. Another situation where collective ownership may be disadvantageous for the co-operative is in attracting equity capital for long-term, risky investments, such as in marketing and innovation.

In this section we will discuss the consequences of collective ownership, in relation to the changing environment in which a co-operative has to compete. Two issues of collective ownership will receive special attention: weak investment incentives and difficult decision-making. Weak investment incentives are particularly problematic if substantial investments have to be made for which members have to supply additional equity capital. Democratic decision-making, as practised by co-operatives, may become problematic if interests among the members are diverging.[34]

In this section we will not follow the procedure of the former sections in first presenting the theory in general and than the application to co-operatives. Because the incentive and decision-making problems in co-operatives are rather specific to the co-operative organisation we will refer to studies on co-operatives directly.

[34] There is another efficiency problem related to ownership: the classical issue of separating ownership and control of the firm. The problem can be seen as a special case of the principal-agent model, with the owners of the firm as the principal and the managers as their agents. Although this agency problem is relevant to co-operatives, it will not be dealt here, as it is not specific to co-operatives. See Van Bekkum (2001) for a discussion of agency problems in co-operatives.

2.7.2 Weak investment incentives

Ownership of assets leads to efficient decisions about using these assets. Because the owner both holds the residual control rights and receives the residual returns, she bears the full financial impact of her choices. However, if property rights are not well defined, not tradable or not well protected, inefficient choices may be made (Milgrom and Roberts, 1992: 294). If no one clearly owns a valuable asset, then no one has an incentive to guard its value properly. If property rights are not tradable, then there is little hope that assets will end up with those people who can make the best use of them and therefore value them most. If property rights are not secure, then owners will not invest great amounts in assets that they may lose with no compensation, or they may sink valuable resources into protecting their claims. In sum, property rights that are ill defined, badly enforceable and non-tradable will lead to inefficient decisions.

Agricultural co-operatives are collectively owned by the farmer-members. Collective ownership means that control rights and return rights are not assigned to any member individually, but are held by all members together. Most co-operatives have no or limited options for trading property rights. Thus, property rights in co-operatives are ill defined and non-tradable, which may lead to inefficient decisions. Cook (1995) distinguishes three investment related efficiency problems: the free rider problem, the horizon problem, and the portfolio problem. The free rider problem occurs if not the investor but someone else benefits most from the investment. For instance, non-member farmers can profit from the marketing activities of a co-operative for generic products, without sharing the costs; or new members can profit from joining the co-operative without having to pay an entrance fee. The horizon problem rises if an investment has to be made that only pays-off in the long run. Particularly older members are not willing to invest in assets that generate (most of the) income after they have retired. The portfolio problem means that individual members cannot adjust their share (i.e., their investment) in the co-operative to their personal risk preference. If the risk is higher than some members are willing to accept these members will not invest. Also, members that face unacceptable risks may influence the management to abstain from investments that are beneficial to the co-operative as a whole.

The main efficiency problem of collective ownership in a co-operative is that it weakens the incentive for members to supply (additional) equity capital to the co-operative firm. This is particularly serious for co-operatives that want to invest in international expansion, R&D or marketing activities. As these are high-risk investments, debt capital is not the most appropriate (because more expensive) source of financing.

Attracting external suppliers of equity capital is not a solution, as it may lead to conflicting interests (Sangen, 1999: 354). These conflicts relate to the goals of the co-operative as well as to the distribution of 'profit'. As the main objective of a co-operative is to provide low-cost services to its members and not to generate maximum profit, it is difficult to establish how much 'profit' the co-operative firm makes. Even if a 'profit' level can be established, dividing it between members and external financiers may be problematic. It is not only in dividing 'profit' that the interests of the members and external financiers collide. Members benefit from the co-operative firm by using it, while financiers benefit by receiving a return on investment. Members want a high price for the produce

they deliver, while financiers want the co-operative firm to get its supplies as cheap as possible in order to obtain the highest dividend. Conflicting interests may also rise as to the future use of equity capital. The board of directors may choose to use the funds for activities that are not in the interest of the financier. As co-operatives normally have no tradable shares, financiers cannot easily sell their share in the co-operative. To defend their interests within the co-operative firm, external financiers are likely to demand control rights. However, most co-operatives have stated in their by-laws that only members have decision rights.[35] All these potential difficulties make it unattractive for external financiers to supply equity capital to a co-operative firm.

Cook and Iliopoulos (2000) summarise the remedies that have been proposed in the literature for solving the weak investment incentive problem. The free rider problem could be solved by introducing a closed membership policy complemented with marketing agreements.[36] A second solution would be the establishment of a secondary market for co-operative shares. Transferable and appreciable shares would ensure existing members of the ability to capture the full value of their investment in the co-operative. The horizon problem could also be solved by introducing a secondary market for co-operative shares. When shares are transferable and appreciable, inactive members and members near the end of their patronage horizon possess the ability to retrieve a portion of their equity capital through the sale of their equity stock. Another solution for the horizon problem may be the adoption of an equity redemption plan with short revolving periods. Finally, solutions for the portfolio horizon problem include, again, transferable and appreciable share, because they enable members to match their individual risk preferences to the risk associated with the co-operative investment portfolio, and the adoption of separate capital pools for individual tasks of the co-operative (particularly relevant for multipurpose co-operatives).

Both the theoretical and the empirical literature suggest that the incentives for members to invest in the co-operative would be enhanced if the property rights in the co-operative were better defined. Cook and Iliopoulos (2000) have empirically tested this hypothesis among a set of American co-operatives. They found that members of co-operatives that have a closed membership policy, use marketing agreements, and have transferable and appreciable delivery rights, are more willing to invest in their co-operative than members of co-operative that have open membership, have no marketing agreements, and have non-transferable and non-appreciable shares. The co-operatives that have closed membership policy, use marketing agreements, and have transferable and appreciable delivery rights are called new generation co-operatives (Harris et al., 1996).

Van Bekkum (2001) has studied the investment-related incentive problem in nine dairy co-operatives.[37] He distinguishes three different elements of the member-co-operative relationship - transaction, investment and governance - and analyses whether these relationships are more collectively or more individually organised. An individual

[35] In most co-operatives only members that actually make use of the services have decision rights.

[36] Marketing agreements are contracts between individual member firms and the co-operative firm, used in marketing co-operatives, to specify the volume and the quality of the commodity supplied by each member to the co-operative firm.

[37] Four large dairy co-operatives in Europe, and five in Australia and New Zealand.

investment relationship is operationalised by the following variables: individualised equity capital; tradable and appreciable production rights; external equity; dividend payments on equity shares; linkage of production rights and equity shares; and linkage between equity shares and voting rights. He found that co-operatives with a more individualised member-firm relationship have fewer investment-related incentive problems.

2.7.3 Laborious decision-making[38]

One of the typical organisational characteristics of a co-operative is member-control. As the members are both the users and the owners of the co-operative, they have good reasons to engage in decision-making. Being in control means having the formal authority to decide over the use and alienation of the co-operative assets. In other words, the members hold the residual control rights. These control rights are held collectively, by the general assembly of members. Because consulting each member individually for each decision is practically impossible, some kind of delegated decision-making has to be organised. The general assembly elects a board of directors that is given the task of directing the co-operative firm. The board of directors remains accountable to the general assembly, which will annually evaluate the past actions and discuss the future plans of the board. Electing board members is a democratic process, with each member having at least one vote. According to the traditional co-operative ideology of member equality each member should have exactly one vote. Several countries still follow this rule, notably Germany and the USA.[39] In the Netherlands almost all co-operatives use proportional voting (Van Bekkum and Van Dijk, 1997). Proportional voting means that a member holds more votes the more use he makes of the services of the co-operative firm. Voting rights are proportional to patronage, but often with a maximum number of votes per member in order to prevent one member of a small group of members to obtain too much influence (and thus undermine the democratic character of the co-operative).

The board of directors consists of members of the co-operative and sometimes a few outside experts. The board is responsible for strategic decisions of the co-operative and for representing members' interests in general. The actual implementation of strategic decisions as well as decision-making on operational matters is delegated to the professional managers of the co-operative firm. In most co-operatives there is a close collaboration between the board of directors and the managers. Important management decisions are discussed among the chairman of the board and the CEO of the co-operative firm. Also individual members often have direct access to the management. In most co-operatives,

[38] This section focuses on the efficiency and effectiveness of collective decision-making and the effect of increasing heterogeneity. Another element of decision-making in co-operatives - the relationship between board of directors and management - will not be discussed here (see note 34).

[39] In the USA, ninety-three percent of all direct-membership co-operatives (thus excluding federated co-operatives) use the one-member/one-vote voting method (Reynolds et al., 1997)

managers regard the process of being "called on the carpet" by any member as a regular part of their job (Peterson and Anderson, 1996).

Reynolds (1997) has argued that democratic decision-making in a co-operative does not mean taking decisions simply by a majority of half of the members plus 1. A co-operative board seeks consensus among the members; that is, it tries to find a compromise that will be approved by a large part of the membership. The need for consensus governance can be explained by the voluntary character of the co-operative membership. Consensus is a process of building cohesiveness and incentives for member support, to keep all members 'aboard'. For co-operatives to obtain consensus, it is important to maintain consistency in member dealings. This means that all members have to be treated equally, and that over time member-treatment should not fluctuate too much (as members usually take a long-term perspective in their relationship with the co-operative).

Collective or democratic decision-making, as practised by co-operatives, brings advantages and disadvantages for the efficiency of the organisation. Advantages of democratic decision-making relate to quality of the decisions and to the effectiveness of implementing these decisions. First, democratic decision-making offers the possibility to reach a decision that everyone supports. This consensus building has the advantage of combining different perspectives and experiences in making decisions (Reynolds, 1997). Second, under certain conditions it leads to fewer type-II errors[40], in comparison with an autocratically governed IOF (Hendrikse, 1998c). Third, consensus governance makes implementation of policies easier. Fourth, it leads to fairness of co-operative dealings with members, such as distributing earnings to members.

Collective decision-making in co-operatives also has disadvantages, when compared to autocratic decision-making in an IOF. First, the process of reaching a decision generally takes longer, leading to lower flexibility of the organisation (Hendrikse and Veerman, 2001b). This problem becomes more serious when the volatility in the environment increases. There is a trade-off between the need to reach consensus on the one hand and inflexibility and slow adjustment to market contingencies on the other hand. Second, the board of directors may lack sufficient knowledge to direct the co-operative firm. This problem is particularly serious in large, diversified co-operatives which operate in an increasingly complex environment (Cook, 1995). Insufficient expertise may lead to inefficient strategic decisions and to suboptimal control of the management. A third disadvantage lies in the 'business as usual' trap (Reynolds, 1997). This means that there may be a tendency to avoid new business directions. As new initiatives often have uneven or selective benefits among the membership, the safest option is to avoid rocking the boat. This, in turn, may undermine cohesiveness, as it discourages innovative producers to continue dealing with the co-operative. Producers who have adopted new technologies or production practices want linkage to value-added processing or marketing systems to maximise benefits of the on-farm adjustment they have made. Fourth, democratic decision-making in a co-operative holds the possibility that a majority of the members, contributing only a small part of patronage of the organisation, impose policies that exploit a minority

[40] A type II error is the probability that an organisation accepts a bad investment project.

consisting of, for instance, large patrons (Staatz, 1987a).[41] These disadvantages of the co-operative – inflexibility, lack of expertise, avoiding innovations, and disfavouring minorities – become more problematic when changes occur in the business environment (e.g., shifting market conditions) and when the membership becomes more heterogeneous.

An important characteristic of a co-operative that keeps decision-making costs low is homogeneity of the membership (Hansmann, 1996). Only one group of patrons (or stakeholders) of the co-operative firm are owners and therefore entitled to participate in decision-making. Moreover, all members supply the same or similar products and have the same interest in maximising the value of these products. In patronising the co-operative firm, members form a homogeneous group. Also, homogeneity is the result of personal and cultural characteristics.

However, if the interests of members start diverging the costs of collective decision-making[42] may rise, particularly if such decisions affect the distribution of value among members of the organisation (Søgaard, 1994). In a situation of diverging interests, the distribution of the economic result tends to become a political issue, and members may try to influence the decision-making process to secure their private (e.g., individual) interests. The efficiency losses resulting from such influence activities have been named influence costs.[43]

The problem of influence costs is more likely to occur if market condition change and the co-operative reacts by differentiation. "The biggest dilemma for a cooperative (…) is that change itself is bound to increase tensions among its members. There are two reasons for this. One is that change upsets established mechanisms for decision making and cooperation. The other is that change tends to cause preferences to diverge, which (…) is problematic for ownership" (Holstrom, 1999). Because of collective ownership, diverging interests among members may be more serious in a co-operative than they would be in an IOF (Cook, 1995). As members do not have the option of selling their 'shares' in the company, they will fight harder for their individual interest in the collective decision-

[41] Suppose a marketing co-operative has 2000 members: 1800 with small farms and 200 with large farms. The small farmers together account for 50% of turnover. Members have voting rights in proportion to their patronage, with a maximum of five votes per member. The large farmers together have 1000 votes, while all the small farms together have 1800 votes. Therefore, the small farmers will dominate in the democratic decision-making process. Whether the large farmers will continue their membership of the co-operative depends on the alternative options available.

[42] The costs of the collective decision-making process come in two kinds: (1) the costs related to the decision-making process itself, like organising meetings, lobbying, and allowances for board members, and (2) the costs of making inefficient decisions. The latter are decisions that do not optimise benefits for the co-operative as a whole, but only for a limited group of owners (or only for the managers).

[43] "Influence costs arise first because individuals and groups within the organization expend time, effort, and ingenuity in attempting to affect others' decisions to their benefit and secondly because inefficient decisions result either directly from these influence activities or, less directly, from attempts to prevent or control them." (Milgrom and Roberts, 1990b: 80)

making process. In other words, if the 'exit' option is not available, members use 'voice' to get their message across (Hirschmann, 1969).

Increasing heterogeneity may also hamper the co-ordination task of the co-operative firm. "Coordination of the cooperative's activities with those of its member firms also may be reduced if the membership is highly heterogeneous. With a highly heterogeneous membership, particularly one in which the members perceive themselves as being in opposing camps (...), it may be difficult to get members to agree on anything other than running the cooperative as a separate profit center" (Staatz, 1987a: 37).

2.7.4 Conclusions

A co-operative is characterised by collective ownership. Together, members decide over the use of the assets in the co-operative firm. They also supply the equity capital needed to run the co-operative firm. Collective ownership causes the horizon problem, the free rider problem, and the portfolio problem, which may lead to inefficient investment levels. This is particularly problematic when the co-operative firm needs to make additional risky investments in innovation and marketing, in order to be able to compete with non-co-operative firms. In recent years, research in co-operative organisation has indicated solutions for these investment-related inefficiency problems. The new generation co-operatives seem to have solved most of these problems.

Because a co-operative is a voluntary organisation and members cannot withdraw their equity investments, all members have a voice in strategic decision-making. In a democratic decision-making process all members together elect the members of the board of directors. Decision-making within the board of directors is mostly done by consensus, in order to keep all 'on-board'. This becomes more difficult if the membership becomes more heterogeneous. A loss of homogeneity reduces the sense of commitment and increases the perception of the free rider problem, thus being a disincentive for additional equity investments. Moreover, increasing heterogeneity raises decision-making costs.

To sum up, collective decision-making in a co-operative has the advantage of keeping all members committed and making implementation of policies relatively easy. However, it has several disadvantages – like inflexibility, inertia, and a reluctance to start new business activities – that become particularly problematic in situations where (1) heterogeneity among the members is increasing, and/or (2) changing market conditions ask for (higher) investments in innovation and marketing.

2.8 Conclusions

We started this chapter with a discussion of several perspectives on vertical integration. Traditional perspectives explain vertical integration from technological economies or market imperfections. A vertically integrated firm can link two production processes and thereby economise on inputs, or it can improve its competitive position by solving market

imperfections. Bargaining associations can be explained with neoclassical economic theory. In this thesis we study vertical integration from a third perspective, that of economising on transaction costs. Transaction costs result from bounded rationality and opportunism in economic agents in combination with specific characteristics of transactions. In TCE asset specificity is the determining characteristic for vertical integration. However, vertical integration may be a response to other problems than underinvestment in specific assets, such as asymmetric and incomplete information. In combination with incomplete commitment, information problems lead to suboptimal motivation of people (and firms) and to suboptimal co-ordination of activities by these people. The resulting transaction costs can be called motivation costs and co-ordination costs.

To solve the problem of co-ordination and motivation, different organisational forms and institutional and contractual arrangements have been designed, depending on the specific characteristics of the transaction involved. The governance structure ultimately chosen for carrying out a transaction is a compromise between the lowest possible co-ordination costs and the lowest possible motivation costs. Because co-ordination, in general, is easier to organise within a firm, a transaction with substantial co-ordination problems will most likely be carried out within the firm. However, economic incentives work better within a market-type of relationship. Therefore, when the costs of incomplete motivation are high, it will be more efficient to carry out the transaction within a market-type governance structure.

Although motivation and co-ordination problems are interrelated, they will be dealt with separately in the next chapters. Because the motivation problem assumes conflicting interests, aligning incentives by bringing assets under single ownership is the ultimate solution. This is the perspective taken in Chapter 3. The co-ordination problem, however, is also present in situations of common interests. Here, several solutions are possible, of which ownership is only one. Chapter 4 and 5 study both the motivation and co-ordination problems.

Transaction cost explanations of vertical integration start from the axiom of the incompleteness of contracts. This means that all real world contracts leave room for dispute and opportunistic behaviour. By bringing a transaction within the boundaries of the firm, inefficiencies resulting from incomplete contracts in situations of diverging interests can be prevented. This implies that the assets used for the transaction come under single ownership. As asset ownership means holding the residual rights of control to the asset, vertical integration can be defined as holding the residual control rights to assets located in two (or more) stages of the production and distribution chain. This definition of vertical integration will be used in this thesis.

Combining control rights over assets in more than one stage of the chain may improve the efficiency of transactions. It improves the incentive for ex ante investment in assets specific to the transaction by preventing a hold-up situation; it prevents ex post haggling over the use of the assets; it aligns interests in the use of the assets; it improves information flows related to the assets; and it improves the co-ordination of connected transactions (thus improving options for systemic innovations).

An agricultural co-operative is a special kind of vertical integration: farmers collectively own assets in another stage of the production and distribution chain. A co-operative has also been called a hybrid mode of governance, as it combines elements of

vertical integration with elements of a market-type of governance. In fact, a co-operative combines the advantages of integration where relationship-specific assets exist with the advantages of market transaction where the difficulties of performance measurement requires decentralisation of incentives.

Economic organisation literature on co-operatives have often mentioned asset specificity in agrifood transactions as the main explanation for the existence of farmer-owned co-operatives. However, the importance of information in motivation and co-ordination issues has received much less attention. The information problems that may explain vertical integration in co-operatives relate to measuring the quality of the agricultural product and to measuring the effort of the processor/marketer. In recent years, both measuring problems have become more important in agrifood chains, as market conditions urge farmers to differentiate, to innovate, and to develop sophisticated marketing programmes. Thus, we may hypothesise that the increasing importance of difficult to measure effort in the agrifood chain will lead to more vertical integration.

The combination of asset specificity and difficulty of performance measurement can also explain the existence of the family farm as the most efficient organisation for agricultural production. As several physical and information assets used in farming are complementary (or co-specialised), it is inefficient to separate ownership of these assets. Therefore, ownership and control (i.e., management) of the farm are held by the same person. Idiosyncratic knowledge of the farm assets and the randomness of nature make it difficult to delegate decision-making and to properly measure and reward hired labour. Family labour and family ownership are the solutions to these information related incentive problems. The same factors that explain the existence of the family farm as the dominant ownership structure in agriculture also explain why processors do not integrate backward into farming. Instructing, measuring, administrating and rewarding the effort of farmer-employees, given the randomness of nature, the seasonality of production and the idiosyncratic knowledge of the farm, is an impossible task.

While most of this chapter has presented arguments favouring farmer-ownership of assets in the processing and marketing stages of the agrifood chain, we have also discussed some of the disadvantages of the co-operative as special type of vertical integration. Collective ownership of the co-operative firm may lead to problems in raising equity capital and in decision-making. The horizon problem, the free rider problem and the portfolio problem prevent efficient investment by the members in their co-operative. This is particularly problematic if competition urges the co-operative firm to invest in risky activities like marketing and innovation. Current market conditions in the agrifood sector require marketing co-operatives to choose between making those investments or restrict themselves to the bargaining function. Increased co-operative effort on innovation and marketing may also lead to laborious decision-making. When the innovation and marketing activities are based on differentiation in the products that members supply, the interests of the members become heterogeneous. Because decision-making in co-operatives is based on democratic procedures and consensus building, diverging interests raise decision-making costs. A loss of homogeneity reduces member commitment and increases the (perception of the) free rider problem, thus being a disincentive for additional equity investments. These problems of increasing heterogeneity will be further discussed in Chapter 4 and Chapter 5.

3. Ownership Structure in Agrifood Chains: The Marketing Co-operative [44]

3.1 Introduction

Globalisation, consumer concerns and increased competition press farmers and food producers to enhance product innovation and to seek more efficient production and distribution structures. In recent years, agriculture and the food industry have shown increasing collaboration on issues of product development, quality guarantee systems and improved logistics (Downey, 1996; Royer and Rogers, 1998). Contract-production and systems of vertical co-ordination are replacing spot markets (Martinez and Reed, 1996). More co-ordination and collaboration may lead to improved efficiency in production and distribution channels and to more product and market innovations (Galizzi and Venturini, 1999). These vertical relationships can take many forms, like strategic alliances, long-term contracts, licensing, subcontracting, joint ventures and franchising (Mahoney and Crank, 1995).

A marketing co-operative is a special type of vertical integration, with farmers owning assets in another tier of the agrifood production and distribution system. Changes in the market for food products raise the question whether co-operatives are still efficient organisations for processing and marketing of agricultural products (Cook, 1995). Are co-operatives well suited to make the investments needed in R&D and marketing, given their particular characteristics of democratic decision-making and raising equity capital among members?

Increasing vertical co-ordination of production, distribution and marketing among firms in a supply chain may have an impact on the investment decisions of each firm individually. Investments by a firm in one tier of the chain must be co-ordinated with investments by firms in other tiers to obtain optimal chain performance. As there are complementarities among the activities of different chain participants, the investments are of a relationship-specific kind. In other words, vertical co-ordination may increase asset specificity. The central question of this chapter is how different ownership structures affect the investment incentives of firms participating in specific agrifood chains. In addressing this question, we apply new property rights theory (or incomplete contract theory) as developed by Grossman and Hart (1986) and Hart and Moore (1990).

We seek to make two contributions to the economics of vertical co-ordination. Where new property rights models have mainly been developed on the basis of two agents engaged in a vertical or lateral relationship, in this chapter we develop a model with three agents. Moreover, the three-agent model is used to analyse the efficiency of ownership structures in the agrifood sector, particularly the farmer-owned marketing co-operative.

[44] This chapter has been published as Hendrikse and Bijman, 2002a.

The rest of this section presents a stylised example for the agrifood industry to introduce the main themes. We consider three agents: a dairy farmer, a manager of a dairy company (the 'processor'), and a manager of a supermarket store (the 'retailer'). There are three assets: the farm, the dairy factory and the store, owned by the farmer, processor and retailer, respectively. Each agent has investment opportunities.

For example, the farmer invests in acquiring knowledge of how to produce organic milk. The investment is specific to the farm, as organic farming requires extensive knowledge of local soil and climate conditions. This investment by the farmer will benefit from all three assets in the chain. Surplus is added by the assets at the processing stage of production, for instance the processing is done in a separate processing line. Surplus is also added in the retailing stage of production, for instance by putting it on an attractively located shelf. We will assume that the total chain surplus generated by the investment of the farmer is $(2+\alpha)t$. The contribution of the assets at the farming (processing, retailing) stage of production is t (t, αt). The investment is efficient when the costs are not more than $(2+\alpha)t$.

To secure a net benefit from the investment the farmer may consider signing a contract with the processor and the retailer about the division of the surplus. However, a contract is often incomplete, for instance, because developments in demand for organic dairy products cannot be foreseen. The chain-specific nature of the farmer's investment means that his investment will yield a significantly lower return if the local processor and/or the local retailer renege on the contract. The farmer has become – for a certain part of his investment – dependent on the processor and retailer. An opportunistic contract party may take advantage of the dependency relationship, for instance when market conditions change. Once the farmer has made his sunk investment, the processor or retailer may demand a larger part of the total chain surplus under the threat of discontinuing the contract altogether. Such opportunistic behaviour is often possible as most contracts can hardly cover all relevant future contingencies. Particularly in situations of great uncertainty and market volatility, opportunities for contract reneging increase. Uncertainty about the future behaviour of his contract partners may lead the farmer to decide on a lower and thus inefficient level of investment.

Another option for the dairy farmer is to take over the dairy company or to start his own processing company. Being the owner of the processing plant, the farmer has control over all activities of the dairy company. The manager of the dairy company is no longer also the owner; he is now an employee of the farmer. In this way the farmer can prevent opportunistic behaviour by the manager. Here we have one of the classic reasons for a group of farmers to set up a farmer-owned processing and marketing co-operative (Schrader, 1989). Similarly, the farmer could take over the supermarket store if he expects or experiences opportunistic behaviour from the manager of the supermarket. Due to scale economics this solution cannot easily be chosen, although there are small-scale examples of farmers selling their own specialties. An example (at least in the Netherlands) are the cheese-farms, where milk production, processing milk into cheese, and the sale of cheese is all done on-farm.

The value of vertical co-ordination among farmer, processor and retailer increases if not only the farmer but also the processor and the retailer make a chain-specific investment. The processor may invest in knowledge of making cheese from organic milk.

The processor's investment will generate a higher surplus if he receives the organic milk from the local farm and if his organic cheese is sold in the local store. For this reason, the processor's investment is also (at least partially) chain-specific. Finally, the retailer also may make an investment in setting up a store identity featuring organic dairy products. As the focus is on locally produced products, the investment is specific to the relationship with the farmer and the processor. The investment by the retailer is also chain-specific.

The investment by the processor (retailer) is also vulnerable to contract reneging by the other chain agents. The processor (retailer) also faces the risk that after having made his sunk investment a larger than contracted for part of the surplus will be appropriated by the other agents. The processor (retailer) has various options for safeguarding his chain-specific investment. The option we pursue in this chapter is the shift of ownership of essential assets. Essential assets are those assets that an investing agent needs to have accessible to generate the maximum surplus. Thus, by acquiring essential assets in other stages of the production and distribution chain the processor (retailer) can safeguard his chain-specific investment. Once he has control over those assets, he can fire the managers working with these assets if they threaten him with contract reneging.

As all three agents can make a chain-specific investment and all three can acquire assets in other stages of the chain to safeguard their investment, the question arises who should own which assets. This entails that the allocation of ownership over assets determines the distribution of the surplus $(2+\alpha)t$ of the investment of the farmer over the three parties. In this chapter we develop a model for analysing the relationship between ownership structure and efficient investment decisions. Before we introduce our model we briefly introduce new property rights theory. The model is elaborated separately for two agents and for three agents. This is followed by formulating the comparative statics results, while the final section presents our conclusions.

3.2 New property rights theory

New property rights theory starts from the basic idea that it is often difficult to write enforceable comprehensive contracts. Real world contracts are almost always incomplete in the sense that there are inevitably circumstances or contingencies left out of the contract, because they are unforeseen or simply because it is too expensive to enumerate them in sufficient detail. As contracts are incomplete, actions and payments must often be determined *ex post*, either unilaterally or through negotiation. Consequently, contracting agents should be concerned *ex ante* with the possibility of opportunistic behaviour and the results of possible renegotiation. This is particularly problematic if *ex ante* transaction-specific investments must be made. These investments create the opportunity for *ex post* appropriation of quasi-surplus (surplus plus specific investment costs) by the non-investing agent to the transaction. The anticipation of possible hold up may lead to under-investment in the economic relationship. Klein, Crawford, and Alchian (1978) and Williamson (1979, 1985) have suggested that vertical integration may resolve this problem.

Grossman and Hart (1986) have argued that vertical integration brings costs as well as benefits. To understand what changes when two firms merge, Grossman and Hart (1986) and Hart and Moore (1990) have developed a property rights theory of the firm. A firm is identified as a collection of non-human assets under common ownership, where ownership means holding residual rights of control. Residual rights are all rights to an asset that are not expressly assigned to another agent (including the state). The allocation of residual rights of control influences the bargaining position of agents to a contract after they have made relationship-specific investments. In the absence of comprehensive contracts, property rights largely determine which *ex post* bargaining position will prevail. An agent owning assets that are essential for value creation in the relationship is in a position to reap at least some of the benefits from the relationship that were not explicitly allocated in the contract by threatening to withhold the assets otherwise. Thus, a shift of ownership affects the *ex ante* investment incentives of contracting agents.[45]

The standard model of new property rights theory consists of a three stage non-co-operative game. The first stage consists of the choice of ownership structure, where each ownership structure is associated with a specific distribution of bargaining power. The second stage holds the specific investment decision(s). At the third stage, the non-investor has the choice whether to honour the contract or renegotiate it.

This game is solved by backward induction. We start therefore with the third stage. Two agents, for instance a farmer and a food processor, sign a contract before investment by the farmer takes place. The contract specifies that each agent receives half of the surplus generated by the investment. The contract is incomplete because situations may arise for which the contract does not specify anything. If, for example, consumer demand turns out to be lower than expected, the processor may argue that the quasi-surplus instead of the surplus has to be divided in such situations. The specificity of his assets has weakened the farmer's *ex post* bargaining position to such an extent that he will accept these new contract terms. The subgame perfect equilibrium strategy in the third stage is therefore to renegotiate the *ex ante* contract.

The investment decision in the second stage of the game determines the bargaining positions in the third stage. The specificity of the investment places the investor in a weak bargaining position regarding the division of the surplus in the third stage. Therefore, the investor anticipates that the other agent may take advantage of the incompleteness by claiming a larger share of the ex post surplus than initially agreed upon. This fear of ex post opportunistic behaviour results in underinvestment.

In the first stage of the game the ownership structure is chosen. It is assumed in new property rights theory that an ownership structure is efficiently chosen. Every ownership structure is associated with a particular distribution of bargaining power. For

[45] The main Grossman/Hart/Moore conclusions on optimal asset ownership in a two-tier vertical relationship (i.e., buyer-seller relationship) are the following. (1) An agent with an important investment (in human capital) should have ownership rights over the asset for which the investment is required. (2) If investments by agent A become relatively more important than investments by agent B, A should own more assets. (3) Highly complementary assets should be under common ownership. (4) Independent assets should be separately held. (5) Important assets should not be owned by a third agent.

capturing bargaining power we adopt the game theoretic solution concept Shapley value (Shapley, 1953), just like the seminal article by Hart and Moore (1990).

3.3 The model: two agents

3.3.1 Three ownership structures

There are two agents (1 and 2), two assets (A_1 and A_2) and two investment decisions (x_1 and x_2). For simplicity, x_i can only take the value 0 or 1. The investment is in human capital; that is, it is person-specific. The investment pays off in the future only if the agent has access to a particular asset; that is, the acquired skill is asset-specific. This implies that the investment does not generate surplus if the investing agent is denied access to the asset.

The model consists of three stages: an ownership structure stage, an investment stage and a bargaining stage. We make the following assumptions about investment (x). Investments are made simultaneously and non-co-operatively (i.e., each agent invests without taking into account the choice of the other agent). Investments are observable but not verifiable. This means no contract can be written about the precise investments, but agents can observe each other's investments once they have been made. The observability implies that bargaining at T_1 takes place under symmetric information about the T_0 investments. No contracts are possible about cost sharing at T_0 or benefit sharing at T_1. As contracts at date T_0 are necessarily incomplete, the distribution of value at date T_1 depends on the bargaining power of the agents.

We assume complementarities in asset use.[46] An investment by agent 1 generates a higher value if not only asset A_1 but also A_2 is used. Similarly for an investment by agent 2: it generates a higher value if more assets are used. As the generation of maximum value depends on the use of assets belonging to another tier of the chain, the investments are chain-specific. Because chain-specificity refers to assets and not to agents, not always all agents are needed to generate the total chain value. The total chain value of an investment will be established by coalitions consisting of at least the investing agent and the agents owning assets. For example, if agent 1 is the investor and owns assets A_1 and A_2, then agent 2 is not needed for generating the maximum chain value of the investment of agent 1.

The value generated by a specific investment is the quasi-surplus (q), being the surplus plus that part of the investment that is sunk in the relationship. The actual value of q depends on who invests and which assets are used. We assume that agent 1 generates a quasi-surplus of t when A_1 is used and 2t when both assets are used. Similarly, we assume that agent 2 generates a quasi-surplus of f when A_2 is used and 2f when both assets are

[46] Complementarity among a group of activities means that if the level of any subset of activities is increased, then the marginal return to increases in any or all of the remaining activities rises (Milgrom and Roberts, 1990a). Notice that our model has complementarity in asset use, whereas Hart and Moore (1990) provide an example of complementarity in investment.

used. The quasi-surplus for various investment decisions and various assets used are shown in Table 3.1. The full quasi-surplus of each investment is generated only when all assets are used.

Table 3.1 Quasi-surplus for two investment decisions and various assets involved

Assets involved	Investment decision	q
A_1	$x_1 = 1$	t
A_1 A_2	$x_1 = 1$	2t
A_2	$x_2 = 1$	f
A_1 A_2	$x_2 = 1$	2f

Notes: $x_i = 1$ means that agent i invests; q is quasi surplus; t = surplus generated by the investment of agent 1 at agent 1's stage of production; and f = surplus generated by the investment of agent 2 at agent 2's stage of production.

Various distributions of asset ownership are possible. We have distinguished 3 different ownership structures. Figure 3.1 shows the assets that each agent owns for each of the three ownership structures. Ownership structure I represents market exchange. Forward integration, where agent 1 owns both A_1 and A_2, is captured by ownership structure II. This ownership structure is associated with the agricultural marketing co-operative, where farmers own the processing or trading company at the second tier of the chain. Finally, ownership structure III represents backward integration.

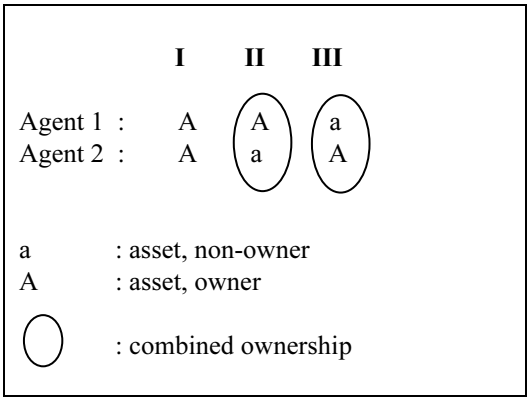

Figure 3.1 Three ownership structures

The bargaining power of each agent in the supply chain under the various ownership structures is captured by its Shapley value.[47] The Shapley value is computed for each ownership structure and each investment by using the characteristic function. A characteristic function v assigns a number to every coalition S, given a particular ownership structure G and given investment choice x and is denoted v(S | G, x). This number is the total value generated by the agents in the coalition S without any help from the agents outside of S[48]. G gives the allocation of asset ownership. The characteristic function and the computation of the Shapley values is provided in Appendix A. Table 3.2 presents the resulting Shapley values (SV) for each investment decision and all ownership structures. This entails 6 cases.

The Shapley value is a measure of power in the *ex post* bargaining process.[49] It specifies for each agent the size of the quasi-surplus that this agent will receive in the

[47] The Shapley value is an allocation of payoffs to each player. The payoff of a player is based on the marginal contribution of a player to a surplus that is created jointly. Shapley (1953) recognised that the sequence in which the various players participate in a coalition has an effect on the value of the marginal contribution of each player. Then the question arises which sequence to consider? He resolved this issue by taking all possible sequences into account and to give them equal weight. The payoff assigned to a player is equal to the average marginal contribution he makes to each coalition, to which he could belong, where all coalitions are regarded as equally likely. This way of determining and disentangling individual contributions to a joint project was an important reason for choosing the Shapley value in our model. An empirical reason for choosing the Shapley value is that the "performance of the Shapley-value for prediction or analysis turns out rather well" (Dixit and Skeath, 1999: 572).

[48] We make the assumption that marginal contributions are distinguishable. This is in line with the seminal articles of Grossman and Hart (1986) and Hart and Moore (1990). It can be traced to the assumption that the investments are observable for the parties involved. This is used in the calculation of the Shapley value in order to distribute chain benefits in the different governance structures. The case of non-distinguishable marginal contributions can also be analysed in our model. The motivation for non-distinguishable marginal contributions can be made by pointing to the non-verifiability of marginal contributions. The calculation of the Shapley-value has to be done in a different way. It cannot be based anymore on marginal contributions, but it can be based on which parties are essential. Essential parties are the investor and the parties who own assets. This provides sufficient variability in the Shapley value in order to distinguish the various governance structures. The results are similar.

[49] In our model we have assumed that a specific agent 1 is trading with a specific agent 2, and that each investment is specific to this trade relationship, in the sense that it generates a higher surplus in this particular relationship than in trade with a third agent. However, substitutability of agent 1 and agent 2 can be easily incorporated in the model, both for the non-investor and the investor. Substitutability of a particular agent reduces its Shapley value in two ways when the agent is a non-investor. First, an increase in the number of substitutes for a particular agent reduces the Shapley value of all these substitutes jointly. The reason is that the probability increases that a particular order of the grand coalition has the feature that one of these non-investors is earlier then the investor. The value added by a

bargaining process. Therefore, the Shapley value determines the maximum costs of investment the agent is willing to make. If we denote the sunk cost (or specific) part of the investment as 'k', then the (investment) participation constraint[50] for agent 1 under ownership structure I is

(1) $k_1 \leq 1.5t$.

Table 3.2 Shapley values for two agents, two investment decisions and three ownership structures

$X = (x_1,x_2)$	G	SV_1	SV_2
(1,0)	I	1.5t	0.5t
(1,0)	II	2t	0
(1,0)	III	t	t
(0,1)	I	0.5f	1.5f
(0,1)	II	f	f
(0,1)	III	0	2f

Notes: $x_i = 1$ means that agent i invests; G = governance structure; SV_i: Shapley value of agent i.

3.3.2 Efficient ownership structures with two agents

An ownership structure is first-best efficient when it implements all and only surplus generating investments. To determine whether a particular combination of investments will yield the first-best, we use the participation constraints of the two agents, i.e. $k_1 \leq SV_1$, and $k_2 \leq SV_2$.

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non-investor in such an order is zero, whereas the value added by the investor and the non-investor together is assigned to the investor. Second, one of the four axioms underlying the Shapley value requires that identical players have to have identical Shapley values. So, the decreasing share of the surplus going to the non-investor has to be split equally between an increasing number of substitutes. If the agent is an investor, then it is obvious that its incentives to invest are diminished when identical rivals benefit from the positive externality of the investment. This is the classic public good problem.

[50] The participation constraint formulates the circumstances under which the investor invests. It is an inequality that states that the revenues of the investment for the investor are not smaller than the costs of investment (k). The revenues of the investment for the investor are equal to the Shapley value of the investor in our model.

Table 3.2 implies a ranking regarding the suitability of the various ownership structures with respect to the specific investments.[51] The ranking of maximum possible investment outlays by agent 1 for the various ownership structures is:

(2) III < I < II.

Ownership structure II is always first-best efficient regarding the specific investment of agent 1. In other words, every surplus generating investment by agent 1 will be implemented under ownership structure II, regardless of the value of k_1. The reason is that all benefits of the investment accrue to agent 1.

The ranking of maximum possible outlays regarding the investment k_2 by agent 2 for the various ownership structures is:

(3) II < I < III.

Figure 3.2 shows which ownership structures are first-best efficient as a function of the sunk costs of each agent. The smaller the specific part of the investment, the more ownership structures yield the first best efficient outcome. If k_1 as well as k_2 have a low value, then the invariance and efficiency result of the Coase theorem holds. The choice of governance structure does not matter in these circumstances. However, the choice of ownership structure matters for efficiency when the value of at least one of the k_i's exceeds a certain level. With higher levels of investment, fewer ownership structures are efficient. For instance, if $f < k_2 \leq 1.5f$ and $t < k_1 \leq 1.5t$ then only I is first best efficient. The general result is that a first best ownership structure assigns more power to an agent when its sunk costs/quasi-surplus ratio increases, ceteris paribus.[52]

There is no first-best efficient combination of investments possible in the areas A, B, and C in Figure 3.2. If investments of 1 and 2 fall in the area A, B or C only second best efficient ownership structures are possible. This means that only one of the two agents will invest. The second best ownership structure choice in region A is III when $2f\text{-}k_2 \geq 2t\text{-}k_1$ and I or II otherwise. Similarly, the second best ownership structure choice in region C is II when $2t\text{-}k_1 \geq 2f\text{-}k_2$ and I or III otherwise. Finally, the second best ownership structure choice in region B is II when $2t\text{-}k_1 \geq 2f\text{-}k_2$ and III otherwise. The general result is that the

[51] The ordinal ranking of the ownership structures can be interpreted as a 'reduced form' of an underlying model (Williamson, 1991). The reduced form is an early stage of the development of the theory of the firm (cf. Holmstrom and Roberts, 1998). The empirical importance of ordinal rankings is that they formulate some constraints with respect to the data. To be more specific, various changes in the choice of ownership structure as a function of the level of asset specificity are predicted not to happen. If they do occur in reality, the relevance of the model must be doubted.

[52] The choice of ownership structure is in our model driven by efficiency considerations only. However, considerations of equity may prevent the first-best ownership structure being chosen. A possible solution is to accompany the choice of ownership structure with a lump sum transfer scheme.

second best ownership structure assigns more power to an agent when the surplus of its investment increases, ceteris paribus.

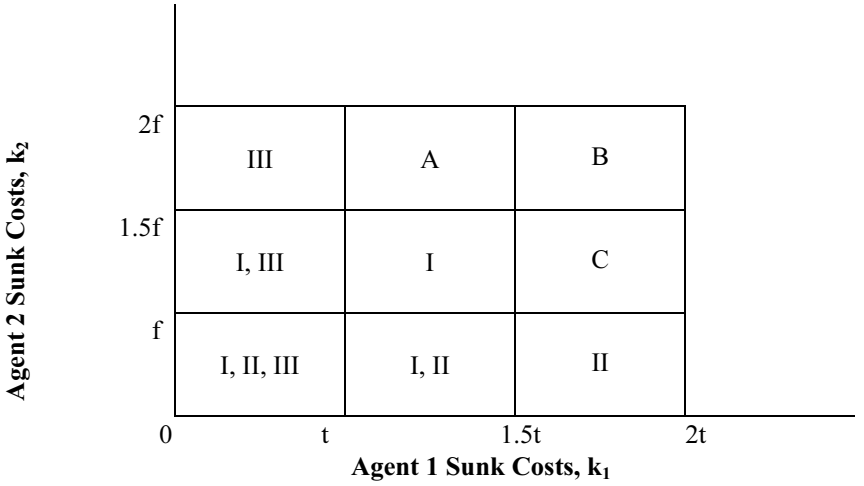

Figure 3.2 First-best efficient ownership structures

3.4 The model: three agents

3.4.1 Ten ownership structures

Now we will present the model for the three agents (1, 2 and 3), three assets (A_1, A_2 and A_3) and three investment decisions (x_1, x_2 and x_3). For simplicity, x_i can only take the value 0 or 1. The three agents represent a specific tier in this agrifood chain: agent 1 is a farmer, agent 2 is a manager in a processing firm (hereafter called a processor) and agent 3 is a manager in a retail firm (hereafter called the retailer). The assets are land, factory and shop. The investments are in human capital (e.g., skills) and are asset specific. For instance, the farmer invests in skills to improve the productivity of his fields, the processor invests in knowledge to increase the efficiency of processing in his factory, and the retailer invests in particular knowledge of the consumers that visit his shop. The asset-specificity of the investment implies that if the agent does not have access to the asset, the investment will not pay off.

Once again, we assume complementarities in asset use. The whole quasi-surplus of an investment will be generated when all assets in the chain are used. The notion of a chain entails that there is a difference between being in the middle or at the end of the chain. We capture this by assuming that the value generated by the investment will be higher if two

adjacent assets are used than if two non-adjacent assets are used. In the three-tier agrifood chain this means that the positive externalities of the investment of the farmer (agent 1) is higher for the processing company (agent 2) than for the retailer (agent 3). The quasi-surplus for various investment decisions and assets used is shown in Table 3.3, where the difference between adjacent and non-adjacent assets is captured by $\alpha < 1$ and $\beta < 1$.

Table 3.3 Quasi-surplus for three investment decisions and various assets involved

Assets involved	Investment decision	q
A_1	$x_1=1$	t
A_1 A_2	$x_1=1$	2t
A_1 A_3	$x_1=1$	$(1 + \alpha)t$
A_1 A_2 A_3	$x_1=1$	$(2 + \alpha)t$
A_2	$x_2=1$	f
A_1 A_2	$x_2=1$	2f
A_2 A_3	$x_2=1$	2f
A_1 A_2 A_3	$x_2=1$	3f
A_3	$x_3=1$	h
A_1 A_3	$x_3=1$	$(1 + \beta)h$
A_2 A_3	$x_3=1$	2h
A_1 A_2 A_3	$x_3=1$	$(2 + \beta)h$

Notes: q is quasi surplus; $x_i = 1$ means that agent i invests; t = surplus generated by the investment of agent 1 at agent 1's stage of production; f = surplus generated by the investment of agent 2 at agent 2's stage of production; and h = surplus generated by the investment of agent 3 at agent 3's stage of production.

Figure 3.3 distinguishes ten ownership structures. It shows the assets that each agent owns for each ownership structure. For instance, ownership structure V entails that the assets A_2 and A_3 are owned by agent 3 and asset A_1 is owned by agent 1. Ownership structure II represents the co-operative, where farmers own the processing company at the second stage of the chain. In a marketing co-operative agent 1 owns A_1 and A_2, while agent 3 owns A_3.

Also for the three agent supply chain we can find the bargaining power of each agent by computing the Shapley values for each investment and each ownership structure (see Appendix A for an example). The Shapley value determines the appropriation rate; that is, it allocates the surplus that the investment of an investor generates between the parties.

Once we know the Shapley value, we know the maximum investment each agent is willing to do under each ownership structure. As we have assumed non-co-operative investment decisions, each agent will base his investment only on its own Shapley value. The (investment) participation constraint for agent 1 under ownership structure I is

(4) $\quad k_1 \leq (9+3\alpha)t/6 = (1.5 + 0.5\alpha)t.$

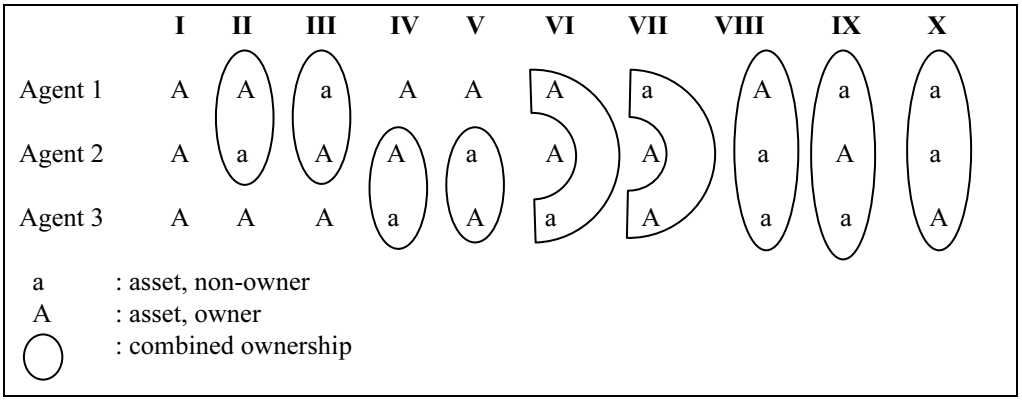

Figure 3.3 The ten possible ownership structure choices

Table 3.4 gives the maximum cost of investment for each investing agent under the 10 different ownership structures. It follows immediately from Table A-5 in Appendix A.

Table 3.4 Maximum investment levels under various ownership structures

Ownership structure	Max. investment by agent 1	Max. investment by agent 2	Max. investment by agent 3
I	$(1.5 + 0.5\alpha)t$	$2f$	$(1.5 + 0.5\beta)h$
II	$(2 + 0.5\alpha)t$	$1.33f$	$(1.5 + 0.5\beta)h$
III	$(1 + 0.33\alpha)t$	$2.5f$	$(1.5 + 0.5\beta)h$
IV	$(1.5 + 0.5\alpha)t$	$2.5f$	$(1 + 0.33\beta)h$
V	$(1.5 + 0.5\alpha)t$	$1.33f$	$(2 + 0.5\beta)h$
VI	$(1.5 + \alpha)t$	$2f$	$(0.83 + 0.5\beta)h$
VII	$(0.83 + 0.5\alpha)t$	$2f$	$(1.5 + \beta)h$
VIII	$(2 + \alpha)t$	$1.5f$	$(1 + 0.5\beta)h$
IX	$(1 + 0.5\alpha)t$	$3f$	$(1 + 0.5\beta)h$
X	$(1 + 0.5\alpha)t$	$1.5f$	$(2 + \beta)h$

3.4.2. Efficient ownership structures in a three-tier chain

Just as for the two-agent model, in the three-agent agrifood chain an ownership structure is first-best efficient when it implements all (and only) surplus generating investments. The participation constraints of the three agents determine whether a particular combination of investments will yield the first-best. The constraints are $k_1 \leq SV_1$, $k_2 \leq SV_2$ and $k_3 \leq SV_3$.

Table 3.4 implies a ranking with respect to the incentives that each ownership structure holds for various investment decisions. The ranking of ownership structures according to the maximum level of investment under each structure is:

(5) VII < III < IX/X < I/IV/V < VI < II < VIII.

Ownership structure VIII is always first-best efficient regarding the specific investment of agent 1. In other words, every surplus generating investment by agent 1 will be implemented under ownership structure VIII, because all benefits of the investment accrue to agent 1.

Because the positive externalities of investment are not fully taken into account when the investing agent makes its investment decision, under-investment may result. For example, agent 1 will invest under ownership structure II when $k_1 \in [0, (2+0.5\alpha)t]$, but not when $k_1 \in ((2+0.5\alpha)t, \infty)$. Ownership structure II is inefficient for high levels of k_1, when $k_1 \in ((2+0.5\alpha)t, (2+\alpha)t)$, because agent 1 does not take the full positive externality of investment for agent 3 into account in its investment decision.

From the perspective of an investment by agent 1 ownership structure VI is less efficient than ownership structure II. Under II agent 1 owns the assets at tiers 1 and 2 (see Figure 3.3) and under VI he owns assets at tiers 1 and 3, while his investment generates more value in tier 2 than in tier 3. Ownership structures I, IV, and V are identical and dominated by ownership structure VI because in I, IV and V agent 1 only owns the asset at the first tier of the chain. Ownership structures IX and X are identical with respect to investment incentives for agent 1: he is indispensable because he makes the investment, while the other agent (i.e., agent 2 in IX and agent 3 in X) is indispensable because he owns all assets. Ownership structure III is less efficient than IX and X because agent 1 has to negotiate with two other agents instead of only one. Finally, ownership structure VII is the least efficient with respect to the investment incentives for agent 1. It is even less efficient than ownership structure III because the combination of agents 1 and 2 in III generate more surplus than the combination of 1 and 3 in VII.

The ranking of ownership structure according to the maximum possible investment k_2 by agent 2 is:

(6) II/V < VIII/X < I/VI/VII < III/IV < IX.

Similarly, the ranking of ownership structures for the maximum possible investment k_3 by agent 3 is:

(7) VI < IV < VIII/IX < I/II/III < VII < V < X.

The explanation of these rankings is similar to that of agent 1.

These three rankings can be presented in a three-dimensional diagram with k_1, k_2, k_3 on the axes. This diagram represents first-best efficient ownership structures. For reasons of simplicity it is sliced into six two-dimensional figures, with each figure representing a range of values of k_2. Figure 3.4 presents the first-best ownership structure for $k_2 \leq 1.33f$. Agent 2 will always invest when the specific level of investment is not above 1.33f.

Agent 3 Sunk Costs, k_3	(5/6+0.5α)t	(1+0.33α)t	(1+0.5α)t	(1.5+0.5α)t	(1.5+ α)t	(2+0.5α)t	(2+α)t
(2+β)h	X	X	X				
(2+0.5β)h	V, X	V, X	V, X	V			
(1.5+β)h	VII, V, X	V, X	V, X	V			
(1.5+0.5β)h	I, II, III, V, VII, X	I, II, III, V, X	I, II, V, X	I, II, V	II	II	
(1+0.5β)h	I, II, III, V, VII, VIII, IX, X	I, II, III, V, VII, VIII, IX, X	I, II, V, VIII, IX, X	I, II, V, VIII	II, VIII	II, VIII	VIII
(1+0.33β)h	I, II, III, IV, VI, VII, VIII, IX, X	I, II, III, IV, V, VII, VIII, IX, X	I, II, IV, V, VIII, IX, X	I, II, IV, V, VIII	II, VIII	II, VIII	VIII
(5/6+0.5β)h	I, II, III, IV, V, VI, VII, VIII, IX, X	I, II, III, IV, V, VI, VII, VIII, IX, X	I, II, IV, V, VI, VIII, IX, X	I, II, IV, V, VI, VIII	II, VI, VIII	II, VIII	VIII

Agent 1 Sunk Costs, k_1

Figure 3.4 First-best efficient ownership structures when agent 2 always invests, i.e. $k_2 \leq 1.33f$

The next step is finding first-best efficient ownership structures for a higher investment by agent 2: $1.33f < k_2 \leq 1.5f$. Figure 3.5 presents this slice. Ownership structures II and V are no longer first-best efficient. Additional figures, shown in appendix B, show that:

- if $1.5f < k_2 \leq 2f$, then VIII and X are no longer first-best efficient;
- if $2f < k_2 \leq 2.5f$, then I, VI and VII are no longer first-best efficient;
- if $2.5f < k_2 \leq 3f$, then III and IV are no longer first-best efficient.

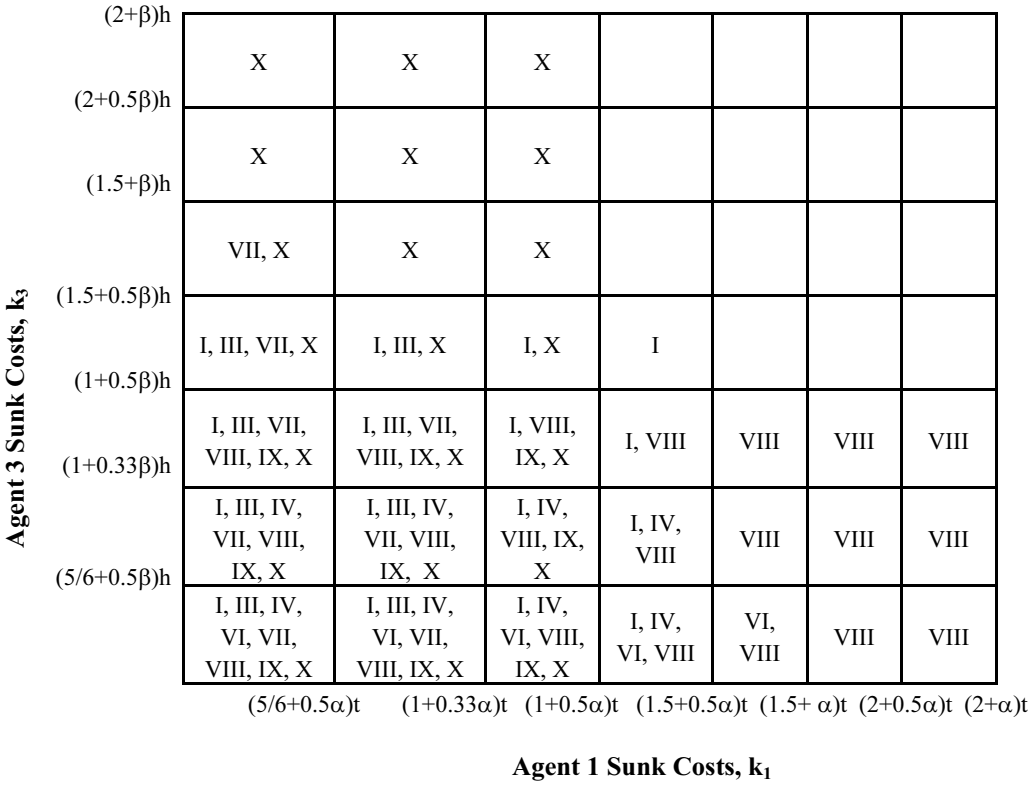

Figure 3.5 First-best efficient ownership structures when the costs of investment of agent 2 are $1.33f \leq k_2 \leq 1.5f$

It follows from Figures 3.4 and 3.5 (and the ones in Appendix B) that each possible ownership structure can be uniquely first-best efficient. The ordering of efficient ownership structures for each investing agent shows that a change in ownership structure increases the incentive to invest for one agent as well as decreases the incentive to invest for other agents. While a shift in ownership structure strengthens agent i's bargaining position, it weakens agent j's bargaining position.

An interesting case is ownership structure II: the farmer owns both the land and the factory, and the retailer owns the shop. This is the typical farmer-owned marketing co operative (MC). If the three agents – the farmer, the manager/processor of the factory and the retailer – all make chain-specific investments, it is the relative size of the investment that determines whether this particular ownership structure is efficient. Figures 3.4 and 3.5 show that ownership structure II is the unique first-best efficient structure if and only if $(1.5+0.5\alpha)t < k_1 \leq (2+0.5\alpha)t$, $0 < k_2 \leq 1.33f$, and $(1+0.5\beta)h < k_3 \leq (1.5+0.5\beta)h$. Here the farmer's specific investment is relatively large compared to the investments by the

processor and the retailer (i.e., $k_1/q_1 > k_2/q_2$ and $k_1/q_1 > k_3/q_3$). If the farmer's investment is smaller, then also I and V are first-best efficient. With ownership structure I each agent owns an asset, and with ownership structure V the processing plant and the shop are both owned by the retailer. If the investment by the retailer is smaller (if $k_3 \leq (1+0.5\beta)h$), then also VIII becomes first-best efficient. Ownership structure VIII means that the farmer owns all three assets. This situation of full chain integration will only yield the social optimum if the specific investments by the processor and retailer are much smaller than the investment by the farmer.

Ownership structure II does not show up anymore in Figure 3.5, indicating that an increase in k_2 will reduce the attractiveness of an MC in inducing investments by all agents in the chain. When the specific investment by agent 2 increases in proportion to the investments by agents 1 and 3, an MC is no longer the best solution to the various hold-up problems. Because an MC is geared towards the interests of the farmer (agent 1), expressed by farmer-ownership of the processing firm, investments by agent 2 face the threat of hold-up by the farmers. The conclusion is that if the manager of a farmer-owned processing firm needs relatively high chain-specific investments, for instance in product innovation or marketing innovation, a shift from MC to another ownership structure may be necessary. For instance, if the manager owns the processing firm he has a much stronger bargaining position and therefore a better incentive to invest.

3.5 Comparative statics results

A number of comparative statics results can be derived from this model. First, the set of efficient ownership structures shrinks when the specific costs of investment increases relative to the surplus it generates. When k/q increases, the ownership structure has to be more fine-tuned to prevent hold-up problems. Another way of formulating this result is that an increase in the value of q, given the level of k, will increase the set of efficient ownership structures. The increase in the ratio surplus/quasi-surplus provides more leeway in the choice of ownership structure such that both agents feel secure that their investments will be recouped. In the cells in the upper right corner of Figure 3.4 and 3.5 there is no first-best ownership structure; that is, there is no ownership structure that is able to obtain the first-best when k_1 as well as k_3 have a high value (in proportion to the level of q).[53]

Second, many agricultural markets are nowadays surplus instead of shortage markets. The response of more product differentiation and more vertical co-ordination entails a higher level of asset specificity, thus increasing k/q. Third, the globalisation of markets entails more competition. This means that surplus decreases and k/q increases, making it more difficult to establish the first-best outcome.

Finally, what happens if the complementarities in the chain increase (i.e., if α or β increases)? A higher value of α means that the specific investment by agent 1 generates a

[53] Which ownership structures are second-best efficient depends on the relative size of the agents' investment decisions.

higher quasi-surplus. This results in a shift to the right of the borderlines between the columns in Figures 3.4 and 3.5. This implies that with given investment levels for agents 1, 2 and 3 more ownership structures are now first-best efficient (also showing that less integrated structures become efficient for agent 1). A similar argument is valid for the value of β. In general, we see that a higher quasi-surplus of a given investment makes more ownership structures efficient.

3.6 Conclusions

Vertical co-ordination in the agrifood sector often requires aligning activities of agents in more than two tiers of the production and distribution system. Particularly if specialty agricultural products are produced, processed and marketed (like with identity preservation), vertical contracting is relationship-specific. If these activities require investments that can only be recouped with particular partners in the system, dependencies exist. Such dependencies provide room for opportunistic behaviour in the form of appropriation of a larger share of the surplus than contracted for. If a company participating in a specific agrifood chain has insufficient guarantee that he will be able to recoup his investment, inefficient investment decisions will result.

In this chapter we have applied the new property rights model to the analysis of investment decisions by three agents in a three-tier agrifood supply chain. In fact, the agrifood supply chain consists of three agents and three assets: farmer + land, processor + factory and retailer + store. New property rights theory predicts that asset ownership has an effect on agents' incentives to invest. This effect is due to the impossibility to write comprehensive contingent contracts for relationship-specific investments and the resulting potential for opportunistic behaviour and *ex post* renegotiation over the trade benefits. The risk of *ex post* contract reneging results in under-investment. Changing the allocation of asset ownership between the trading agents may solve the hold up problem.

Each agent in a three-tier agrifood supply chain can make investments yielding a higher surplus if the agent collaborates with agents in the other tiers of the chain. An important element in the new propery rights model is the distinction between agents and assets. Each agent makes an investment in human capital, the investment will only yield surplus if the agent has access to a particular asset, and the investment will yield a higher surplus if the agent has also access to assets in other tiers of the chain. The latter characteristic makes the investment (at least partially) chain-specific. Whether agents are actually willing to make the chain-specific investments depends on the division of value in case of *ex post* renegotiation. The bargaining power in this renegotiation process is determined by the ownership of assets that are essential for the investment; that is, without access to these assets the investment will generate no or lower value.

Our model shows that optimal asset ownership is determined by the specific investment cost/quasi-surplus ratio for agent 1 in proportion to the specific investment cost/quasi-surplus ratio for agent 2 when first-best efficiency is attainable. If this ratio is higher for agent 1 than for agent 2, then agent 1 should own most of the assets that are used

in generating the quasi-surplus. In other words, if the specific investment by agent 1 generates a smaller surplus (relative to the investment) than the specific investment by agent 2 does, then agent 1 should own more assets to obtain the efficient investment decisions. The second-best ownership structure choice assigns most power to the agent generating the highest surplus.

When the farmer's specific investment is high relative to the specific investment by the processor, farmer-ownership of the assets in the processing stage of the chain obtains the first-best solution. This is the classic farmer-owned marketing co-operative. However, if the investment by the processor (or retailer) becomes relatively more important for total chain value than the investment by the farmer, the co-operative may no longer be an efficient ownership structure. The current trend towards restructuring of co-operatives, particularly toward finding solutions for the lack of equity capital, may be an indication of the inefficiency of farmer-control over assets in the processing and marketing stages of the agrifood chain.

The model of a three-tier chain has been illustrated with the example of the farmer, processor and retailer. A three-agent supply chain for fresh produce consisting of a seed company, a vegetable grower and a wholesaler can be analysed in the same way. The same results will of course hold, but the marketing co-operative is in such a chain represented by ownership structure IV instead of ownership structure II.

If changes in technology or changes in agrifood markets shift the relative importance of the individual investments by different chain partners (that is, if retailer investment becomes more important than farmer investment), it may be necessary to change the allocation of ownership of essential assets to induce agents to make those investments that generate the chain optimum. Thus, it may be necessary to change the ownership structure in agrifood chains to obtain that combination of investment decisions yielding the first-best ownership structure. The model we have presented may contribute to determine ownership structures that induce the generation of maximum value.

Appendix A. Characteristic Functions and Shapley Values

Table A-1 Characteristic functions for the two-tier model

$X = (x_1,x_2)$	G	v(∅)	v(1)	v(2)	v(3)
(1,0)	I	0	t	0	2t
(1,0)	II	0	2t	0	2t
(1,0)	III	0	0	0	2t
(0,1)	I	0	0	f	2f
(0,1)	II	0	0	0	2f
(0,1)	III	0	0	2f	2f

Notes: $x_i = 1$ means that agent i invests; G = governance structure; and v(Z) = value of coalition Z.

Explanation for Table A-1: v(∅) represents the value which is assigned to the empty coalition, which is always zero; v(1) is a coalition with only agent 1 and generates only value if agent 1 has access to asset A_1 (i.e., under I and II); v (2) is a coalition with only agent 2 and generates only value if agent 2 has access to asset A_2 (i.e., under I and III); v(12) is a coalition of agents 1 and 2 and generates the full quasi-surplus of 2t or 2f.

By using the characteristic function, we can compute the Shapley value for each agent under each ownership structure. For investing agent 1 (i.e., x = (1,0)) under ownership I the Shapley value is computed by adding his marginal contribution in each possible sequence of the grand coalition of agents 1 and 2, and dividing the total contributions by the number of coalitions (Table A-2). In coalition (12) the marginal contribution of agent 1 is t, in coalition (21) the marginal contribution of agent 1 is 2t. The sum 3t is divided by 2, giving a Shapley value of 1.5t for agent 1 under ownership structure I.

Table A-2 Computation of Shapley value for investment by agent 1 and ownership structure I

Order in coalition S	Value added by agent 1	Value added by agent 2
(12)[a]	t	t
(21)	2t	0
Sum of marginal contributions	3t	t
Shapley value	1.5t	0.5t

[a] (xy) is the sequence in which agent x is first, and agent y is second.

The computation of the Shapley value for three agents is done the same way. Suppose ownership I is chosen and agent 1 invests (i.e., x = (1,0,0)).
The characteristic function v(S | I, (1,0,0)) is:
N = {1,2,3}
v (∅ | I , (1,0,0)) = 0
v (1 | I, (1,0,0)) = t
v (2 | I, (1,0,0)) = 0
v (3 | I, (1,0,0)) = 0
v (12 | I, (1,0,0)) = 2t
v (13 | I, (1,0,0)) = (1+α)t
v (23 | I, (1,0,0)) = 0
v (123 | I, (1,0,0)) = (2+α)t

Table A-3 presents the computation of the Shapley values for ownership structure I and investment by agent 1. We illustrate the numbers in the table by elaborating on two possible orders in which the grand coalition of all players can be formed. Consider first the order 123. The marginal value added by player 1 is v (1 | I, (1,0,0)) - v (∅ | I , (1,0,0)) = t - 0 = t. The marginal value added by player 2 is v (12 | I, (1,0,0)) - v (1 | I , (1,0,0)) = 2t - t = t. The marginal value added by player 3 is v (123 | I, (1,0,0)) - v (12 | I , (1,0,0)) = (2+α)t - 2t = αt. The marginal contribution of each player in order 312 is computed similarly. The marginal value added by player 3 is v (3 | I, (1,0,0)) - v (∅ | I , (1,0,0)) = 0 - 0 = 0. The marginal value added by player 1 is v (13 | I, (1,0,0)) - v (3 | I , (1,0,0)) = (1+α)t - 0 = (1+α)t. The marginal value added by player 2 is v (123 | I, (1,0,0)) - v (13 | I , (1,0,0)) = (2+α)t - (1+α)t = t.

Table A-3 Shapley values for ownership structure I and investment by agent 1

Order in coalition S	Value added by agent 1	Value added by agent 2	Value added by agent 3
(123)[a]	t	t	αt
(132)	t	t	αt
(213)	2t	0	αt
(231)	(2+α)t	0	0
(312)	(1+α)t	t	0
(321)	(2+α)t	0	0
Sum of marginal contributions	(9+3α)t	3t	3αt
Shapley values	(9+3α)t/6	t/2	αt/2

[a] (xyz) is the sequence in which agent x is first, and agent y is second, and agent z is third.

In the three-agent model there are ten possible ownership structure and three types of investment. Thirty different characteristic functions have therefore to be analyzed to determine the level of investment of each agent and the efficient choice of ownership structure. Table A-4 presents the characteristic functions. We will explain the numbers of rows seven (with ownership structure VI) and eight (with VII) of this table to illustrate its construction. Assume that agent 1 invests. Coalitions without agent 1 have value 0 because agent 1 has to invest and is therefore essential. This implies $v(2) = v(3) = v(23) = 0$. If all agents are in the coalition then the whole surplus is of course created by this coalition: $v(123) = (2+\alpha)t$. Compare ownership structure VI with ownership structure VII. Agent 3 adds no value in ownership structure VI to a coalition of which agent 1 is already a member because agent 1 owns the assets at the third stage. This implies $v(1) = v(13)$ and $v(12) = v(123)$. The coalition of agent 1 adds a value of $(1+\alpha)t$ because he owns the assets at stage 1 and 3: $v(1) = (1+\alpha)t$. The coalition of the agents 1 and 2 generates the whole surplus because together they own all the assets: $v(12) = (2+\alpha)t$. The agents 1 and 3 are both essential in ownership structure VII because agent 1 invests and agent 3 owns the assets at stage 1. This implies $v(1) = 0$ and $v(12) = 0$. Agent 2 is essential for the agents 1 and 3 for generating the value with his asset: $v(13) = (1+\alpha)t$.

Table A-4 Characteristic functions for the three-tier model

X	G	v(1)	v(2)	v(3)	v(12)	v(13)	v(23)	v(123)
(1,0,0)	I	t	0	0	2t	(1+α)t	0	(2+α)t
(1,0,0)	II	2t	0	0	2t	(2+α)t	0	(2+α)t
(1,0,0)	III	0	0	0	2t	0	0	(2+α)t
(1,0,0)	IV	t	0	0	(2+α)t	t	0	(2+α)t
(1,0,0)	V	t	0	0	t	(2+α)t	0	(2+α)t
(1,0,0)	VI	(1+α)t	0	0	(2+α)t	(1+α)t	0	(2+α)t
(1,0,0)	VII	0	0	0	0	(1+α)t	0	(2+α)t
(1,0,0)	VIII	(2+α)t	0	0	(2+α)t	(2+α)t	0	(2+α)t
(1,0,0)	IX	0	0	0	(2+α)t	0	0	(2+α)t
(1,0,0)	X	0	0	0	0	(2+α)t	0	(2+α)t
(0,1,0)	I	0	f	0	2f	0	2f	3f
(0,1,0)	II	0	0	0	2f	0	0	3f
(0,1,0)	III	0	2f	0	2f	0	3f	3f
(0,1,0)	IV	0	2f	0	3f	0	2f	3f
(0,1,0)	V	0	0	0	0	0	2f	3f
(0,1,0)	VI	0	f	0	3f	0	f	3f
(0,1,0)	VII	0	f	0	f	0	3f	3f
(0,1,0)	VIII	0	0	0	3f	0	0	3f
(0,1,0)	IX	0	3f	0	3f	0	3f	3f
(0,1,0)	X	0	0	0	0	0	3f	3f
(0,0,1)	I	0	0	h	0	(1+β)h	2h	(2+β)h
(0,0,1)	II	0	0	h	0	(2+β)h	h	(2+β)h
(0,0,1)	III	0	0	h	0	h	(2+β)h	(2+β)h
(0,0,1)	IV	0	0	0	0	0	2h	(2+β)h
(0,0,1)	V	0	0	2h	0	(2+β)h	2h	(2+β)h
(0,0,1)	VI	0	0	0	0	(1+β)h	0	(2+β)h
(0,0,1)	VII	0	0	(1+β)h	0	(1+β)h	(2+β)h	(2+β)h
(0,0,1)	VIII	0	0	0	0	(2+β)h	0	(2+β)h
(0,0,1)	IX	0	0	0	0	0	(2+β)h	(2+β)h
(0,0,1)	X	0	0	(2+β)h	0	(2+β)h	(2+β)h	(2+β)h

Notes: X = (x_1, x_2, x_3) is vector of investments; G = governance structure; and v(Z) = value of coalition Z.

The Shapley value is used to determine the appropriation rate. It allocates the surplus which the investment of an investor generates between the three agents. Notice that for each particular case the Shapley value specifies an appropriation rate for all the three agents and of course the maximum investment cost only for the investor. Table A-5 gives the Shapley values for three investment decisions, three agents and 10 ownership structures.

Table A-5 Shapley values for the three-tier model

X	G	Shapley value agent 1	Shapley value agent 2	Shapley value agent 3
(1,0,0)	I	(1.5+0.5α)t	0.5t	0.5αt
(1,0,0)	II	(2+0.5α)t	0	0.5αt
(1,0,0)	III	(1+ 0.33α)t	(1+0.33α)t	0.33αt
(1,0,0)	IV	(1.5+0.5α)t	(0.5+0.5α)t	0
(1,0,0)	V	(1.5+0.5α)t	0	(0.5+0.5α)t
(1,0,0)	VI	(1.5+α)t	0.5t	0
(1,0,0)	VII	(5/6+0.5α)t	0.33t	(5/6+0.5α)t
(1,0,0)	VIII	(2+α)t	0	0
(1,0,0)	IX	(1+0.5α)t	(1+0.5α)t	0
(1,0,0)	X	(1+0.5α)t	0	(1+0.5α)t
(0,1,0)	I	0.5f	2f	0.5f
(0,1,0)	II	1.33f	1.33f	0.33f
(0,1,0)	III	0	2.5f	0.5f
(0,1,0)	IV	0.5f	2.5f	0
(0,1,0)	V	0.33f	1.33f	1.33f
(0,1,0)	VI	f	2f	0
(0,1,0)	VII	0	2f	f
(0,1,0)	VIII	1.5f	1.5f	0
(0,1,0)	IX	0	3f	0
(0,1,0)	X	0	1.5f	1.5f
(0,0,1)	I	0.5βh	0.5h	(1.5+0.5β)h
(0,0,1)	II	(0.5+0.5β)h	0	(1.5+0.5β)h
(0,0,1)	III	0	(0.5+0.5β)h	(1.5+0.5β)h
(0,0,1)	IV	0.33βh	(1+0.33β)h	(1+0.33β)h
(0,0,1)	V	0.5βh	0	(2+0.5β)h
(0,0,1)	VI	(5/6+0.5β)h	0.33h	(5/6+0.5β)h
(0,0,1)	VII	0	0.5h	(1.5+β)h
(0,0,1)	VIII	(1+0.5β)h	0	(1+0.5β)h
(0,0,1)	IX	0	(1+0.5β)h	(1+0.5β)h
(0,0,1)	X	0	0	(2+β)h

Notes: X = (x_1, x_2, x_3) is the vector of investments; G = governance structure; and v(Z) = value of coalition Z.

Appendix B. Efficient Ownership Structures

There are no first-best efficient ownership structures for $k_2 > 3f$ because the sunk costs are larger than the quasi-surplus.

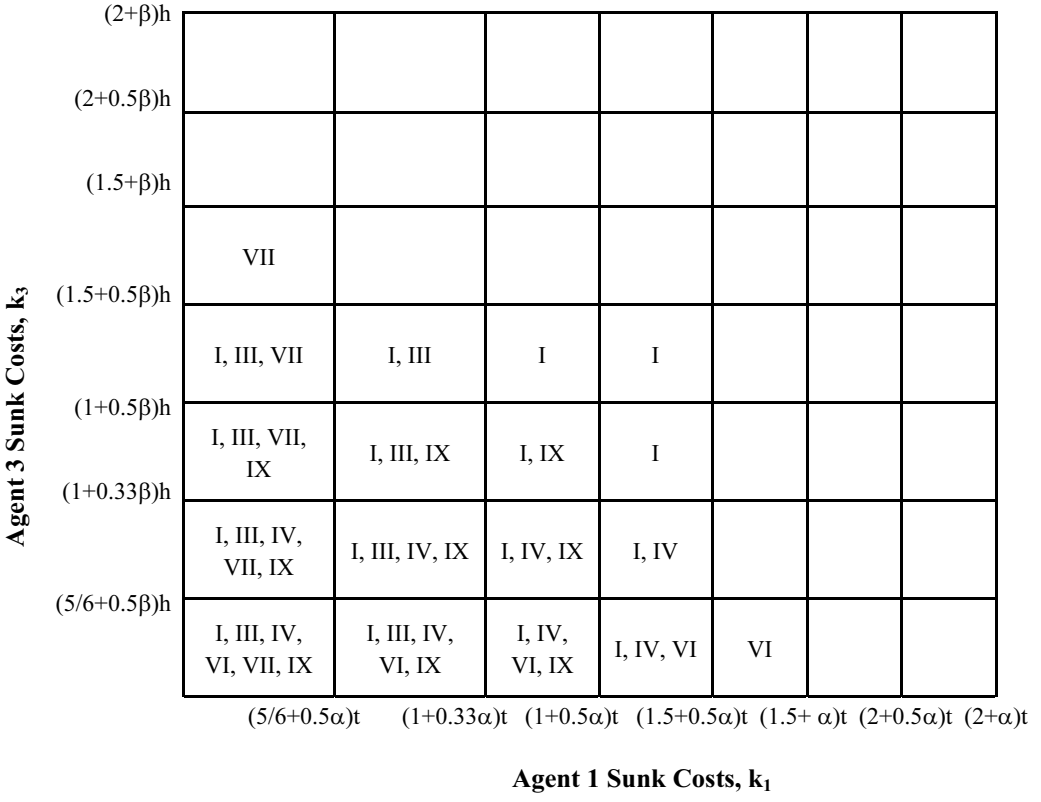

Figure B-1 First-best efficient ownership structures when the costs of investment of agent 2 are $1.5f < k_2 \leq 2f$

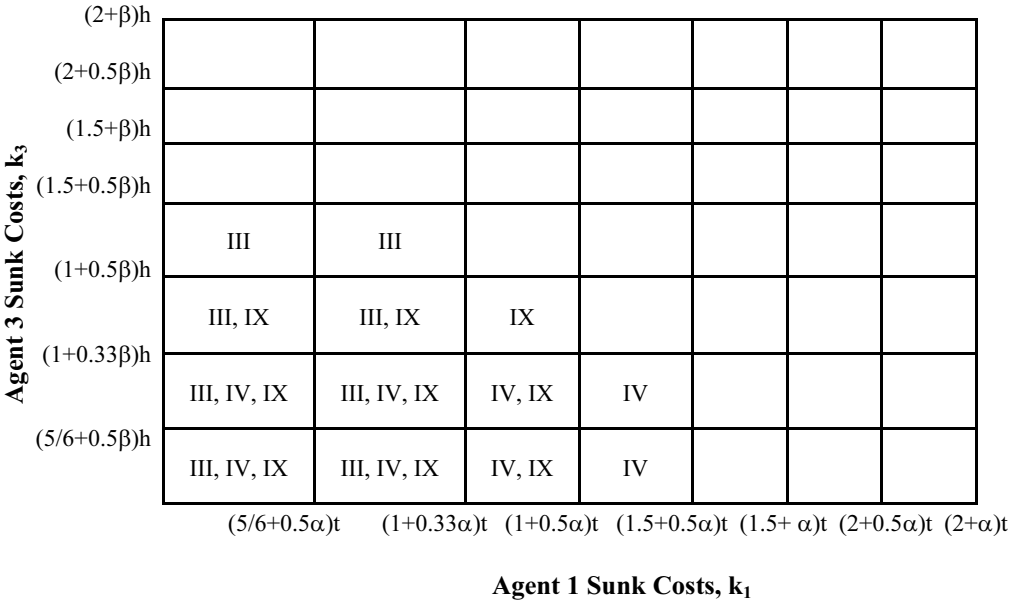

Figure B-2 First-best efficient ownership structures when the costs of investment of agent 2 are $2f < k_2 \leq 2.5f$

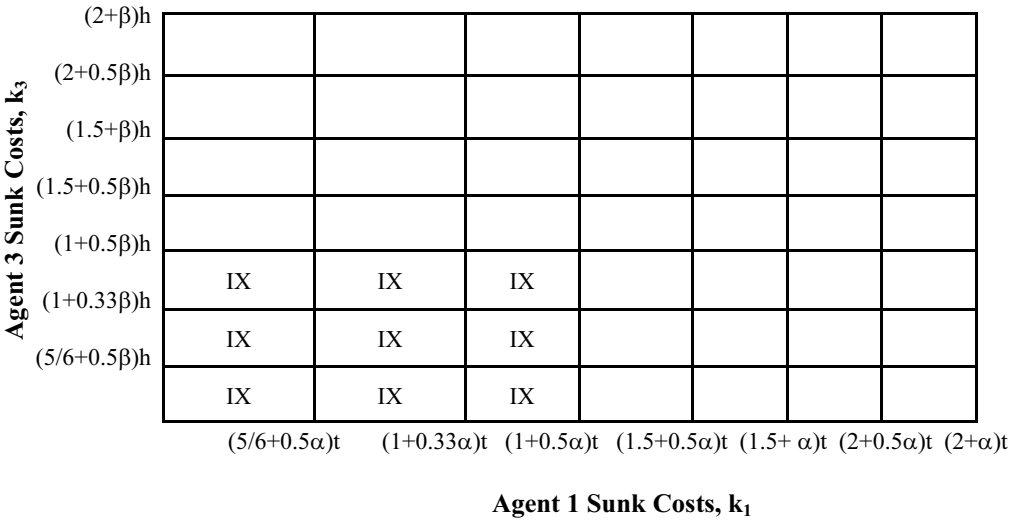

Figure B-3 First-best efficient ownership structures when the costs of investment of agent 2 are $2.5f < k_2 \leq 3f$

4. Coherence in Organisations: VTN/The Greenery as a System of Attributes [54]

4.1 Introduction

In 1996, nine Dutch co-operative auctions for fruit, vegetables and mushrooms decided to merge into a new co-operative, *Voedingstuinbouw Nederland* (VTN), and to combine all their commercial activities in one central marketing and sales organisation, The Greenery International BV.[55] The merger was a reaction to changes in the market conditions in the fruit and vegetable sector in Northwest Europe. In the early 1990s, Dutch fruit and vegetable growers saw their competitiveness rapidly decreasing. Growers explored several options for improving their market position, such as cutting costs on their individual farms, developing new, high-value added products, and increasing the efficiency of sales and logistics. Improving the efficiency of sales and logistics, and marketing products with higher value added could not be achieved by growers individually, but had to be realised through the new marketing co-operative VTN/The Greenery.[56] Its strategy included the following goals: reduce costs, increase scale of operation, add more value, enhance market orientation and improve co-ordination in the production and distribution chain (VTN, 1996). In implementing this strategy, VTN/The Greenery introduced several functional and organisational changes compared with the traditional auction co-operative.

This chapter presents the struggle of VTN/The Greenery in implementing its new strategy and in finding the most appropriate organisational structure. Besides describing the first five years of VTN/Greenery history, the chapter provides an analysis of the new organisation that is emerging. The description and analysis of the new marketing co-operative is presented as a case study of organisational change. While in Chapter 3 we focussed on one element of organisation - that of ownership -, this chapter places the efficient ownership question in a broader perspective by studying other organisational as well as functional characteristics.

In studying the interaction between various organisational and functional characteristics of a co-operative, we have chosen to use the case study research method. The case study is an appropriate research method when a "how" or "why" question is being asked about a contemporary set of events over which the investigator has little or no control (Yin, 1994: 9). In addition, a case study is suitable for obtaining a integrated picture of an event or an organisation (Verschuren and Doorewaard, 2000: 170). In other words, because

[54] A preliminary version of this chapter has been published as Bijman et al. (2000).

[55] In 1997 the *Centraal Bureau Tuinbouwveilingen* (CBT), a federative co-operative providing marketing services to 22 member co-operative auctions, was merged with VTN, and its activities were integrated in The Greenery International.

[56] We will use the name VTN/The Greenery when the whole organisation (co-operative + executive enterprise) is meant, and use VTN and Greenery respectively if the co-operative or the enterprise individually is meant.

of the holistic approach, a case study presents the object of study as a whole. Finally, the transformation of a number of traditional auction co-operatives into one new marketing co-operative presented a unique opportunity to make a detailled description of the challenges of organisational change.

The information presented in this case study comes from four sources: (1) trade journals and newspapers; (2) official VTN and The Greenery documents; (3) several publications describing change processes at VTN/The Greenery; and (4) interviews with VTN/Greenery representatives (see the appendix to this chapter for a list of specific sources).[57] As the manuscript of this chapter has been closed in summer 2001, more recent changes in structure or strategy of the VTN/The Greenery have not been included.

In this chapter we will analyse the new marketing co-operative from the perspective of consistency among the various functional and organisational characteristics. For this, we use the concept 'system of attributes' (Hendrikse and Veerman, 1997). Attribute is another word for functional and organisational characteristic. Attributes form a system because they are related to each other; there are interactions and trade-offs. An individual attribute is a variable that can have different values. For instance, the functional attribute 'marketing' can have the value 'mass-marketing' or 'niche-marketing'. Good performance of the system requires the values of the various attributes to be co-ordinated. Attributes that are well aligned may not only result in low cost of running the organisation, but may also lead to better performance in the individual tasks. A system of well-aligned attributes makes a coherent organisation.

A system can consist of several subsystems. We will not only study VTN/The Greenery as one system of attributes but we will also look at several subsystems of attributes. Examples of subsystems of attributes within a firm are the combination of various functions (like production and marketing), the combination of various governance elements (such as control, ownership and decision-making), and the combination of different incentive elements. These three subsystems - of functions, governance elements and incentives - will be discussed in more detail in the following sections.

Maintaining consistency among attributes can be difficult in situations where a firm wants to respond to changes in its environment, as when new technologies become available or customers demand different products. Starting new activities and/or restructuring the internal organisation may be a good strategy when the nature of competition has changed. However, choosing which attributes to change and how to organise this change process may not be easy; changes involve costs and take time. In addition, the firm is faced with the dilemma between taking a gradualist route, which may result in a mishmash of badly matched attributes, and paying the cost of making wholesale changes. In a coherent organisation, changing the value of one particular attribute without changing the values of other attributes often leads to a loss of functionality of the organisation as a whole (Hendrikse, 1998a). A shift from one system to the other should not take too long, as attribute values of the old and new system often do not match.[58]

[57] Both methodological triangulation and data triangulation was applied (Yin, 1994).

[58] The need for "all or nothing" changes of complementary attributes has particularly been studied in the context of using information technology. Brynjolfsson and Hitt (2000: 25) argue that firms investing in computers need to make organisational changes to take advantage of the productivity enhancing possibilities of information technology: "Changing

The structure of this chapter is as follows. Section 4.2 presents a brief discussion of the foundations and several applications of the system of attributes concept. Section 4.3 describes the background to the establishment of VTN/The Greenery: the traditional marketing structure, the changing market conditions, and the resulting dissatisfaction with the auction. Section 4.4 and 4.5 give a detailed description of the new functional and organisational characteristics of VTN/The Greenery, and compare these with the characteristics of the traditional auction co-operative. Section 4.6 discusses whether the governance structure, the decision-making structure and the incentive structure of VTN/The Greenery currently form efficient subsystems. Finally, Section 4.7 draws conclusions on co-operative restructuring in a changing environment.

4.2 Coherence in organisations

4.2.1 Introduction

In any firm there are multiple functional and organisational activities to be performed. Functional activities include production and marketing, while organisational activities consist of, among others, decision-making and information exchange. In addition, firms maintain relationships with a number of stakeholders, such as employees, owners, suppliers and clients. Together these activities make up the characteristics of a firm.

While there are many ways of doing things, clustering of characteristics exists (Milgrom and Roberts, 1990a). For instance, a specific type of production (like the 'transfer line' technology) goes together with a specific type of work organisation (like strong specialisation) and a specific type of supplier relationship (like keeping substantial inventories of parts). The reason for clustering of characteristics lies in the complementarities that exist among the various activities of the firm. Complementarity among activities means that if the level of one activity is increased, then the marginal return to increases in any or all other activities rises (Milgrom and Roberts, 1990a: 514). This implies that if the marginal costs associated with one activity falls, it will be optimal to increase the level of all the related activities.

Consistency among many activities of the firm does not only come from technical complementarities, but also from psychological and social processes within the firm. Psychological benefits from consistency result from the uniformity of the goals of the organisation and the simplicity of the messages sent by the management (Baron and Kreps, 1999). When one manager emphasises the need to enhance the quality of the work and another manager emphasises the need to reduce costs, an employee may get confused about what is expected of him. Such uncertainty may reduce effort, may hamper collaboration

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incrementally, either by making computer investments without organisational changes, or only partially implementing some organisational changes, can create significant productivity losses as any benefits of computerisation are more than outweighed by negative interactions with existing organisational practices."

with colleague's (who choose the 'other' goal), and may also negatively affect individual learning processes. Efficient organisation requires consistency in managing human resources, both individually and in groups.

The goal of this section is to make clear why coherence in organisations is important and how it can be achieved. We will present two principles that drive coherence in organisations and two examples of how firms can be organised differently but still form coherent systems of attributes. The principles driving coherence are the law of large numbers and the equal compensation principle. The examples are Japanese versus American firms, and producer owned co-operative firms versus investor-owned firms.

4.2.2 The law of large numbers

Any firm performs various tasks, from procurement and production to marketing and management. It is the combination of tasks within one organisation that makes a firm into a system. A firm is a system of functional attributes. Milgrom and Roberts (1988a) have studied production and marketing activities in traditional manufacturing firms and found that firms either produce-to-stock or produce-to-order. Firms that produce-to-stock typically manufacture uniform products in large numbers, and subsequently sell from inventory. The production-to-stock mode is only profitable for a large size market. Here, the law of large numbers applies. If the market is sufficiently large, the risk of producing too much or too little is low, because the uncertain demands of different clients can be pooled. A large market induces economies of scale in production and inventory. The advantage is immediate delivery; the disadvantage is limited choice. On the other hand, firms producing-to-order wait for demand specification before they start producing. These firms save inventory costs but face substantial information costs and higher production costs. Produce-to-order involves costs of obtaining, transmitting and processing the information needed for production and costs of formulating, communicating and implementing production plans based on the information. The particular choice of mode of production depends on the environment the firm faces, such as the size of the market, the demands of the customers and the state of technology. A shift from one strategy to another occurs if markets or technologies change, but combinations of both strategies followed by the same firm are rare. This implies that all attributes of the firm should be either geared to produce-to-order or to produce-to-stock.

A produce-to-stock system typically has the following attribute values: low prices, low production costs, large market, narrow assortment, high costs of market research and low uncertainty of demand. A produce-to-order system is typically efficient in a situation with high prices, high production costs, small market, broad assortment, low costs of market research, and high uncertainty of demand. Figure 4.1 presents the choice between produce-to-order and produce-to-stock on just two attributes: marketing strategy and production technology.

		Production technology	
		low cost, low flexibility	*high cost, high flexibility*
Marketing strategy	*low price, narrow assortment*	Produce-to-Stock	
	high price, broad assortment		Produce-to-Order

Figure 4.1 Co-ordinating production and marketing activities of the firm

4.2.3 The equal compensation principle

A particular element of human resource management is to reward employees for their efforts. Many different incentive measures exist, and an employer must choose the incentive that is most appropriate for the particular task the employee is given. However, most employees have more than one task, which raises the question of how to align incentives for different tasks to be done by the same person. Holstrom and Milgrom (1991, 1994) have studied this multitask principal-agent problem. They have argued that firms use a combination of various incentive instruments to motivate their employees, and that the working of one instrument affects the working of other instruments. An employer uses at least three mechanisms for directing its workers: job restriction, contingent rewards and asset ownership. Job restriction determines the freedom that an employee has in deciding the allocation of resources (e.g., money and time) over different tasks and activities. Contingent rewards (or incentive contracts) provide the employee with (financial) compensation for his effort. This compensation can be based on output, as in piece rate earnings, or on input, like in hourly payments. The structure of asset ownership determines which assets the employer owns and which assets the employee owns. The central argument of Holstrom and Milgrom is that, given that each employee has more tasks, employees will unevenly distribute their time or attention over these tasks. In fact, if an employee's allocation of time between two different tasks cannot be monitored by the employer, the employee will devote most (or all) of his time and attention to the activity that has the highest marginal rate of return to himself. If an employer wants the employee to pay equal marginal attention to two activities, the marginal rate of return to the employee from the attention paid to each of the two activities must be equal. Milgrom and Roberts (1992: 228) have called this the equal compensation principle.

The equal compensation principle can be applied to many principal-agent problems. Not only between employer and employee, but also between independent agents contracts can be signed that require a multitask effort by the agent. To make these contracts work efficiently, a consistent set of incentives for the agent must be developed and applied.

An example of the equal compensation principle is given by the organisation of the work of the physiotherapist (Hendrikse, 1998b) In most countries, a physiotherapist either has an independent practice or is employed by a hospital or health care centre. The equipment needed for treating patients is owned either by the physiotherapist himself – when he has his own practice – or by the hospital / health care centre. Every physiotherapist has at least two tasks: treating patients and maintaining the equipment. These tasks compete for time and effort spent by the physiotherapist. How he allocates his time and effort on these tasks, depends on the incentives he receives for each task. If he only receives incentives for treating his patients, he may neglect the maintenance of the equipment. On the other hand, if he receives strong incentives for maintenance, he may not treat enough patients. A physiotherapist that wants to sustain his job or practice has to find a balance between giving attention to treating patients and to maintaining equipment. Each of the two models of organising the work of the physiotherapist – independent or employed – presents a consistent system of incentives. In the hospital, the physiotherapist is told by his employer how to allocate time and effort (i.e., he has small task freedom), he is paid a monthly salary (i.e., he receives compensation for his input), and the equipment is owned by the employer (i.e., the physiotherapist does not incur any costs if the equipment breaks down). In a proprietary practice, the physiotherapist can make his own decisions about spending time and effort (i.e., he has large task freedom), he is paid per patient (i.e., he is rewarded by output), and he owns the equipment (i.e., he bears the risk of devaluation of the equipment in the case of bad maintenance). Figure 4.2 presents several combinations of incentives. Only two sets of incentives (1 and 8) are consistent. For every other combination there is always a better combination possible by changing one or two attributes.

Attributes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Task Freedom: Large (L) or Small (S)	L	L	L	L	S	S	S	S
Contingent Rewards: Input (I) or Output (O)	O	O	I	I	O	O	I	I
Asset Ownership: Physiotherapist (Ph) or Employer (E)	Ph	E	Ph	E	Ph	E	Ph	E

Figure 4.2 Incentive schemes for the physiotherapist
(source: Hendrikse, 1998b)

4.2.4 Information structure and decision-making

Within firms, having proper information is crucial for making right decisions. Thus, information flows must be organised in a way that the decision-maker receives the information he needs to make good decisions. Information needed for the efficient execution of operational tasks often comes available at a decentralised level. If decisions on operational tasks are taken in a hierarchical way (i.e., by a manager supervising these tasks) the manager must make sure he receives the proper information from his employees. If the decision is taken by the employees themselves, they must share all necessary information. Whether employees share information among themselves not only depends on the organisation of decision-making, but also on the organisation of the incentives that motivate them.

Aoki (1990) has compared combinations of decision-making structure and incentive structure in Japanese and American firms. Figure 4.3 shows the relationship between these attributes. Decision-making on operational matters can be decentral or central, while incentives for employees can be organised collectively or individually. Because Japanese employees are rewarded for collaboration and information sharing, there is less specialisation of tasks. Therefore, incentives are company-specific, not task-specific. This implies that incentives are organised by the central human resource department. In the USA, on other hand, employees have specialised tasks and are rewarded for carrying out their specific task; incentives are targeted at the particular task/person combination. Because under this system employees have no incentive to share information about their activities, the task of co-ordination of operational tasks is done by the management. Hierarchical decision-making in American companies is consistent with individual incentives.[59]

		Incentive structure	
		Individual	*Collective*
Decision-making on operational tasks	*Central*	USA	
	Decentral		Japan

Figure 4.3 Decision-making and incentives in American and Japanese firms

[59] Another example of how 'structure determines strategy' is presented by Hammond (1994). He has studied the effect of the hierarchical structure of a firm on its decision-making agenda. Because different organisational structures lead to different information flowing from the shop floor to the top executives, the latter will make different decisions.

In fact, Aoki (1990) has compared four attributes: decision-making on operational tasks, incentive structure, monitoring of financial performance, and involvement of employees in strategic decision-making. For optimal company performance, the values of these four attributes have to match. In Japanese firms, decision-making on operational tasks is organised in a horizontal (i.e., non-hierarchical) way with many consultations among employees of different divisions. For Japanese employees the main incentive is promotion to a higher layer within the same company. This is consistent with the lifetime employment many Japanese firms offer. Financial monitoring is carried out only from a distance by banks that provide both equity capital and debt capital. Finally, employees, because of their long-term presence in the company, have an important say in strategic management decisions. In US firms, these four attributes have different values, but still form a consistent system. Operational tasks are directed from above, incentives are decentralised and market-oriented (i.e., primarily financial), there is direct influence of stockowners, and there is minimal involvement of employees in strategic decisions.

The particular combinations of organisational attributes in the Japanese and American firms are, as we have argued, internally consistent. The particular social, economic and political environment determines which one is most efficient. For instance, the labour market in Japan has rather different characteristics than the labour market in the USA (Milgrom and Roberts, 1988b). In Japan, low employment mobility, fewer opportunities to shift jobs and relatively weak labour unions are consistent with the above listed employment characteristics (lifetime employment, small differences in financial rewards, information sharing among employees). In the USA, on the other hand, the labour market is much more flexible and salary differences are much bigger. This is consistent with individual financial incentives, with large job mobility and limited information sharing within the company.

To sum up, although the Japanese and American systems have quite different attribute values, they are both coherent. They can both be used to make certain products, but the one is more efficient in one institutional, economic and cultural environment, while the other is more efficient in another environment. According to Aoki, the American (or hierarchical) system fits well in an environment characterised by stability, where learning processes on the operational level are of minor importance and where economies of specialisation are high. Additionally in an extremely uncertain environment, the American system, with its central decision-making, will perform better. The Japanese system will particularly prosper in an environment characterised by continuous but gradual change. “In this case, the information value created by learning and horizontal coordination at the operational level may more than compensate for the loss of efficiency due to the sacrifice of operational specialization” (Aoki, 1990: 9).

So far, we looked at the interests of the employees and their role in operational decision-making. In American firms employee interests are more heterogeneous which leads to central decision-making. In Japanese firms, the interests of the employees are more homogeneous which provides room for decentralised decision-making.

Decision-making and supplier interests

Another way to study the relationship between decision-making structure and incentive structure is to look at the interests of the main suppliers of a firm. In a marketing co-

operative, members are the most important group of stakeholders: they own the co-operative firm and they supply the products that are processed and marketed by the co-operative firm. Decision-making in co-operatives is a democratic process, which is greatly facilitated by the homogeneous nature of the membership. This means that members, as suppliers of farm products, have equal interests in the services provided by the co-operative firm. Thus, democratic decision-making and homogeneous interests of the suppliers form an efficient combination of attributes. An IOF, however, usually has a more diverse group of suppliers and uses autocratic decision-making vis-à-vis these suppliers. Thus, the combination of heterogeneous suppliers and autocratic decision-making also seems to be stable. Figure 4.4 shows four possible combinations of two values on the attribute 'decision-making structure' and two values on the attribute 'interests of the main suppliers'. Only two seem to be viable: (1) the farmer-owned marketing co-operative, and (4) the IOF. Many examples of both organisations can be found in the food processing and marketing industry. Take the typical dairy co-operative as an example of system (1): the members supply the milk to the co-operative firm, which processes the milk into dairy products; all suppliers are involved in the decision-making process. System (4), combining heterogeneous supplier interests with autocratic decision-making, is also ubiquitous: many IOFs processing and marketing source their raw materials from a very diverse group of suppliers. Their focus is not on providing the best services to one group of suppliers, but to bring together various inputs to generate the highest product value.

		Decision-making	
		democratic	*autocratic*
Interests of main suppliers	*homogeneous*	(1) co-operative	(2)
	heterogeneous	(3)	(4) IOF

Figure 4.4 Decision-making in a firm processing and/or marketing farm products

Systems (2) and (3) do not seem to be stable. Combinations of homogeneous user interests and autocratic decision-making will not survive, for the following reasons. An autocratic decision-maker will seek the advantages of diversification, implying a shift from (2) to (4). These advantages can be found in broadening the range of raw materials, thus benefiting from economies of scope, or they can be found in shifting - over time - from one raw material to another if market conditions favour such a change. A shift from (2) to (1) can also be imagined, implying a strengthening of the democratic content of decision-making on supplier demands. For instance, a special committee of suppliers can be formed that decide on the use conditions. This way, commitment of suppliers to the company can be strengthened. In addition, combinations of heterogeneous supplier interests and democratic decision-making (3) are not stable because the heterogeneity leads to

inefficiency problems in the decision-making process (like influence costs). A firm with system (3) will tend to shift to system (1), moving from heterogeneous to homogeneous interests, or to system (4), moving from democratic to autocratic decision-making.

4.2.5 Consistency among governance attributes

Explaining the need for consistency among attributes is easier if we look at only two, three or four attributes, as has been done in the sections above. However, for a real-world firm, many more attributes have to be aligned. Hendrikse and Veerman (1997) provide an example of a system of attributes that brings together several subsystems of attributes. They focus on the various elements that together make up the governance structure of a firm. They compare the governance structure of a farmer-owned co-operative and an investor-owned firm (IOF). Both types of organisation are coherent systems of attributes[60], but attribute values differ considerably between them. In the marketing co-operative, the members are the main patrons: they supply the raw material, they supply equity capital, they control (through the democratically elected board of directors) the management of the co-operative firm, and collectively they are the owners of the co-operative firm. In an IOF, ownership lies with the investors (who have supplied equity capital). The board of supervisors controls the management, but the stock market itself also plays a role in disciplining managers. Ownership titles are easily transferable, so that investors not content with firm strategy can sell their shares. Decision-making in a co-operative is organised democratically: all members have a vote. In an IOF decisions about company strategy are taken by the management in an autocratic way. Another way of presenting the difference in decision-making is to say that co-operative decisions are taken bottom-up and IOF decisions are taken top-down. Finally, the members of the co-operative have the right to deliver everything they produce; this right comes with the obligation to deliver all products to the co-operative. In an IOF, suppliers are selected by the market mechanism. Figure 4.5 presents the main governance attributes of farmer-owned co-operatives and IOFs.

4.2.6 Conclusion

Most studies on organisational coherence using the system of attributes approach present only two opposite systems of attribute values. Although such dichotomy is useful in argumentation, there is no theoretical or practical reason to expect that only two coherent combinations of attributes exist. While there are several coherent combinations (i.e., there are several equilibria), only one of them may be efficient. Which combination is most efficient depends on the state of technology, on the social and institutional environment, and on the market situation. If the environment changes, for instance when new technologies become available, a traditional system of attributes may loose its advantages and another combination may become efficient.

[60] Presenting only two governance structures does not imply that these are the only equilibria. For explanatory reasons it is easier to present only two (opposing) options.

Attributes	**Farmer-Owned Co-operative**	**Investor-Owned Firm**
Equity capital suppliers	Users	Investors
Ownership title	Users collectively	Investors individually
Transferability of ownership titles	Low	High
Control of management	Board of directors (internal)	Supervisory board (external)
Decision-making structure	Democratic / Bottom-up	Autocratic / Top-down
Delivery rights/obligation	Users	Market

Figure 4.5 Governance attributes of co-operatives and investor-owned firms

The need for (internal) coherence presents a great challenge for a firm in a process of reorganisation. In responding to a dynamic external environment (e.g., shifts in technology, market structure or customer demand), firms may have to change some of their functional and organisational attributes. However, changing one or two attributes without changing others may result in an unstable and inefficient situation for the firm as a whole. As VTN/The Greenery has been formed in reaction to a changing environment, throughout this chapter we will make a comparison between the combination of attributes in a traditional co-operative auction and in the new marketing co-operative.

4.3 From co-operative auction to marketing co-operative

The establishment of VTN/The Greenery has been a response to dissatisfaction with the traditional way of selling Dutch fresh produce – through the co-operative auction. This dissatisfaction, in turn, had arisen because the auction had difficulty with finding an appropriate answer to the changes in market conditions for fruit and vegetables. In this section we describe the changes in market conditions and the resulting dissatisfaction with the auction as the dominant sales channel.

4.3.1 Changing market conditions for fruits and vegetables

For many decades, the Dutch market for fruit and vegetables was characterised by many small suppliers being price takers, many buyers, standardised products and uniform packaging, large transparency, and a growing demand (Veerman, 1998). Under these conditions, the auction proved to be a very efficient marketing system. The auction was the pivot in the marketing of fruit, vegetables and mushrooms.[61] Figure 4.6 shows the position of the auction in the marketing channel for fresh produce in the Netherlands. Producers brought their products to the auction (which thus had a collection function), where they were bought by wholesalers who subsequently sold the products to domestic and foreign retailers. Not including the final consumer, the production and distribution chain consists of four stages: production, collection, wholesale and retail. The rectangles in Figure 4.6 represent independent firms. The oval represents an independent firm. The continuous arrows represent logistic flows. The dotted arrows represent control relationships. While producers own their farm individually, they collectively own the auction (represented by the shaded area).

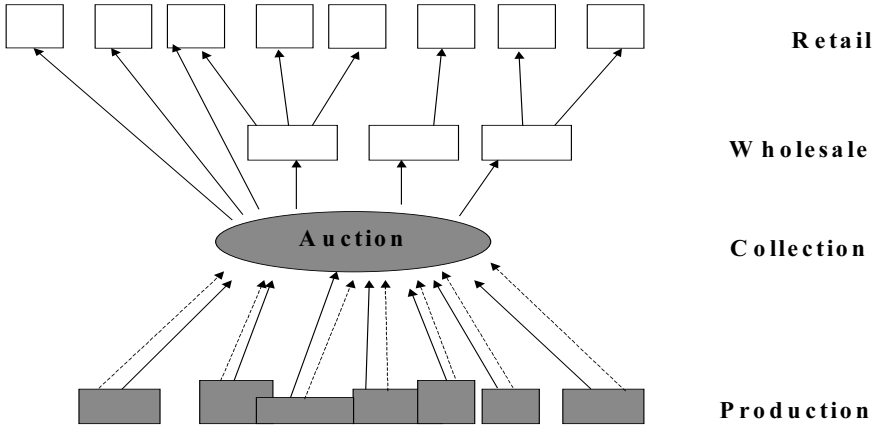

Figure 4.6 Traditional marketing channel for fresh produce in The Netherlands

In the early 1990s it became clear that conditions had changed, both on the supply and the marketing side. Table 4.1 presents some figures on structural changes in the Dutch horticultural sector. While auction turnover was still growing in the 1980s, it fell from 2.1 billion euro in 1990 tot 1.6 billion in 1995. The advantages of the auction were no longer

[61] In 1990, 92 percent of all greenhouse vegetables, 78 percent of all fruit, 50 percent of all open field vegetables and 42 percent of all mushrooms was sold through the auction (Bijman et al., 1994).

self-evident. Several stakeholders, both sellers and buyers, started to question the efficiency of the auction for marketing fresh produce. What had changed?

Table 4.1 Structural change in the Dutch vegetable and fruit industry

	1970	1980	1990	1995
Growers of				
- open field vegetables	34,166	16,599	12,454	10,243
- greenhouse vegetables	13,583	7,862	5,652	4,686
- fruit	app. 10,000	6,964	5,183	4,475
- mushrooms	1,100	823	853	704
Auctions	88	55	28	20
Auction turnover*	1,790	1,672	2,167	1,668
Exporters	213	157	165	185

Source: VTN (1996)
* In million euro of 1995

The OECD (1997) distinguishes three principal factors for change in market conditions in the fruit and vegetable sector:

- changes in the composition of final demand;
- changes in potential supply due to technological developments in plant breeding, transport and storage, which have widened the geographical and seasonal markets;
- the growing importance of large buyers, especially of modern retailing chains.

Consumer demand in Northwest Europe has changed. As the supply of fruit, vegetables and mushrooms is abundant and income is rising, consumers demand higher quality, more convenience and more variety (Steenkamp, 1992; Meulenberg 2000). Also issues of food safety, environmental impact and other concerns about the production process play a more prominent role in purchase decisions. These trends in the consumer market urge producers to put more emphasis on the quality attributes of their products. Also, these trends have induced retailers to use quality attributes in their marketing and competition strategies.

The trend of internationalisation (or globalisation) has also effected the market for fruit and vegetables. Economic, political and technological developments have favoured internationalisation. Since the 1980s competition for Dutch fruit and vegetables in Northwest-European markets has become much stronger. While the growth of consumer demand slowed down, production continued to expand in most European countries. Particularly with the accession to the EU of Spain and Portugal in 1986 an enormous boost to the production of vegetables in Spain and its export to Northwest Europe has occured. Import from outside Europe has also increased, sometimes as a result of political decisions. For instance, North-African countries obtained larger quota for import into the EU as a reward for their support in the Gulf war, and the import ban for South African products was lifted after the abolition of the Apartheid system. Particularly on the German market, with

its strong price competition, the low price imports from Morocco results in serious competition for Dutch producers. Additionally, improved transport and storage technologies have enabled shipping of fruit and vegetables from the Southern Hemisphere to the EU countries.

Food retail has become very concentrated in Northwest Europe in recent years (ISMEA, 1999). In most Northwest European countries, the market share of the five largest food retailers is more than 60% (Baas et al., 1998). In 1998, the four largest food retailers and purchase groups in the Netherlands had a combined market share of 82% (NRC Handelsblad, 17/7/99). The reasons for consolidation in food retail are the building of strong negotiating positions vis-à-vis suppliers, and obtaining sufficient scale for private label products and investments in advertising and information technologies. Another important development in food retailing is that the supermarket share of total fruit and vegetables purchases is growing at the cost of specialty shops. In 1995, the supermarket share of fruit and vegetable retailing was more than 50% in France and the UK, more than 70% in Germany and more than 80% in the Scandinavian countries (OECD, 1997). In the Netherlands the share of the fruit and vegetable market serviced by supermarkets increased from 50% in 1990 to 69% in 1999 (Jaarboek Detailhandel, several issues). Fruit and vegetables are not only sources of profit for retailers, they are also of strategic importance for building store image (Bech-Larsen, 2000).

The concentration process among supermarkets has had several effects on the market for horticultural products. The largest firms have gained substantial market power. For instance, the largest supermarket chain in the Netherlands, Albert Heijn, has a market share of 27% of food retailing. Albert Heijn may be even more important than its market share suggests, as it targets the quality-conscious consumer and is considered trend setting in (fresh) food retail. The German supermarkets, with their low price strategies, are well known for using their strong bargaining position vis-à-vis suppliers. Large retailers have used their market power to develop more elaborate purchase strategies. They prefer relatively stable prices, large quantities of uniform quality, and like to be able to plan their sales promotions well ahead. They also want to deal only with a small number of suppliers that can deliver a full assortment, year-round.

In response to mergers and acquisitions among retailers, wholesalers in fruit and vegetables also experienced a concentration process. As the number of buyers at the auction decreased, auctions increasingly competed among each other in attracting buyers (because more buyers generally means more competition among buyers and thus higher prices). By providing special services, like leasing land for storage and packaging facilities cheaply, the co-operative tried to tie buyers to the auction.

4.3.2 Dissatisfaction with the traditional auction

The auction is primarily an organised market place where sellers and buyers meet, and where price is determined by way of the auction clock. With the changes in market conditions for fruit and vegetables the disadvantages of using an auction become more explicit. An increasing number of both sellers and buyers became dissatisfied with the

auction. Additionally, from a chain perspective the auction revealed more and more inefficiencies.

Large purchasers of fruit and vegetables became increasingly dissatisfied with the auction system for several reasons. First, the auction system lead to relatively high purchase costs for large buyers, as they had to send agents to several auction locations. Moreover, when a wholesaler wanted to buy a large quantity of the same product (for instance for a sales promotion) it became its own competitor. For the auction clock an occasional higher demand immediately drives up the price. Second, large retailers prefer stable prices, which the auction cannot guarantee. Third, buying at the auction makes it impossible to negotiate with producers about delivery conditions (time, quantity, quality, special packaging, etc).

This last point, about the inability to transfer information from buyers to sellers, is often presented as the main disadvantage of the auction in a market where consumers demand more variation and higher quality. Another disadvantage of particularly the fruit and vegetables auction is the lack of incentives for growers to improve quality. As the auction combines products from different producers in one lot, all products in this lot receive the same price. For the individual grower it is strategically optimal to supply products that just meet the requirements of a particular quality class (Koldijk, 1996).

The large emphasis on standardisation meant that growers with specialties, like vine tomatoes, were not sufficiently rewarded. Also the lack of differentiation in auction tariffs led to dissatisfaction among growers, particularly the large growers. Some of these (large) growers left the co-operative and contracted with wholesalers directly, either individually or collectively with growers of like products. In the latter case these growers established new growers' associations.[62]

There were other disadvantages for the Dutch fruit and vegetable industry as a whole. The need to bring all produce to the auction location – in order to be shown to customers - causes high logistic costs. It also led to a loss of quality due to extra time and extra handling needed in comparison with direct shipment from grower to client. In addition, the transparency of the Dutch fruit and vegetables market gave foreign competitors an opportunity to act strategically, and use the auction price as their reservation price in negotiations with buyers. Finally, the auction clock only generates information about today's market. There is no information transferred about future supply and demand conditions.

To sum up, in the early 1990s several problems in the marketing of Dutch fruit and vegetables became clear: (a) low prices, (b) dissatisfaction among large customers, (c) insufficient orientation towards the qualitative demands of the customer, (d) dissatisfaction among the largest and most innovative members, and (e) inefficiencies in logistics. The merger of nine auctions and the establishment of VTN/The Greenery as new marketing co-operative were meant as a solution to most of these problems.

[62] Reasons for grower dissatisfaction with the auction will be elaborated in Chapter 5.

4.4 New functions

In this section, we will describe and discuss the functional attributes of VTN/The Greenery, as they have developed since 1996. These attributes will be compared to the situation in the traditional horticultural auction. In the next chapter, the organisational attributes will be described.

The four main functions of the traditional co-operative auction are price determination through the auction clock, sales administration on behalf of the sellers (including insurance against buyer default), logistic services, and quality classification and inspection (Meulenberg, 1989). These activities are still carried out by The Greenery, but new functions have been added (Figure 4.7). Most of the new activities can be categorised under the heading 'marketing'. To carry out the marketing activities, VTN/The Greenery has made investments in fresh produce wholesale and – to a small extent – in processing.

	Traditional Auction	The Greenery
Price determination by auction clock	X	X
Price determination by contract mediation	-	X
Sales Administration	X	X
Quality control of product	X	X
Quality control of production process	-	X
Logistics	X	X
Marketing	-	X
Innovation	-	X
Wholesale	-	X
Processing	-	X

Figure 4.7 Functions of a traditional auction and of The Greenery

4.4.1 Price determination

In the traditional auction the clock was used as the mechanism for price determination. Products are shown to buyers, the auction clock starts to run from a high to a low price, and buyers push a button to stop the clock at the price they are willing to pay.[63] Invented in 1903, the auction clock has proved to be a very efficient price determination mechanism. Using an auction for price determination is particularly useful when goods are non-standardised or when market clearing prices are highly unstable (Milgrom, 1989). Unstable market prices are the result of variation in production in combination with perishability of

[63] This system of price determination from high to low is known as a Dutch auction.

the products (requiring immediate sale). A major advantage of this way of auctioning is the speed of the selling process, which is needed to sell many different lots of perishable products in a short period of time. Another advantage of the auction is the transparency of price determination. Every buyer and seller knows exactly and immediately what price is being paid for each product. This transparency avoids the situation where growers have to make too much effort in gathering timely market information. In other words, growers can fully specialise in the on-farm production activities.

The auction as a price determination mechanism works particularly well for sellers in situations with limited supply and/or many buyers (Tollens, 2000). Optimal working of the auction requires that the largest part of total demand and total supply are brought together, and that there is sufficient competition among buyers. Competition is encouraged by the number of buyers and the need for frequent purchasing.

In response to changing demands from growers and customers, The Greenery has applied alternative price determination mechanisms. It has set up an internal agency for contract mediation to facilitate direct contracting between growers and wholesalers. The mediation agent brings together supply and demand, makes sure that essential information is transferred between buyer and seller, and makes the final deal on behalf of the grower. Contract mediation makes possible the proper rewarding of growers for specialties, as well as signalling special requirements to producers (for instance on packaging and order size).[64] A seller using mediation still obtains the traditional advantages of the auction, like insurance against buyer default and the option of selling additional produce through the auction clock. Not only specialties but also more standardised products are sold through mediation, particularly if customers demand large quantities. In this case, products from various growers are combined into one lot, and the price received by the grower is a mix of the clock price and the mediation price. As no individual price per grower can be paid, the incentives for growers may still be suboptimal.[65] The Greenery is seeking the best combination of mediation selling and clock selling. If most of supply is sold by mediation, the price established by the auction clock might become more and more volatile. For this reason, the Greenery makes agreements with growers (represented by the Product Market Advisory Committee) that a certain minimum of total supply will be sold through the clock (this is also to guarantee supply to buyers only purchasing through the clock).

The Greenery has also started to experiment with a third price mechanism: unilaterally setting a price, and inviting buyers to make a bid for specified quantities. Initially The Greenery used a rather rigid system of price setting. This was not successful, as prices paid to growers were eventually lower than competitors paid to their suppliers. Growers, particularly those for cucumbers, complained about this system. In order to regain control over sales, all cucumber-growing members of VTN formed an association (*Friskom*), and started to negotiate with The Greenery about what price determination mechanism to use.

[64] The Greenery uses so-called Niche Market Compensations: if a grower puts extra effort in packaging for a particular customer, then he receives a bonus on top of the market price.
[65] This is different from flower auctions, where the mediation agencies service transactions between individual growers and buyers.

Shifting from the auction clock to other price determination mechanisms means that trust in the grower-Greenery relationship becomes more important. Mediation requires a larger degree of trust of the grower in the capabilities of The Greenery personnel. During the first years of The Greenery existence, trust was low, for several reasons. First, while the auction clock resulted in a fully transparent price determination process, under the new mechanisms some secrecy was introduced to facilitate the bargaining process between buyers and The Greenery sellers. Second, some negotiators of The Greenery were inexperienced. Third, prices obtained for some products were actually lower than what could be obtained at other auctions. Fourth, the initial management of The Greenery strongly emphasised their focus on servicing clients instead of servicing suppliers (i.e., members of the co-operative).

4.4.2 Quality control

Quality standards and quality control are another issue where The Greenery follows a more pro-active strategy. Traditionally, private quality standards in the fruit and vegetable sector have been set by collective organisations like the Product Board for Horticulture and the CBT. The Product Board represented all firms engaged in the production and distribution chain, while CBT represented all fresh produce auctions. The main purpose of these standards was to improve the efficiency of selling, logistics and promotion. Quality classification reduces transaction costs and may enhance the competitiveness of the Dutch fruit and vegetables industry.

Activities of The Greenery on quality issues go beyond those of the traditional auction. Quality standards are no longer targeting only products, but now also cover production processes. Because the quality characteristics of fruits and vegetables are mainly determined on the farm, The Greenery has introduced regulations for growers about environmental impacts, food safety and working conditions. A major element in these regulations is the requirement for growers to register critical activities like the use of pesticides and other agrochemicals.

In the 1998 Annual Report, The Greenery announced that it would help growers to improve quality production. For instance, it will provide growers with a handbook with precise quality standards and advise how to comply with these standards. For growers producing for the UK market, special cultivation requirements have been introduced (the so-called UK standard). The major UK retailers demand food quality standards above the Dutch and UK legal requirements. From 2001 onwards The Greenery quality regulations (including the registration requirement) is obligatory for all its suppliers.

Besides the more general objective of being a supplier of quality produce, two developments have speeded up the introduction of detailed quality control. First, major European retailers, united in Eurep, have established their own set of quality requirements for all their fresh produce suppliers (Eurep, 1999). Second, The Greenery, as a trader in fresh produce, is legally required to apply an HACCP-system (HACCP = Hazard Analysis Critical Control Point). Such a quality control system is a combination of a list of all potential risks to food safety and rules of conduct for the reduction of these risks. Implementing these rules of conduct is particularly important for product liability. To avoid

product liability claims firms have to show that they have done everything possible to prevent food safety risks. Because quality is mainly determined by growers, The Greenery would like to extend the HACCP system to its suppliers. As all products are marketed under "*the greenery"* label, defect products can seriously damage the image of The Greenery. Therefore, the product quality and liability issue is a shared responsibility of growers and The Greenery. Moreover, since December 2000, European legislation on product liability is also applicable to growers of fresh produce. This means that growers also have to be able to prove they have done everything to guarantee the safety of the product.

4.4.3 Logistics

The traditional auctions were experts in logistics, as a large number of relatively small lots of time-critical products have to be brought in, administered, temporary stored, presented to buyers, and then brought to the buyer's loading location. Transportation to and from the auction location, as well as storing and reloading activities resulted in considerable costs. One of the goals of The Greenery was (and is) to reduce logistic costs in the whole chain from production to retail store. Transporting products directly from the farm to the customer's distribution centre would mean a major cost reduction. However, this cannot be achieved if the product is sold through the auction clock, because wholesalers and retailers buying at the auction clock require immediate delivery of their purchase. Selling through mediation has made logistics more flexible. Moreover, the perishability of fruits and vegetables requires as little handling as possible. Thus, direct transport from farm to customer may improve final product quality.

The traditional auction had a major collection and distribution function in a market characterised by many small sellers and many small buyers. Now that the buying market has become much more concentrated, and also growers have become much larger, there are many options of shipping directly from the farm to the distribution centre of the retailer. The physical collection function is not as important anymore. In July 2000, one third of all products sold by The Greenery were shipped directly from grower to customer.

In 1999, The Greenery centralised its commercial activities and changed the function of several of its sites. Out of 11 sales locations only 5 remain (three with an auction clock), while the other six will only be collection sites. The main logistic and commercial centres will be De Lier (mediation, storage and transhipment), Bleiswijk (mediation, storage and transhipment), and Barendrecht (auction clock, mediation, storage and transhipment. Smaller sales and logistic centres are Wervershoof (auction clock, mediation, storage and transshipment) and Breda (auction clock, storage and transshipment).

4.4.4 Marketing

The traditional co-operative auctions did not have a marketing function. Product promotion and advertising were carried out collectively by the CBT and the Product Board for

Horticulture. Most of Dutch fruit and vegetables were sold under the "Holland" label, which used to have an image of quality until the early 1990s when Dutch vegetables were discredited in Germany, the main export market.

Right from the start The Greenery has followed a more offensive marketing strategy. Major elements of its marketing strategy are market research, direct relationships with major retailers, brand promotion, product innovation and differentiation, and high quality. The Greenery aims to be recognised as a supplier of premium quality produce; to become a preferred supplier of the major retailers of Northwest Europe (and assist retailers in planning and executing sales promotions); to be innovative in marketing as well as in new product development; and to supply year-round a broad category of fresh produce. Ultimately, The Greenery would like to obtain total responsibility of delivering and promoting the full range of fresh produce to its major clients, a strategy called 'category management' (Annual Report 2000).

An important part of its marketing strategy is establishing *the greenery* as a brand name. All products from The Greenery will carry this logo, which should stand for quality and expertise (Annual Report 1998). This brand name is primarily meant for building an image among wholesalers and retailers. Eventually, it may be extended to become a consumer brand. However, establishing a consumer brand requires substantial investments, for which The Greenery currently does not have the funds. Establishing a consumer brand may also be difficult in the various international markets where Greenery products are sold. For instance in the UK, an important market, most products are sold under private label of the retailer. Here, marketing under *the greenery* label has no added value. In Germany, on the other hand, private labels are much less established. But here margins are very low, generating not enough funds to invest in brand building.

The marketing strategy of VTN/The Greenery is based on a clear division of production and marketing tasks between growers and co-operative firm. The Greenery takes the responsibility for all sales and marketing activities, while growers concentrate on production. The Greenery collects information about consumer demand in general (through market research) and about specific demands of their main clients (through direct contact). The Greenery then presents this information to growers, who produce the required quantities and qualities.

Not all VTN members agree with this division of labour between growers and Greenery. Because VTN/The Greenery does not obtain ownership title to the products, growers continue to have a voice in the marketing of their products. Several growers have established crop-specific associations to better defend their interests vis-à-vis The Greenery management (see Chapter 5). Some growers' associations have even developed their own brand, to be able to market their products as specialty products. These brand names may compete with *the greenery* brand, or at least lead to double investments in advertising. While The Greenery would prefer to develop only one brand name, it has acknowledged the demands of its suppliers. The Greenery has developed a marketing policy of "unity in diversity" that combines attention for the special image of the growers' association with the general image of *the greenery* label (Annual Report 1998).

Soon after The Greenery had designed its marketing strategy, it found out it needed forward integration into wholesale to be able to successfully implement its strategy (Kyriakopoulos, 2000). The Greenery could not become a preferred supplier of the major

European retailers if it did not have direct access to these retailers. Also for implementation of its category management strategy The Greenery depended on wholesalers who imported the non-domestic products. Because this two-sided dependency was considered undesirable by the board of managers, it decided to take a major step into the fresh produce wholesale business.

4.4.5 Wholesale and processing

In 1998 VTN/The Greenery bought two (groups of) fresh produce wholesale companies. The acquired companies, Van Dijk Delft Group and the Fresh Produce Division of Perkins Food plc, were both importers and exporters, and have major retailers in Germany and the UK as their clients. According to *Groente en Fruit*, the main trade journal for growers of fresh produce in the Netherlands, The Greenery paid 310 million euro for these firms (Van der Berkmortel and Van der Scheer, 1999). In 1998 these companies had a combined turnover of 1.1 billion euro. In 2000, their turnover had grown to 1.5 billion (Annual Report, 2000).

The acquisition of wholesale companies raised several organisational and strategic questions for The Greenery. First, should the wholesale, auction and mediation services be integrated, and if so, how should that be done? Second, what about competition between the own wholesale subsidiaries and other wholesalers buying at the auction or mediation agency? Initially, the wholesale companies continued to operate as independent subsidiaries. They were considered as profit centres for The Greenery. However, it soon became clear that for optimal implementation of the marketing strategy, wholesale and other Greenery activities should at least be co-ordinated. Because sixty percent of all produce sold by the business unit "Operations" (auction, mediation and other sales methods) was bought by its own wholesale subsidiaries, the situation was not very efficient and led to conflicting interests within the firm. In November 2000 the Greenery board of management took the decision to seek synergy benefits between the wholesale companies and other business units of The Greenery. In December 2000, the general assembly of VTN members agreed with the integration of the sales activities of "Operations" with the purchase activities of the wholesale subsidiaries. The newly formed division, named "Sales Operations" has the following tasks: allocation of product to customers, deciding on the method of pricing, deciding on product prices (where appropriate), co-ordinating logistics, and purchasing additional product when VTN growers cannot supply sufficient quantities.[66]

The Greenery has also invested in processing fruit and vegetables into ready-to-eat and other convenience products. The market for these products, like pre-cut vegetables and fruit salads, is growing rapidly, with the supermarket as the main sales outlet. Having its own processing activities fits well in the strategy of supplying retailers with the full range of fresh produce.

[66] In July 2000, Kees de Wit, CEO of Van Dijk Delft, one of acquired wholesale companies, became member of the Greenery board of management and obtained marketing and sales as his main responsibilities.

4.4.6 Conclusions

If we compare the functions of The Greenery with those of the traditional auction we see structural changes as well as major extensions. The classical auction clock has been replaced by other price determination mechanisms. The auction clock is now used for less than one third of produce supplied by VTN members. Contract mediation, for daily, weekly or monthly contracts, has become the dominant price determination mechanism. Where selling by auction clock required the physical collection of all produce, selling on contract makes possible the direct shipment from the grower to the customer. Fewer and fewer products are actually transported to and from the Greenery logistic centres. As a result, several clock rooms have been closed. In line with consumer demand, quality control has become a more important function. On the issue of marketing, collective promotion has been substituted for company-specific promotion. The Greenery is promoting its own brand, and is establishing close relationships with major retailers in Europe to become a preferred supplier of quality fresh produce.

Two functions as mentioned in Table 4.1 have not been discussed above: sales administration and innovation. The administration of each transaction was carried out by the auction co-operative and continues to be done by The Greenery. Also the insurance against defaulting by buyers is still provided by the marketing co-operative. Innovation was never a task of the auction, but The Greenery has started to explore the possibilities of developing specialties in collaboration with growers and customers. Because of the high costs and high risks of such innovation, it is still a small activity of The Greenery.

With the 1998 acquisition of wholesale companies, The Greenery has taken up a major new function. These wholesale companies provide direct access to several major retailers in, for instance, the UK and Germany, and generate the dearly needed profit for The Greenery as a whole. After two years of working independently, the wholesale companies have been integrated with other Greenery activities in order to eliminate internal competition and to obtain synergy benefits. Fresh produce wholesale expertise is now incorporated in the Greenery board of management. Gradually The Greenery is changing from an auction co-operative into a marketing co-operative.

The acquisition of wholesale companies presented an interesting paradox for VTN/The Greenery. The main goals of a traditional co-operative auction and a wholesale company are fundamentally opposite. While the auction is set up for the selling of the members' products for the highest price possible, the trading firm wants to buy its products as cheaply as possible and sell as dearly as possible. Having an auction and a wholesaler under common ownership leads to a conflict of interests. If the wholesaler buys somewhere else, it increases competition for the products of the members, leading to lower prices. However, the success of the trading firm is dependent on its freedom to do business with any producer and customer. VTN/The Greenery has acknowledged this internal conflict, and in November 2000 it integrated its sales activities (auction and mediation) and its purchase activities (wholesale). The new division - called Greenery Sales Operations - takes responsibility for selling growers' products, allocating products to specific customers, and determining the price to be paid to the growers.

Figure 4.8 presents the new distribution schedule for Dutch fresh produce after the formation of VTN/The Greenery. In Chapter 5 we will present the growers' associations

that have been established both as alternatives to The Greenery and as interest organisations under the Greenery umbrella.

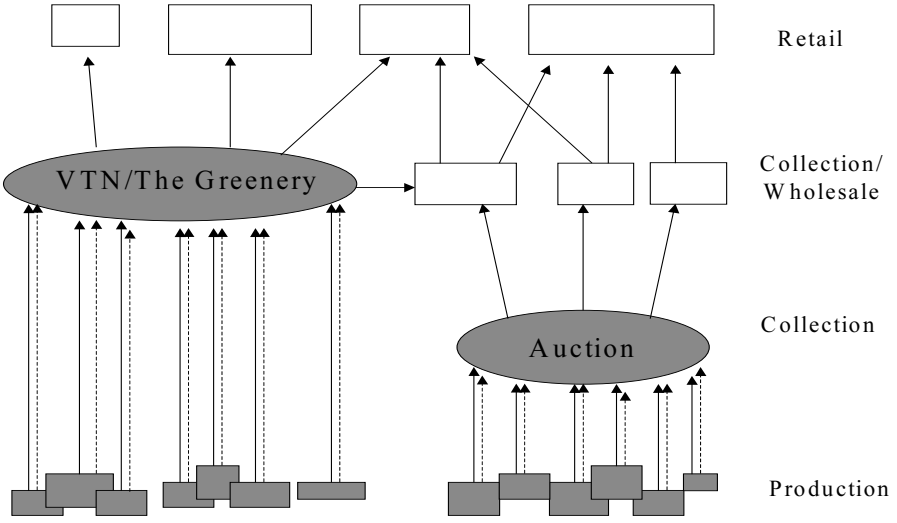

Figure 4.8 New marketing structure for Dutch fruits and vegetables.

4.5 New organisation

In the preceding section we have discussed the functional dynamics of The Greenery. This section describes and discusses the developments in the main organisational attributes of VTN/The Greenery. Discussing organisation implies disentangling the various relationships between growers, VTN and The Greenery. There is a transaction relationship between growers and Greenery, and there is an ownership relationship between growers and VTN and between VTN and The Greenery. Within the ownership relationship, we will focus on two elements: control and decision-making on the one hand, and financing and investment on the other hand.

4.5.1 Grower – Greenery transactions

Grower - Greenery transactions have certain characteristics that are typical of a marketing co-operative, such as applying the principle of equal treatment, and the combination of delivery rights and delivery obligations. Other issues that shape the grower-greenery

relationship are the loss of commitment by the members to the co-operative firm, and the growing heterogeneity among members.

Delivery rights / delivery obligation
In the traditional co-operative auction, members had both the right and the obligation to deliver all their produce to the auction, and the auction had the obligation to sell everything that was delivered. Growers' delivery obligation prevented free rider behaviour by growers and resulted in scale economies at the auction. Delivery rights gave growers a guarantee that all their produce would be sold. The traditional auctions guaranteed a minimum price and withdrew excess supply from the market.[67] As The Greenery has started a system of supply prognoses for planning its marketing and sales activities, the obligation to supply all products to The Greenery has become even more important. The Greenery does not apply a minimum price.

The equality principle
A distinguishing feature of a co-operative is the proportionality principle regarding allocation of costs and benefits. Members benefit from their co-operative in proportion to their patronage. However, there are always costs and benefits that cannot easily be allocated to a particular product transaction or a particular member. These costs and benefits will be allocated on the basis of the equality principle. Equal treatment serves to prevent distribution of costs and benefits from becoming a 'political' issue that might endanger the cohesion of the voluntary producer organisation (Søgaard, 1994).

The traditional auction already used some type of cost differentiation: large suppliers paid a smaller auction fee than small suppliers. However, full differentiation of costs was not possible, due to the large number of activities, the many quality classes and the working of the minimum price system. Large growers and growers of specialties felt they were cross-subsidising small suppliers. As heterogeneity among growers increased, both in volume of patronage and type of product, more growers became dissatisfied with the system of cost allocation. In December 1999, VTN/The Greenery introduced new cost allocation schemes, based on the cost making/cost bearing principle. The generic percentage fee for Greenery services will be differentiated on the basis of turnover size per grower, and fixed fees for specific administrative and logistic activities will be introduced. The result is that large growers pay less, while small growers pay more. The cost making/cost bearing principle can relatively easily be introduced for administrative and logistic services, but not for marketing activities. As The Greenery offers a full range of products to its clients, the cost of advertising and customer relationships cannot be allocated to individual products. Thus, some kind of cross-subsidisation may remain.

Increasing heterogeneity among members
The equality principle may raise additional opposition when the membership of the co-operative become more heterogeneous and when the co-operative firm initiates non-

[67] The minimum price level was set by the CBT. The costs of product withdrawal were covered by a product-specific fund filled by a levy on all auctions sales (for that product). These funds were administered by the CBT.

traditional activities. The membership of VTN has become more heterogeneous in its demand for Greenery services because growers increasingly supply products that require special marketing treatment by the co-operative firm. The merger has also increased geographical heterogeneity, although this may be a temporary problem. The Greenery has initiated marketing activities (like promotion of *the greenery* brand and establishing good relations with major retailers) for which the costs are not in direct proportion to the volume or the value of the products supplied by the members. Applying the equality principle among a heterogeneous membership may lead to cumbersome decision-making in the co-operative.

The increasing heterogeneity of member interests has led to the establishment of many growers' associations. These associations bring together all growers of a particular crop or crop variety. VTN/The Greenery makes a distinction between two types of growers' association of VTN members. One type has been established for representing the interests of its members vis-à-vis Greenery management. The other type of association goes beyond interests representation and has developed its own marketing strategy. The latter association has is own brand name and packaging, and often has direct contracts with wholesale clients. This growers' association takes responsibility for part of the co-ordination activities otherwise done by The Greenery.

Initially, The Greenery was rather negative about growers' associations of VTN members, particularly when they developed their own marketing policy. Greenery management has now experienced that it may be efficient to discuss marketing issues with the board of the growers' association instead of with all growers individually. Some growers' associations have set up their own supply prognosis system, sharing the information with The Greenery. Particularly for small growers, The Greenery is actually promoting more collaboration in delivery.

Loss of member commitment

With the establishment of VTN/The Greenery and the functional changes in new organisation, growers were faced with many changes in their transaction relationship with the new co-operative firm. Several auction sites have been closed, logistic structures and practices have been redesigned, employees have been given different tasks, and new personnel have been hired. Growers were confronted with new delivery conditions, forcing them to reorganise their own operations. All these changes resulted, at least in short term, in dissatisfaction among growers. Part of this dissatisfaction was caused by a lack of communication between Greenery and growers. In the traditional auction, communication lines were short between growers on the one hand and the board directors and auction management on the other hand, and growers could easily discuss operational matters with the directors and management. After the merger, the geographical and the psychological distances have increased between growers on the one hand and directors and management on the other hand.

Part of this psychological distance was caused by the attitude of the management. In its early years, the management of The Greenery – most of them recruited from outside the agrifood sector – used a rather top-down way of communicating with growers, thus breaking with the (Dutch) tradition of consultation and consensus building. CEO Van der Mee even said he was hired to do the marketing job and not to deal with growers. Growers

were told that the marketing of their products was now the sole responsibility of The Greenery and that they were mere suppliers of The Greenery. Such messages were badly received by the growers. This attitude of the management was even more problematic as the higher prices expected after the merger were not realised.

Dissatisfaction over The Greenery strategy, no opportunities to influence management decisions, low prices and sufficiently attractive outside options caused many growers to exit VTN. Particularly those growers that could easily find another sales channel – growers producing a large volume and/or special products – left the co-operative. In 1996 VTN/The Greenery started with approximately 9000 members (VTN Annual Report 1997). At the end of 2000, only 6000 members remained, representing 4000 farms (The Greenery Annual Report 2000). Within five years, one third of the members had left the co-operative. A large number of members exited VTN because of terminating their own farm. While a smaller number of growers left the co-operative because of dissatisfaction, these growers accounted for the largest share of lost turnover. Dissatisfied growers became members of other co-operative marketing organisations or started a growers' association to contract directly with wholesalers.

4.5.2 Control and decision-making

In the traditional co-operative auction, the communication lines between members and management were short. The board of directors and the management of the co-operative firm had frequent meetings to discuss all strategic and even most operational issues. For individual members there was always the option of visiting the auction and talking to a manager. The influence of members on the policies and activities of the co-operative firm was substantial.

The founders of VTN/The Greenery wanted to make a clear separation between decision-making in the co-operative society (VTN) and in the co-operative firm (The Greenery BV)[68]. The founders expected much opposition from growers to the shift from a supply oriented auction co-operative to a market–oriented marketing co-operative. They wanted to channel this opposition into VTN meetings, but let it not interfere directly with Greenery operations. The formal separation between growers and management gave the latter more freedom in running the new co-operative firm.

Originally, in 1996, the following decision-making structure was introduced. VTN had a general assembly consisting of 105 members of regional boards. The number of votes of each regional board depended on the region's share of total Greenery turnover, with a maximum of seven. The general assembly chose the eleven members of the board of directors: ten growers and one external chairman. VTN had a separate supervisory board, consisting of 9 members (6 growers and 3 outside experts). The Greenery was given a management board of 6 persons, and a supervisory board of 7 persons. The supervisory board consisted of members of VTN (but not members of the board or directors or supervisory board) and outside experts. The board of directors of VTN functioned as the general meeting of shareholders of The Greenery. There was no personal link between the

[68] VTN is the 100% shareholder of The Greenery BV.

boards of VTN and The Greenery. The only link between decision-making in The Greenery and in VTN was through the once-a-year general assembly of shareholders of The Greenery.

The formal separation between decision-making in VTN and The Greenery made it impossible for growers and board of VTN to have direct control over Greenery operations. This lack of influence was an additional reason for growers to exit VTN. Eventually the Greenery board of supervisors took its responsibility and in July 1998 the CEO of The Greenery resigned. Some members of the management board had already left, while others were soon to follow. Within the first two and a half years of its existence five members of the management board of The Greenery had left (only one remained). Three of them were replaced and two positions were cancelled as part of a cost cutting operation. Also in VTN several directors left the board. In 1998 the chairman of the board was replaced and in 1999 the vice-chairman left.

VTN has drawn two major lessons from this experience. First, the chairman of the board of management of The Greenery must have experience in the agricultural or horticultural sector. Second, there must be a direct link between decision-making in VTN and decision-making in The Greenery. The first issue was solved by appointing as chairman the former CEO of Cehave, the largest Dutch feed co-operative. The second issue was taken care of by establishing a personal link between the board of directors of VTN and the supervisory board of The Greenery. All seven members of the board of VTN are now also members of the supervisory board of The Greenery. Through this personal union, VTN has more (direct) control over Greenery decisions. Figure 4.9 gives the decision-making structure of VTN/The Greenery (as of mid-2001).

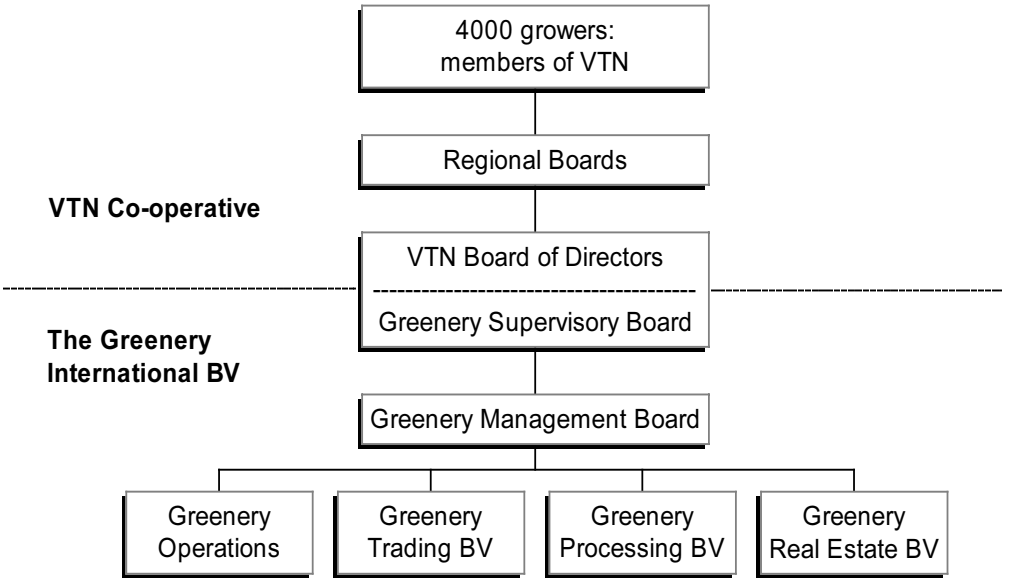

Figure 4.9 VTN/Greenery decision-making structure

A formal structure for direct consultation between growers and The Greenery has been established through the Product Market Advisory Committees (PMACs). PMACs represent all growers of a particular crop, from all parts of the country. PMACs are consulted by Greenery managers on all strategic and most operational issues concerning the crop, including decisions about pricing and marketing methods. Every year The Greenery makes a product-marketing plan for each crop and discusses this with the PMAC concerned.

Although the importance of these committees for grower commitment is acknowledged, Greenery management does not want too much interference with its operational activities. The Greenery 1998 Annual Report states that PMACs sometimes have too much influence on day-to-day business of The Greenery. In November 2000, the CEO of The Greenery said that PMACs would be involved in decisions on pricing and marketing, but mainly in retrospect (AgD, 10/11/00). In the fall of 1999 a conflict between Greenery management and the PMAC for fruit (about closing the Utrecht site for selling fruit) made clear that the PMAC has the formal right to be consulted on strategic issues concerning its products (Oogst, 5/11/99).

There is no statutory relationship between growers' associations and VTN/Greenery decision-making. In reality, however, there is a great deal of consultation and negotiation, for instance about the annual product-marketing plan. For one product - cucumbers - the PMAC and the board of the growers' association (*Friskom*) coincide. For other products, growers' associations are represented in the PMACs.

4.5.3 Financing and investments

Traditionally, in a co-operative equity capital is supplied by the members. The usual way to increase equity capital in a co-operative is by retained earnings. As the co-operative auction does not take title to the growers' product, there are no earnings. A co-operative auction can raise equity capital by increasing the levy on its services paid by the members. In the traditional auctions investments were mainly in buildings and other physical assets. As the horticultural sector showed continuous growth, funding (mostly by debt capital) was never a serious problem.

In the Greenery, financing has been a problem right from the start. The company needed additional capital for its ambitious marketing plans. It was expected that the merger would reduce costs by more than hundred million euro, which would make funds available for marketing, innovation and ICT. However, the reorganisation turned out to be more expensive, and the exit of a large number of growers lead to a loss of turnover. As a result, marketing plans had to be cancelled or delayed. The acquisition of the wholesale companies meant a substantial decrease in the already low solvency. VTN did not want to invite external investors because that would mean a loss of growers' decision rights. Therefore, additional equity capital had to come from VTN members, but this turned out to be quite difficult.

As we have explained in Section 2.7.2, there are several reasons why growers do not want to invest in the co-operative firm. These reasons relate to the disadvantages of collective ownership. The internal free rider problem exists because The Greenery is

investing in marketing for its whole product range. However, not all products in this range will benefit equally from the marketing efforts. The external free rider problem exists because prices negotiated by The Greenery are used by competitors as a reference price for their transactions. The portfolio problem is present because investments in marketing are risky, which not all growers appreciate. The horizon problem is present because many growers are older than 50 years and do not want to make investments that only pay-off in the long run. In addition to low investment incentives due to ill-defined property rights, growers may not have the funds available, because of their low-income situation and the need to invest in their own farm. The latter reasons applied to most fruit and vegetables growers in The Netherlands in the mid-1990s.

Still, VTN/The Greenery was looking hard for additional equity capital. In 1998 VTN proposed several routes for obtaining additional funds from the members (VTN Annual Report 1998): a special financial instrument developed by VTN together with co-operative insurance company Interpolis (part of Rabobank); an obligatory loan to The Greenery with a duration of 8 years; and a voluntary subordinated loan to The Greenery.

The voluntary instruments have not been successful; only a small number of growers did sign up for these loans. In 1999 the VTN general assembly decided that the liquidity fee of one percent of turnover that each grower pays to The Greenery (and which is partly paid back at the end of the year) will be transferred into an obligatory subordinated loan to be paid back after eight years (AgD, 22/9/99). This will generate a yearly addition of 9 million euro to the equity capital of The Greenery. Another option that VTN directors have been speculating about is the participation of external financiers.

VTN has also tried to solve the ill-defined property rights problem by individualising part of the equity capital. Traditionally in Dutch co-operatives there are no individual ownership titles, and retained earnings become part of the unallocated equity capital. In recent years, however, more and more co-operatives are giving individual ownership titles to the additions to equity capital (Van Bekkum and Van Dijk, 1997: 114). When the nine auctions merged into VTN the decision was made to transfer part of the unallocated capital into individual ownership titles (VTN, 1996).[69] This was to be done by issuing options to certificates to shares: options in order to give the members freedom in deciding the actual transfer date, because of tax reasons; certificates because decision rights connected to the shares had to remain with VTN collectively. Only income rights were individualised[70]. But dividend will not be paid before 2002, in order to strengthen the solvency of The Greenery. At the end of 1998, The Greenery started with the actual issuing of certificates and options to certificates (The Greenery Annual Report 1998).[71]

Growers hold certificates to B-shares, representing 70% of 1996 equity capital. The rest of the equity capital, the so-called A-shares, is collectively held by VTN. The

[69] There was a large difference is the size of the general reserves among the nine merging auction co-operatives. By individualising ownership and making possible trade in these ownership titles, members of the rich co-operatives would eventually benefit from the wealth they had build up over the years.

[70] The certificates give right to cumulative preferential dividend.

[71] Each grower received shares to the value of 2.5 % his average patronage in the last three years before the merger (Kyriakopoulos, 2000). With a 1996 turnover of 1.27 billion euro, the total value of the B-shares was about 32 million euro.

certificates for B-shares will become tradable among members from 2002 onwards. Members exiting VTN before 2001 maintain their rights to Greenery shares if they terminated their farm, but lose all rights when they leave because of disagreement over Greenery strategy.

Other ways to increase investment without having to draw on members are subsidies and co-operative investments by Greenery and growers' associations. Since a new marketing order for fresh produce has been introduced in the European Union, funds are available for those growers' associations and co-operatives that implement a common marketing programme for fruit and vegetables (see also Section 5.7). These funds can be spent on advertising and on physical assets like packaging and sorting stations. VTN/The Greenery has been one of the Dutch recipients of these European subsidies. Investments in processing, sorting, packaging and product development may also be co-financed by The Greenery and a growers' association. For example, The Greenery and tomato growers' association *Prominent* have financed the building of a 9 million euro distribution station for sorting and packaging of the specialty tomatoes (and other products) of Prominent growers (Greentime, 25/2/99). In this case, the contribution by The Greenery (4.5 million euro) was paid out of the EU funds that the Greenery had received.

4.5.4 Conclusions

During its first years of existence VTN/The Greenery has experienced difficult times and has gone through several phases of reorganisation. After five years, the fog is lifting and the new organisational characteristics are becoming clear. Conclusions can be drawn regarding the transformation from a co-operative auction to a marketing co-operative.

With the fundamental change in Dutch horticulture from supply orientation to market orientation, client-relationships have replaced grower-relationships as the main focus of attention for the management of the marketing co-operative. Strategic policies are now developed from a marketing perspective and no longer from a production perspective. This implies that growers' interests are no longer necessarily the main interests that Greenery management takes into account. New decision-making structures have been implemented giving Greenery management more freedom to operate, and reducing the direct influence of growers on Greenery operations. A new institution for co-decision has been set up, the PMAC, but the extent of its influence is still under debate.

As a result of the increasing heterogeneity among the membership and of the Greenery orientation on customers, growers have felt the need to strengthen their crop specific interests in the transaction relationship with The Greenery. Of the two relationships between grower and co-operative, the control relationship seems to have decreased in importance while the transaction relationship has gained in importance. Growers have established new associations to represent their interests in the transaction relationship.

While The Greenery is looking for ways to strengthen its equity position, growers are reluctant to provide the necessary funds. This may be a result of financial problems at the farm level, but also of low commitment of the member to the co-operative. If this low commitment is caused by low trust in Greenery management it may be a temporary problem. However, if low commitment is caused by increasing heterogeneity of interests,

time may not solve this problem. As members, by setting up growers' associations, have indicated their focus on the transaction relationship, the solution for the capital problem may also have to be found in that relationship.

4.6 Attribute systems in VTN/The Greenery

This section will analyse the transformation of the co-operative auction to the marketing co-operative from the perspective of coherence in organisations as described in Section 4.2. Several subsystems of attributes will be discussed separately: governance structure (Section 4.6.1), decision-making structure (Section 4.6.2) and incentive structure (Section 4.6.3). Finally, Section 4.6.4 presents conclusions on the various subsystems. In the following discussion, we will only consider two values for each attribute. This makes the presentation somewhat stylised in order to emphasise the effect of the different attribute values on the coherence of the system.

4.6.1 Governance structure

In a co-operative, the governance situation is rather complicated. Farmers have both a transaction relationship and an ownership relationship with the co-operative firm. The transaction relationship (or patronising relationship) is the most important, because a co-operative is established to provide services to the farmer. The ownership relationship is subordinated to the transaction relationship; it was established to safeguard the efficiency of the transaction between the farm and service-providing firm.

In Section 4.5.2 we have presented the main governance attributes of a farmer-owned co-operative and an IOF. Before we discuss governance attributes in the traditional auction and in VTN/The Greenery, we will briefly repeat the main differences in governance attributes between co-operative and IOF (see Figure 4.10). In analysing governance attributes, we must bear in mind that the main goal of the IOF is to give the owners (i.e., investors) the highest return on investment, while the main goal of the co-operative is to provide optimal services to the owners (i.e., the users).

In a co-operative the residual income rights lie with the users, in an IOF they lie with investors. Residual income is income that is not contracted for, for instance growth in the value of the assets in the firm. In a co-operative, ownership titles are held collectively (i.e., by all members together) while in an IOF ownership titles are held individually. Collective ownership of co-operatives leads to non-tradability of ownership titles, while an IOF ownership title can easily be traded. Control of the management is about who or what decides whether the management is performing well. In a co-operative this task lies with the board of directors (consisting of members), while in an IOF control lies with the board of supervisors (who are mostly outsiders). Ultimately the stock market will evaluate management performance in the IOF. Residual decision rights, that is, those decision rights that are not explicitly given to anyone else, are in the hands of the users of the co-operative

firm. In an IOF, residual decision rights lie with the investors. Since the users of the co-operative are the owners they also provide equity capital. In an IOF equity capital is provided by the investors.

Attributes	**Co-operative**	**Investor-owned firm**
Residual income rights	users	investors
Ownership title	collective, non-tradable	individual, tradable
Residual decision rights	users	investors
Control of management	board of directors (internal)	supervisory board (external)
Equity capital by	users	investors

Figure 4.10 Governance structure attributes

Figure 4.10 gives only two (extreme) values on each governance attribute, while in practice other values may exist. Thus, the two systems presented here should be taken as ideal types of governance structures. The key point is that both systems are internally consistent and therefore coherent. It is conjectured that combinations of attribute values from both IOF and farmer-owned co-operative will not often be found in practice, and when they are found the organisation will most likely not operate efficiently. Once again, whether an IOF, a co-operative or any other coherent system is the most efficient governance structure depends on the environment in which these structures have to operate.

Traditional auction versus VTN/The Greenery

The traditional horticulture auction was established as a grower-owned co-operative. Growers, as members of the co-operative, were the primary users of the auction. While there were other users of the auction, like buyers, only member-growers had residual income rights. Equity capital was supplied by the users through retained earnings. Asset ownership was collective; there were no individual ownership titles, and thus ownership was non-tradable. The obligation to use the auction for all products and the collective ownership lead to a strong commitment of growers to 'their' co-operative and to democratic decision-making. Residual decision-rights were in the hands of the members (if users), while in practice the membership had delegated decision rights to a board of directors.

In VTN/The Greenery, several of the governance structure attributes have obtained different values. Let us first look at the role of equity capital. Member investment in the traditional auction was limited, and the capital was mostly invested in land, buildings and logistic and administrative equipment. As these investments could easily be financed by debt capital, most auctions had low solvency rates. Member investment in VTN/The Greenery is of a different kind, for two reasons. First, investments have to be larger, to

finance marketing programmes as well as the acquisition of the wholesale companies. Second, investments are more specific and risky and therefore require a higher solvency rate. Thus, the attribute *supply of equity capital* has become more important in VTN/The Greenery than it ever was in the traditional auction. While the board does not want to invite outside investors, it does ask members to make investments that are unrelated to patronage. Thus, a first step towards equity capital provided by investors has been made.

While ownership of the traditional auction was fully collective, VTN/The Greenery has transferred 70% of its equity capital (as of December 1996) into individual ownership titles. These certificates (to shares) do not carry decision rights, which stay with VTN collectively, but do provide residual income rights. Growers now have two ways to receive income from their co-operative, as users and as investors. These interests can be conflicting, particularly when the users are not the same as the investors (for instance after retirement of growers holding certificates).

Decision rights (or control rights) have also changed in the transformation from auction to VTN/The Greenery, not so much in content but more in the process. In the traditional auction co-operative, there was close collaboration between the board of directors and the managers. But individual members also had direct access to the management; thus actively pursuing their residual decision rights. In VTN/The Greenery the control situation has been shifting back and forth. Initially, it was decided that the management board would have much more freedom of operations than was common in a co-operative. This situation was even institutionalised by omitting a direct control link between VTN and The Greenery. After considerable complaints from members about their loss of (residual) control, a formal link between VTN and The Greenery was established: the board of directors of VTN now functions as the supervisory board of The Greenery. While decision rights are officially still in the hands of the members and their board, there is a least a perception among the members of a loss of part of their decision rights.

We can conclude that VTN/The Greenery is experiencing a shift in governance attributes, from the co-operative system towards the IOF system (from left to right in Figure 4.10). The new attribute values may conflict with traditional attribute values. Individualisation of ownership rights has given growers two ways to receive income: as users and as investors. Direct grower control of management has been curtailed, while the members still maintain residual decision rights. New influence mechanisms (PMACs and growers‘ associations) have been established for the transaction relationships, which may interfere with the traditional structure of exerting control rights. In the next subsection we look in more detail at the changes in decision-making and control.

4.6.2 Decision-making structure

Decision-making in a co-operative is characterised by democratic voting procedures and by consensus building. All members have a voice in the decision-making process, although this influence is exerted indirectly, by electing the members of the board. In some co-operatives all members are consulted when major strategic decisions have to be taken. While foreign co-operatives often use the one-member-one-vote principle, most Dutch co-operatives use proportional voting. Still, even members with a large patronage are only

given a small number of votes, so that a few members never outvote the majority of the membership. Another characteristic of decision-making in co-operatives is consensus. This means that decisions are not taken by a simple majority, but that the board tries to find a compromise that will be approved by a large majority of the membership. Because a co-operative is a voluntary organisation, it has to make an effort to keep all (or at least most) members satisfied. Consensus also requires equal treatment of all members.

Consensus governance in a co-operative works very well in a relatively stable environment and with a relatively homogeneous membership. However, if the interests of the members diverge, the decision-making process becomes more difficult and costly. The more heterogeneous the membership becomes, the more difficult it is to maintain equal treatment of members. Such heterogeneity leads to high influence costs in case members have no alternatives, or it leads to members exiting the co-operative if they have outside options.

Traditional auction versus VTN/The Greenery

In the traditional auction co-operative, the goal was straightforward and uniform: to organise an efficient market place for the sales of all products supplied by the members. Although members supplied a great variety of products, they had equal interests in an optimal working of the auction clock. All growers profited from the auction services in proportion to the value of the produce they supplied. Decision-making was characterised by democracy and consensus.

Over the years, the membership of the co-operative auction had become more heterogeneous. The size distribution of holdings became more skewed. In addition, growers started to develop specialties that did not fit in the traditional product classification and required specific marketing effort. The traditional auction, with its consensus governance, had difficulty in accommodating diverging member interests, resulting in the exit of several members. One of the reasons to establish VTN/The Greenery was to keep large and innovative members aboard. However, heterogeneity was not reduced but rather reinforced by The Greenery. First, the merger of the nine auctions brought together growers from a large geographical area, increasing the potential for conflicting interests. Second, the reorganisation process affected members in an unequal way; members that saw their local auction closed had to bring their produce to more distant locations. Third, and most important, the new functions that The Greenery took on, such as marketing and wholesale, lead to a more differentiated transaction relationship between grower and Greenery.

The new marketing strategy of The Greenery made grower-Greenery relationship subordinate to the Greenery-customer relationship. To prevent the adverse effects of increasing member heterogeneity on decision-making The Greenery management wanted to limit direct member influence, for several reasons. First, price determination in contract negotiations cannot be done democratically. Second, many short-term, rapid decisions have to be made, making it impossible to consult all or even most members. Third, the Greenery policy of establishing long-term relationships with major retailers may sometimes be in conflict with the short-term demands of growers. Long-term contracts may lead to lower short-term prices. To sum up, to be able to implement a long-term strategy (including major reorganisations), direct member influence on Greenery activities was considered undesirable.

These changes in decision-making in VTN/The Greenery are illustrated in Figure 4.11 (being almost a copy of Figure 4.4). In Section 4.2.4 we saw that democratic decision-making does not combine very well with heterogeneity among the main suppliers. If the membership of a co-operative becomes more heterogeneous, decision-making problems are likely to occur. In VTN/The Greenery we see that members' interests are shifting from homogeneous to heterogeneous (a shift from (1) to (3)). In decision-making there is a tendency of shifting from democratic to autocratic (from (1) to (2)). However, there is currently uncertainly among the VTN and Greenery board members about how far this shift should go, and among the members about how far this shift has actually progressed. We may conclude that there is currently an unstable situation. Figure 4.11 also suggests directions for solving this problem: returning to the traditional co-operative decision-making system, or continuing the reorganisation process and become an IOF.

		Decision-making	
		democratic	*autocratic*
Interests of VTN members	*homogeneous*	(1) co-operative	(2)
	heterogeneous	(3)	(4) IOF

Figure 4.11 Decision-making and member interests in VTN/The Greenery

4.6.3 Incentive structure

The main task of the auction co-operative was to provide sales and logistic services to the members. The members sold their product *through* the auction. The price was the main mechanism for transferring information from buyers to sellers. Decisions about the quantity and quality of the crop were all taken by the grower individually. The auction had no direct influence on the price received by the growers.[72] In fact, the auction was only facilitating transactions between producers and customers. Being a member of the auction co-operative gave the grower the right to make use of the auction for any quantity of produce, provided it falls within a designated quality class. This right of delivery came with the obligation to sell the whole farm production through the auction. The auction co-operative also provided a guarantee that the grower would receive his money; the risk of buyer default was carried by the co-operative. In addition, the traditional vegetable auction co-operative also used a minimum price system.

[72] The only influence the auction has on price formation is through attracting as many buyers as possible, which will increase demand and may thus raise the price.

Several elements of the transaction relationship have changed with the establishment of VTN/The Greenery.[73] At least three of the four functions of the traditional auction - price determination, sales administration, quality control and logistics - have been changed. First, logistics has changed because several auction sites have been closed, but even more so because no longer all products have to be brought before the auction clock. Second, the quality requirements have changed, not only because specific clients demand specific quality, but also because quality requirements are extended to on-farm production processes. Third, The Greenery is now using several price determination mechanisms, making growers more dependent on Greenery effort in negotiating the best sales conditions (which include many more elements than just the price).

The most important change in the grower-Greenery relationship does not result from alterations in the execution of logistics, price determination and quality tasks, but from the overall strategy of The Greenery. The marketing co-operative is following an offensive marketing strategy and seeks to become a preferred supplier fruits and vegetables to major retailers. This strategy may eventually result in the situation that production activities (by growers) becoming subordinate to marketing activities (by The Greenery).

The Greenery management is studying options for the introducion of production contracts for growers, specifying both quantity and quality of the products to be delivered. If these contingency contracts are introduced, then the grower's right to deliver any amount of production to The Greenery will be substituted by the (contractual) right to deliver a product of specified quantity and quality[74]. There may be several reasons why The Greenery wants to introduce such production contracts.[75] It prevents the difficulty of supply forecasts as well as having to deal with excess supply. In addition, with contract production The Greenery can provide customers with certainty of delivery, stable market prices and quality guarantees. Moreover, if The Greenery wants to sell products under a brand name (in order to obtain customer loyalty), it must have some control over the kind and volume of products being sold under this brand.

Changes in the grower-Greenery relationship will affect the economic incentives for growers. As the equal compensation principle (see Section 4.2.3) suggests, changes in one incentive may require changes in other incentives as well. We will illustrate this mechanism with the following fictitious example. Assume a grower supplying vegetables to The Greenery that, in turn, sells the products under a brand name (*the greenery*) to various retailers. The grower has two tasks: production and quality control. In the allocation of grower time and effort these two tasks compete. The value of the brand under which the vegetables are sold depends on the quality of the produce. Certain quality attributes are difficult to measure (like those related to the production process). Grower effort on production and quality control is determined by the combined effect of three incentive attributes: task freedom, contingency rewards, and asset ownership. The decision how and what to produce can lie with the grower or with The Greenery. The grower can be rewarded

[73] Members of other marketing co-operatives may also experience these changes.
[74] In March 1999 the chairman of VTN mentioned the possibility of introducing delivery rights (Groente & Fruit, 19/3/99).
[75] Such production contracts can be signed between The Greenery and individual growers, but also between The Greenery and a group of growers organised in a growers' association.

for his output (i.e., for production) or for his input (i.e., for quality control). The brand is an asset that can be owned by the grower or by The Greenery. The owner takes responsibility for maintaining the value of the brand. Figure 4.12 presents the eight different combinations of incentives for the grower.

It can be argued that only system 1 and 8 are internally consistent. In system 1, the grower takes all production decisions (both on quantity and quality), is rewarded for the quantity he delivers to The Greenery, and owns the brand. In system 8, The Greenery takes the production decisions[76], compensates the grower for his input, and owns the brand. Which one of the two systems is most efficient depends on the particular market conditions, state of technology, and institutional environment.

Attributes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Production Decisions: Grower (G) or The Greenery (T)	G	G	G	G	T	T	T	T
Rewards to Grower: Input (I) or Output (O)	O	O	I	I	O	O	I	I
Brand Ownership: Grower (G) or The Greenery (T)	G	T	G	T	G	T	G	T

Figure 4.12 Incentive systems for growers supplying quality vegetables, to be sold under brand name by The Greenery

To see that other combinations are unstable, take for instance system 2. The grower takes the production decisions, he is rewarded for his output, and The Greenery owns the brand name. The incentives for the grower are such that he devotes most of his effort to production and very little to quality control. Maintaining high quality is of low importance to him. For The Greenery this is an undesirable situation, because the value of its brand depends on the quality of the product. The Greenery would like to protect its brand, for instance by setting strict quality requirements. However, this may lead to high measuring costs if quality is difficult to measure. The grower has an incentive to shirk. In this case, it would be more efficient to allocate brand ownership to the grower (i.e., shift to system 1). Other combinations are equally unstable.

The current incentive system for VTN members neither corresponds with system 1 or with system 8. While production decisions are still taken by the grower, he is faced with

[76] If The Greenery takes production decisions this does not necessarily mean that The Greenery takes ownership of the grower's farm. It does, however, mean that the grower can only deliver what The Greenery has asked him to grow. This also implies that - opposite to the situation in the traditional auction - The Greenery purchases the grower's products.

more stringent product and process quality requirements. In other words, the Greenery is trying to obtain more control over production decisions. Growers are still only rewarded for output. The Greenery is building a business-to-business brand name. To sum up, The Greenery seems to be in a shift from system 2 to system 6. Neither of them are stable incentive systems.

4.7 Conclusions

In transforming from a traditional auction co-operative to a marketing co-operative, VTN/The Greenery has obtained new functional and organisational attribute values. While the traditional auction had a simple task, that is, running the auction clock in an efficient way, The Greenery has many more functions, such as marketing, wholesale, innovation and extended quality control. As new functions did not combine with the auction clock new price determination instruments were added. New functions have lead to a reorientation of the main focus of the organisation. Marketing, wholesale and innovation require a management focus on the market, that is, on customers. This may imply, at least in the short-term, that supplier interests are subordinated to customer interests.

This chapter has analysed the establishment and the restructuring of VTN/The Greenery from the perspective of coherence in organisations. The 'system of attributes' approach postulates that consistency among the functional and organisational attributes of a firm is needed to prevent internal conflicts and dysfunctioning. Changes in the environment as well as changes in technologies may force firms to make changes in their functional and organisational attributes, in order to remain competitive. However, due to complementarities among various attributes, changing the value of one attribute often requires a simultaneous change in several related attributes. This integral shift from one system to another may be the most difficult aspect of a reorganisation process.

The transformation from co-operative auction to marketing co-operative and the broadening of functional activities leads to the question whether the new set of functional and organisational attributes of VTN/The Greenery makes a coherent system. In drawing conclusions on the transformation process we will limit ourselves to the organisational attributes, in line with the main focus of this thesis on governance structure. Figure 4.13 combines the analysis on three (sub)systems of attributes: governance structure, decision-making process, and incentives.

The first column describes the traditional auction co-operative; the second column presents the current situation for VTN/The Greenery; and the third column presents the IOF. VTN/The Greenery seems to be moving towards the IOF, but it is currently unclear whether it will continue to transform into an IOF. We should emphasise that co-operative and IOF are presented here as two extremes only for simplification reasons. There may be other coherent systems as well. The main conclusion of Figure 4.13 is not that VTN/The Greenery has to choose between a traditional co-operative and an IOF, but that the current combination of attribute values does not seem to form a consistent whole.

Attribute	**Traditional Co-operative**	**Current System**	**IOF**
Governance structure:			
Residual income rights	users	growers as users and investors	investors
Ownership title	collective, non-tradable	collective + individual (partly tradable)	individual tradable
Residual decision rights	users	users + management + supervisory board	management + superv. board
Control of management	board of directors	board of directors (internal)	supervisory board (external)
Equity capital by	users	users	investors
Decision-making process:			
Initiative	growers	growers + management	management
Procedure	democratic	democratic	autocratic
Interests of main stakeholders	homogeneous	heterogeneous	heterogeneous
Incentives:			
Quantity (= output) or quality (= input)	quantity	quantity + quality	quality
Brand ownership	growers	growers	marketing firm
Freedom in production decisions	large	medium	small

Figure 4.13 Several systems of attributes for marketing fresh produce

The governance structure of VTN/The Greenery has changed from a pure grower-owned co-operative towards a combination of co-operative and IOF. With the individualisation of ownership rights, growers will have two ways to receive income from The Greenery: as users and investors. This may lead to conflicting interests among members, and to conflicting objectives for the management.

On the issue of decision-making we have seen two important developments. First, while growers still maintain residual decision rights, their formal influence on Greenery operations has been reduced (shown by the shift of initiative from only growers to growers + management, under Decision-making structure). Second, grower interests have become more heterogeneous. Decision-making in co-operatives is known to become more difficult and more costly if heterogeneity among members increases. VTN membership is more heterogeneous compared to the traditional auction co-operatives, due to the larger geographical distance among VTN-members, the greater variation in the size of the members' holdings, the greater variety of products traded by The Greenery, and - most importantly - the more individual (or crop-specific) attitude that growers take towards VTN/The Greenery. As decision-making in VTN does not provide a platform for these

product-specific interests, and as growers perceive VTN influence on Greenery strategy and operations as small, grower commitment to VTN may decrease. Growers may choose other routes to defend their interests vis-à-vis The Greenery, such as through growers' associations. If the grower-Greenery relationship crystallises into two dimensions - growers as users and growers as investors - there may also appear two separate decision-making processes: collectively in VTN when the investor interests are concerned, and individually (i.e., per growers' association) when the product-related interests are concerned.

In the incentive structure for growers we see gradual but profound changes. In the traditional auction co-operative, growers were rewarded by volume of products delivered to the auction and prices were established by the auction clock. The introduction of contract mediation opens new ways to compensate growers for their effort, and to better co-ordinate production activities (by growers) and marketing activities (by The Greenery). Already, some growers receive a premium because they supply products in client-specific packaging. Payoff to growers will become more differentiated. This combines with the more individualised relationship between growers (or growers' association) and VTN/The Greenery.

Eventually, The Greenery may evolve towards a system where it no longer sells what the grower is producing, but where the grower produces what The Greenery has agreed to supply to the retailer for a set price. Under this system, The Greenery will negotiate with individual growers (or growers' associations) about quantity and quality of products to be supplied. The resulting contracts will also contain strict requirements for the cultivation process. A further consequence of this development may be that The Greenery obtains ownership title to the products, that is, it will actually buy the products from the growers. This raises the question whether such an incentive structure combines with the co-operative governance structure.

The analysis of the functional and organisational attributes of VTN/The Greenery leads to the conclusion that the attributes currently do not form a coherent system. Some attributes have been changed, such as price determination and homogeneity of the membership, while others still have the same value as under the traditional auction co-operative. The current situation seems to be one of disequilibrium, because it combines functional attributes of an auction and a wholesale company, and it combines organisational attributes of a farmer-owned co-operative and an investor-owned firm.

Appendix: Additional sources

Besides the publications referenced in the text and listed in the back the thesis, the following sources have been used for this chapter:

VTN/Greenery publications:
- *VTN Annual Report 1997, 1998, 1999, 2000*
- *The Greenery Annual Report 1997, 1998, 1999, 2000*
- *Greentime*: bimonthly magazine of The Greenery

Other publications:
Groente & Fruit (G&F): a weekly trade journal for fruit and vegetable growers
Agrarisch Dagblad (AgD): a daily newspaper for the agrifood sector
Oogst, a weekly farm journal
Jaarboek Detailhandel, a yearbook for Dutch retail, published by Hoofdbedrijfsschap Detailhandel
NRC Handelsblad, a daily newspaper

Interviews:
C.P. Veerman, Member of the Supervisory Board of The Greenery, 9 September 1999.
A.J.M. van de Riet, Manager Co-operative Affairs, The Greenery, 27 March 2001.
J.A. Groenewegen, Member of Board of Directors VTN, 28 March 2001.

5. New Producer Organisations in Dutch Food Horticulture[77]

5.1 Introduction

5.1.1 Background

Since the early 1990s more than seventy new producer organisations (POs) have been established in the Dutch fruit and vegetables industry. In response to changing market conditions and the inability of the traditional auction to accommodate these changes, growers of fruits and vegetables have set up new organisations. These new POs unite producers of a specific crop, in order to collectively bargain with customers, to implement a quality assurance programme, to organise sorting and packaging, and to carry out product-specific marketing activities.

The sudden growth in the number of new POs in Dutch food horticulture is a reaction to changes in market conditions. In Chapter 4 we saw that these changes have induced the transformation of auction co-operatives into a large marketing co-operatives. Compared to the traditional auctions, the new marketing co-operatives are much larger, more heterogeneous and have more diverse functions. Some of the new co-operatives focus on the marketing function, and have acquired wholesale assets, others focus on providing a broader range of traditional and new services to its members. In reaction to this restructuring process, several growers have left the restructured auction co-operatives and have established small new POs. Other growers have continued their membership of the restructured auction, but have also set up new organisations to promote their product-specific interest within the restructured auction co-operative.

Changes in the institutional environment have facilitated the growth of new POs. The new 1996 EU regulation on the fresh produce market promoted the formation of POs in order to strengthen growers' bargaining position vis-à-vis large customers and to support the implementation of environmental plans. Developments in information and communication technology (ICT), such as fax, mobile phone and Internet, have probably greatly improved the options for growers to trade directly with wholesalers and retailers.

The sudden increase in the number of POs in the fruit and vegetables industry gives rise to at least four questions:

1. Why do growers set up new POs?
2. Why have growers withdrawn from existing POs like the auction co-operative?
3. What different types of POs have been set up, and which factors explain the differences?
4. What are the advantages and disadvantages of the different types of PO?

[77] Parts of this chapter have been published in Bijman and Hendrikse (2001) and Hendrikse and Bijman (2002b).

5.1.2 Methodology

Because the rise of new POs in horticulture is a new phenomenon no empirical studies exist. Therefore, a major part of this chapter is devoted to describing the new developments. In addition, the chapter tries to explain the growth of the organisations by using a conceptual model on the trade-off between market power and innovation incentives.

The information presented here has been collected from different sources. First, trade journals have been spelled to identify new POs, their history and their specific characteristics. Second, the trade register of the Dutch Chamber of Commerce has been searched to find the names and year of registration of all formally established POs. Third, several interviews have been held with directors of new POs, as well as with managers of the restructured auction co-operatives. As many of the new organisations have been set up in reaction to the transformation process at the traditional auctions, the relationship between new POs and restructured auction co-operatives will be one of the focal points in this chapter.

A fourth method used for information gathering was a questionnaire sent to the chairman of the board of one specific set of POs: new co-operatives. A survey was chosen because we wanted to know the various reasons for growers to establish co-operatives (instead of other forms of association). The questionnaire was sent in May and June 2001. After two weeks of sending, a round of telephone calls was made to those directors that had not returned the questionnaire. This resulted in information on POs that were no longer active and on changes in board membership. Eventually, 24 questionnaires were returned. Not all questionnaires gave answers to all the questions, so the number of answers used in description and analysis may vary from question to question. The appendix to this chapter presents the questionnaire (in Dutch).

5.1.3 Outline of this chapter

The main question to be answered in this chapter is why Dutch producers of fruits and vegetables have established new POs. Although several types of POs have existed for a long time[78], growers felt the need to establish new types of organisation. A major explanation comes from the restructuring that took place among the traditional auction co-operatives. Therefore, we will start this chapter with a section on the restructuring process (Section 5.2).

Section 5.3 gives the numbers of new POs and presents a characterisation on the basis of two distinctions. The first dimension is the governance structure for the transaction between grower and marketing firm. We distinguish association, which stands for a market type of governance structure, and co-operative, which stands for a vertical integration type of governance structure. The second dimension deals with the relationship between the new PO and the restructured auction co-operative. We distinguish independent and dependent

[78] Traditional types of POs in horticulture are auction co-operatives, study groups and (economic) interest organisations.

POs. A dependent PO means that the members of the PO continue to be a member of one of the restructured auction co-operatives.

Section 5.4 gives details on the new dependent associations, while Section 5.5 presents the new co-operatives (both dependent and independent). Three main functions of the new POs are discussed in Section 5.6: bargaining, marketing and quality control. Marketing may lead to difficulties in the relationship between the dependent PO and the restructured auction co-operative, as both may take the lead in developing (and investing in) a marketing strategy. Growers of the new dependent co-operatives have to co-ordinate their marketing activities with the restructured auction co-operatives.

Because the European Union has developed a policy to promote the establishment of POs in the fresh produce industry, the role of European legislation will be briefly described in Section 5.7.

One of the challenges for POs relates to the heterogeneity of the membership. A homogeneous PO generally has low decision-making costs and high flexibility. However, a homogeneous PO is often small in size and supplies only one product, while (large) customers prefer to purchase a broad range of fresh products from only a few suppliers. In the fruit and vegetables sector a large PO generally has a more heterogeneous membership, which brings about decision-making costs and loss of incentives for innovation and quality enhancement. The latter may imply an efficiency loss if the market demands more differentiation. However, a large PO generally has a stronger negotiation position vis-à-vis customers. Section 5.8 presents a theoretical analysis of this trade-off between innovation and market power. Finally, in Section 5.9 conclusions are drawn on the dynamics of POs, particularly on their interaction with the restructured auctions.

5.2 The auction co-operative

Because most POs have been established in reaction to the strategies of the traditional and restructured auctions, we will first describe the role and organisation of the auction co-operative. Successively, we will present a brief history of the co-operative auction, describe its functions and organisation, discuss the forces that have lead to restructuring, and describe the strategies of the current restructured auction co-operatives.

5.2.1 A brief history

For more than one hundred years, the auction was the dominant instrument for selling Dutch fresh produce like fruits, vegetables and mushrooms (see also Section 4.3.1). The auction was an efficient way of selling perishable products supplied by a large number of growers and purchased by a large number of wholesalers, retailers and exporters. While it still is the main instrument for selling ornamentals, in fruit and vegetables the auction has lost its dominance in the 1990s. Nowadays, most Dutch fresh produce is sold by way of

contract mediation. In this section we will answer the questions why the auction has been set up, how it is organised, and why it lost its dominance in recent years.

The first vegetable auction of The Netherlands was established in 1887 (Kemmers, 1987). During the first decades of the 20th century each town or region with professional horticultural production set up its own auction. In those early years of auction history, the main reason to establish an auction was dissatisfaction among growers with traditional sales structures that were insufficiently equipped to exploit the opportunities of growing demand in Western Europe (Van Stuijvenberg, 1977; Ter Woorst, 1987). In 1934 an 'auction law' was enacted, as part of government measures to alleviate the effects of the economic crisis. This law contained a legal obligation to use an auction for selling Dutch fresh produce. In 1945 the total number of fresh produce auctions reached its top with 162 (Fontein, 1987: 202).

After WW II, the number of auctions gradually declined, due to mergers of local and regional co-operatives. The most rapid decrease in the total number of auctions occurred after 1965, when the auction law was abolished. In 1995, one year before the establishment of VTN/The Greenery, the total number of auctions had declined to 20. In 2001, only six independent co-operative auctions for fruits, vegetables and mushrooms remained.

5.2.2 Function and organisation

To understand the internal and external organisation of the horticultural auction it is useful to make a distinction between the auction as a mechanism for price determination, allocation and information exchange, and the auction as a grower-owned co-operative. The ultimate goal of the co-operative is to increase the income of its members. It does so by improving the market position of growers vis-à-vis buyers and by enhancing the price determination process (Ter Woorst, 1987). The main functions of the traditional auction co-operative were price determination, sales administration, logistics, and quality control (see Section 4.4).

All auctions were established as grower-owned co-operatives. Growers were to gain most by improving the sales process. The market position of the individual grower was (and is) relatively weak vis-à-vis a buyer because of (1) the relatively small quantity he offers for sale, (2) the perishability of the products, and (3) his lack of market information. By collectively offering for sale the products of many growers and by using an auction as the price determination process, the working of the market between sellers and buyers is enhanced. In fact, the market function of the grower's farm is delegated to the co-operative auction. Because the market function is derived from the on-farm production function, growers maintain control over the firm that organises the auction. The sales process functions best if growers use the auction for their total production. Therefore, all co-operative auctions have a statutory delivery obligation for its members. This obligation comes with decision-making rights over auction policies. These rights are held collectively by all members of the co-operative. To sum up, the strong interest of growers in the proper working of the auction, the involvement of a large number of growers, and the

interdependency relationship between market function and production function made the grower-owned co-operative an efficient way of organising the auction.[79]

5.2.3 Pressure to restructure the auction

In Section 4.3 we have described the changes that have taken place in the market conditions for fruits and vegetables, and the pressure that customers exerted on the traditional auction co-operative to change the sales mechanism. In this chapter we assess the disadvantages of the auction from the perspective of the grower.

In the early 1990s, several large and innovative growers became increasingly dissatisfied with the auction. Large growers felt that the cost allocation system of the auction – paying a percentage of sales as auction fee – resulted in subsidising small growers. Most dissatisfied, however, were those growers that saw new market opportunities for specialty products. These innovative growers wanted to meet the increasingly heterogeneous consumer demands by producing new crop varieties. While producing such high value added crops was not a problem - often the seed company provided specific cultivation advice - they experienced that the auction system did not support such differentiation. There are three reasons why the auction co-operative had a hard time in coping with these developments.

First, specialty products require a special marketing effort, for which the auction did not have the expertise. Most auctions did not want to start product-specific marketing activities, as it did not fit with the traditional policy of equal treatment of members and collective product promotion. In the democratic decision-making process the votes of the innovative growers were far too few to be able to force a change of strategy.

Second, the auction clock may have been a very efficient sales mechanism for generic products; it provided a disincentive for product differentiation. At the auction location, all fruits and vegetables were sorted into quality classes. The lots that were brought before the auction clock represented one quality class, but contained products from different growers (i.e., products were sold in 'blocks'). This type of bundling affects a grower's production decisions in several ways. Producing for an anonymous market gives an incentive to supply generic products. There is no incentive to meet the special demands

[79] The horticultural auction generated even broader societal benefits (Ter Woorst, 1987). First, selling through the auction gives growers the opportunity to fully specialise in the production function. Second, the auction makes possible the servicing of a larger geographic area, because buyers from distant consumption areas can purchase the needed products at the auction (and profit from market transparency). Third, because there are no power elements involved in the sales process, growers consider themselves as colleague's and not as competitors, favouring knowledge exchange. Fourth, the auction improves the efficiency in the total production and distribution chain; also buyers benefit from the market transparency and the concentration of the sales process. Fifth, because everyone can register as a buyer at the auction, there are no entry barriers (on the purchase side) for new trading firms. This enhances competition among buyers and thus furthers efficiency in the distribution channel.

of a particular customer. Moreover, a grower does not have an incentive to increase product quality. As there is always some variation in a quality class, the grower will supply products with quality characteristics that are just above the lower boundary of a quality class. Because targeting a higher position within a particular quality class raises production costs but does not obtain a higher price, the grower has no incentive to enhance product quality.[80]

Third, because being member of the auction co-operative obliges a grower to supply all its products to the auction, there was (officially) no opportunity to select an alternative sales channel for the more innovative products. Still, some growers did try out alternative sales channels by directly contracting a small part of their harvest with wholesalers, and found out they could receive a higher price.

In our survey, board members of new POs were asked why their members had left the auction co-operative. The answers were in line with what had been written in professional journals. Table 5.1 gives the answers for ten co-operatives.

Table 5.1 Reasons for leaving the auction co-operative (n = 10)

Reason	times mentioned
No possibilities for customer-specific (value added) products	5
A desire to pursue individual strategy	2
Discontent	2
High costs	1

In conclusion, growers with the potential to innovate and develop specialty products had an incentive to leave the auction co-operative and contract with wholesalers directly. Wholesalers and retailers were eager to contract with them as they, too, saw new market opportunities for specialty products. More importantly, retailers wanted to get rid of the auction as the main sales method, as it confronted them with uncertainty and high costs.

5.2.4 From co-operative auction to marketing co-operative

Most fresh produce auctions in the Netherlands have gone through restructuring processes in the 1990s. The number of fruit, vegetables and mushroom auctions has decreased from 28 in 1990 to 20 in 1995 and 6 in 2001. Substantial size differences have appeared; the remaining six include one very large organisation (VTN/The Greenery), two large ones (Veiling ZON and Fruitmasters), and three relatively small ones (Veiling Zuid-Limburg, Veiling Zaltbommel and Veiling Zundert). Table 5.2 presents key figures on the three large restructured auction co-operatives.

[80] For this reason the Dutch flower auctions do not use block auctioning (Hogervorst and Koot, 2001).

VTN/The Greenery

VTN/The Greenery is by far the largest marketing co-operative for fresh produce in the Netherlands. With an annual turnover of more than 1.5 billion Euro, it sells about half of all vegetables produced in the Netherlands. It was established in 1996, with the merger of nine auction co-operatives. Since this merger, major changes have taken place in the functional and organisational characteristics of the company. First, the importance of the auction clock as a price determination mechanism has greatly decreased; only about one third of all members' products is now sold through the auction clock, the rest is sold through contract mediation. Second, the Greenery has become a major wholesale company; in 1998 it acquired two major groups of fresh produce wholesale companies and it has integrated its sales activities with the purchase activities of the wholesale subsidiaries. Third, it has developed a customer-oriented strategy, as it wants to become the preferred supplier of several large food retailers in Europe. Fourth, it has implemented an organisational division between the co-operative society (VTN) on the one hand and the co-operative firm (The Greenery) on the other hand. The effect of this separation is that growers only have indirect influence on the activities of the firm. For the transaction relationship between grower and Greenery, these changes mean that the decision-making power over the marketing of the growers' products lies with The Greenery (see Chapter 4 for a more details on VTN/The Greenery).

Table 5.2 Key figures of the main restructured auctions (2000)

	Turnover (million Euro)	Members	Employees
VTN/The Greenery	1522	4000	2712
ZON	330*	1500	432
Fruitmasters	91	1250	195

Source: Annual Reports

*: Including ornamentals, which account for about 25% of turnover.

ZON[81]

While VTN/The Greenery is transforming into a marketing co-operative and wholesale company, Coöperatieve Veiling Zuidoost-Nederland (*Co-operative Auction Southeast Netherlands;* ZON), is becoming a service provider for growers and growers' associations. The restructuring process of ZON is the result of the strategic decision to leave the marketing decisions with the growers themselves. While in the traditional auction the growers' products disappeared in an anonymous market, under the new strategy growers themselves have to decide which markets to target, which customers to supply, and which

[81] This section on ZON is based on the 2000 Annual Report and on an interview with the CEO, Ron Mulders, on October 9, 2001.

sales method to use. The new task of ZON is to facilitate the sales and marketing process in close collaboration with growers and new POs.

The decision to become a service provider has several implications for the structure and activities of ZON (ZON Annual Report, 2000). First, the auction used to be organised as a top-co-operative[82], with regional co-operatives as its members. Growers were members of these regional co-operatives and thus had only indirect influence on ZON policies. This structure, however, hampered a direct connection between growers and their customers. To link producers with customers and make possible direct interaction between growers and ZON, the intermediary co-operatives had to make room for direct membership of growers of co-operative ZON.

Second, the main services provided by ZON are organised in different business units in order to make explicit what the added value of each service is for the growers. These services include providing a market place (with auction clock and contract mediation), sales administration, logistic and storage facilities, quality control, sorting, and maintaining contacts with retailers and other customers. While these services are carried out collectively because of economies of scale and scope, the users carry the costs in proportion to their patronage.

The new strategy and structure have far-reaching implications for the relationship between growers and ZON and for the role of new POs. While other co-operatives tend to see their members more and more as mere suppliers, ZON considers its members as its primary customers. Growers will have to be more explicit in their demand for services from their co-operative. Since it is very costly for ZON to deal with all growers on an individual basis, part of the strategy of ZON is to support growers of the same product to form POs. Both for ZON and for the customers (i.e., the wholesalers and retailers) it is more efficient to deal with a PO than with a number of individual growers. To sum up, POs are an essential element of the new strategy of ZON.

Fruitmasters[83]

Fruitmasters, a specialised fruit marketing co-operative, follows a strategy that lies in between those of Greenery and ZON. At Fruitmasters also the role of the auction clock has diminished, to about one third of all members' products. Another one third is sold through contract mediation and the last third is actually bought by a wholesale subsidiary of Fruitmasters (i.e., Fruitmasters Holland). The latter poses an interesting challenge for the co-operative because it competes with the trading companies that purchase products at the auction or mediation agency.

Fruitmasters considers itself a service provider to the growers. The marketing choices lie with the growers, but the execution of the marketing (and related) activities is delegated to the co-operative firm. Because fruits like apples and pears can be stored and because there are many trading companies that would like to purchase directly from the grower, the latter always has several options for selling its products. However, Fruitmasters wants the sales and marketing task to be carried out collectively to benefit from economies

[82] Sometimes called a federative co-operative.

[83] This section on Fruitmasters is based on the 2000 Annual Report and on an interview with the CEO, Ryan Verwoert, on October 16, 2001.

of scale and scope and to prevent competition among the growers themselves (and thus price erosion).

The need for centralisation of the sales and marketing task also determines the position of Fruitmasters vis-à-vis POs. Although there are only a few POs of growers of fruits, Fruitmasters acknowledges the advantages of POs in the communication between co-operative firm and member firm and in bringing growers together to exchange ideas on marketing. At the same time, Fruitmasters strongly disapproves of POs starting commercial activities.

5.3 The rise of new producer organisations

Growers who wanted to exit the auction co-operative and contract with wholesalers directly were faced with a dilemma. Wholesalers were not interested in dealing with individual growers (but for untypical large producer), and growers knew that their bargaining position vis-à-vis the wholesaler was weak when negotiating individually. Selling their products collectively would improve the attractiveness and the bargaining power of the growers. Therefore, producers who left the co-operative auction have established new POs. Bargaining with a wholesaler, retailer or food processor is the main function of these organisations. In addition, some of them also facilitate knowledge exchange among members, set up quality control systems, and develop product-specific marketing activities.

Since the early 1990s, a large number of new POs have been established in Dutch food horticulture. Between 1993 - when the first was set up - and 2001, the Dutch Chamber of Commerce registered 74 new fruit and vegetables POs.[84] Figure 5.1 gives the distribution of the establishment of new POs over the years 1993 through 2000. Most of the new organisations have been formally established in the second half of the 1990.[85]

In Figure 5.1 we have also made a distinction between association and co-operative. Association stands for bargaining association, and co-operative is short for marketing co-operative. A bargaining association is set up for the collective sales of the members' products or the collective purchase of inputs to be used by the member firms. For instance, growers of vegetables for the processing industry bargain - before the growing season starts - about prices, quantities, qualities and delivery conditions. Bargaining associations are quite common in situations where a number of farmers grow the same crop and sell their products to the same customer (cf., Iskow and Sexton, 1992).

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[84] POs that have subsequently been terminated are included. In addition to the formally established POs, several growers' groups exist that have similar goals but do not (yet?) have a legal status. Examples are Excellent Growers Group, Rivierenland and Zoetpuntpaprika. These groups have not been included in the analysis.

[85] Interviews with board members of several POs made clear that the informal establishment preceded the formal registration at the Chamber of Commerce by one or two years.

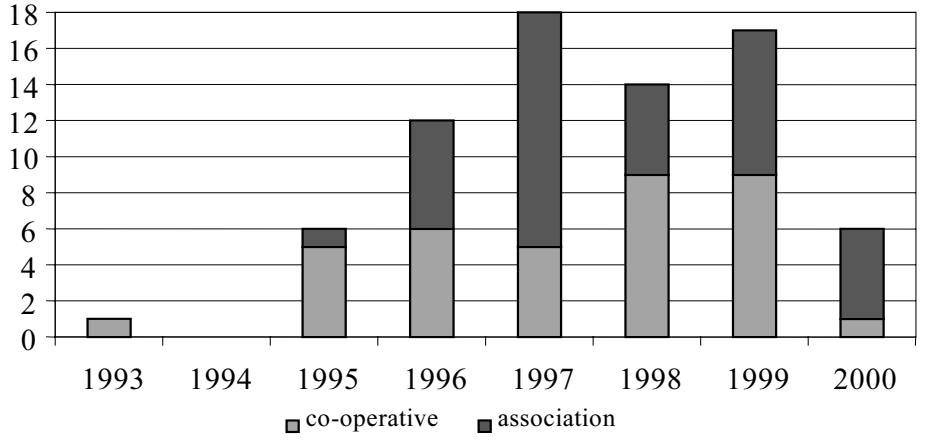

Figure 5.1 Number of new producer organisations per year, 1993-2000
Source: Compiled on the basis of information retrieved from the on-line trade register of the Dutch Chamber of Commerce (www.kvk.nl; consulted in July 2001).

Half of all new POs are grower-owned co-operatives.[86] A marketing co-operative is set up to provide services that go beyond collective bargaining and for which investments by the members are required. For instance, if the marketing of the members' products requires sorting and packaging, the co-operative firm may built a sorting hall, purchase sorting and packaging equipment, and hire personnel. Additional investments may be in marketing assets, such as a brand name. Because a co-operative means that the member firms hold assets in another stage of the production and distribution chain, we have called it a form of vertical integration (see Chapter 2). Thus, while a marketing co-operative often also has bargaining function, the distinction between bargaining association and marketing co-operative lies in the difference of governance structure for the transaction between grower and marketing firm. The bargaining association represents a market-type of governance structure while the marketing co-operative stands for a vertical integration type of governance structure.

The governance structure distinction between association and co-operative is mirrored in the legal status of the PO. Under Dutch law an association is not a firm; it is not meant to carry out independent economic activities and it cannot make a profit. By establishing a co-operative, growers collectively establish a new firm. This co-operative firm can execute economic activities, such as purchasing and selling, hiring employees, investing in physical and intangible assets.

Besides the distinction between association and co-operative, we will make a second categorisation. This second dimension concerns the relationship between the grower

[86] Of the 36 new co-operatives that have been registered in the selected period, seven are no longer in operation (by mid 2001).

and the restructured auction. Is the grower still a member of the restructured auction co-operative or has he left the co-operative? If the grower continues to be a member of the restructured auction co-operative, we call him a dependent grower. This dependency refers to the statutory obligation to sell all products through the restructured auction co-operative. If the grower has left the restructured auction co-operative, we call him an independent grower. If this grower has subsequently set up a new PO, we call this an independent PO. If the dependent grower has set up a new PO, this is a dependent PO.

The distinction between dependent and independent PO correlates with the scope of action of a PO. A dependent PO has to co-ordinate its (marketing) activities with those of the restructured auction co-operative; independent POs have full sovereignty over decisions about which clients to serve, what investments to make and what marketing strategy to follow. Even dependent POs may obtain some room for making unilateral decisions if they have sufficient bargaining power within the restructured auction co-operative. For instance, the cucumber PO *Friskom* has substantial bargaining power vis-à-vis The Greenery because it represents almost all cucumber-producing members of VTN and cucumber is an indispensable product in the Greenery portfolio.

		relationship with restructured auction	
		dependent	independent
governance structure	association	(1)	(2)
	co-operative	(3)	(4)

Figure 5.2 Four types of new producer organisations

By combining the governance structure choice with the distinction between dependent and independent PO we obtain a two-by-two matrix of four types of new POs (Figure 5.2). The first type of PO, depicted by (1), brings together producers who continue to be member of one of the large restructured auction co-operatives. The main goal of this type is to promote and defend crop-specific interests within these large (and often heterogeneous) co-operatives. The second type (2) consists of growers who have never been member of the auction co-operative, or who have terminated their membership. The main goal of these independent associations is collective bargaining vis-à-vis a wholesale company or a food processor. There are not many POs in this category. The third type of PO (3) also consists of members of The Greenery, Veiling ZON and Fruitmasters. These growers have established new co-operatives, not only to defend their common interest vis-à-vis the restructured auction, but also to invest in product-specific sorting, packaging and marketing activities. The fourth type (4) brings together growers who have left the restructured auction co-operative. Because their commercial ambitions could not be realised within the traditional or even the restructured auction, these growers have established their

own marketing co-operative, carrying out activities like sorting, packaging, selling, marketing and quality control.

Three types of POs will be described in more detail in the following sections: associations of dependent growers, co-operatives of dependent growers, and co-operatives of independent growers.

5.4 New dependent associations

Between 1993 and 2001 at least 28 new dependent associations (type 1 in Figure 5.2) have been established by growers who continue to be members of a restructured auction co-operative.[87] Table 5.3 presents for each association the year of establishment (using the date of registration at the Chamber of Commerce), the number of members in 2001, and the main product. In addition to these 28, several associations have been formed that have not officially registered at the Chamber of Commerce.[88] We expect that these informal organisations have the same functions as the formal ones and that they will eventually become officially registered POs.

Why do growers who are members of a restructured auction co-operative set up separate product-specific associations while continuing being members of the large co-operative? This question can be divided into two subquestions: why set up an association, and why remain member of the restructured auction. The answer to the first subquestion has three elements.

A first reason to set up a new PO can be found in changing consumer demand and tougher competition in international markets. In reaction to these changing market conditions, growers have developed new products. These specialties often require specific marketing activities to fully exploit the niche markets they are targeting. However, it may not be in the interest of the restructured auction to set up marketing activities for individual products. A conflict of interest arises between producers demanding product-specific marketing and the marketing co-operative developing a marketing strategy for all products together. Even if the co-operative firm is willing to support product-specific marketing, investments and human capacity are scarce resources and cannot support all products equally. By setting up a product-specific association, growers of specialty products strengthen their bargaining position vis-à-vis the management of the co-operative firm.

The second reason lies in the auction restructuring process itself.[89] Part of this process consists of increasing the geographical scale of operation. Thus, growers from various regions are united within one co-operative. With growing geographical spread of

[87] Excluded are several POs that were originally established as an association and were later transformed into a co-operative. These new co-operatives are included in Section 5.5.

[88] For examples see note 84.

[89] As the restructuring of the auctions is an ongoing process, growers establishing new associations may react to this process as well as to the outcome of the process. These factors cannot be disentangled.

the membership, the interests of the members may become more heterogeneous. For instance, if the restructuring and economising process requires the closing of a delivery location, growers from this region may fight to keep 'their' location open.

Table 5.3 New associations of dependent growers (n = 28)

Name	Established in	Members*	Main product
Longer Life Span	1995	80	tomatoes
Aumosa	1996	exit**	aubergine
Pamosa	1996	83	peppers
Professional	1996	7	tomatoes
Evident Tomatoes	1996	45	tomatoes
Blauwe Bessen Collectief	1997	40	blueberries
Witpuntpaprika	1997	4	peppers
Friskom	1997	250	cucumbers
Tros Partners	1997	45	tomatoes
Zonlof	1997	22	chicory
Tomara	1998	exit	tomatoes
Across Borders	1998	11	tomatoes
Quality Pepper Packers	1998	60	peppers
Drunen	1998	10	leeks
Frumosa	1998	15	fruits
Fresh Fantasy	1999	32	lettuce
Big Best	1999	16	tomatoes
Everest	1999	12	lettuce
Paddestoelen	1999	20	mushrooms
Veratel	1999	28	rhubarb
Raphanus	1999	20	radish
Fresh Bean	1999	20	beans
RoDeKo	1999	115	cabbage
NewStar 2000	2000	17	apples
Red Chique	2000	9	chicory
Delta Fruit	2000	140	fruits
Cherry Queen	2000	4	cherries
Houtig Kleinfruit Holland	2000	30	soft fruits

*: the number of members has been taken from trade journals and information provided by the PO itself; the size of the membership may vary from year to year;
**: exit means that the association no longer exists (in 2001);

A third reason lies in the loss of influence for the members of the restructured auction co-operative. If this marketing co-operative follows a strategy of becoming a preferred supplier to its retail customers, it has to make member interests subordinate to the

interest of the customer (at least in the short term). To achieve its market-oriented goals, the management of the marketing co-operative claims more freedom of operation from the membership (compared to the situation in the traditional auction co-operative). Members loose part of their influence on the management of the co-operative firm. An association may give growers an alternative instrument for influencing the management of the co-operative firm.

To sum up, market conditions that favour product differentiation, new functions of the marketing co-operative, and increasing heterogeneity among the members have been reasons for growers to promote product-specific interests. The association was the vehicle to do so. Finally, there is also a reinforcing mechanism in establishing associations. When one group of growers starts an association for negotiating with the co-operative firm about the marketing of the association's product, growers of other crops may feel pressed to do the same.

The second question raised above was why growers who have set up product-specific associations do not exit the restructured auction co-operative. The answer lies in the benefits of a large organisation. Members profit from economies of scale in administration, risk reduction and quality control systems. Moreover, the large organisation may be able to achieve some market power, and has (or has access to) more resources for promotion activities. Thus, economies of scale and market power of the restructured auction co-operative may be more important for these growers than having the full freedom of an independent association.

5.5 New co-operatives

5.5.1 Choosing the co-operative form

Between 1993 and 2001, 36 new co-operatives were established. By mid 2001, 29 of these were still operating.[90] In the survey, 24 new co-operatives (i.e., 66% of total) have returned the questionnaire. We have asked the reason for choosing the co-operative as the legal form for the collective enterprise. Table 5.4 presents the results for both dependent and independent co-operatives.

Table 5.4 shows that (board) members of new co-operatives still consider the traditional co-operative goals of sharing costs and benefits as a major reason to choose a co-operative as the legal form of their collective enterprise. Equally important is the desire to restrict the legal liability of the growers and the board of directors. Some associations have chosen to formally locate the commercial activities in a limited company. Because an association is not allowed to establish a limited company, some associations transformed into a co-operative. Four directors explicitly mentioned eligibility for obtaining subsidy under EU Regulation 2200/96 as reason to establish a co-operative. Some of the directors

[90] Two are formally dissolved; five are 'dormant': they still exist as legal entity, but do not carry out any activities.

that gave 'legal reasons' as answer may also have referred to the EU Regulation requirements.[91] Other reasons mentioned were fiscal benefits, flexibility of the organisation (particularly entry and exit of members), and a strong collective bargaining position.

Table 5.4 Reasons for choosing a co-operative as the legal form of the enterprise (n =24; more answers possible)

Reasons	***# times mentioned***
Sharing costs and benefits	10
Liability / legal reasons	10
EU subsidy requirement	4
"Strength in unity" (*samen sterk*)	4
Fiscal reasons	3
Flexible organisational form	3
Others	2
Total	*44*

In our survey, directors were asked about the goals of the co-operative. Directors could indicate for a given set of seven goals whether each was a primary goal, a secondary goal or no goal. Directors could also add other goals to the list. Table 5.5 presents the results for 24 new co-operatives. Guaranteeing product quality is the most important goal of the new co-operatives, while strengthening the bargaining position vis-à-vis customers is a good second. Benefiting from economies of scale, guaranteeing continuous supply to customers, and selling under brand name are mentioned by more than half of all co-operatives as a primary goal. Strengthening the bargaining position vis-à-vis suppliers and developing new products are less important for the members of the new co-operatives.[92]

[91] In the Netherlands, only co-operatives are eligible for these EU subsidies. Section 5.7 gives more information on the EU Regulation and the Common Market Organisation.

[92] Goals and activities are not always clearly distinguished. The ultimate goal of a growers' association is to increase members' income. The goals listed in the survey could also be considered as activities to reach this main goal.

Table 5.5 Goals of all new co-operatives (n = 24; more answers possible)

	Primary goal	Secondary goal	No goal
Guaranteeing product quality	19	3	3
Strengthening bargaining position vis-à-vis customers	17	5	1
Benefiting from economies of scale	15	6	1
Guaranteeing continuous supply to customers	13	5	2
Selling under brand name	11	6	2
Strengthening bargaining position vis-à-vis suppliers	7	9	2
Developing new products	6	11	0

5.5.2 New co-operatives of dependent growers

Above we have distinguished two types of new co-operatives: of dependent growers and of independent growers. Here we will describe the co-operatives of dependent growers (the dependent co-operatives). Section 5.5.3 presents the independent co-operatives.

Several of the dependent co-operatives were originally established as associations, and later turned into co-operatives when they expanded their activities from only bargaining to sorting, packaging and marketing. These activities require investments by the members in a collective firm, for which the co-operative is a more suitable legal form. Some of these co-operatives have established a limited (holding) company for the actual executing of the commercial activities, mainly for fiscal reasons. Table 5.6 lists all 20 new co-operatives of dependent growers that have been set up between 1993 and 2001. Two of these co-operatives are no longer existing, while four of them are no longer operational (they are 'dormant').

Table 5.7 presents the main goals of 14 new co-operatives of dependent growers. Strengthening the bargaining position vis-à-vis customers, guaranteeing product quality, and benefiting from economies of scale are the main goals. It is interesting to see that these growers find strengthening their bargaining position vis-à-vis customers so important, because the sales process is carried out by or in collaboration with the restructured auction.

It is not clear from the survey whether directors have taken 'customers' to mean the restructured auction or the wholesalers. The other goals listed are mentioned less often as main goals, and more often as secondary goals. One co-operative mentioned another main goal: knowledge exchange among members.

Table 5.6 Co-operatives set up by dependent growers (n = 20)

Name	Established	Members*	Main product
Gartenfrisch	1995	65	tomatoes
Prominent	1995	22	tomatoes
Present	1995	10	tomatoes
Neraco	1996	exit	radish
Frutanova	1996	7	tomatoes
De Smaaktomaat	1996	81	tomatoes
Komosa	1996	89	cucumbers
Oranje Paprika	1996	29	peppers
Witte Paprika	1997	4	peppers
Spruiten	1997	417	sprouts
Greenco	1997	9	tomatoes
Growers Connection	1998	exit	aubergine
Natures Best	1998	9	cucumbers
Fresh Orange	1998	7	peppers
Tinkerbell	1998	dormant	baby peppers
EKO 2000	1999	dormant	mushrooms
Dutch Fresh	1999	dormant	vegetables
Pretty Purple	1999	dormant	peppers
Quality Growers Holland	1999	3	chicory
Green Connection	2000	23	peppers

*: exit = no longer existing; dormant = still existing but not in operation

Table 5.7 Goals of new co-operatives of dependent growers
(n = 13; more answers possible)

	Primary goal	Secondary goal	No goal
Strengthening bargaining position vis-à-vis customer	9	3	1
Guaranteeing product quality	9	3	2
Benefiting from economies of scale	8	2	1
Strengthening bargaining position vis-à-vis suppliers	4	4	1
Guaranteeing continuous supply to customers	4	3	2
Developing new products	4	7	0
Selling under brand name	4	4	2
Exchanging knowledge among members	1	0	0

These goals translate into various activities. Some co-operatives have built their own sorting and packaging centre, some carry out part of the sales activities themselves, and some have their own marketing programme (such as promotion of their brand name, maintaining a site on the Internet). All these activities are carried out in collaboration with or with consent of the restructured auction. The latter organisation continues to do the sales administration for the new dependent co-operatives.

5.5.3 New co-operatives of independent growers

Already by the end of the 1980s, innovative growers collaborated with seed companies and exchanged information among each other about cultivation practices and marketing opportunities. As discussed above, the auction was not well positioned to promote such innovation activities. Refusal by the auction co-operative to start specific marketing programmes for specialties, in combination with positive experiences of marketing outside of the auction led several innovative growers to establish their own co-operative PO. Personnel were hired to do the sales and marketing activities, and investments were made in sorting and storage equipment, in marketing, and in special packaging. The focus of these POs is on the top segment of the fruit and vegetable market; some carry their own brand. From 1993 through 2000, 16 new co-operatives of independent growers have been established (Table 5.8).

Table 5.9 presents the main goals of the independent co-operatives. Guaranteeing product quality is the most important goal; 10 out of 11 marked it as a primary goal. In second position we find guaranteeing continuous supply to customers. Strengthening the bargaining position vis-à-vis customers is also an important goal. Strengthening the bargaining position vis-à-vis suppliers is not important. A director of an independent association told us that most of the independent growers are large enough to individually profit from any discount from suppliers. Several other goals were mentioned in the survey, some more customer-oriented, others more production-oriented.

Table 5.8 Co-operatives set up by independent growers (n = 16)

Name	Established	Members	Main products
Unistar	1993	35	fruit
Cherrytomaat	1995	3	cherry tomato
Rode Parels / Red Pearl	1995	10	tomatoes
Quality Queen Growers Group	1996	27	peppers, cucumbers, tomatoes
Rainbow Growers Group	1997	21	greenhouse vegetables
Sweet Color Pepper	1997	22	peppers
CCH	1998	5	mushrooms
Fossa Eugenia	1998	18	tomatoes, aubergines, lettuce
Rijko	1998	280	vegetables for processing
Green Nature Group	1998	5	tomatoes
White Pearl	1998	16	cauliflower
Eurosol	1999	dormant	tomatoes
Best Growers Benelux	1999	50	greenhouse vegetables
Diana	1999	5	tomatoes
Rainbow Paprika Telers	1999	7	peppers
Vers Direct Teelt	1999	33	greenhouse vegetables

Table 5.9 Goals of new co-operatives of independent growers (n = 11)

	Primary goal	Secondary goal	No goal
Guaranteeing product quality	10	0	1
Guaranteeing continuous supply to customers	9	2	0
Strengthening bargaining position vis-à-vis customers	8	2	0
Benefitting from economies of scale	7	4	0
Selling under brand name	7	2	1
Strengthening bargaining position vis-à-vis suppliers	3	5	1
Developing new products	2	5	3
Accessing CMO subsidy	1	0	0
Delivering directly to client	1	0	0
Obtaining market position	1	0	0
Producing in a environment-friendly way	1	0	0
Exchanging knowledge among members	1	0	0

When we compare the goals of the dependent and the independent co-operatives (Tables 5.7 and 5.9), we see that guaranteeing quality is more important for the independent co-operative, while strengthening the bargaining position vis-à-vis customers is more important for the dependent co-operatives. Also guaranteeing continuous supply to customers is less important for dependent co-operatives. New co-operatives of independent growers seem to have a stronger customer-orientation than the new co-operatives of dependent growers, because they give higher priority to activities that customer value (i.e., guaranteeing product quality and continuous supply).

New co-operatives of independent growers trade with wholesalers or have their own wholesale subsidiary. Of the 15 newly established co-operatives[93], six are part of a cluster of collaborating POs. They share several wholesale subsidiaries, which are organised as limited companies. The six collaborating co-operatives follow a very active marketing strategy: they sell their products under brand name, they have their own packaging activities, and they have rather extensive websites presenting products and members. Three new co-operatives have been set up by wholesalers themselves, in order to strengthen information sharing and commitment of their own suppliers, and also to be eligible for EU subsidies. These three do not have their own marketing programmes. One co-operative of fruit growers has in-house wholesale activities. One co-operative is a bargaining co-operative for growers that supply the vegetables processing industry. Finally, four co-operatives have contractual relationships with independent wholesale companies.

[93] Of the total number of 16, one is no longer functioning but still formally existing (=dormant).

5.6 Functions of new producer organisations

Table 5.4 presented the main goals of the new co-operative POs. Guaranteeing product quality and strengthening bargaining position vis-à-vis customers are the most important reasons for growers to establish a new co-operative. Also benefiting from economies of scale, guaranteeing continuous supply to the customer, and selling under a brand name are considered important goals. The activities needed to reach these goals can be clustered. In this section we will discuss the following clusters of goals and activities: bargaining, quality control, and marketing.

5.6.1 Bargaining

Most POs have a bargaining function, for instance in collectively selling the products of the members to a customer. The main goal of a bargaining PO is to maximise members' income, by negotiating the best delivery conditions. While the price is the most important bargaining issue, other delivery conditions are relevant as they also influence grower income. Research on bargaining associations in the American fruit and vegetable sector (supplying the processing industry) showed that negotiation issues also included moment of payment, quality of the produce, length of the contract, transport, weighing procedures, and pesticides use (Iskow and Sexton, 1992). Stability of the price is particularly important for growers' investment decisions.

Whether bargaining is effective depends for a large part on its market share. The larger the market share, the fewer alternatives for the customer, and the larger the bargaining power of the association. In the fresh fruit and vegetables industry many different products are substitutes. Thus, not only market share, but also substitutability is an important element determining bargaining power. The strongest negotiation power is obtained by having a large share of a market for a special product. Once a large market share has been obtained and can be maintained, the bargaining outcome can even be improved by putting restrictions on the quantity of production. One of the main challenges for a bargaining PO is the free rider behaviour of growers producing the same (or similar) products without being member of the PO.

Our survey showed that co-operatives of dependent growers consider strengthening their bargaining position vis-à-vis customers as their main goal (Table 5.7). Generally, these customers are wholesalers, but they can also be retailers if the PO trades directly with retailers. Several dependent POs trade directly with wholesalers, while the restructured auction co-operative (of which the growers continue to be members) provide logistic or administrative services to the association. Growers then negotiate with the wholesaler about the price they receive for their product and with the restructured auction about the price they have to pay for its services. Other growers let the restructured auction do the marketing and sales, but still feel the need to strengthen their bargaining position vis-à-vis this large organisation. The need for stronger bargaining power is particularly present when the restructured auction co-operative follows a market-oriented strategy putting the customer first and the supplier (i.e., the grower) second.

5.6.2 Quality control

From interviews and trade journals it was already known that quality assurance is one of the main functions of the new POs. This finding was confirmed in the survey: 19 out of 24 co-operatives indicated 'guaranteeing product quality' as a primary goal. This emphasis on quality is a result of and a strategic reaction to three developments in the fresh produce market. First, consumers have become more concerned with food quality issues (where quality also concerns both products and the production process). Second, retailers have made quality as a major issue in their competition strategy. Third, intensified competition has led growers to use quality and quality assurance programmes as an element of competition strategy.

There is a strong link between selling under a brand name and organising quality control. The quality of a product is part of the image that is communicated by way of a brand name. The company that has invested in establishing the brand name (i.e., the owner of the brand) has a strong interest in maintaining the quality of the product. It stands to lose the (sunk) investment if the brand name is devalued due to bad product quality. Therefore, the brand owner will determine quality requirements, and will organise quality control. Retailers selling fruits and vegetables under their own brand will take an interest in controlling the quality of the products, because defected products may devalue the brand as a whole and thus also affect the sales of other products sold under this label. Particularly retailers targeting the top-quality segments of the market have elaborate quality control systems. In the last decade, several large European retailers have set up quality assurance systems for their supply of fresh produce, individually or collectively in the Eurep GAP initiative (Aust Stern, 2001; Brouwer and Bijman, 2001).

Implementing a quality assurance system that includes difficult to measure requirements for production may be easier if it is initiated by a grower-owned marketing co-operative than by a private wholesale company. Because in the co-operative decisions on the quality assurance programme are made by the growers themselves, the commitment to abide the rules may be larger (and chances of shirking or free rider behaviour by growers may be lower).

5.6.3 Marketing

A PO developing its own marketing strategy has to make many choices, like:
- selling by way of the auction clock or contract negotiation;
- developing a trade name or a consumer brand name;
- selling under producer brand or retailer brand;
- targeting specific customers, and thus specific wholesalers and/or retailers;
- selling individual products or packages of products.

The choices on these issues depend to a large extent on the answer to another essential question: should the PO carry out the marketing itself or should it leave it to the restructured auction co-operative. POs of independent growers have full freedom in making these choices, but POs of dependent growers have to co-ordinate their marketing strategy with that of the restructured auction.

Many POs have been established to exploit new market opportunities for specialty products. For these organisations, marketing is at the forefront of their business strategy. However, POs focussing on their bargaining function have less elaborate marketing strategies. In general, there is a large diversity in the choices made by the various (co-operative) POs.

A number of POs have started marketing activities with developing their own packaging, including a trade name and a logo.[94] Such PO-specific packaging can play an important role in the relationship with customers, as it distinguishes the product from other products. If the customer is a wholesaler, this firm can also use this distinction in its own marketing strategy vis-à-vis retailers. Still, developing a trade name and specific packaging is only the first step in a marketing strategy. An additional activity can be the introduction of a consumer brand name. A brand name is a vehicle for communication with clients. It distinguishes one product from another and it represents certain (quality) characteristics. It thus helps customers in their search activities, reducing information and search costs. A brand represents a certain reputation and can tie a customer to a specific producer. Co-operatives POs have introduced several new brand names, such as Red Pearl tomatoes, Rainbow peppers, and Natures Best cucumbers.[95] By selling under brand, growers try to exploit consumer willingness to pay a higher price for a specialty product.

There is an organisational link between the marketing function and the sorting/packaging function. Branding a product necessitates sorting and packaging to be under control of the brand owner. Sorting determines which products (i.e., which quality) are sold under the brand, while packaging determines the appearance of the product. Thus, we may expect that POs with a branded product strategy also have their own sorting and packaging facilities.

Marketing activities of the new POs encounter several limitations. First, marketing of branded fruits and vegetables is a costly activity. The huge investments required to establish a consumer brand can hardly be repaid by the profits of a single fruit or vegetables specialty product. Many new POs started with the ambition to capture a market niche by developing a specialty product and by marketing this product under a brand name. Soon they realised that they do not have the financial resources to establish a consumer brand or that they do not have direct access to the consumer. Two strategies have crystallised from this experience. One is focussing on establishing a trade name, targeting wholesalers and retailers instead of consumers, and informing these customers about the qualities of the branded products.[96] The second strategy is closer collaboration among POs in order to benefit from economies of scale in marketing.

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[94] A trade name and accompanying packaging can also be important for internal reasons, as it is the tangible symbol of co-operation.

[95] Also a restructured auction like The Greenery has introduced a brand name for its products: *the greenery*. Such firm-specific brand name for fresh produce is a fundamental deviation from the marketing tradition under the old auctions where all produce was internationally promoted under the collective brand name "Holland".

[96] Even the growers of *Tasty Tom* (one of the most well known new tomato brands) have acknowledged that directly reaching the consumer was a bridge too far, and that they should target wholesalers and retailers (Zuidland, 22/6/01).

Investment in the promotion of the specialty product is needed to complement investment in the development and production of these specialty products. However, it does not have to be the producer himself who invests in marketing; also the wholesaler or retailer can invest in promoting the specialty product. Because of the asset specificity of a brand name, it is not likely that the company having no control over production will invest in establishing a brand name for that product. Therefore, we will not see wholesalers investing in brand names, and we see retailers investing only in store brands (i.e., private labels), not in product brands.

The second problem encountered is that product brands compete with retailer own brands, making retailers unwilling to support the introduction and/or promotion of a branded product. The role of the retailer in marketing of fruits and vegetables has become much more important in recent years. The large food retailers nowadays account for the majority of fresh produce sales to consumers. In addition, the fresh produce department has become an important element in the marketing strategy of the food retailer (Bech-Larsen, 2000). Product-specific brands do not fit in the retail strategy of selling fruits and vegetables under private label.

A third problem concerns the organisation of the production and distribution chain. Given the vulnerability of a brand, the owner would like to exert control over several stages of the production and distribution chain. The brand-owner determines which products are sold under the brand, what quality characteristics these products have, what outlets the products are being sold, and which new products are being developed to be sold under the brand. In other words, brand ownership calls for co-ordination of the production, marketing, quality control and innovation functions. It is an open question whether POs have the capabilities and resources to exert sufficient control over the whole chain.

A fourth challenge is also related to capabilities of the POs, particularly the capabilities of the board of directors. Because marketing requires a rather different expertise than production, it may be difficult for the board to develop these capabilities or to be able to select the best marketing managers. The problem here is one of bounded cognition: the board members may just not be knowledgeable and experienced enough to make the most efficient decisions.

So far, we have not made a distinction between dependent and independent co-operatives. While it is evident that independent co-operatives have to develop their own marketing strategy, also dependent co-operatives with special products have started to think about special marketing efforts. Whether their special marketing demands are met by the large restructured auction co-operative depends on the strategy of the latter. If it follows a strategy where marketing decisions are all made on the central and not at the local (grower or PO) level, a conflict of interest may result. If the restructured auction leaves all marketing decisions to the growers or PO, we can expect a more harmonious relationship.

A last element of the marketing strategy concerns the choice between selling one product or selling a package of several (related) products. For instance, a PO may bundle tomatoes, lettuce and cucumber to be sold as salad package. This makes the PO a more interesting business partner for wholesalers and retailers. However, it increases the heterogeneity within the organisation, resulting in decision-making costs and other efficiency problems (see Section 5.8).

5.7 The role of EU policy

So far, we have studied changing market conditions as the main reason why growers of fruits and vegetables have set up new associations and co-operatives. Additional explanations come from changes in public policies. The establishment of new POs has been supported by European Union policy. On 26 October 1996 the European Council adopted the *Regulation (EC) No. 2200/96 on the common organisation of the market in fruit and vegetables*. This common market order meant a major deviation from earlier policies: from the defensive instrument of intervention payments to the offensive instrument of promoting marketing activities and strengthening producer market position. The main goals of the new Regulation are the following. First, to lower intervention payments that had lead to structural excess supply, by reducing community compensation for product withdrawals. Second, to alleviate the negative effects of greater liberalisation of international trade and the accession of new Members States, by strengthening producers' position in the more competitive and open market. Third, to strengthen the position of relatively small producers vis-à-vis large purchasers, by encouraging them to establish producer organisations.

The cornerstone of the new fruit and vegetable market order are the POs, which take care of the grouping of supply and the marketing of produce (CEC, 2001). They also play a relevant role in the improvement of the environmental performance of the horticultural sector. In a more competitive and open market POs should enable producers better to react and adapt to market signals. Membership is voluntary, but members are obliged to market their entire production through the PO. In exchange, democratic rules will enable producers to scrutinise their organisation, which also has to provide members with the technical assistance needed in adopting environmentally sound agricultural practices.

All recognised POs are entitled to Community financial support to set up an operational fund. This fund is financed half by members themselves and half by EU contribution. Such a fund can be used to finance an operational programme meant to strengthen the market position of the producers and to promote a more environment oriented operation of the sector. Within an operational programme, the following activities are eligible for financial support: improvement of product quality, enhancing products' commercial value, promotion of the products targeted at consumers, creation of organic product lines, the promotion of integrated production or other methods of production respecting the environment, and the reduction of withdrawals.

In 2000, almost 1400 POs accounted for 40% of total fruit and vegetable sales in Europe (CEC, 2001). In the Netherlands, fourteen POs are officially recognised, and most of them have received financial support from Brussels (Table 5.10). In 2000, together they received 30 million Euro in support under the common market order. The list of Dutch recognised organisations includes both the restructured co-operative auctions and several new co-operatives. These fourteen organisations account for more than 70% of all Dutch sales of fruit and vegetables (CEC, 2001).

Table 5.10 Recognised producer organisations in the Netherlands (2000)

Name	Members [1)]	Subsidies [2)] (x1000 Euro)
Best Growers Benelux (BGB)	50	[3)]
Coöperatieve Champignonafzetvereniging Horst (CCH)	5	414
Rijko	280	253
Fossa Eugenia	18	[3)]
Fruitmasters	1250	264
Nautilus	130	360
Quality Queen Growers Group	27	458
Rainbow Growers Group (CTR)	75	1802
Veiling Zaltbommel	340	739
Veiling Zuid-Limburg	200	201
Veiling Zundert	380	254
Veiling ZON	1500	4532
Vers Direct Teelt (VDT)	33	250
VTN/Greenery	4000	20920

1) Figures provided by company sources (Annual Reports or personal communication).
2) Figures provided by Product Board for Horticulture (12 November 2001). These figures may be (substantially) lower than the amounts applied for, due to lower actual expenditures.
3) These POs have not applied for subsidy in 2000.

5.8 Investment incentives and market power

5.8.1 Co-specialised investments

In section 5.6.1 we have discussed the bargaining function of a PO. It was stated that the bargaining power of a seller increases with its market share. While a large market share does not necessarily give the seller oligopolistic power, it makes him a more interesting trade partner. In the current fresh produce market, where buyers are large wholesale or retail companies, sellers feel the need to strengthen their bargaining power by building collective sales organisations. This has been one of the reasons for the mergers of auctions that led to the formation of VTN/The Greenery and Fruitmasters. However, for a marketing co-operative to be an interesting partner for large customers requires supplying many different products and supplying them year-round. This entails sourcing of products from many different suppliers.

Although in a traditional auction co-operative different growers supplied different products, the membership was homogeneous as all growers had the same interest in the optimal working of the auction. This is no longer the case when the auction co-operative becomes a marketing co-operative using different price determination methods, investing in

marketing activities, selling packages of products instead of individual products, and sourcing products also from non-member suppliers to be able to service retailers year-round. With these new functions of the restructured auction co-operative the interests of the members start to diverge. Because not all members have the same interest in these marketing activities and the accompanying investments the membership of the co-operative becomes more heterogeneous.

Heterogeneity is particularly problematic if co-specialised investments have to be made in two stages of the production and distribution chain: in production (at the level of the member firm) and in marketing (at the level of the co-operative firm). Innovative growers invest in product innovation at their own farm and want the co-operative firm to invest in the accompanying marketing effort needed to fully exploit the innovation. However, in a heterogeneous co-operative innovative growers have no full control over the investments by the co-operative because decisions are taken by all members together. Non-innovative growers may not be willing to increase investment in marketing activities, or they may want to share in the revenues of the investments. Co-operatives generally apply the principle of equality for revenues and costs that cannot easily be allocated to specific products (and thus to specific members).[97] Thus, innovative growers face the risk that their on-farm investment in product innovation will not be accompanied by investment in marketing, or that they do not receive the full revenues of their innovation because they have to share with all members of the co-operative. The result will be under-investment by innovative growers.

In Chapter 4 we have already shown that collective ownership and collective decision-making may entail a disincentive for members to invest in the co-operative firm. Incentive effects of collective ownership can also help to explain the establishment of independent co-operative PO, as innovative growers see it as a solution to the investment problem at the heterogeneous co-operative.

The independent co-operative POs established in The Netherlands so far have been very homogeneous organisations. As all members grow the same crop, on-farm investments are similar for all growers. Accompanying investments by the new co-operative PO are borne by all growers collectively and in proportion to their patronage. No conflict of interest arises within this homogeneous co-operative.

However, homogeneous co-operatives in the fresh produce sector are necessarily small and therefore lack bargaining power. Only if the co-operative sells a unique product, it can exert some market power. However, monopoly power in the fruit and vegetable industry does not exist, as substitutability of products at the consumer level is very high. Moreover, as new products can be copied within a few years uniqueness would only be temporary.

To sum up, the strong investment incentives in a small, homogeneous, one-product co-operative has a trade-off in the lack of bargaining power. Similarly, the bargaining power of a large, heterogeneous, multi-product co-operative has a trade-off in weak investment incentives for the members. Whether a homogeneous or a heterogeneous co-

[97] The equality principle serves to prevent distribution of the co-operative gain (or loss) from becoming a 'political' issue which might endanger the cohesion in the voluntary organisation (Søgaard, 1994).

operative is most efficient depends on the demand conditions, the level of required investment and the market structure. We will now analyse this trade-off in more detail, using a game theoretic model to find the switching point.

5.8.2 Incentive to invest

We distinguish homogeneous and heterogeneous POs. All members in a homogeneous PO produce the same product. A heterogeneous PO consists of at least two types of members. We assume that each member produces the same amount of output, but the quality of the output differs (for instance, one grower produces traditional tomatoes and the other produces tomatoes on the vine).

Suppose that there are two types of growers. Grower 1 produces one unit with value A and grower 2 produces one unit with value B. Assume A > B, that is, growers of type 1 deliver products with high value and growers of type 2 produce low value products. The value of the product of the grower will only be realised when a third party is involved, for instance a wholesaler.

Cooperative game theory[98] will be used to analyse the effect of the choice of co-op. A cooperative game is summarised by the characteristic function, which consists of the set of players and a specification of the pay-off for every possible subset of the set of players. Three players are distinguished. Grower 1 is player 1, grower 2 is player 2, and the wholesaler is player 3. The type of PO determines the pay-off of a coalition of players. The outcome or equilibrium of a cooperative game is a specification of a pay-off for every player. As equilibrium concept we use the Shapley value (Shapley, 1953). It is an indication of the power of each player and therefore an indication of the incentive of each party to invest.[99]

The characteristic function of a homogeneous PO is N= {1,2,3}, v(∅) = 0, v(1) = 0, v(2) = 0, v(3) = 0, v(12) = 0, v(13) = A, v(23) = B, v(123) = A+B. The Shapley value is (A/2, B/2, (A+B)/2): party 1 receives A/2, party 2 receives B/2, and party 3 receives (A+B)/2. The analysis of a heterogeneous PO is facilitated by defining I = {1,2}, that is, I is the coalition of all growers. The characteristic function of a heterogeneous PO is N= {I,3}, v(∅) = 0, v(I) = 0, v(3) = 0, v(I3) = A+B. The Shapley value is ((A+B)/2, (A+B)/2). Dividing (A+B)/2 equally over party 1 and 2 results in the Shapley value ((A+B)/4, (A+B)/4, (A+B)/2).

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[98] Cooperative game theory has nothing to do with (agricultural) co-operatives. Cooperative game theory (as opposed to non-cooperative game theory) is a mathematical tool that starts from the assumption that the agreements between the parties in the game are binding.

[99] The two most well known equilibrium concepts in cooperative game theory are the core and the Shapley value. An important advantage of the Shapley value compared to the core is that it assigns a unique value to each player, whereas the core may be empty or consist of many outcomes. An empirical reason for choosing the Shapley value is that the "performance of the Shapley-value for prediction or analysis turns out rather well" (Dixit and Skeath, 1999: 572).

Proposition 1: Grower 1 has a stronger incentive to invest when being a member of the homogeneous PO than being a member of the heterogeneous PO.
Proof: $A/2 = (A+A)/4 > (A+B)/4$ because $A > B$.

Proposition 2: Grower 2 has a weaker incentive to invest in the homogeneous PO than in the heterogeneous PO.
Proof: $B/2 = (B+B)/2 < (A+B)/4$ because $A > B$.

The equality principle regarding distribution of unallocated revenues results in an incentive to under-invest for the high quality grower in a heterogeneous PO. If growers see outside opportunities to sell high-quality products, they leave the heterogeneous PO and establish a homogeneous PO consisting of only high quality growers. This process of self-selection will result in a decrease of the average product quality in the heterogeneous PO.

5.8.3 Market power

So far, we have only looked at the investment incentives for high-quality and low-quality growers. However, in competitive market is it important to have a certain amount of bargaining power (or market power). We will now broaden the analysis, incorporating the effect of market power.

Proposition 3: The power of the wholesaler is the same in each PO.
Proof: The Shapley value of the wholesaler is $(A+B)/2$ in the homogeneous as well as the heterogeneous PO.

Proposition 3 entails that the power of grower 1 and 2 together is the same in each PO. They receive together half of the total surplus. There is in the above model no change in the distribution of market power for the growers collectively when they switch from a homogeneous to a heterogeneous PO. The reason is that the total supply of the growers is equal to the total demand of the wholesaler.

When we reduce the demand of the wholesaler we can capture the effect of the choice of PO on the distribution of market power. This provides the wholesaler with opportunities to create competition between the growers. Suppose that the wholesaler wants to buy only one unit of the product of the growers, whereas each grower is still producing one unit. The characteristic function of the homogeneous PO in this market with an abundance of supply is $N= \{1,2,3\}$, $v(\varnothing) = 0$, $v(1) = 0$, $v(2) = 0$, $v(3) = 0$, $v(12) = 0$, $v(13) = A$, $v(23) = B$, $v(123) = A$. The Shapley value is $(A/2–B/3, B/6, A/2+B/6)$. The characteristic function of the heterogeneous PO is $N= \{I,3\}$, $v(\varnothing) = 0$, $v(I) = 0$, $v(3) = 0$, $v(I3) = (A+B)/2$.[100] The Shapley value is $((A+B)/4, (A+B)/4)$. Decomposing this vector into the two growers results in $((A+B)/8, (A+B)/8, (A+B)/4)$.

[100] Notice that the package sale by the heterogeneous co-operative is responsible for $v(I3)=(A+B)/2$.

Proposition 4: The homogeneous PO creates more value than the heterogeneous PO.
Proof: $v(123) = A > v(I3) = (A+B)/2$ because $A > B$.

Proposition 5: The wholesaler has more power with the homogeneous PO than with the heterogeneous PO.
Proof: The Shapley value of the wholesaler with the homogeneous PO is $A/2+B/6$, while the total value is equal to A. The Shapley value of the wholesaler with a heterogeneous PO is $(A+B)/4$, while the total value is $(A+B)/2$. The wholesaler has more power with the homogeneous PO than with the heterogeneous PO because $(A/2 + B/6)/A = 0.5 + B/6A > ((A+B)/4)/(A+B)/2 = 0.5$.

The heterogeneous PO can be viewed as a merger of homogeneous POs. It creates countervailing power vis-à-vis the wholesaler. The creation of homogeneous POs undermines the countervailing power of the growers. This is attractive for the wholesaler. The growers obtain half of the total value with a heterogeneous PO (i.e., $(A+B)/4$ of total $(A+B)/2$), whereas they collectively receive less than half of the total value in homogeneous POs (i.e., $A/2-B/6$ of total A).

Proposition 6: Grower 2 has a weaker incentive to invest being a member of a homogeneous PO than of a heterogeneous PO.
Proof: The Shapley value of grower 2 is $(A+B)/8$ in the heterogeneous PO. The Shapley value of grower 2 is $B/6$ in the homogeneous PO. Grower 2 prefers the heterogeneous PO above the homogeneous PO for every value of A and B because $(A+B)/8 > (B+B)/8 = B/4 > B/6$.

The equality principle as well as the countervailing power principle of a heterogeneous PO is beneficial for grower 2.

Proposition 7: Grower 1 has a stronger incentive to invest in the homogeneous PO than in the heterogeneous PO when $9A > 11B$.
Proof: Grower 1 prefers the homogeneous PO above the heterogeneous PO when $(A/2–B/3) > (A+B)/8$, that is, $9A/11 > B$.

5.8.4 Conclusions

Looking at the combined effect of investment incentives and market power we can draw the following conclusions regarding the choice of PO by the different types of growers. The high quality grower (grower 1) prefers the heterogeneous PO when the difference between the two growers is not too large. In this case, the disadvantageous effect of the equality principle in the heterogeneous PO for grower 1 is not large enough to eliminate the advantageous countervailing power effect. However, current developments in fresh produce markets, favouring differentiation, product innovation and higher quality products, seem to indicate an increase in the difference between A and B. Proposition 7 implies that the high

quality growers will form a homogeneous PO in order to escape the adverse effects of the equality principle in a heterogeneous PO. The benefit of self-selection for the high quality growers is larger than the loss of countervailing power. The wholesaler gains in two ways from this self-selection effect. First the size of the total pie increases from (A+B)/2 to A. Second, the wholesaler will obtain a larger share of the pie because there are now two POs instead of one, which results in competition between the two homogeneous POs.

5.9 Conclusions

New producer organisations have been established in response to changing market conditions and transformation processes at the traditional auctions. This development process can be summarised in five stages.

Period 0: All growers are member of the auction co-operative and sell their products through the auction clock. Buyers are (anonymous) wholesalers and retailers.

Period 1: The consumer is demanding more variety and higher quality. Some growers see market new opportunities in these changing demands. They invest in product innovation. However, these investments will only pay-off if accompanying changes (i.e., investments) are made in the organisation of sales and marketing. Traditional auctions are not able or willing to make these changes, because the majority of the members do not want to make additional investments, the auction organisation does not have marketing capabilities, and the auction does not have direct contact with major retailers (needed to reach specific consumer groups).

Period 2: The most innovative growers exit the co-operative auction and start trading with wholesalers or retailers directly. Because individually growers are too small to be interesting suppliers, they form POs. These independent POs are organised around a specific product or variety. They start product-specific promotion activities. A trade name is used to signal a certain quality of product and process, as well as to strengthen internal commitment; it is the tangible expression of the growers' collective reputation. For reasons of protecting specific investments, these independent POs become co-operatives.

Period 3: Changing market conditions are also reason for the traditional auction co-operative to restructure. Some become marketing co-operatives, others become service providers to growers and growers' associations. The auction clock is (partly) replaced by contract mediation.

Period 4: Growers who continue to be members of the restructured auction co-operative also establish POs. They collaborate in developing cultivation recipes and quality control programmes. Because of increasing heterogeneity among the members of the co-operative and the new marketing strategies followed, growers feel the need to promote their product-specific interest more strongly even within the restructured auction co-operative.

The various functions that a POs performs within the fresh produce chain depend on the interaction between the strategy of the PO and the strategy of the restructured auction co-operative. The growers of dependent associations, on the one hand, choose to focus on production and delegate the marketing of their products to the restructured

auction, thus profiting from economies of scale at the marketing stage of the chain. Independent co-operative POs, on the other hand, choose to carry out the marketing activities themselves and trade directly with wholesalers and retailers. Compared to the restructured auctions, these new co-operative POs are small and have a homogeneous membership. They follow a differentiation strategy, developing special products for niche markets. Developing and marketing new products requires investments at both production and marketing stages of the agrifood chain. In an independent co-operative PO investment incentives are optimal because growers control both production and marketing and all benefits from the investment is distributed only among the members of the association. In other words, no sharing with non-investing members takes place (as would be the case in a heterogeneous co-operative). However, the disadvantage of a small homogeneous co-operative is the lack of market power. When market conditions favour differentiation, the advantage of strong innovation investments may more than compensate the disadvantage of the lack of market power.

While an independent PO may have stronger innovation incentives, its limited size is a disadvantage in a market where customers (particularly retailers) prefer to trade with only one or two suppliers that can deliver a full range of fruits and vegetables year-round. Even among the independent POs we see developments that may attenuate the disadvantages of small scale. First, growers collaborate with foreign producers or even set up foreign production themselves to be able to guarantee continuous supply to their customers. Second, independent POs increasingly collaborate in their marketing, quality control and administrative functions. We may hypothesis that in the near future mergers of independent POs will take place in order to benefit from economies of scale in administration and quality control and from economies of scope in marketing.

Because not all restructured auction co-operatives follow the same strategy, even dependent POs vary in the functions they (want to) perform. If the restructured auction prefers to locate all marketing decisions at the central level, growers may feel the need to let their PO act as a bargaining association vis-à-vis the marketing co-operative. Especially when (a part of) the restructured auction co-operative functions like a wholesale company and gives strategic priority to servicing customers, growers may feel pressed to defend their product-specific interests. A problem arises when both the PO and the restructured auction co-operative want to decide on the marketing strategy for the growers' products. If they both invest in marketing activities inefficiency may result, because the restructured auction follows a marketing strategy for its whole product portfolio (and sell bundles of products to its customers) and the PO only promotes its own products. This problem of inefficient marketing investments at two stages of the chain may particularly appear with dependent co-operatives developing their own marketing programme (e.g., their own brand name).

However, if the dependent co-operative PO co-ordinates its marketing activities with the restructured auction co-operative, there may be benefits to gain. These benefits result from the stronger investment incentives in the new PO. If the marketing investments of the heterogeneous marketing co-operative can be divided into a generic part and a product-specific part, growers may make the product-specific investment in their new co-operative PO. This reduces the need for the large marketing co-operative to obtain additional equity capital from its members.

Figure 5.3. shows the relations between the various actors in the Dutch fresh produce industry. Many new POs have appeared, some under the umbrella of the restructured auction co-operative (such as VTN/The Greenery), others as independent (marketing) co-operatives. Independent co-operatives trade directly with wholesalers. A number of growers continue to bring their products to a traditional auction, not bothering with marketing issues. The growers of the dependent associations and dependent co-operatives continue to transact with the restructured auction co-operative, but now indirectly through their new PO. It is the new PO that negotiates with Greenery management about the marketing strategy for the products of the PO. However, the control relationship of the growers with the restructured auction co-operative is still direct. These two routes for growers to influence the activities of the co-operative firm do not seem to present an efficient decision-making structure.

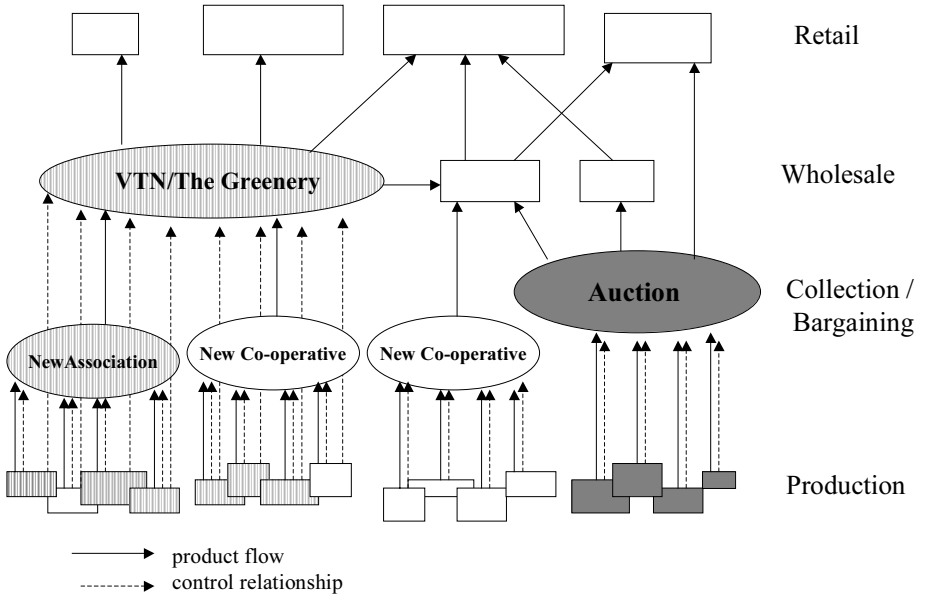

Figure 5.3 New producer organisations in Dutch food horticulture

Appendix: Questionnaire (in Dutch)

Vragen aan bestuurders van coöperatieve telersverenigingen

Basisgegevens

Naam vereniging …….…….
Jaar van oprichting: …….…….
Huidig aantal leden: ……..…….
Aantal werknemers: …….…….
Omzet: …….…….
Naam geïnterviewde: ……..……
Functie geïnterviewde: …..……..……..

Doelstellingen en activiteiten

1. Welke doelstellingen streeft de vereniging na?

Doelstelling	hoofd-doelstelling	neven-doelstelling	geen doelstelling
versterking onderhandelingspositie t.o.v. klanten			
versterking onderhandelingspositie t.o.v. toeleveranciers			
benutten van schaalvoordelen			
continue aanvoer garanderen aan afnemer			
ontwikkelen van nieuwe producten			
verkoop onder merk (consumentenmerk of keurmerk)			
garanderen van productkwaliteit			
overig:			

2. Welke activiteiten voert de vereniging uit om bovengenoemde doelstellingen te bereiken?

Formele organisatie

3. Waarom is voor een coöperatie gekozen als ondernemingsvorm?
4. Welke beperkingen voor toetreding hanteert de coöperatie?
5. Welke beperkingen voor uittreding hanteert de coöperatie?
6. Heeft de coöperatie dochterondernemingen of deelnemingen? Zo ja, hoe zijn taken tussen moeder en dochter(s) verdeeld? Waarom deze verdeling?
7. Indien beschikbaar, kunt u dan een organogram van de vereniging meesturen?

Besluitvorming

8. Hoeveel bestuursleden telt de vereniging?
9. Hoe worden de bestuursleden gekozen?
10. Heeft het bestuur volledig mandaat van de algemene ledenvergadering of zijn er besluiten waarvoor alle leden bijeen worden geroepen? Zo ja, welk soort besluiten betreft dit?
11. Hoe worden in het bestuur besluiten genomen?
    - ❑ met gewone meerderheid van stemmen (= helft + 1)
    - ❑ met gekwalificeerde meerderheid (bijv. 3/4 van alle stemmen)
    - ❑ met consensus
    - ❑ anders: ……..
12. Hoe is het stemrecht in de vereniging verdeeld?
    - ❑ alle leden één stem
    - ❑ aantal stemmen in verhouding tot omzet (met maximum aantal per lid : ……)
    - ❑ aantal stemmen in verhouding tot kapitaalinbreng
13. Over welke onderwerpen is er in het bestuur (of onder de leden) het meeste verschil van inzicht?

Investeringen en financiering

14. Welke investeringen heeft de coöperatie gedaan?
15. Hoe zijn deze investeringen gefinancierd?
    (meerdere antwoorden mogelijk)
    - ❑ kapitaalinbreng van de leden
    - ❑ kapitaalinbreng van derden
    - ❑ leningen van leden
    - ❑ leningen van banken
    - ❑ subsidies
    - ❑ overig ……..
16. Wordt bij de investering samengewerkt met de volgende partij(en)?
    - ❑ toeleverancier (anders dan leden)
    - ❑ afnemer
    - ❑ overig …….
    - ❑ geen
17. Is sprake van financiële participatie van de volgende partij(en)?
    - ❑ toeleverancier (anders dan leden)
    - ❑ afnemer
    - ❑ overig ……
    - ❑ geen

Relatie tussen lid en coöperatie

18. Hanteert de coöperatie een leveringsplicht?
    - ❑ ja
    - ❑ nee
19. Hanteert de coöperatie leveringsrechten?
    - ❑ ja
    - ❑ nee
20. Worden er afspraken gemaakt over de hoeveelheid te leveren product?
21. Worden er speciale kwaliteitseisen (anders dan wettelijke eisen) gesteld aan de producten en aan de productieprocessen? Zo ja, welke?
22. Wie heeft deze kwaliteitseisen opgesteld?
    - ❑ de vereniging zelf
    - ❑ de groothandel
    - ❑ de retailer
    - ❑ overig: ……..
23. Wie controleert naleving van de kwaliteitseisen?
    - ❑ de vereniging zelf
    - ❑ een onafhankelijke controle-instituut
    - ❑ de afnemer
    - ❑ overig: ……..

Relaties in de keten

24. Heeft de vereniging contracten met toeleveranciers (anders dan leden)?
    - ❑ ja
    - ❑ nee
25. Zo ja, om welke producten of diensten gaat het, en wat is de reden voor deze speciale afspraken?
26. Hoe worden de producten van de vereniging verkocht?
    (indien meerdere afzetkanalen, graag verdeling aangeven in procenten)
    - ❑ via de veilingklok
    - ❑ via bemiddeling, met langlopende contracten
    - ❑ via bemiddeling, met daghandel
    - ❑ overig ……
27. Heeft de vereniging contracten met haar afnemers?
    - ❑ ja
    - ❑ nee
28. Zo ja, welke zaken zijn in het contract met de afnemer geregeld?
    - ❑ prijs
    - ❑ hoeveelheid
    - ❑ kwaliteit
    - ❑ verpakking en sortering
    - ❑ duur van het contract
    - ❑ overig: ……

29. In welke landen worden de producten van de vereniging geconsumeerd?

Overige zaken

30. (indien van toepassing:) Waarom zijn de leden uit de coöperatieve veiling gestapt?
31. Wie beschouwd de vereniging als haar belangrijkste concurrenten?
32. Heeft de vereniging ambities om te groeien?
    - ❑ Ja
    - ❑ Nee
33. Zo ja, hoe wil zij dat bereiken?
    - ❑ meer leden
    - ❑ samenwerking met andere verenigingen
    - ❑ fusie met andere verenigingen
    - ❑ overig: ……

6. Summary and Conclusions

In recent decades, farmers, processors, wholesalers, retailers, and all others involved in the production and distribution of agricultural products have strengthened their vertical collaboration in order to be able to supply consumers with a broad variety of high quality products, in a highly competitive market. This process of increasing collaboration among vertically related firms has been named vertical co-ordination. Vertical co-ordination can be organised in different ways, through different institutional arrangements. The choice of institutional arrangement is a function of the type of transaction, the market and policy environment, and the state of technology. When changes in these variables occur, current arrangements may be longer efficient and new arrangement may be needed.

This thesis has studied the marketing co-operative as a particular type of institutional arrangement in the agrifood chain. Marketing co-operatives play a major role in the agricultural sector of most industrialised countries. In the Netherlands, 84 percent of all milk is processed by co-operative dairy companies, 64 percent of all sugar beets is processed by co-operative refineries, and 95 percent of all cut flowers and potted plants is sold through co-operative auctions. Also in other European countries a large part of agricultural production is processed and sold through co-operatives. As market conditions for agricultural and horticultural products are changing, many questions have been raised about the efficiency of the marketing co-operative.

A co-operative is a collectively owned firm, established to support the economic performance of its member firms. It provides particular services that are linked to the production activities of the member firms. Members profit from the co-operative firm through and in proportion to their use of these services. Members collectively control the co-operative firm, and decisions are taken by democratic procedures. These organisational characteristics influence the efficiency of the co-operative in the agrifood chain, because they affect the investment decisions of the chain participants.

We consider the co-operative as a particular governance structure. A governance structure is a specific allocation of decision rights and income rights over assets. This allocation is important when relationship-specific investments have to be made, because it determines bargaining power if contracts fail. As contracts are often incomplete, parties may be reluctant to make investments that become locked into a specific relationship. If the return on this investment depends on the access to a particular asset, then ownership of that asset provides bargaining power in case of contract reneging or renewal. Thus the governance structure determines whether efficient investments will be done or not.

The main objective of this thesis is to analyse, both theoretically and empirically, the efficiency of the marketing co-operative as a specific governance structure in fruit and vegetable production and distribution chains. As market conditions for fruits and vegetables have changed, the efficiency of the marketing co-operative is no longer self-evident. The theoretical part of the thesis is on efficient governance structures in agrifood chains and the scope of the co-operative under various conditions. The empirical part of the thesis focuses on the interaction between governance structure and other attributes of the co-operative

firm, as well as on the trade off between efficiency of the chain and the strategy of the individual firms.

The contribution of this thesis lies in the following elements:

- it describes and discusses the institutional economics literature on co-operatives (Chapter 2);
- it extends the two-agent-two-asset incomplete contracting model of Grosmann-Hart-Moore by building a three-agent-three-asset model of selecting efficient governance structures in an agrifood chain (Chapter 3);
- it provides a detailed case study of a fruit and vegetables co-operative vertically integrating into wholesale, and studies the coherence of the new organisation by using a system of attributes approach (Chapter 4);
- it presents data on new producer organisations in Dutch fruit and vegetable markets, and it develops a game-theoretic model for analysing the trade off between countervailing power in large heterogeneous organisations and strong innovation incentives in small homogeneous organisations (Chapter 5).

We will now give a more detailed summary of the individual chapters. Each chapter answers one or more of the five research questions presented in the Chapter 1.

Chapter 2 has presented a survey of the economic literature on co-operatives. It provided answers to the first research question: *What have been the efficiency explanations for farmers to vertically integrate into processing and marketing of farm products*. Traditional explanations for establishing co-operatives have focused on market structure, particularly on the need to build countervailing power. While this may be a good explanation for the formation of bargaining associations, it does not fully explain the vertical integration of farmers into the processing and marketing stages of the chain. Additional explanations can be found in the existence of transaction costs in buyer-seller relationships and the need to reduce these costs. Asset specificity is the main transaction cost determinant of vertical integration and it exists in many farmer-processor relationships. Farmers have vertically integrated into processing and marketing to protect their on-farm relationship-specific investments.

Information problems have also been a reason for establishing co-operatives. Problems of incomplete or asymmetric information are present when the processor has difficulty in measuring the quality of the agricultural product and when farmers have difficulty in measuring the effort of the processor/marketer. Incomplete information may prevent the establishment of processing and marketing firms, while asymmetric information may prevent farmers from signing contracts with processors and marketers. If these measuring problems seriously affect on-farm production decisions (to the extent that efficient investments are withheld), farmers may solve them by collectively establishing their own processing and marketing firm.

This chapter has also answered the second research question: *Are these explanations still valid and/or have other efficiency reasons appeared for establishing marketing co-operatives?* There is no reason to expect that asset specificity has been substantially declined in agrifood transactions. While certain technologies may increase flexibility or market transparency (such as ICT), most market developments may require more relationship-specific investments. These developments include concentration among

processors and retailers, the need for more customer-specific innovation, and the introduction of customer-specific quality assurance programmes. Market orientation in production decisions requires co-ordination of production investments and marketing investments. When these two types of investments are carried out by different firms, the interests of these firms have to be aligned and their activities have to be co-ordinated. If the risks of being dependent on another firm are too large, firms choose between abstaining from making efficient investments and acquiring the other firm. In addition, information has become more important in agrifood transactions as market conditions urge farmers to differentiate, innovate, and produce high-quality products. These trends also require more co-ordination of the activities of several chain participants. If converging interests prevent information exchange, organisational solutions have to be found. Thus, the increasing importance of collaboration, co-ordination and information exchange would suggest an increase in the number of co-operatives or at least a competitive advantage for existing co-operatives.

Vertical integration as an arrangement for farmer-processor transactions has mostly been initiated by the farmer and not by the processor. The relatively small scale of the family farm in combination with substantial economies of scale in processing and marketing require a special type of vertical integration: a number of small firms collectively owning the large firm. The farmer-owned co-operative has the important advantage of combining elements of vertical integration to protect relationship-specific investments at the farm and the processing firm, with elements of market transactions to gain the benefits of independent operation at the farm level.

If production investments and marketing investments have to be co-ordinated, how much freedom do farmers maintain in on-farm production decisions? There are two diverging developments that influence this issue. On the one hand we see that the importance of marketing investments leading to stricter requirements for the quantity and the quality of the products delivered by the members. On the other hand we see increasing individualisation of society, the need for product differentiation, and growing heterogeneity among members, which all ask for strengthening of individual incentives. However, individualisation and heterogeneity lead to more laborious decision-making in co-operatives. While market conditions demand more differentiation, efficient decision-making in a co-operative does not allow too much heterogeneity.

In **Chapter 3** we have answered the following research question: *How does the particular ownership structure of the marketing co-operative affect investment incentives for member firms and co-operative firm?* We have applied new property rights theory to study investment incentives in an agrifood chain consisting of three agents. Because there are complementarities among the activities and assets of the different firms in the chain, investment by a firm in one tier of the chain should be co-ordinated with investments by firms in other tiers to obtain optimal chain performance. The investments are asset-specific in the sense that they only generate surplus if the investor has access to a particular asset, and they are relationship-specific in the sense that they generate a higher surplus if complementary assets are also deployed. The relationship-specific character of the investment makes it vulnerable for hold-up by the other agent. Whether agents are actually willing to make these investments depends on the division of value in case of *ex post*

renegotiation. The bargaining power in this renegotiation process is determined by the ownership of assets that are essential for the investment; this means that without access to these assets the investment will generate no or lower value.

One of the contributions of this chapter lies in modelling the surplus generated by a three-agent-three-asset chain with complementary investments. The surplus generated by each investment is larger if agents in two adjacent stages of the chain collaborate then when agents in distant stages collaborate. Our model showed that optimal asset ownership is determined by the specific investment cost/quasi-surplus ratio for agent 1 in proportion to the specific investment cost/quasi-surplus ratio for agent 2 when first-best efficiency is attainable. If this ratio is higher for agent 1 than for agent 2, then agent 1 should own most of the assets that are used in generating the quasi-surplus. In other words, if the specific investment by agent 1 generates a smaller surplus (relative to the investment) than the specific investment by agent 2 does, then agent 1 should own more assets to obtain the efficient investment decisions. The second-best ownership structure choice assigns most power to the agent generating the highest surplus.

When the farmer's specific investment is high relative to the specific investment by the processor, farmer-ownership of the assets in the processing stage of the chain obtains the first-best solution. This is the classic farmer-owned marketing co-operative. However, if the investment by the processor (or retailer) becomes relatively more important for total chain value than the investment by the farmer, the co-operative may no longer be an efficient ownership structure. If changes in technology or in market conditions shift the relative importance of the individual investments by different chain partners (that is, if retailer investment becomes more important than farmer investment), it may be necessary to change the allocation of ownership of essential assets to induce agents to make those investments that generate the chain optimum. Thus, it may be necessary to change the ownership structure in agrifood chains to obtain that combination of investment decisions that yields the first-best ownership structure. The model we have presented may contribute to determine ownership structures that induce the generation of maximum value.

While Chapter 3 has focused on selecting efficient governance structures, in **Chapter 4** we have studied the co-operative as a more complex organisation. The complexity of a co-operative can be captured by the system of attributes approach that studies the interaction among various organisational and functional characteristics of a firm.

The main research question is this chapter was: *What impact do changes in the market and institutional environment for Dutch food horticulture have on the efficiency of the traditional auction co-operative?* We have answered this question by presenting a case study of one auction co-operative that has been restructured in response to changing market conditions. A case study method was used because it enables rich data and 'reality' to be captured in greater detail than other methods. This case deals with the transformation of an auction co-operative into a marketing co-operative for fruits and vegetables in the Netherlands. VTN/The Greenery was established by merging nine fruit and vegetable auctions in 1996. The merger was inspired by the need to reduce the costs of selling members' produce, to enhance market orientation and to improve co-ordination in the production and distribution chain. In 1998 several wholesale companies were acquired as

part of a strategy to become a preferred supplier of the full range of fresh produce to major retailers in Europe.

As a result of the fundamental shift from production orientation to market orientation, VTN/The Greenery now puts strategic priority with its customer relationships. Growers' interests may no longer necessarily be the primary interests that the management pursues. This is not to say that The Greenery does not work for the growers – in the end they are still the owners of the co-operative firm – but it may imply that when grower interests and customer interests do not correspond, priority is given to the customer.

The analysis in Chapter 4 used the system of attributes approach to study the coherence of the new organisation. The system of attributes approach postulates that functional and organisational attributes of an organisation have to be consistent to prevent internal conflicts and dysfunctioning. Changes in the environment as well as changes in technologies may force firms to make changes in both strategy and structure. Due to complementarities among attributes, changing the value of one attribute often requires a simultaneous change in several related attributes. If not, inefficiency may result. However, changing all complementary attributes simultaneously, that is, making a full transformation, is one of the most difficult aspects of a reorganisation process.

In the transformation process of VTN/The Greenery several attributes have changed while others remain unchanged. For instance, while the co-operative maintains a democratic decision-making structure, its has individualised part of its equity. The latter results in two categories of beneficiaries of the co-operative firm: users and investors. Even if both are members, conflicts of interests may appear. Another issue that has made decision-making more difficult and more costly is heterogeneity among the membership. Heterogeneity reduces commitment and increases uncertainty. Members now exert influence through the formal decision-making procedure in VTN, but also through direct negotiations between members united in a new producer organisation and Greenery management. While VTN/The Greenery has developed ambitious and costly marketing strategies, members are unwilling or unable to provide the additional equity funds. Building a brand name and other marketing investments may demand more control over production decisions. However, this may be difficult to establish in the co-operative structure. Finally, the shift in price determination mechanism from auction clock to contract mediation has introduced the problem of information asymmetry between growers and mediators and between growers and buyers.

In Chapter 4 we have focussed on governance structure attributes, decision-making attributes and incentive attributes. We have shown that the current combination of attributes does not form a consistent whole, as it combines elements of the traditional co-operative with elements of an IOF. VTN/The Greenery may have to take its transformation process one step further to become a coherent organisation.

Chapter 5 presented a description and analysis of the rise of new producer organisations (POs) in Dutch food horticulture. POs unite producers of a specific crop, in order to collectively bargain with customers, implement a quality assurance programme, and carry out product-specific sorting, packaging and marketing. Since 1990 more than seventy new POs have been established, half of them co-operatives. This chapter answered the fifth

research question: *What reasons explain the establishment of new marketing co-operatives in Dutch food horticulture?*

Explanations for the sudden rise of new POs can be found in the inability of the traditional auction co-operative to accommodate changes in market conditions. Also the transformation of the traditional auction co-operative into a marketing co-operative has been reason for growers to establish new POs. The restructuring and transformation process has lead to increasing heterogeneity among the membership, which in turn urged growers to more explicitly defend their product-specific interests within the large marketing organisation.

Four different POs have been distinguished on the basis of governance structure (bargaining association versus co-operative) and on the basis of whether the producer are still members of a restructured auction co-operative or not. The four types are dependent association, independent association, dependent co-operative, and independent co-operative. Most of the analysis in this chapter is focused on the new co-operatives.

The various functions that a PO performs within the fresh produce chain depend on the interaction between its own strategy and that of the restructured auction co-operative. The growers of dependent associations, on the one hand, choose to focus on production and delegate the marketing of their products to the restructured auction co-operative, thus profiting from economies of scale at the marketing stage of the chain. Independent co-operatives, on the other hand, carry out marketing activities themselves and trade directly with wholesalers and retailers. Compared to the restructured auction co-operative, they are relatively small and have a homogeneous membership. Often, they follow a differentiation strategy, developing and producing specialty products for niche markets.

Developing, producing and marketing new products requires investments at both the production and the marketing stages of the agrifood chain (because production and marketing are interdependent). In a homogeneous co-operative investment incentives are optimal because growers control both production and marketing, all members invest, and all benefits are distributed directly in proportion to patronage. No sharing with non-investing members takes place, as would be the case in a heterogeneous co-operative. However, the disadvantage of a small homogeneous co-operative is its lack of market power. If market conditions favour differentiation, the advantage of strong innovation incentives may more than compensate the disadvantage of the lack of market power.

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Samenvatting (in Dutch)

Dit proefschrift bestudeert de rol van de coöperatie in de keten, in het bijzonder de coöperatie als specifieke eigendomsstructuur. Die eigendomsstructuur brengt economische voor- en nadelen met zich mee. Of de balans van die voor- en nadelen positief is, hangt af van de economische en institutionele omgeving waarin de coöperatie en haar leden actief zijn. Verandert die omgeving, dan kan ook de balans veranderen.

De eigendomsstructuur van de coöperatie kent twee bijzondere karakteristieken. Ten eerste, het eigendom is collectief. Dit wil zeggen dat alle leden van de coöperatie gezamenlijk eigenaar zijn van de coöperatieve onderneming. Ten tweede, de coöperatie is een vorm van verticale integratie. Dit wil zeggen dat producenten in de ene schakel van de keten activa in eigendom hebben in een voorafgaande of volgende schakel van de keten. Omdat eigendom van invloed is op investeringsbeslissingen, leidt de specifieke eigendomsstructuur van de coöperatie tot specifieke investeringskeuzes van producenten. Die keuzes hebben gevolgen voor de opbrengsten van de gehele keten. We zullen laten zien dat de eigendomsstructuur van de coöperatie ook de investeringsbeslissingen van andere ondernemingen in de keten kan beïnvloeden.

De centrale vraag in dit proefschrift is of de coöperatie een efficiënte eigendomsstructuur is voor transacties met land- en tuinbouwproducten. Een eigendomsstructuur is efficiënt als het de hoogste waarde genereert voor alle betrokken partijen tezamen. We beperken ons tot afzetcoöperaties, dat wil zeggen coöperaties die de producten van boeren en tuinders bewerken en verkopen. Een verdere afbakening is gemaakt door in het praktijkgerichte deel van het onderzoek alleen coöperaties in de Nederlandse groente- en fruitsector te bestuderen.

Het centrale thema is behulp van de vijf onderzoeksvragen uitgewerkt:

1. Welke verklaringen vinden we in de economische literatuur voor de keuze van de coöperatie als specifieke eigendomsstructuur voor transacties met land- en tuinbouwproducten?
2. Zijn deze verklaringen nog steeds geldig en/of worden nieuwe verklaringen aangedragen?
3. Hoe beïnvloedt de eigendomsstructuur van de coöperatie de investeringsbeslissingen van de verschillende partijen in een agroketen?
4. Wat is de invloed van veranderingen in markt en institutionele omgeving op de efficiëntie van afzetcoöperaties in de Nederlandse voedingstuinbouw?
5. Wat zijn de verklaringen voor het ontstaan van nieuwe telersverenigingen in de Nederlandse voedingstuinbouw?

Hoofdstuk 2 geeft, op basis van literatuuronderzoek, antwoord op de vraag naar de verklaringen van het bestaan van coöperaties als specifieke eigendomsstructuur (onderzoeksvraag 1). Ook beantwoordt dit hoofdstuk de vraag of traditionele verklaringen nog geldig zijn, en of nieuwe verklaringen zijn gevonden (onderzoeksvraag 2).

Traditionele verklaringen voor het bestaan van coöperaties benadrukken het gebrek aan marktmacht van boeren en tuinders en de wens schaalvoordelen te behalen bij

verwerking en afzet van hun producten. Deze verklaringen zijn echter niet overtuigend. Ongelijke marktmacht kan immers met behulp van een onderhandelingsvereniging worden opgelost. Schaalvoordelen kunnen ook door een particuliere (= niet-coöperatieve) onderneming worden behaald, waarna de winst met de toeleveranciers wordt gedeeld. Dat boeren en tuinders kiezen voor een vorm van verticale integratie kunnen we verklaren uit de specifieke kenmerken van de transacties tussen producenten enerzijds en verwerkers en verkopers anderzijds. Deze transacties worden gekenmerkt door relatie-specificiteit van investeringen en door informatieproblemen.

Relatiespecificiteit van investeringen is een centraal concept uit de transactie-kostentheorie. Deze theorie gaat ervan uit dat contracten altijd onvolledig zijn. Deze onvolledigheid van contracten impliceert dat partijen die een contract sluiten er altijd rekening mee houden dat de andere partij het contract kan verzaken. Contractverzaking is vooral vervelend als een van beide partijen investeringen heeft gedaan die alleen opbrengsten genereren in de specifieke relatie waarop het contract van toepassing is. Relatiespecificiteit van investeringen leidt tot transactiekosten omdat ondernemingen maatregelen moeten nemen om contractafspraken te controleren en eventueel af te dwingen. Bovendien zullen ondernemingen afzien van investeringen die een te groot risico van contractverzaking met zich meebrengen. Beide typen kosten leiden tot verlies van efficiëntie voor de keten als geheel. Dit kan worden voorkomen door middel van verticale integratie: producenten nemen de verwerkende en verkopende onderneming in eigendom, en brengen daarmee de transactie binnen één onderneming, in dit geval de coöperatie.

Zijn relatiespecifieke investeringen een reden om nieuwe coöperaties op te richten dan wel oude voort te laten bestaan? Door technologische ontwikkelingen (ICT en moderne transporttechnieken) kan de relatiespecificiteit van investeringen verminderen. Er zijn echter ook ontwikkelingen die in tegengestelde richting wijzen. Concentratieprocessen onder afnemers, de invoering van ketenkwaliteitssystemen en een grotere nadruk op klantgerichte innovatie maken dat investeringen van producenten vaak afgestemd zijn op de wensen van een specifieke afnemer. Deze ontwikkelingen kunnen reden zijn voor producenten om nieuwe coöperaties op te richten.

Onvolledige informatie en asymmetrische informatie kunnen ook het bestaan van coöperaties verklaren. Deze informatieproblemen komen voor in situaties waar de verwerker moeilijk de kwaliteit van het landbouwproduct kan meten of waar de boeren de inspanning van de verwerker of handelaar moeilijk kunnen controleren. In zulke gevallen komen er geen efficiënte contracten tot stand, omdat zowel boeren als particuliere verwerkers afzien van relatiespecifieke investeringen. De oplossing voor dit inefficiëntie-probleem is de oprichting van een coöperatieve onderneming, waarmee het risico wordt uitgesloten dat de andere partij misbruik maakt van zijn informatie-voorsprong.

In situaties waar meer informatie-uitwisseling gewenst is maar niet tot stand door belangentegenstellingen, dan kan verticale integratie een oplossing zijn. Coöperaties kunnen dus concurrentievoordeel halen uit het feit dat er in principe geen belangen-tegenstelling bestaat tussen de producenten in de ene schakel van de keten en de verwerker of handelaar in de andere schakel. Gezien het toenemende belang van informatie-overdracht in de keten (o.a. voor *tracking* en *tracing*) zal dit voordeel eerder toe- dan afnemen.

Terwijl we in hoofdstuk 2 verscheidene argumenten aandragen voor het bestaan van coöperaties, worden ook enkele argumenten besproken die pleiten tegen de coöperatie. De belangrijkste daarvan is dat collectief eigendom tot een zwakke prikkel leidt om te investeren in de coöperatieve onderneming. Dit is vooral problematisch als de concurrenten van de coöperatieve onderneming wel veel investeren in risicovolle activiteiten als marketing, innovatie en internationalisering. Een tweede nadeel is het vaak trage besluitvormingsproces binnen een coöperatie. Hierdoor kan de coöperatieve onderneming niet flexibel inspelen op veranderingen in de vraag of het gedrag van de concurrenten. Een derde nadeel is de neiging om een behoudende strategie te volgen. Dit laatste heeft te maken met het democratisch besluitvormingsproces en met de noodzaak consensus te bouwen (om alle leden binnen de coöperatie te houden). De collectiviteit van eigendom leidt vooral tot problemen wanneer de belangen van de leden sterk uiteen lopen. Heterogeniteit in het ledenbestand maakt besluitvorming moeizaam en leidt tot een nog zwakkere prikkel om in de coöperatieve onderneming te investeren.

In **hoofdstuk 3** hebben we de vraag naar de efficiëntie van de eigendomsstructuur van de coöperatie theoretisch benaderd. We presenteren een model bestaande uit drie partijen, drie activa en drie investeringsbeslissingen, en onderzoeken hoe verschillende eigendomsstructuren de investeringsbeslissingen van de drie partijen beïnvloeden en daarmee de efficiëntie van de keten als geheel bepalen. Dit hoofdstuk beantwoordt onderzoeksvraag 3.

Het model maakt gebruik van de theorie van onvolledige contracten. Deze theorie benadrukt het belang van eigendom van activa bij investeringskeuzes die betrekking hebben op die activa. We definiëren eigendom als het bezit van residuele beslissingsrechten over een actief. Residuele beslissingsrechten zijn de beslissingsrechten die niet via contract of wet aan anderen zijn toegewezen. Deze rechten zijn van groot belang bij het *ex post* (dat wil zeggen nadat een contract is gesloten) onderhandelen over de inzet van activa. Omdat zich altijd situaties kunnen voordoen waarin het contract niet voorziet, is het voor investerende partijen van belang onderhandelingsmacht te hebben over de activa die onmisbaar zijn om de investering tot waarde te brengen. Zonder onderhandelingsmacht kunnen de opbrengsten van de investering door een andere partij worden toegeëigend. Bij hun investeringsbeslissingen houden partijen rekening met hun *ex post* onderhandelingsmacht. De verdeling van residuele beslissingsrechten op activa is dus van invloed op de *ex ante* investeringsbeslissingen van partijen in de keten, en daarmee op de efficiëntie van de keten.

First-best efficiëntie wordt gerealiseerd als alledrie partijen in de keten investeren. Dit levert voor alle partijen gezamenlijk de hoogste waarde op. Omdat het om relatiespecifieke investeringen gaat, zullen partijen alleen investeren als ze residuele beslissingsrechten hebben over de activa waarop de investeringen betrekking hebben. Het model laat zien dat de partij met de hoogste relatiespecificiteit van investeringen de meeste activa in eigendom moet hebben om tot efficiënt investeringsgedrag te komen.

Het model laat ook zien dat als de relatiespecificiteit van de investeringen van de boer hoger zijn dan de relatie-specificiteit van de investeringen van de verwerker, de boer de verwerkingsactiva in eigendom moet hebben om tot een efficiënte keten te komen. In dit geval is de coöperatie een efficiënte eigendomsstructuur. Als echter de relatiespecificiteit van de investeringen van de verwerker hoger is dan van die van de boer, dan is het efficiënt om het eigendom van alle activa in handen van de verwerker te geven. Dit laatste is in de

praktijk vaak niet haalbaar. In zo'n geval is het beter geen verticale integratie na te streven en elke partij het eigendom te geven over de activa waarmee deze werkt. Ons model impliceert dat wanneer veranderingen in de markt of de technologie ertoe leiden dat de relatiespecificiteit van de investeringen van de verwerker en handelaar groter wordt ten opzichte van de relatiespecificiteit van de investeringen van de primaire producent, een herverdeling van eigendom over activa in de keten noodzakelijk kan zijn om tot efficiënte investeringsbeslissingen door alle partijen in de keten te komen.

In **hoofdstuk 4** bestuderen we de coöperatie vanuit het perspectief van systeem-van-attributen. Terwijl we in hoofdstuk 3 slechts één karakteristiek van de coöperatie hebben geanalyseerd, te weten de eigendomsstructuur, gaat het in dit hoofdstuk juist om de samenhang tussen verschillende attributen. Attributen kunnen zowel organisatorische als functionele karakteristieken zijn. De systeem-van-attributen-benadering benadrukt het belang van afstemming tussen verschillende attributen. Een goede afstemming leidt tot een coherent systeem. Hoofdstuk 4 geeft antwoord op de vraag naar de invloed van veranderingen in markt en institutionele omgeving op de efficiëntie van afzetcoöperaties in de Nederlandse voedingstuinbouw (onderzoeksvraag 4).

Of een coöperatie een coherent systeem van attributen vormt, onderzoeken we met een gevalsstudie van VTN/The Greenery, de grootste groente- en fruitcoöperatie in Nederland. Deze coöperatie is opgericht in 1996 door negen groente- en fruitveilingen te laten fuseren. In 1998 nam VTN/The Greenery enkele groothandelsondernemingen over, en maakt sindsdien een transformatie door van coöperatieve veiling naar afzetcoöperatie. In reactie op veranderingen in de markt heeft de nieuwe coöperatie een klantgerichte strategie geïntroduceerd, wat impliceert dat de relatie tussen Greenery en haar klanten prioriteit krijgt boven de relatie tussen Greenery en telers. Ten behoeve van haar marketingstrategie heeft de Greenery nieuwe activiteiten opgezet of in huis gehaald, zoals groothandel, verwerking en innovatie. Om haar grote klanten optimaal te kunnen bedienen, moet de Greenery ook internationaal opereren.

Een gedetailleerde analyse van VTN/The Greenery laat zien dat de huidige combinatie van attributen geen coherent systeem oplevert. Ten eerste, met de invoering van bemiddeling als prijsvormingsmechanisme en met toenemende differentiatie in de markt zijn de belangen van de leden bij de activiteiten van de Greenery niet meer homogeen. Een grotere heterogeniteit van ledenbelangen leidt tot moeizame besluitvorming. Ten tweede, vanwege de noodzaak marketing centraal te stellen in de strategie is de invloed van de leden op het beleid van de Greenery gereduceerd. Daarmee is de betrokkenheid van de leden bij hun coöperatie ook verminderd. Ten derde, de marktgerichte strategie vraagt om aanpassingen in de bedrijfsvoering van de producenten. Waar voorheen de coöperatieve onderneming zich aanpaste aan veranderingen bij de producenten dienen nu de producenten zich aan te passen. Gaat dit wel samen met zeggenschap van die producenten? Ten vierde, de onderneming is begonnen met individualisering van het eigen vermogen, waarmee er mogelijk belangenconflicten ontstaan tussen leden die product leveren en leden die kapitaal leveren. Ten vijfde, leden hebben zich verenigd in telersverenigingen die vervolgens met het management van de Greenery onderhandelen over de afzetstrategie voor het specifieke product van de telersvereniging. Daarmee hebben telers twee wegen om het management van de Greenery te beïnvloeden: via de formele lijn van coöperatiebestuur en via de

informele lijn van onderhandeling tussen telersvereniging en management. Dit bemoeilijkt de uitvoering van een coherente marketingstrategie door de Greenery. Het resultaat van al deze veranderingen is een verminderde betrokkenheid, een moeizame besluitvorming en een geringe bereidheid van leden om in de coöperatieve onderneming te investeren.

Hoofdstuk 5 beschrijft en analyseert van de opkomst van nieuwe telersverenigingen in de Nederlands voedingstuinbouw (onderzoeksvraag 5). Telersverenigingen en telers-coöperaties bestaan uit producenten van één bepaald product of ras. Telers hebben deze verenigingen opgericht om verschillende redenen: gezamenlijk onderhandelen met afnemers, gezamenlijk opzetten van een kwaliteitszorgsysteem, gezamenlijk investeren in verpakkingsapparatuur, of gezamenlijk de markt veroveren.

Sinds 1990 zijn er meer dan 70 nieuwe verenigingen in de Nederlandse groente- en fruitsector opgezet. De helft daarvan zijn coöperaties. De snelle groei in het aantal telersverenigingen komt voort uit ontevredenheid over de werking van de traditionele veiling enerzijds en over het beleid van geherstructureerde veilingen zoals VTN/The Greenery anderzijds. De klassieke groente- en fruitveiling liet weinig ruimte voor innovatieve producten, terwijl de veranderingen op de markt wel aanleiding gaven tot meer differentiatie. Innovatieve telers zochten elkaar op en maakten gezamenlijk afspraken met de groothandel. De meeste telersverenigingen zijn echter opgericht na 1996, dus na de oprichting van VTN/The Greenery. De toegenomen belangentegenstelling binnen deze organisatie en de grotere nadruk op marketing waren aanleiding voor VTN-leden om meer aandacht te vragen voor productspecifieke belangen.

We maken een onderscheid tussen verschillende soorten telersverenigingen. Verenigingen van telers die ook lid zijn van VTN dienen hun activiteiten te coördineren van The Greenery. Voor deze verenigingen neemt de afzetcoöperatie de marketing op zich. In de praktijk zien we dat de verenigingen ook zelf in marketing investeren, maar dit kan leiden tot dubbele marketingkosten. Onafhankelijke telersverenigingen kunnen een geheel eigen (marketing)strategie volgen. Deze onafhankelijkheid biedt in principe een sterke prikkel tot investeren in productvernieuwing. Innovatieve producten vragen investeringen in zowel productie als marketing. Onafhankelijke telersverenigingen kunnen zelf de verhandeling van hun producten verzorgen door activa in de handelsschakel in eigendom te nemen. De investeringsprikkel wordt versterkt door het homogene karakter van de vereniging.

Onafhankelijke telersverenigingen zijn echter vaak klein en bieden hun afnemers slechts één product. Daarmee is hun onderhandelingsmacht gering. Telers die ook lid zijn van VTN, profiteren van de schaalvoordelen en de marktmacht van The Greenery. Er blijkt dus een afruil te bestaan tussen marktmacht en investeringsprikkels. In dit hoofdstuk laten we zien onder welke voorwaarden de kleine en homogene telersvereniging efficiënt is en onder welke voorwaarden de grote maar heterogene afzetcoöperatie (zoals VTN/The Greenery) efficiënt is. De keuze is vooral afhankelijk van de waarde die innovatieve producten genereren.

Curriculum Vitae

Jos Bijman (1959) is senior researcher at the Agricultural Economics Research Institute (LEI), The Hague, The Netherlands. He studied political science at the University of Amsterdam. After his graduation in 1988 he worked two years as a researcher at the Department of International Relations and International Public Law, Faculty of Social Sciences, University of Amsterdam. Next, he worked for one year as a teacher at the Faculty of Philosophy and Technical Social Sciences, Delft Technical University. In September 1991 he joined the LEI, where his research initially focused on technology assessment and socio-economic impacts of agricultural biotechnology. In recent years he has extended his expertise to internationalisation of agribusiness and the organisation of (international) agrifood chains.

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