Organisational innovation in agriculture and food chains

towards sustainable business networks

Prof. dr Jacques H. Trienekens

Inaugural lecture upon taking up the post of Personal Professor of Chain and Network Management at Wageningen University on 2 July 2015

WAGENINGEN UNIVERSITY
WAGENINGEN UR

ISBN 978-94-6257-367-3

Organisational innovation in agriculture and food chains

towards sustainable business networks

Rector Magnificus, colleagues, students, family and friends

Thank you all for being here and joining this lecture.

In the presentation I will first go into developments in Global food chains and incentives for food companies to take part in these chains. Then I will discuss three focal areas of my research: information exchange in food chains, the organisation or governance of food chains, and the relationships of food chains with multiple public and private parties. Subsequently I will discuss future research angles and examine the position of Wageningen University research and education in this field.

1 Introduction

Food chain management emerged in the '90s when retailers and food industries optimised the replenishment of products in their supply chains so that they could maintain lower stock levels and handle the increasing variety of products that were moving their way along the chain.

Because supermarket assortments had increased significantly since the beginning of the 1990s (from 5000 articles in an average supermarket in the early '90s to more than 20000 articles today) shelf space became more precious, with an important consequence: there was less space on the shelf for individual products, which meant that more frequent replenishment became necessary, with smaller quantities of products (Trienekens, 1999; Vorst, 2000). Starting with retail giant WalMart in the US, most supermarkets in Western countries changed to this system of more frequent deliveries of products, up to several times a day for some products, compared to once or twice a week in the past.

So, the first incentive for companies to collaborate in Global food chains was the move towards offering larger assortments of products from all over the world to the consumer. Moreover, these products had to be available year round. As a consequence this meant that most retail chains and food industries had to move to global sourcing of products.

Typical attributes of food products, such as perishability and variation in quality, further stimulated collaborations between companies in Global food chains. Multinational food industries such as Nestle and Unilever, and large retailers such as WalMart and Tesco are examples of companies that established Global food chains. However, besides these frontrunners, most food industries and retailers nowadays have Global replenishment networks.

A second important development particularly relevant for the food chain has been the rise in consumer concerns about safety issues. Since the '90s there have been a number of food crises (Trienekens and Zuurbier, 2008). Examples are the BSE crisis in the '90s, several dioxin crises in pork and poultry in North-Western Europe, cases of vegetable contamination around the world, the example of Melamine in dairy products in China, etc. The latter crisis was a perfect example of the global character of the food industry today. Across the whole world products which contained dairy components were recalled from supermarket shelves. Food safety along the food chain is one of the main incentives for food companies to collaborate more intensively with other companies.

A third incentive for chain collaboration is the increasing demand among consumers, governments and society at large for sustainable food production, including environmental aspects such as manure disposal, soil and water pollution, global warming, and typical welfare aspects such as prevention of child labour, working conditions throughout the food chain, fair trade but also animal welfare, figure 1. (Maloni and Brown, 2006; Wognum et al., 2011). At the same time the food business often requires opposing goals, such as quality assurance standards which add value for Western consumers but are difficult to meet for small producers in developing countries, or, global sourcing which brings a wide range of cheap products to Western supermarkets but also results in additional CO_2 emissions due to increasing transportation distances.

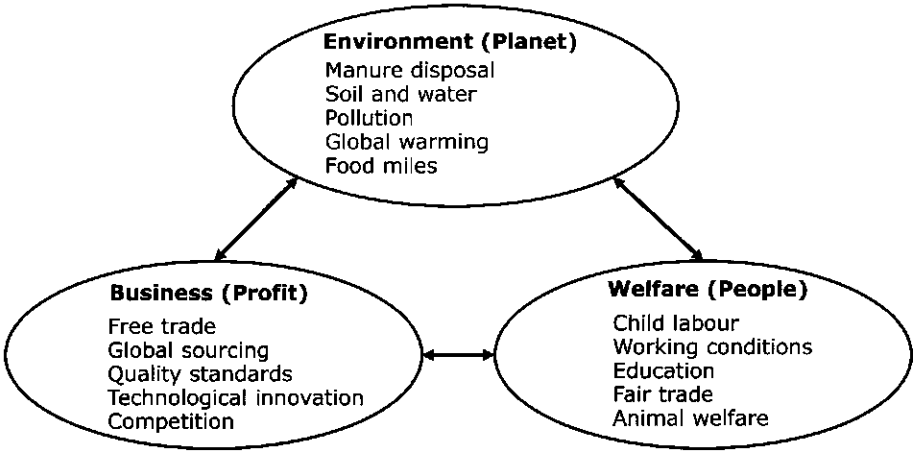

Figure 1 *Planet – Profit – People concerns*

As many of these concerns focus on how the end-product is made and where it, or its components, come from, food companies have to be sure that products that they buy are sustainably produced. In fact, if a company develops a sustainable purchasing and marketing strategy, this strategy should cover the whole chain. This again requires closer collaboration with other companies and the establishment of trustworthy control instruments throughout the chain. For example, in the garment chain, working conditions can be poor on the farms where the cotton is produced, in processing companies where textile is produced (we all know the example of Bangladesh), during transportation (low wages, long hours) and even in the final sale where sales staff may be underpaid. Or, as another example, animal welfare plays a role on the farm (for example, the living space of animals), during transportation (duration of transport of live animals) and at the slaughterhouse (think of the method of stunning the animal). Interesting in this last example is that increased attention by companies to animal welfare may at the same time lead to higher quality meat; the less stressed animals are, the higher the quality of the meat in general. This again will have a positive effect on the chains'profit. (Trienekens and Wognum, 2013).

The developments towards chain collaboration lead to new business relationships but also stimulate a culture of orientation in the final consumer, by all links of the chain. Indeed, every link in the chain adds value to the final product that is delivered to the market. Therefore, many companies have changed their method of production from supply-oriented, in which technical production processes are the focus of production management, to demand-oriented in which market orientation becomes

the key focus. Market orientation means that all companies in the chain should be able to jointly and quickly respond to fluctuating market demands including: speed of deliveries, assortment of products, origin and production methods, etc. (Grunert et al., 2015).

After this introduction about the incentives for companies to collaborate in Global food chains I now want to move on to research innovation.

2 Research innovation

My research focuses on the organisation and information exchange in agriculture and food chains, from farm to fork. It covers and relates research subjects like food chain information exchange, food chain organisation and the embeddedness of food chains in their business environment.
In this inaugural lecture I will, therefore, discuss three fields of research innovation. I will do so by following research lines developed with PhD students I have supervised over the last 7-8 years.
The first is:

2.1 Information exchange and transparency in food chains

A lot of research on transparency and information exchange in food chains has been performed in the past and Wageningen University has played an important role in this field (Hofstede et al, 2005).
Information exchange in food chains supports various functions (Trienekens et al., 2012):

- Companies at all chain stages need demand information from their customers and information about deliveries from their suppliers, in order to plan their own production and distribution processes,

To investigate the complexity of how companies have to deal with the variety of customer demands (Verdouw et al., 2010; Verdouw, 2010). Verdouw modelled information exchange and coordination in food chains based on differentiated demands. He designed a reference model that enables companies to configure specific purchasing, production and distribution processes. His reference model contains building blocks and a method for combining these in the right configuration to match specific demand. The model is about the day-to-day order information exchange between supply chain partners.
Figure 2 shows a typical diagram that depicts information flows on different management levels for the production process at a fruit producer. It shows the chain in the top figure, and two further decompositions of the production process below.

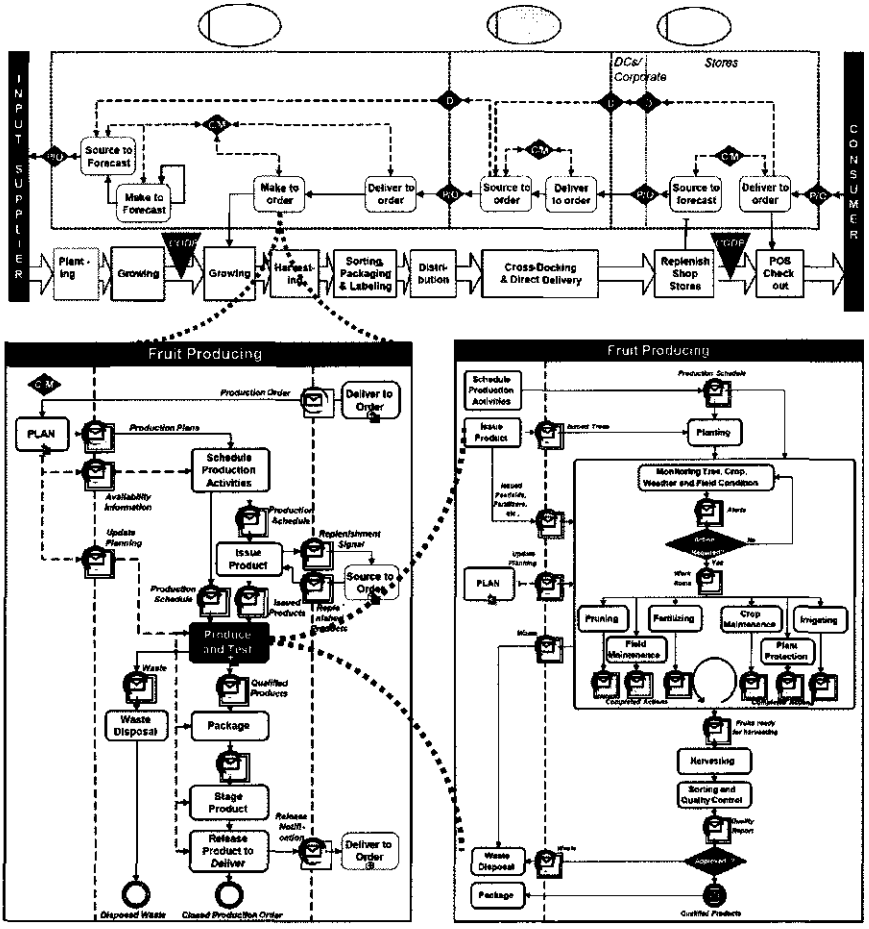

Figure 2 *construction of information flows in a fruit chain (Verdouw, 2010)*

- Second, information about product attributes can be used for control measurements and process optimization (Vorst et al., 2005; Han).

For example, in animal chains, at farm level we see a development towards the management of individual animals, where feeding installations automatically identify the animal (through the tag it wears) for the right amount and composition of feed and so that medicines can be added when required. Also, from a chain perspective, we see the optimization of processes throughout the chain based on automatic exchange of quality and performance data, e.g. between slaughterhouse and farm and between farm and feed industry. With the performance information on the quality and health of the animal that a farmer receives from the slaughterhouse,

he may be able to improve and optimize farm processes, for example by optimizing feeding regimes for animals.

Two other important functions of information exchange include the following.

- Consumers, as the last party in the chain, can be served with information about specific quality attributes of the product, such as the origin of the product or the way it is processed. Information can be provided, for example, via labels or QR codes that enable the customer to search information about the product on the internet (Trienekens et al., 2012).
- Last but not least, information exchange between actors in the chain is essential for traceability purposes,
  - to find the origin of food safety problems that may occur and recall hazardous products where necessary, or,
  - to assure the origin of products to consumers.

In traceability research of Denolf (2014) we found that technology solutions such as Radio Frequency Identification (RFID) or integrated information systems can indeed support traceability in the chain. However, they can only partly ensure it. In all these processes of capturing, storing, processing and transfer of information, human beings are involved who can, consciously or not, make mistakes. In this respect we have all heard about the scandals in the meat industry and the faulty information on labels of, for example, beef, organic eggs, and others. Can we, as consumers, really be sure that the product information provided is correct?

Therefore, organisational measurements are essential. As food chain networks are becoming increasingly complex, many companies are trying to simplify their network by reducing the number of suppliers. Furthermore, organisational control measurements are set up, with a formalised system with divisions of tasks, responsibilities and authorisations throughout the company and food chain. However, even with all these managerial measurements it remains hard to ensure the integrity of products as our examples have shown.

This brings us to informal organisational mechanisms that in my view are essential for an effective chain management system. Much of our and others' research shows that commitment to joint aims, and trust between business partners are key elements that support compliance of the individual actors. Moreover, the commitment and willingness of staff members to provide correct information to staff of other companies seems to be essential for an efficient and effective exchange of information. For example, a study of poultry chains in China (Peng, 2011, 2012) shows a positive relationship between trust, the willingness to communicate and the

quality of information exchange. In contrast, according to this research contracts between chain actors, i.e. formal arrangements, don't show a positive correlation with willingness to communicate. So, informal mechanisms seem to be a key condition for success in this regard. These findings are confirmed by other studies in other countries where trust and commitment strongly support overall compliance of chain actors with food quality and safety. Therefore, these informal governance mechanisms might be the key to improving food chain management and preventing misuse of information in these chains (Figure 3).
(Power has similar effects as trust in the food chain, I will come back to this concept later in this lecture)

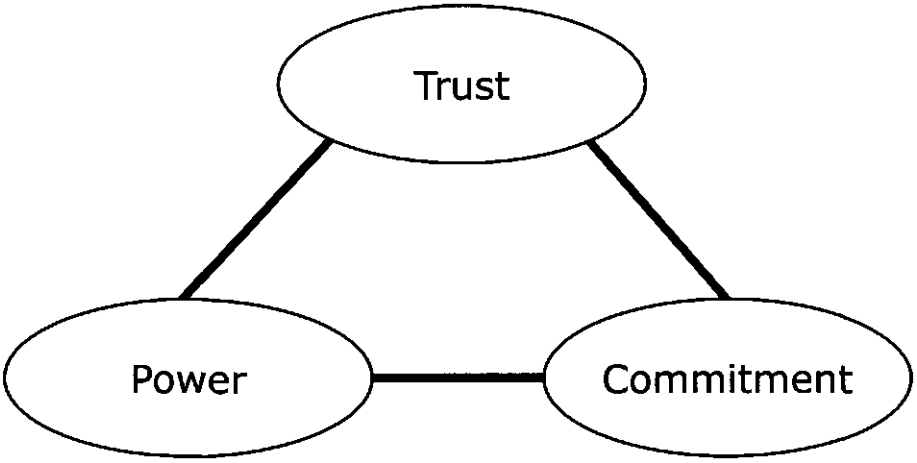

Figure 3 *Trust, commitment, power as key elements in the organisation of (Global) food chains.*

So far, I have discussed information exchange in food chains, and pointed out the importance of informal organisational mechanisms.

I will now continue and focus further on food chain organisation (or food chain governance).

2.2 Food chain organisation.

First I will discuss formal organisational mechanisms, including quality assurance standards and contracts. Subsequently, I will return to informal governance mechanisms, focusing in particular on food chain quality management.

Actors in global food chains increasingly link their firm level quality management systems to the quality systems of other actors in the chain. Each actor in the chain can only deliver high-quality products if other actors in the same chain do so (Han, 2011).

As most (international) food chains are made up of legally independent units, finding organisational mechanisms that assure quality across the chain is a big challenge. One of the answers to this challenge has been the adoption by retailers and food industries of private quality and safety assurance standards, with which their suppliers have to comply. Nowadays these standards require extensive documentation of production processes of chain actors and certification and auditing by independent organisations. In this way quality assurance standards have become important mechanisms to organize transactions in global food chains.

Since the 1990s these standards have evolved from safety control mechanisms into more comprehensive quality control mechanisms. The number of standards has increased enormously during the past decades (Trienekens and Zuurbier, 2008). As such, they now also serve as strategic tools for market penetration and competitive advantage of food chains. They cover issues such as origin and authenticity of food products, production and processing methods and increasingly specifications relating to environmental impact, animal welfare concerns and worker conditions.

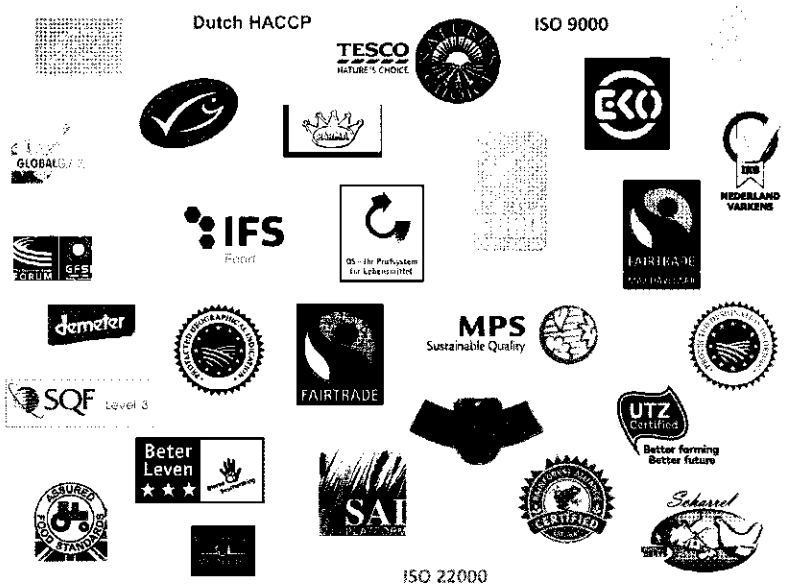

Figure 4 Diversity of quality and safety assurance standards

Figure 4 shows a multitude of quality assurance standards. Some are mainly focused on food safety aspects, some on specific sustainability aspects, some are business-to-business standards and others are consumer standards. Many of these standards cover the whole or a large part of the food chain.

Most of these private standards are set by branch organisations, NGOs or associations of companies, and audited and enforced by third parties. However, on the company level, compliance with further requirements, in most cases related to quality grading, shelf life, cold chain facilities and payment schemes, plays an important role. On this level specific company-to-company arrangements are made.

Let's first look more closely at the contract as a formal organisational (or governance) mechanism.

Although in the literature there are a large number of studies about contracts between parties in the food chain, they don't really distinguish between the different coordination mechanisms a contract might contain. In one of our projects (Wever, 2012), we worked out a typology for contracting. Contracts include coordination mechanisms for price, volume, quality and investment (figure 5). We see that compliance to Quality Standards may be part of a contract. All four mechanisms have applications on the continuum between market, where transactions are purely based on price, and hierarchy, where one party decides on the actions of another.

	Market ←		→	**Hierarchy**
Price	Spot price	Reference market price	Fixed forward price	Internal price
Volume	Spot volume	Fixed volume with min/max deviations	Fixed volume	Internal volume
Quality	Spot market specifications	Third party quality coordination	Counterparty quality coordination	Internal quality coordination
Investment (source)	Capital market	Third-party to the transaction	Party to the transaction	Internal capital allocation
Investment (price)	No (external) investments required	Debt security	Convertible debt security	Equity security

Figure 5 Coordination mechanisms in contracts (Wever, 2012)

The application of this model to a number of cases showed the importance of looking at contracts on a more detailed level. Indeed, different coordination mechanisms for any specific case can take different positions on the market-hierarchy continuum, making the definition of contracts more detailed and complex than traditional theories, such as Transaction Cost Theory (Williamson 1981; Rindfleisch and Heide, 1997), which only provide generic contractual solutions. Figure 5 shows the example that a company can choose to comply with a production standard imposed upon it by a specific retailer, which is a more hierarchical governance mechanism, while the price is arranged through a reference market and the volume and deliveries through a spot market. This typology not only adds to existing contract theory but also enables companies to better define and discuss (more) specific coordination mechanisms, in relationships with buyers and suppliers. It also explains the variation among food chain organisational structures that we recognize in practise, even if similar quality arrangements are in place.

Moreover, the study helps us to understand frictions between contracts in food chains, when coordination mechanisms are, in many cases, not aligned between actors. For example, if a company has fixed prices and fixed volume arrangements with its suppliers and it doesn't have similar arrangements with its buyers, the challenge is to

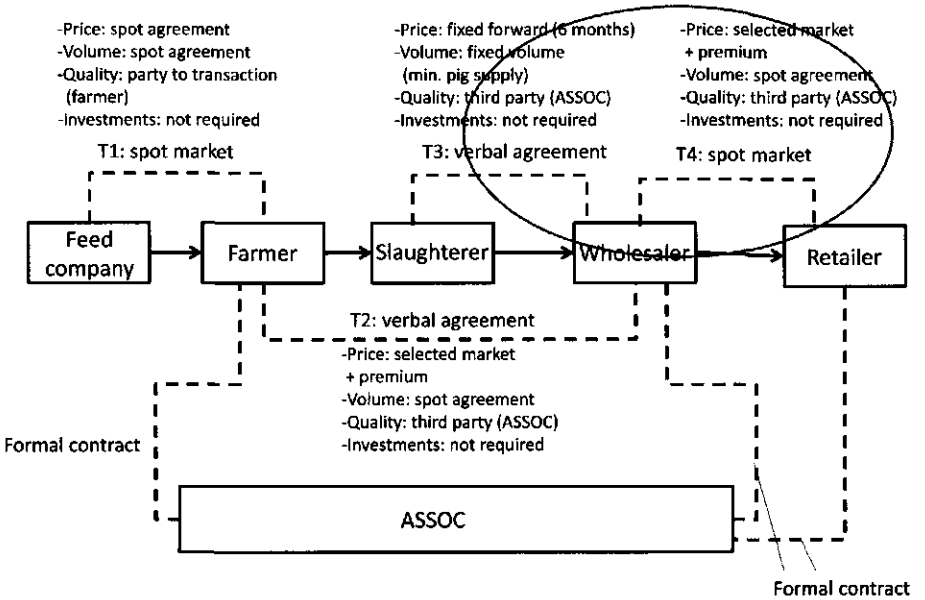

Figure 6 *Potential conflicts in organisational arrangements in a food chain (adapted from Wever, 2012)*

find market channels to which it can sell all its products. Or, when a company buys products according to certain production standards, it should be able to get an extra margin from the customer, to cover for the higher costs of the products.

Figure 6 shows the challenges from a chain perspective, where, for example, fixed price and volume arrangements between slaughterhouse and wholesaler differ from the spot market arrangements between wholesaler and retailer. This puts challenges on the wholesaler to find buyers for all its products and for prices aligned with the quality standard and, in case of low supply, to be able to find additional sources according to the standard.

This example clearly shows the interdependency of contracts between different links in the food chain and how quality plays a key role in this.

After discussing formal arrangements between food chain partners (standards and contracts), I now want to move back to informal arrangements.
Van Plaggenhoef (2007) performed a survey on collaborative food quality management in three agricultural sectors: poultry meat chain, fruit and vegetables chain and the flower and potted plant chain. As in most of our research, we collected data from both the supplier and buyer side of the firm, to investigate how supplier and buyer perspectives were aligned or were different.

In general, this research shows that the integration of quality management by companies implies open communication about product specifications and planning of deliveries between companies.

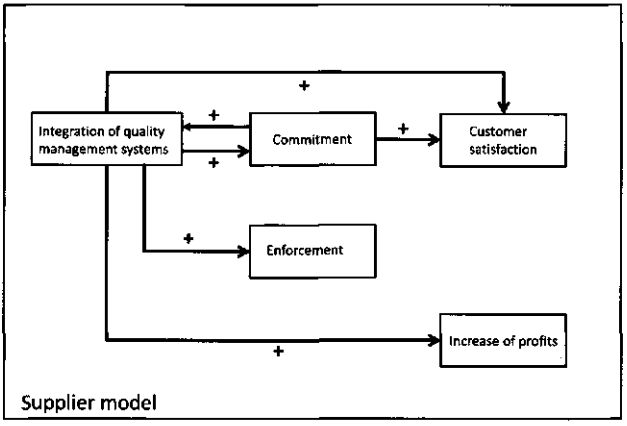

Figure 7 *Integration of quality management systems (Plaggenhoef, 2007)*

Figure 7 shows that integration of quality management with suppliers has a positive effect on the commitment of suppliers, enforcement of quality compliance, customer satisfaction and profits. However, only commitment and not enforcement positively influences the integration of quality management systems, indicating that commitment would be needed to establish integration. Moreover, commitment improves customer satisfaction.

This research also has shown that the actor that takes the initiative in quality management integration is the buyer, the demanding partner. Therefore, the buyer should build commitment of his suppliers to achieve successful integration of quality management. This finding is consistent with multiple studies in other parts of the world.

After discussing the information exchange and organisation of food chains I now want to move on to our third field of research:

2.3 Food chain network relationships

Companies and supply chains are increasingly aware of their relationships with multiple stakeholders and they have to act accordingly in order to get a "license to produce". This holds true not only for globalising food chains but also for fast upcoming regional and niche food chains, being dependent for their success on the acceptance of consumers, stakeholders and society at large.

In China we investigated the impact of the culturally embedded concept of guanxi on relationships between farmers and customers (Lu, 2007; 2011; 2012). Guanxi is a Chinese version of social networks and networking; being part of a guanxi network ensures access to all partners in the network. Network partners can friends, neighbours, businesses, government officials, customers, etc. Hualiang Lu, our PhD student, interviewed farmers and typical buyers of vegetables, including processing firms, supermarkets and exporters, in Jiangsu province in China. Figure 8 shows the chain network.

Traders (wholesalers and traders that come to the field) are the main buyers of vegetables (53%) followed by direct sales to the wet market (23%), wet markets are street markets, while a smaller part 13% goes to processors and retailers. The study showed how farmers' guanxi networks support them by means of information sharing on market demand and financial and technical assistance. Guanxi networks help smaller farmers to find buyers and help large-scale companies (processors, exporting companies and supermarkets) to gain access to international markets.

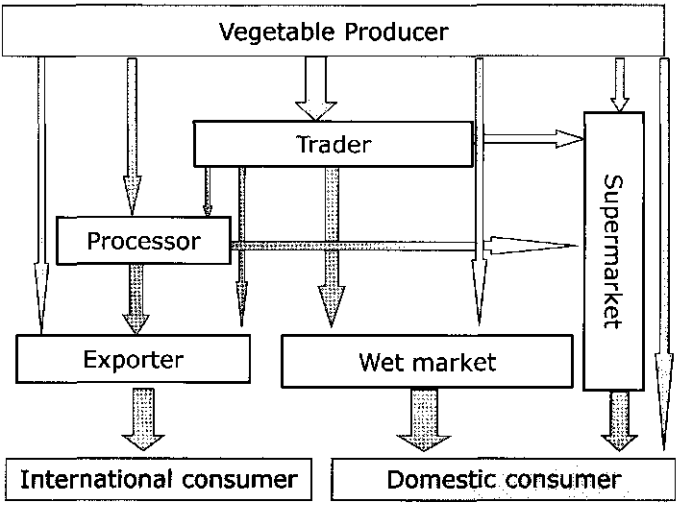

Figure 8 Vegetable chain network in region Nanjing, China (Lu, 2007)

This research also shows the peculiar difference between supplier and customer relationships. Guanxi is important for establishing relationships with customers, but less or even not important in relationships with suppliers. As customers (for example a trader or food processor) are the more powerful partner in the relationship (with the farmer), they can easily impose their demands, without needing guanxi to safeguard transactions. On the other hand, suppliers are less certain about sales possibilities and therefore rely on their networks to be able to sell their products. This finding is in line with other studies, that show that suppliers in general value trust, as an informal mechanism, much higher than buyers. Buyers in food chains are the more powerful party: retailers are more powerful than food processors because they provide access to consumer markets, food processors are much bigger and more powerful than farmers (Plaggenhoef, 2007; Han, 2009; Peng 2011). For buyers to suppliers power has similar effects as trust for suppliers to buyers; it decreases uncertainty about deliveries.

The importance of network relationships for doing business in the food chain has been underlined by many studies. In the Dutch pork sector we investigated the networking behaviour of pig farmers (Tepic et al., 2012). Partners in the pig farmer's network include chain actors, health services, government, Dutch pig innovation centre Sterksel, farmer organisation LTO, farmer union NVV, NGOs, WUR, consultancies, banks, etc. Tepic investigated the relationship between the networking behaviour of pig farmers and the innovation performance of these farmers.

Figure 9 provides insight into the networking behaviour of pig farmers. It shows the percentage of farmers that regularly-often visit fora, meetings, etc. It shows a picture of many farmers being open to information from their business environment, in the broadest sense.

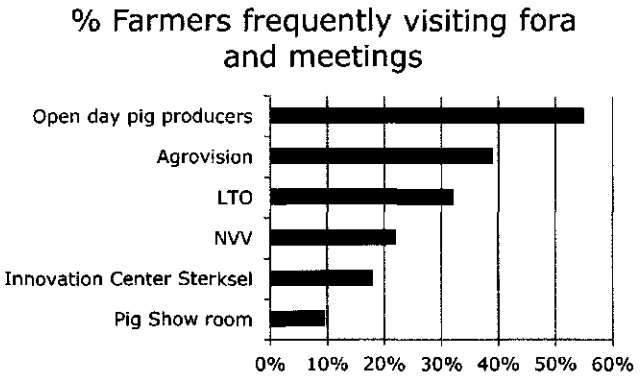

Figure 9 *Networking behaviour of farmers (adapted from Tepic et al., 2012; Tepic, 2012)*

Figure 10 depicts the percentage of farmers that invest in sustainability innovations. These are recent innovations, which shows that a large percentage of Dutch pig farmers follow these typical innovations.

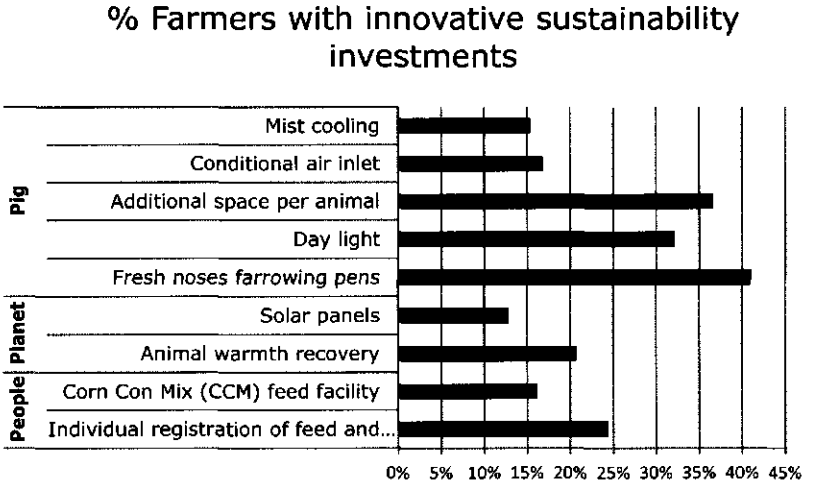

Figure 10 *Sustainability investments of farmers (adapted from Tepic et al., 2012; Tepic, 2012)*

Tepic used Absorptive Capacity of the farmers as mediating variable between network behaviour and sustainable innovations. Absorptive Capacity is the ability to get and also apply external information. Her results showed that farmers with stronger networking contacts have a greater absorptive capacity and are the more innovative farmers. Another finding of her research is that farmers who score higher on innovativeness also score higher on farm profitability, although the research shows a rather weak relationship. This might indicate that the return on investment of these innovations may take time.

So we see that network behaviour, i.e. having frequent contact with multiple stakeholders, supports innovation and business performance.

Building on the research of Tepic, let's now look further at the relationship between chain and network behaviour and internal company behaviour.

Grekova (2014) performed a study on environmental management systems and environmental collaboration in food processing companies. She finds a positive relationship between the involvement of multiple functions (or departments) of the organisation in environmental issues, include savings on energy, water, raw materials, packaging, and incentives for recycling, and collaboration on these issues with customers and suppliers.

She also finds that involvement in environmental issues by multiple functions/ departments positively correlates to absorptive capacity, which relates to the whole network of the organisation. This could indicate that absorptive capacity of companies increases if cross-functional participation increases. Again this leads us to an interesting research angle, namely into the relationships between networking and cross functional integration (Grekova et al., 2014).

In the supply chain management literature (e.g. Fawcet et al., 2014) we see that effective supply chain management presumes effective cross-functional communication within the company. We can now extend this research angle by indicating that effective external networking presumes effective internal (cross-functional) networking. In practice this means, for example, that networking just by a marketing manager or CEO of a company is not sufficient to extract the most benefits from the knowledge and experience from his or her network. Networking should disseminate throughout the organisation and should involve staff across different functions and layers. Moreover, as information and knowledge exchange with suppliers and customers seems to keep path with multi-stakeholder networking, in chain perspective the research question arises how chain actors joint networks and

cross-functional collaboration may support innovativeness and performance of these chains. This research angle may bring an important contribution to the literature, in particular to Social Network Theory and Supply Chain Management.

I will now continue with future research angles.

3 Future research angles

In my future research I aim to address comprehensive organisational solutions for food chain and network management taking into account these three interconnected research angles: information exchange in food chains, organisational mechanisms in food chains and how food chain actors relate to other stakeholders.

Therefore, I see three groups of research challenges, where I will give three examples of research I am currently working on:

- First, research into how organisational mechanisms and information and communication technology can support trustworthiness of food products and prevent fraud along the food chain. In this research we will also investigate the potential role of external stakeholders, such as government, certification organisations, animal welfare organisation and environmental organisations.
  One of our projects focuses on agricultural export chains in New Zealand: the lamb chain, the venison chain, the apple chain and the kiwi chain. All these chains try to differentiate from international competing chains through value-added production, including a New Zealand authenticity brand, and by addressing new international markets. Our research will focus on what organisation and communication mechanisms throughout the food chain best support value-added production and market segmentation.
  The field work is being performed in Western Europe, an important end-market for these products, and New Zealand where the production chains are. We work in close collaboration with Lincoln University in New Zealand and several companies in these sectors. Three of our Wageningen students are currently doing thesis work on this project and I myself will start research in New Zealand from August until the end of this year.

- A second research angle is how the organisation of food chains can support quality differentiation through quality assurance standards. A PhD student that I am jointly supervising with Prof. Kirsten of Pretoria University, is performing this research on the Karoo lamb chain. The Karoo is a vast semi-desert area in South Africa, several times the size of the Netherlands. Sheep farming is one of the major

agricultural activities and most of the area is less suited to other agricultural products.

Although a Karoo Meat of Origin certification scheme has been developed and there is a Karoo Lamb label, there are still a lot of challenges to make it successful

- Control of the scheme is (very) weak. Apparently, sheep from outside the Karoo are too easily included in the scheme. Moreover, other demands of the scheme, such as organic production, are not well controlled.
- As the scheme is not really recognized yet by the consumer, the benefits are minor and, moreover, not fairly distributed among the chain actors
- Opportunistic behaviour of the chain actors in not respecting contracts and not adhering to the standard, is a major problem, also for the efficiency in the chain, as planning for slaughtering, trading and retailing is difficult.

The aim of the research is to find the right conditions to set up a trustworthy chain for this private label product, with value added for all partners.

- A third research angle looks into horizontal relationships, for example relationships between farmers, and relationships between the food chain and its stakeholders.

  In a research project performed in Africa, in Zimbabwe, we focus on contract farming arrangements. Contract farming means production according to a contract a farmer has made with his customer, for example a food processor. There are currently many problems in existing contract farming schemes in Africa, such as side selling (i.e. farmers not keeping to their promises), no reasonable payment and putting all risks at the producers (i.e. processors not keeping to their promises), limited or lack of provision of input materials and credits, problems with compliance to quality assurance standards, little government support, etc. The investigation is directed at what combination of typical organisational mechanisms (contract elements, communication, trust, collaboration between farmers, network relationships, etc.) would lead to the best performance on price, quality, relationship stability, etc.

I now want to move on to the position of food chain and network research and education at Wageningen University.

4 Position of Wageningen University

In the 1990s in the Netherlands both public and private parties recognized the important potential role of chain management for the food sector. Therefore, government together with the business world and research organisations established public-private funded chain programs in various sectors in the agri- and food

industry. These programs were ACC (Agri Chain Competence), KLICT and Transforum from the mid-1990s to the early years of 2000. Wageningen University and Research Centre has always played a leading role in these programs and has always been a major initiator of knowledge transfer on chain management to agribusiness and the food industry. While in the early years of 2000 supply chain management in food was still a rather new concept in research as well as in business practice, nowadays it is an integrated part of our research programs and a well-established function in the management of many companies.

Most research work on chain management in Wageningen started in the Business Science groups, in particular Management Studies Group in the '90ts with as an important output for example the publication of a handbook on food chain management in 1996: "Verticale Samenwerking", (vertical collaboration) by Zuurbier, Trienekens and Ziggers.
Since the early years of 2000 chain research has been performed by a number of science groups at Wageningen university, such as Operations Research and Logistics, Business Economics, Marketing and Consumer Behaviour, Product Design and Quality, Management Studies and by the research institutes. Nowadays food chain research of Wageningen University and its research centres has established a recognized and central position in international research in this area.

Since the early '90s supply chain management was also included in Wageningen University education, for example in the course Integrated Goods Flow Management where a number of natural as well as social science disciplines jointly provided education to students. Up-to-date, chain management has a solid position in several education programs at Wageningen, through specialised courses such as Supply Chain Management and Advanced Supply Chain management but also by becoming an integrated part of any course on management, marketing, business economics, logistics, etc. Moreover, many students now choose subjects related to food chain management for their Bachelor as well as their Master's theses. And, this is one of the main functions of Management Sciences at Wageningen: to educate our students about chain management in order to prepare them for the business world and to transfer the latest knowledge and innovations in this field to the sector, through our graduates. In the next years I will work on further strengthening the position of food chain and network management in the educational programs of Wageningen University, at the Bachelor, Master and PhD level. Moreover, the recognized role of Wageningen University as a supplier of food chain and network education will also help spread our insights around the world, and will give Wageningen University a competitive edge in supply chain management education.

5 To conclude

Ongoing developments in the business world require new approaches regarding the organisation of globalising food chains on the one hand and swiftly emerging regional and niche chains on the other. I hope I have given you a good impression of my research field covering the organisation and information exchange of food chains. I look forward to working with colleagues and partners from Wageningen UR and around the world to further develop this challenging research field; responding to the demand of public and private parties for sustainable food chain networks, that deliver the products that consumers want in the way that society values.

Word of thank

I want to conclude my lecture with a few words of thanks.
Rector Magnificus, members of the board, members of the appointment committee and former director of the Social Sciences department Laan van Staalduinen, thank you for the confidence put in me through this appointment.

Dear colleagues of the Management Studies Group. Thank you for the good collaboration in joint research projects (national as well as international), in joint courses and in the supervision of Master's as well as PhD students. Collaborating with colleagues almost always leads to cross-fertilization and new insights and ideas. A special word of thank goes to the chair of our group Onno Omta for the long years of collaboration on multiple PhD projects, our journal, the Wicanem conference and many other things, and for his guidance that made our group the research group it is today.

I would like to thank my colleagues from Wageningen and other universities around the world with whom I have worked in the past and will continue working in the future. I also have great appreciation for the PhD students I have worked with and will be working with in the next years. Thank you also for the joint publications with which we brought our research to the attention of the world research community. A special word of thanks to my former promoters Adrie Beulens and Paul van Beek, for their collaboration in many interesting projects during my promotion studies, but also in the years since.

Dear students, thank you for your enthusiasm and interesting discussions throughout the years during courses and thesis work. I am proud to have been able to guide such a large number of you through your Master thesis. Working with you has shown me time and again why Wageningen graduates are in such demand by employers around the world. I look forward to further projects with you!

Dear colleagues from Wageningen research institutes and companies and organisations, nationally as well as internationally. Thank you for the excellent collaboration and many new insights I have gained from working together with you.

Dear family, thank you for being such a nice and warm family over the years! Dearest Marie-Louise, Alex and Pepijn. You bring so much pleasure into my life and Marie-Louise, thank you so much for your enduring support in the years that have passed.

Finally I thank you all for participating in this inaugural lecture.

Ik heb gezegd

References

Denolf, J.M. 2014, *Critical success factors for implementing supply chain information systems.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Fawcett, S.E., Ellram, L.M., Ogden, J.A. 2013, *Supply chain management, from vision to implementation,* Pearson Education Limited International

Grekova, K., Bremmers, H., Trienekens, J., Kemp, R., Omta, O. 2014, Extending environmental management beyond the firm boundaries: an empirical study of Dutch food and beverage firms. *International Journal of Production Economics,* vol. 152, pp. 174-187

Grekova, K., 2014. *Environmental innovation in chains and networks.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Grunert, K., Fruensgaard Jeppesen, L., Risom Jespersen, K., Sonne, A. 2005, Market orientation of value chains; a conceptual framework based on four case studies from the food industry. *European Journal of Marketing,* vol. 39, nr. 5/6. pp. 429-455.

Jiqin, H., Trienekens, J.H., Omta, S.W.F. 2011, Relationship and quality management in the Chinese pork supply chain. *International Journal of Production Economics,* vol. 134, pp. 312-321

Han, J. 2009, *Supply Chain Integration, Quality Management and Firm Performance; in the pork processing industry in China.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Hofstede, G.J., Schepers, H., Spaans-Dijkstra, L., Trienekens, J., Beulens, A. (Eds.) 2005, *Hide or Confide, The Dilemma of Transparency,* Reed Busines Information BV 's-Gravenhage, pp 239

Lu, H. 2007, *The Role of Guangxi in Buyer-Seller Relationships in China.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Lu, H., Feng, S., Trienekens, J.H., Omta, S.W.F. 2012, Network strength, transaction-specific investments, inter-personal trust, and relationship satisfaction in Chinese agri-food SMEs. *China Agricultural Economic Review,* vol.4, nr. 3, pp. 363 – 378.

Lu, Hualiang, Trienekens, Jacques H., Omta, S. W. F. and Feng, Shuyi 2010, Guanxi Networks, Buyer-Seller Relationships, and Farmers Participation in Modern Vegetable Markets in China. *Journal of International Food & Agribusiness Marketing,* vol. 22, nr. 1, pp. 70-93.

Maloni, M.J., Brown M.E. 2006, Corporate social responsibility in the supply chain: an application in the food industry. *Journal of Business Ethics,* vol. 68, pp.35–52.

Peng, G., J.H. Trienekens, S.W.F. Omta, and Wang, W. 2012, The Relationship between Information Exchange Benefits and Performance: Mediating the Effect of Supply Chain Compliance in the Chinese Poultry Chain. *International Food and Agribusiness Management Review,* vol. 15, nr. 4, pp. 65-91.

Peng, G. 2011, *Inter-organisational information exchange, supply chain compliance and performance.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Plaggenhoef, van W. 2007, *Integration and Self-Regulation of Quality Management in Dutch Agri-Food Supply Chains.* Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Rindfleisch, A. & Heide, J. 1997, Transaction-cost analysis: Past, present and future applications. *Journal of Marketing,* vol. 61, pp. 30–54.

Tepic, M., Trienekens, J.H., Hoste, R., Omta, S.W.F. 2012, The Influence of Networking and Absorptive Capacity on the Innovativeness of Farmers in the Dutch Pork Sector. *International Food and Agribusiness Management Review*, vol.15, nr. 3, pp.1-34

Tepic, M. 2012, *Innovation Capabilities and Governance in the Agri-Food Sector*. Ph.D. thesis, Wageningen University, Wageningen, The Netherlands.

Trienekens, J.H. 1999, *Management of processes in chains: a research framework*. Ph.D. Thesis, Wageningen University, Wageningen, The Netherlands.

Trienekens, J.H., Zuurbier, P.J.P 2008, Quality and safety standards in the food industry, developments and challenges. *International Journal for Production Economics*, vol. 113, nr. 1, pp. 107-122

Trienekens J.H., Wognum, P.M., Beulens, A.J.M., Vorst, van der J.G.A.J 2012, Transparency in complex dynamic food supply chains. *Advanced Engineering Informatics* vol. 26, pp. 55–65.

Trienekens, J.H., Wognum, P. 2013, Requirements of supply chain management in differentiating European pork chains. *Meat Science*, vol. 95, nr. 3, pp. 719-726.

Verdouw, C.N., Beulens, A.J.M., Trienekens, J.H., Wolfert, J. 2010, Process modelling in demand-driven supply chains: A reference model for the fruit industry. *Computers and Electronics in Agriculture*, vol. 73, nr. 2, pp. 174 - 187.

Verdouw, C.N. 2010, *Business Process Modelling in Demand-Driven Agri-Food Supply Chains: A Reference Framework*. PhD Dissertation, Wageningen University, Wageningen.

Vorst, van der J.G.A.J. 2000, *Effective food supply chains: generating, modelling and evaluating supply chain scenarios*. Ph.D. thesis, Wageningen University, Wageningen, The Netherlands, 2000.

Vorst, van der J., Beulens, A., Beek, van P. 2005, Innovations in logistics and ICT in food supply chain networks, in W.M.F. Jongen, M.T.G. Meulenberg (Eds), *Innovations in Agri-food Systems: Product Quality and Consumer Acceptance*, Wageningen Academic Publishers, Wageningen, The Netherlands, pp. 245–292.

Wever, M. 2012, *Chain-wide consequences of Transaction Risks and their Contractual Solutions*. Ph.D. thesis, Wageningen University, Wageningen, The Netherlands, 2012.

Williamson, O. 1981, The economics of organization: The transaction-cost approach. *The American Journal of Sociology*, vol. 87, nr. 3, pp 548–577.

Wognum, P.M., Bremmers, H., Trienekens, J.H., Vorst, van der J.G.A.J., Bloemhof, J.M. 2011, Systems for sustainability and transparency of food supply chains – Current status and challenges. *Advanced Engineering Informatics*, vol. 25, nr. 1, pp. 65-76.

Zuurbier P.J.P., J.H. Trienekens, G.W. Ziggers 1996, *Verticale Samenwerking*, Kluwer bedrijfsinformatie, Deventer.