

1.2 Co-ordination Mechanisms in Chains and Networks

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1 Introduction

To get food on your plate three times a day takes the contribution of a whole sequence of firms. Consecutively, there are producers of inputs like seeds and fertilisers, there are farmers, processing firms and logistic services providers, there are wholesalers and retailers. Together they make up a typical supply chain in the agrifood business. A *supply chain* (or chain for short) is a sequence of firms, involved in successive production activities. These firms are linked by streams of (intermediary) products, information and money. The core of the supply chain is the product flow. To quote some common definitions: 'A supply chain is a network of organisations that are involved through upstream and downstream linkages in different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer' (Christopher, 1998), or alternatively: 'A supply chain is a system whose constituent parts include material suppliers, production facilities, distribution services and customers, linked together via the feed-forward flow of materials and the feedback flow of information and financial capital' (Stevens, 1989).

In many supply chains, a progressing division of labour facilitated by the application of ICT (information and communication technologies) and other new technologies has lead to a gradual de-coupling of the information and financial flows from the product stream. Separate organizations have become involved in the transfer of information and money. This development has transformed the chain into a network. A *network* thus consists of a chain, a sequence of organizations centred round a product stream, together with the supporting organizations that deal with the information and financial flows. In this chapter, I shall stick to the term chain to mean both the traditional chain and the chain extended into a network.

This chapter looks into the nature of chain relationships, mainly based upon insights from institutional economics. Firms in a chain all have their specific objectives and interests. Particularly, commercial organizations each tend to maximise their own profits. Improvement of chain performance as a whole may come into conflict with this tendency. Attempts to increase aggregate

chain profits are often hampered by issues concerning the distribution of these profits. A *central issue* in chain development is therefore to align interests of the various actors in a chain where possible, and to design co-ordination mechanisms to deal with conflicts of interests.

Basically, chain collaboration is a matter of finding organizational modes for vertical relationships (i.e. relationships between a supplier and a buyer in a chain). We shall proceed as follows. The starting point for our analysis is a vertical relationship between two firms without organizational integration: exchange between firms as it is organised through spot markets (markets where goods are bought and sold for cash and delivered immediately). I shall consider the particular problems this poses in terms of lost opportunities and efficiency losses by looking at market failures. Then, I shall present the two main routes of escape from market failure as they develop in commercial relationships. We look at advantages and weaknesses and at the costs and benefits of the different mechanisms.

2 The market mechanism as an institution

If people or organizations meet as independent actors to exchange something in return for something else (often money), we call this a *market*. Market exchange is the transfer of property rights from one actor to another. An important characteristic is the independence of the actors: they are free to exchange and have no authority over each other. A market exchange mechanism induces actors to demand as much as possible, in return for as little as possible. Under certain assumptions, like decreasing marginal utility (i.e. the utility to you of every next piece of an item you obtain is less), markets tend to an equilibrium, a situation where those actors that are willing to exchange do so against a specific price. This equilibrium is a welfare optimum in the sense that all agents that engage in exchange benefit from this exchange, and all opportunities to benefit from exchange are being exploited.

The market is an example of an economic *institution*. Institutions are the formal and informal rules and mechanisms that govern exchange (Hazeu, 2000). They are co-ordination mechanisms, social technologies, routines that people and organizations employ both to compete and to co-operate with each other and to transfer things (Nelson and Sampat, 2001). Institutions are 'the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic' (North, 1990).

An institution offers a solution to a co-ordination problem. Individuals face a co-ordination problem, if they all decide individually on their actions while

their payoffs depend also on the decisions of other individuals and not only on their own decisions. Institutions limit the set of permitted actions and outcomes. They restrict behaviour by laying down some 'do's and don'ts', by requiring or precluding certain actions in specific situations. This makes life more predictable, enables individuals to co-ordinate their behaviour and allows for planning. Rules are accompanied by enforcement mechanisms. If someone deviates, sanctions are imposed on the deviator. Often, institutions are backed up by moral values: abiding by the rules meets with approval and breaching them with disapproval. Institutions may be formal (laws, contracts), but also informal (social norms).

Institutions have developed to overcome problems of incomplete information and information asymmetries. People are '*boundedly rational*', which means that they have limited capacities to gather, process and evaluate information. Particularly, they have only restricted knowledge of what other agents may do in the future. Also, people may be *opportunistic*, in the sense of acting selfishly, disregarding any other interests except their own. Bounded rationality together with the suspicion of opportunism on the part of other people stifles human interaction and exchange. For example, if you are not sure that what you paid for will be delivered, and you suspect your trading partner might exploit the situation, you will be cautious and not enter into any deal. Institutions curb the possibilities for such opportunistic behaviour by a mix of rules, rewards and punishments and thereby generate information about the probable future actions of other agents. In this way they compensate for bounded rationality.

The market is an economic institution in the sense that it regulates exchange of property. To function properly and to rule out opportunistic behaviour, the market requires all kinds of preconditions to be fulfilled. These preconditions mainly have to do with two things: rights and information. Rights may be property rights, decision rights and entitlements to benefits. For instance, property must be recognised and protected, contracts must be enforceable, the value of money must be trustworthy, conditions of sale must be unambiguous. Thus, the market is a mechanism that functions thanks to all sorts of laws, regulations and support organizations that serve to protect different kinds of rights. The rule that you can only sell what is yours or that you should in some markets publicly announce prices are examples of laws and regulations; a court that handles disputes is a support organization to enforce the law.

The market has to be able to generate the necessary information in order for the market mechanism to generate benefits for all, i.e. the market has to be transparent. All actors on the market must have access to all relevant information. If some agents are able to restrict information and if information is therefore asymmetrically distributed (as is often the case, for instance if the

seller knows better what is being traded than the buyer), this opens up the possibility for opportunistic behaviour and hampers the accomplishment of mutually beneficial exchange.

Protecting rights and generating the required information for the market to function properly requires effort and therefore entails costs. These costs, that have to be made to make an institution like the market operate, are called *transaction costs*. There are *ex ante* transaction costs that pertain to gathering relevant information on transaction opportunities (search costs), to evaluating alternatives, bargaining, negotiating a contract. There are *ex post* transaction costs related to monitoring and enforcing a contract and protecting property rights.

3 Two sources of market failure

Consider firms that exchange products on spot markets. These are not bound to their trading partners for any prolonged period; they are flexible and independent. They each bear part of the transaction costs that make the market function: costs of searching, bargaining and enforcement. Under specific conditions, the spot market may be the lowest cost institutional mechanism available for the firm to pursue its objectives. There are, however, some circumstances where the market fails as an effective and efficient co-ordination mechanism. Often this is the case when the transaction costs necessary to make the market function rise to very high levels. Two sources of market failure are relevant in the present context: asset specificity and asymmetric information. We consider each in turn.

3.1 Asset specificity

Suppose a firm acquires or develops special types of machinery or expertise upon the requirements of a firm down the chain. An example might be a food-processing firm that is required to invest in dedicated packaging machines that pack its products according to the specifications of a retailer. Assets like this only have a value in the context of a specific supplier-buyer-relationship; they are *relation-specific assets*. Asset-specificity, the requirement to invest in relation-specific assets, may lead to allocative inefficiency: an investment that is in principle beneficial to both parties does not happen. Investments in relation-specific assets are sunk, in the sense that they are irrecoverable once made. If a contract between two trading partners requires one of them to invest in relation-specific assets and if contracts are incomplete, in the sense that they do not specify all future contingencies, then the investing partner can become the hostage of the other partner. Once the investment in the relation-specific asset has been made, the bargaining position of the investing party has weakened because the asset cannot be put to

alternative use without substantial losses. He may therefore be vulnerable to opportunistic behaviour of the other party. As this situation is foreseen by the investing party before any deal is concluded, this party will not enter into such a deal. This is called the *hold-up problem*. Deals that are in principle beneficial for both parties are not concluded for lack of a credible mechanism to preclude opportunistic behaviour once the investment has been made (or alternatively, for lack of a credible commitment that parties will stick to the initial agreement).

A well-known example of the hold-up problem is the situation faced by farmers that decide upon investing in cattle for dairy production. Once the cows produce milk, the output must be sold at once as milk quickly spoils. Usually, because of scale economies, there is only one milk factory in the vicinity. Even if there are more, there is no time to bargain with alternative buyers because milk must be sold while fresh. In this situation, the farmer is at the mercy of the milk factory. The threat of exploitation by the milk factory may prevent the farmer to invest in dairy cattle. Asset specificity is in fact a situation where specific rights, in this case: entitlements to the benefit of investments, cannot be protected, at least not with any credibility within the context of the market. If a complete contract could be drawn up *ex ante* and enforced *ex post*, then the problem could be solved. This, however, would be prohibitively expensive.

3.2 Asymmetric information

Even without investments in relation-specific assets being involved, uncertainty about the characteristics of traded products and of the future behaviour of trading partners can lead to allocative inefficiencies. Consider the situation where the quality characteristics of products cannot be fully perceived and evaluated by a buyer. For example, you may look at, feel and smell the melon while it is in the shop, but you will only know the taste by the time it is on your table. Suppose higher quality has a higher value in the market, but is produced against higher costs. Buyers will be unwilling to pay the price of a top quality product if, because of imperfect information and the possibility of opportunistic behaviour, there is a probability that they will end up with a low quality product. In response, sellers will withdraw the high quality product from the market if it cannot fetch the required high price that allows them to recoup production costs. Therefore the high quality product is withdrawn from the market, despite the fact that there are buyers that would be willing to pay the required price. This is the problem of *adverse selection*.

Besides adverse selection, which is an *ex ante* problem that occurs before deals are concluded, there is another uncertainty related problem, the *moral hazard* problem. This occurs *ex post*, after deals have been concluded. Suppose that

the effort level of a producer of a product is imperfectly observable by the buyer. This is common in the case of agricultural production, where uncertainty about production volumes, delivery times and quality characteristics arise from the fact that production is influenced by autonomous and unpredictable factors like weather conditions and the occurrence of pests and diseases that influence harvests. After a deal is struck, a seller has an incentive to put in less effort than originally agreed. A buyer, anticipating on the possibility of this sort of opportunism, will be unwilling to enter into a deal, thereby again leaving mutually profitable trading possibilities unexploited. A solution could be the generation of the information that would permit the buyer to adequately judge product quality. This is often very expensive, though.

4 Two alternative mechanisms

Problems of protection of rights or of transparency may lead to failure of the market as an institutional mechanism, in the sense that mutually beneficial business deals do not come about or transaction costs rise to prohibitive levels. If the market fails, then other institutional mechanisms are called for that can cope with the circumstances that give rise to this specific type of market failure. This takes the form of some degree of vertical co-ordination. Vertical co-ordination usually combines elements of two other co-ordination mechanisms that facilitate exchange. Both imply more management of the supplier-buyer relationship, of chain integration, and therefore less independence and flexibility.

4.1 The hierarchical mechanism

Under specific circumstances, exchange is best organised through the operation of hierarchies. A *hierarchical relationship* is an exchange relationship where one actor can determine *ex post*, after the relationship has been concluded, what the other will do, over a certain period of time and within certain contractual constraints, in exchange for some price that has been concluded *ex ante*. This price can be for instance a contract price, a salary (in the case of labour) or a share in profits (e.g. in the case of a joint venture). Thus, one actor transfers authority over his activities to another. Where in market exchange an agent sells an output, a hierarchical exchange situation results from an agent selling his productive capacity as an input to a value creating process of somebody else. Once a hierarchical relationship has been concluded, people or organizations do not meet each other as autonomous actors, like in the market, but in a situation where one has authority over the other: there is a *principal* and an *agent*.

An example of a hierarchical arrangement is the milk co-operative. This producer co-operative has developed because farmers deciding upon investments in livestock found themselves faced with a hold-up problem, as described above. A milk co-operative processes raw milk into consumer products and is wholly owned by the farmers that produce the milk. Because the farmers are entitled to decide upon the policy of the co-operative, the latter will work in their common interest and pay an acceptable price for raw milk. The establishment of a producer co-operative removes the threat of exploitation and thereby resolves the hold-up problem, the conflicts of interest between upstream producers and processors that impedes investment. This is an example of substitution of hierarchy for market, of vertical co-ordination for competition. Though it creates certainty and economic security for upstream producers, it limits flexibility and introduces rigidities.

Institutional mechanisms perform their function at a certain cost – this holds for hierarchies as well as markets. In a hierarchical relationship, the principal has contracted the agent to pursue the principal's objectives. However, once the contract is concluded, the agent has an incentive to pursue his own objectives, to the disadvantage of the principal. As the principal is imperfectly informed about the activities of the agent, the latter can spend part of the time sold to the principal for his own benefit. So, like in the case of markets, a main factor hampering the exchange mechanism is asymmetric information and the occasion rising from it for opportunism. Costs of the mechanism, known as *agency costs*, are made to overcome this information asymmetry and tendency toward opportunistic behaviour. Part of them are made by the principal for gathering information (monitoring the activities of the agent) and for aligning objectives of principal and agent by creating incentives for the agent to work for the benefit of the principal. Another part is borne by the agent who invests in bonding, in building a reputation to earn the confidence of the principal.

4.2 *The reciprocal mechanism*

Alternatively, co-ordination of exchange can be governed by informal norms. Norm based mechanisms of interaction are typical of social networks. The *reciprocal mechanism*, or *social network*, is 'a separate, different mode of exchange, one with its own logic' (Powell, 1990), not a half way house between market and hierarchy (see also table 1). Informal norms guide the behaviour of groups of actors that entertain long-term relationships, for instance within the family, between neighbours, between friends, between close colleagues or in a business community. Exchange here frequently takes the form of doing something for somebody else, in exchange for the implicit reassurance that, should opportunity or necessity arise in the future, they will return the favour. Norms that govern this behaviour specify what can be expected within certain specific relationships; they pertain for instance to

helpfulness, hospitality, expected contributions to the common good of the family, the work place, the neighbourhood, et cetera. Norms direct exchange within a relationship where the return is as yet unspecified. Typically, it is not yet certain whether the occasion will occur where the favour should be returned, what the return favour will actually be, and often, who exactly will deliver the return.

Social norms are rules of behaviour, based upon shared values like fairness, honesty, respect. They call for virtuous behaviour in exchange relationships. They govern not so much exchange between one actor and another, but rather, and maybe primarily, between one actor and the other members of a group or of society. An actor abides by the norm, in exchange for other actors sticking to the norm; this makes norms common and characteristic of specific networks. Many norms are general rules of behaviour about what is to be expected of others in certain situations, embedded in culture. However, norms can also be relation or network specific as they develop as rules of behaviour particular to a small group.

Norms often serve to avoid negative side effects of behaviour (also called negative externalities; e.g. the norm to keep quiet so as not to disturb the neighbours), to provide public goods (e.g. the norm to shovel snow in front of one's own house), and to provide security (e.g. the norm to help people in case of accidents on the street). Though norms may be informal, they can nonetheless be forceful means to guide behaviour. They reduce uncertainty by precluding opportunistic behaviour. As this mechanism organizes exchange of something now in return for something later, information is always asymmetric: the agent on the receiving end knows what he gets, but the one on the giving end is uncertain whether the favour will ever be returned. Norms, and the implied repercussions if they are transgressed, offer a reassurance that the return favour will indeed be delivered when occasion or need arises. The force of the norm and the degree of certainty it offers depends upon the gravity of the consequences of transgressing the norm.

As is the case with the two other mechanisms, there are costs attached to the reciprocal mechanism. First, it takes an investment in time and effort in community building and in the development of personal relationships. Secondly, norms curtail freedom and reduce flexibility. They preclude all kinds of self-interested behaviour and impose group solidarity. Finally, norms only work as long as transgressing them leads to some form of punishment. As a rule, punishment entails a cost not only to the receiving party.

Table 1 Stylised comparison of co-ordination mechanisms

Forms			
Key features	Market	Hierarchy	Social network
Normative basis	Contract – property right	Employment relationship	Complementary strengths
Incentives	Prices	Authority	Norms
Means of communication	Prices	Routines	Relational
Methods of conflict resolution	Haggling – resort to courts	Administrative fiat	Norm of reciprocity – reputational concerns
Degree of flexibility	High	Low	Medium
Amount of commitment among the parties	Low	Medium to high	Medium to high
Tone or climate	Precision and/or suspicion	Formal, bureaucratic	Open-ended, mutual benefits
Actor preferences or choices	Independent	Dependent	Interdependent

After Powell, 1990

5 Costs and trade-offs

The spot market does not require a lot of management of buyer-supplier relationships. Under certain conditions, though, the market fails to deliver efficient exchange or would do so only against very high transaction costs. In that case, exchange requires some degree of *vertical co-ordination*, the development of a tighter vertical relationship. This can be through some form of hierarchical control or on the basis of some co-operative agreement. The former is usually organised through a formal contract whereas the latter functions on the basis of mutual understanding, informal norms of conduct and trust.

Table 2 Mechanisms of vertical co-ordination: strengths, weaknesses, costs

	Market	Hierarchy	Social network
Form	Spot market transactions, competition	Long term contracts, sub-contracting, vertical integration	Strategic alliances, joint ventures
Strengths	Information dissemination, incentives, specialisation, experimentation, individual freedom	Enforcement, certainty	Motivation, commitment, information exchange, mutual learning, internal flexibility
Weaknesses	Rent-seeking, commitment, profit distribution	Incentives, rent-seeking, individual freedom	Enforceability, free riding, abuse, external rigidity
Costs	Transaction costs: <ul style="list-style-type: none"> • searching; • bargaining; • enforcing. 	Agency costs: <ul style="list-style-type: none"> • monitoring; • incentive alignment; • bonding; • dead-weight losses. 	Networking costs: <ul style="list-style-type: none"> • networking; • co-operating, helping; • retaliating.

Partly based upon CPB, 1997

Now consider the advantages and disadvantages of the three mechanisms (see table 2). A transparent market condenses and conveys information in the form of price signals and provides incentives to compete on the basis of efficiency. Under the right conditions, this achieves efficient allocation. It allows agents maximum freedom and flexibility and it stimulates innovation. However, the time profile of trading in a market is short and commitment is therefore low. In the market, agents decide on the basis of self-interest. Under specific circumstances, notably high entry barriers, this is likely to lead to the exploitation of market power and rent seeking (trying to secure privileges from public policy) and thereby to a very skewed distribution of income or profits. Under conditions of asset specificity and information asymmetries, it leads to prohibitively high transaction costs and beneficial deals not coming about.

The time profile of a hierarchical arrangement is much longer than that of a market transaction: a contract has duration. Therefore, hierarchy offers stability and certainty. Once the contracts have been concluded, the distribution of authority is clear and there is no need for further searching and bargaining. This stability and certainty come at a cost, though. In a hierarchical relationship, the agent has an incentive to shirk, to let his own interests prevail over those of the principal. Therefore monitoring and incentive alignment are required which lead to compliance costs.

A network relationship is an implicit agreement, a set of contingent mutual promises based upon shared values and norms of behaviour. The time profile of a reciprocal network relationship is indeterminate and the individual benefits an agent may reap are uncertain. The advantages of social networks are in the commitment they generate and the security this provides in conditions of uncertainty or lack of information. Reciprocal network relationships are internally flexible, in the sense that implicit agreements easily adjust to changing circumstances, and they facilitate mutual learning and development. Reciprocal relationships, though, are only as reliable as agents want them to be: norms of conduct are internal to a network and there is no external authority to enforce them. Therefore, reciprocal network relationships may elicit free riding and abuse. Enforcement of implicit norms of conduct is often difficult and retaliating may be expensive or even impossible. An additional disadvantage is that commitment to an established network reduces external flexibility, the ability to step out of established relationships and switch to potentially more profitable trading partners, and thereby may introduce some degree of rigidity. Network development introduces entry and exit barriers.

5.1

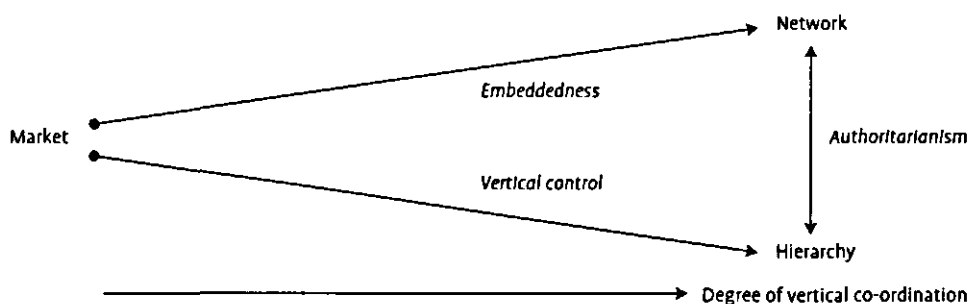
Balancing co-ordination mechanisms

Vertical co-ordination is called for if market failure troubles exchange between a supplier and a buyer in a chain. This vertical co-ordination may be more of a formal hierarchical or more of a co-operative network nature. Most arrangements found in practice combine features of all three mechanisms (see figure 1). There are many forms; one may think for instance of subcontracting, where long-term relationships are usually maintained through negotiations rather than competitive bidding. Other examples are franchising, where a firm down the chain uses a trademark owned by a supplier, and alliances, where technology is shared or specific activities are co-ordinated.

On the one hand, organizations that are engaged in repeated exchanges may seek a balance between elements of market and hierarchy. This results in a certain degree of redistribution of formal authority and control, taking the form of long-term contracts or participations, mostly involving the delegation of some amount of discretionary power to a 'chain manager'. On the other hand, organizations may seek a balance between elements of network and market exchange, of competition and collaboration, of norm guided behaviour and market. The stronger their social ties, the more they move to norm co-ordinated behaviour; the weaker their ties, the more they rely on market co-ordination. This balancing between norm and market results in a certain degree of voluntary co-operation and *embeddedness* of ties. Embeddedness is the extent to which an exchange relationship is rooted in a social structure, in a structure of personal ties. Embedded relationships enable not only the transfer of material values (goods, services, money), but also

facilitate the exchange of knowledge and information and of reassurances, of various kinds of signals that build trust. Trustworthiness is an element of high value in embedded ties: it decreases transaction costs (costs of searching, bargaining, contracting, monitoring, enforcing) and it provides security (the guarantee that one can depend on one's partners in unforeseen circumstances). Finally, an integrated vertical relation is characterised by a specific mix between formal hierarchy and informal reciprocity, a degree of "authoritarianism". There is a balance to be accomplished between directing behaviour and empowering people, between commands and obedience on the one hand and devolution of responsibilities and trust on the other.

Figure 1 Balancing institutional mechanisms



5.2 What drives vertical integration in supply chains?

The search for effective and efficient institutional arrangements between suppliers and buyers often seems a process of trial and error. Remarkably, we currently see how some firms move towards more hierarchical arrangements in chains, using ever more elaborate contracts to organize their relationships with preferred suppliers, while at the same time structuring their internal operations using market mechanisms, for instance by having business units trade with each other as independent partners. We also see that business relations get ever more formalized through contracts, while at the same time an increasing emphasis is put upon informal transaction mechanisms and the establishment of generally accepted norms (referred to with terms like social accountability, business ethics, licence to produce) to govern transactions between actors in social networks. This raises the question: what are the drivers of these changes in institutional arrangements in chains?

All three types of co-ordination of vertical relationships have their specific strengths, weaknesses and costs. A common hypothesis is that the institutional mechanism with the most favourable cost-benefit ratio is likely to become the standard in any particular situation. A process of competition or of evolutionary selection will take care of weeding out arrangements that are

less efficient and more expensive. In relationships where relation-specific assets are involved or that are characterised by high uncertainty or information asymmetries, one would therefore expect more hierarchy than market (Williamson, 1989). This argument is not univocally supported by empirical observation: there is a good deal of path dependence and limited rationality involved in the choice of institutional arrangements. Also, in cases where institutional arrangements lead to unequal exchange, there are vested interests that will try to conserve the status quo, however inefficient this may seem from an aggregate point of view.

Casual observation suggests, though, that vertical integration is currently progressing in many supply chains. Vertical collaborative agreements and joint development initiatives seem more prominent than they used to be. Also, there is a heightened (public) awareness of norms of commercial behaviour and business ethics and this seems to have become more important in the conduct of business. This raises the question of what drives this process. One factor may be technological change. The relative attractiveness of different institutional mechanisms depends partly upon their costs. Technological development, especially the continuing development of ICT-applications, not only reduces the cost of trading in absolute terms, but also changes the relative costs of market, hierarchy and social network. The costs of institutional arrangements, be they transaction, agency or networking costs, are to a large extent costs of gathering and processing information: search costs and monitoring costs. Information gathering, transfer and use has been revolutionised by the development of ICT-applications. ICT has led to more transparency in markets: product and price information of competing offers is more readily available. In addition, ICT has also led to extended capabilities to monitor performance and enforce contracts in a hierarchical relationship. Finally, improvements in communication technologies, and in transportation as well, have made the extension of networks over great distances easier and cheaper. One cannot determine *a priori* which co-ordination mechanisms have benefited most from these developments, though.

Another factor that influences vertical integration may be of a cultural nature. Individualization (or de-collectivisation) in society decreases the force of norms of behaviour. Globalization extends trade networks far beyond the borders of social and cultural groups and renders business relationships increasingly anonymous. Agents identify less with the people they entertain commercial relationships with and the threat of social expulsion therefore becomes less awesome. This drives business partners toward ever more formalization of their relationship through elaborate contracts. Also, informal norms of conduct are increasingly formalised in regulations and laws. As this becomes increasingly costly, this stimulates conscious efforts in social network building and in establishment of shared norms. Efforts to abide by common norms materialise in a good reputation. Downstream buyers in the

chain often face problems of adverse selection and moral hazard. A favourable reputation may deal with that by reducing the need to monitor and check on the part of these buyers. It thereby decreases the cost of trade. Reputation-building is often helped by developing personal relationships, by transforming anonymous market relationships into a social network. Stable, long-term personalized relationships provide a basis for risk sharing and for collaboration in joint development projects. For example, the development of a preferred supplier relationship, as is common in many supply chains, reduces transaction costs and increases commitment, while retaining a considerable degree of flexibility.

An open question is whether firms actually use the choice for particular institutional arrangements as instruments in competition. This can be competition between firms in a chain over the distribution of revenue or between different chains for their position on consumer markets. The more market power a firm has, the more possibilities it has to structure the mechanism of exchange to its own benefit. For example, retail firms not just negotiate the prices they pay to farmers for fresh products, but increasingly determine the conditions under which these prices are set and trade takes place.

6 Conclusions

A central issue in supply chain development is the co-ordination of exchange between firms in the chain, such that conflicts of interests are dealt with efficiently and that aggregate chain performance is maximized. Exchange between independent agents is mostly co-ordinated through the market. The market mechanism, however, performs well under specific conditions and these conditions are not always met. If property rights cannot be enforced or if information is asymmetrically distributed, the costs of letting the market mechanism operate rise to very high levels or the market may fail altogether. This happens in cases of asset specificity and where there is a risk of adverse selection or moral hazard. In those cases, some degree of vertical co-ordination may resolve the problems. Increasing vertical co-ordination implies introducing elements of hierarchical co-ordination (authority) and of network co-ordination (the reciprocal mechanism). Vertical co-ordination introduces stability and may resolve conflicts of interest, but it often also reduces flexibility and incentives to innovate. Besides, the hierarchical mechanism and the social network also have their operating costs; these have to be weighed against the transaction costs of the market. Generally, though, there seems a tendency toward increasing vertical co-ordination and experimentation with new forms of vertical arrangements. This is likely to be related to technological progress in ICT and to individualization and globalization.

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