The Agri-Food Cooperative Netchain
A Theoretical Framework to Study its Configuration

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Abstract

This paper proposes a research framework of the design and configuration of agrifood chains where the focal firm is a second-tier cooperative (group of affiliated cooperatives) in order to assess the alignment of (relational) governance structures and coordination mechanisms in these chains with supply chain management (SCM) principles. The theoretical framework proposes an integrative approach by drawing on the Relational View of inter-organisational competitive advantage and the Theory of Networks as inter-cooperative vertical relationships are embedded in horizontal ties between firms (first-tier cooperatives) of social rather economic nature. The conceptual framework developed herein will help theory building in SCM, but most importantly it would advance current knowledge on the scope of SCM in the agrifood cooperative sector.

Keywords: *supply chain management, agrifood cooperatives, governance structure and coordination mechanisms*

1. Introduction

Firms are finding it increasingly difficult to maintain their competitive advantage in the current business environment by relying entirely on their own resources and capabilities. Fast-moving technological innovation, increasing and globalised competition, vertical disintegration and ever-changing consumer demands have shaped a business environment where the establishment of inter-firm relationships have emerged as a necessary condition for firm's competitiveness and resulting in the establishment of extensive business networks.

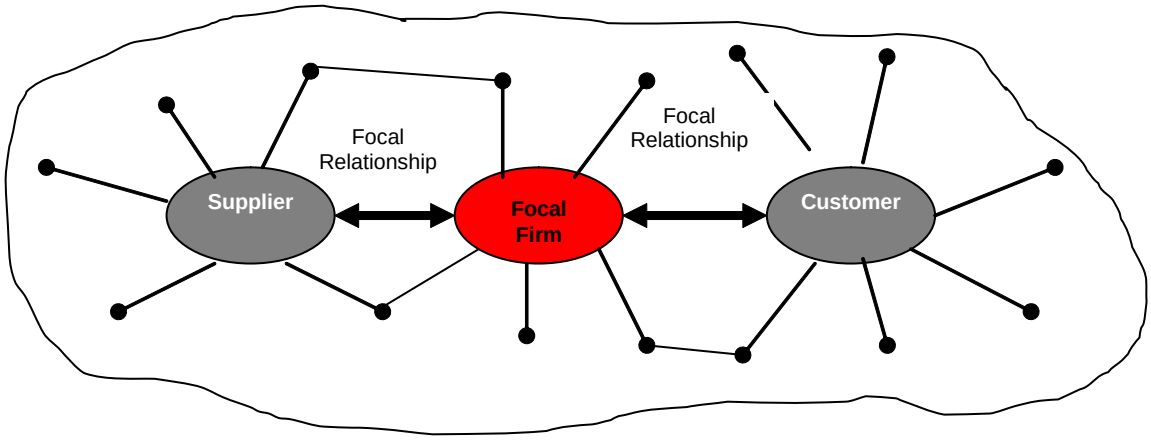
Of particular interest are those business relationships established along the production and distribution chain leading to the development of an integrative approach to the study of business networks known as Supply Chain Management (SCM). This management philosophy seeks the cooperation of all actors in the chain so by working together firms will be able to supply higher quality products, achieve greater process efficiency and innovativeness, and offer greater value to the final consumer.

The term SCM has been used to explain the planning and control of materials and information flows as well as logistical activities, both within and between companies (Cooper et al., 1997; Fisher, 1997). Studies have also used it to describe strategic, inter-organisational issues (Harland et al., 1999), to discuss an alternative organisational structure to vertical integration (Thorelli, 1986), to identify and describe the relationship a company develops with its supplier (Helper, 1991; Narus and Anderson, 1995), and to address the purchasing and supply perspective (Morgan and Monczka, 1996; Farmer, 1997).

The SCM philosophy has been traditionally applied to the automobile sector (Dyer, 1997; Dyer and Nobeoka, 2000). However, in recent years researchers and practitioners have recognised the useful application of SCM to the agrifood sector characterised by a continuous flow of perishable products, a well-informed consumer concerned about the provenance and safety of agrifood products, and a stricter food safety legislative environment.

This paper focuses on the agrifood second-tier cooperatives (groups of affiliated cooperatives) given the relevance of these governance structures in some agricultural sectors (i.e. fresh produce) and the paucity of studies applying SCM principles to agrifood cooperatives. In the European Union (EU) there are some 300,000 cooperatives playing an important role in sectors like fresh produce where in countries such as Denmark, the Netherlands or Belgium, 70-80% of fresh produce production is marketed through cooperatives (General Committee for Agricultural Cooperation, 2000). To date only a handful of studies have focused on agrifood cooperative as unit of analysis (Claro, 2004; Sauvee, 2002).

This paper takes as the central unit of analysis the second-tier cooperative. From this focal firm's point of view we position all other organisations in the network. Therefore, in identifying the different theoretical determinants of netchain design and configuration, the research framework will consider a double dyadic relationship: the supplier (first-tier cooperatives)-focal firm (second-tier cooperative) dyad and the focal-firm-customer dyad (Figure 1).



Source: Adapted from Halinen and Tornroos (2005)
Figure 1. Research scope of business networks

The paper is structured in four parts. After this introduction, section two presents the theoretical approaches considered in this paper for the development of the research framework. The following sections outlines the theoretical framework developed for this analysis and presents a number of hypotheses for further analysis. Finally, there are conclusions and recommendations.

2. The Theoretical Foundations

Zaheer and Venkatraman (1995) argue that inter-firm vertical relationships have two dimensions: a) the structure of the relationship as an indicator of the degree of vertical integration of business transactions, and b) the process of the relationship as a measure of the level of joint actions between firms. They define the (relational) governance structure as the inter-organisational framework where exchanges or transactions take place, and the governance process as the inter-organizational activities part of the transactions within this relational framework. Thereby, both the structure (static approach) and the process (dynamic approach) are equally important to fully understand and describe the complexity of inter-organisational links.

The election of a governance structure and its coordination process is viewed as a firm's inter-organisational strategy (Zaheer and Venkatraman, 1995). From this perspective, the comparative advantage emerge from interdependent firms' relationships, and thereby moving from a resource-based view (RBV) of the firm (e.g., Barney, 1991; Teece et al., 1997) to 'relational view' of inter-organisational competitive advantage (Dyer and Singh, 1998). Although complementary to the RBV, the relational view considers the dyad/network instead of individual firms as the unit of analysis, and therefore provides a more coherent support to our approach to SCM.
Under the relational view approach (Dyer and Singh, 1998), (effective) governance structures play a key role in the creation of relational rents that extend beyond efficiency arguments in Transaction Cost Analysis (TCA) (North, 1990; Williamson, 1985) by providing incentives for value-creation initiatives (i.e., investing in relation-specific assets, sharing-knowledge, or combining complementary strategic resource) which will be difficult to imitate or replicate by competitors. Hence, *competition between firms* would be replaced by *competition between supply chains.*

Moreover, a variety of hybrid coordination strategies between the two extreme forms proposed by TCA (i.e., fully vertically integrated systems and spot-markets) have been identified, ranging from formal mechanism, such as contracts and equity arrangements (Joskow, 1987; Osborn and Baughn, 1990), to more informal strategies, such as information sharing and joint planning (Noordewier et al., 1990; Palay, 1984). The middle has also been defined as networks (Thorelli, 1986) or hybrid governance structures (Williamson, 1975; Powell, 1987; Borys and Jemison, 1989).

The perishability of fresh produce and the increasing globalisation of production and consumption require tightly coordinated chains so suppliers and buyers are working, not with the concept of a single relationship, but managing sets of relationships as portfolios, and sets of

products as categories. Integration and sharing of information are extensive with open communication facilitated by multi-level / multifunctional relationships (Garcia Martinez and Poole, 2004).

Thereby, the conceptual framework developed in this paper (Figure 2) includes a construct labelled 'coordination mechanism' of the supply chain which will be measured through three variables: (i) joint investments in specific assets, (ii) shared communication, and (iii) joint actions by actors in the chain.

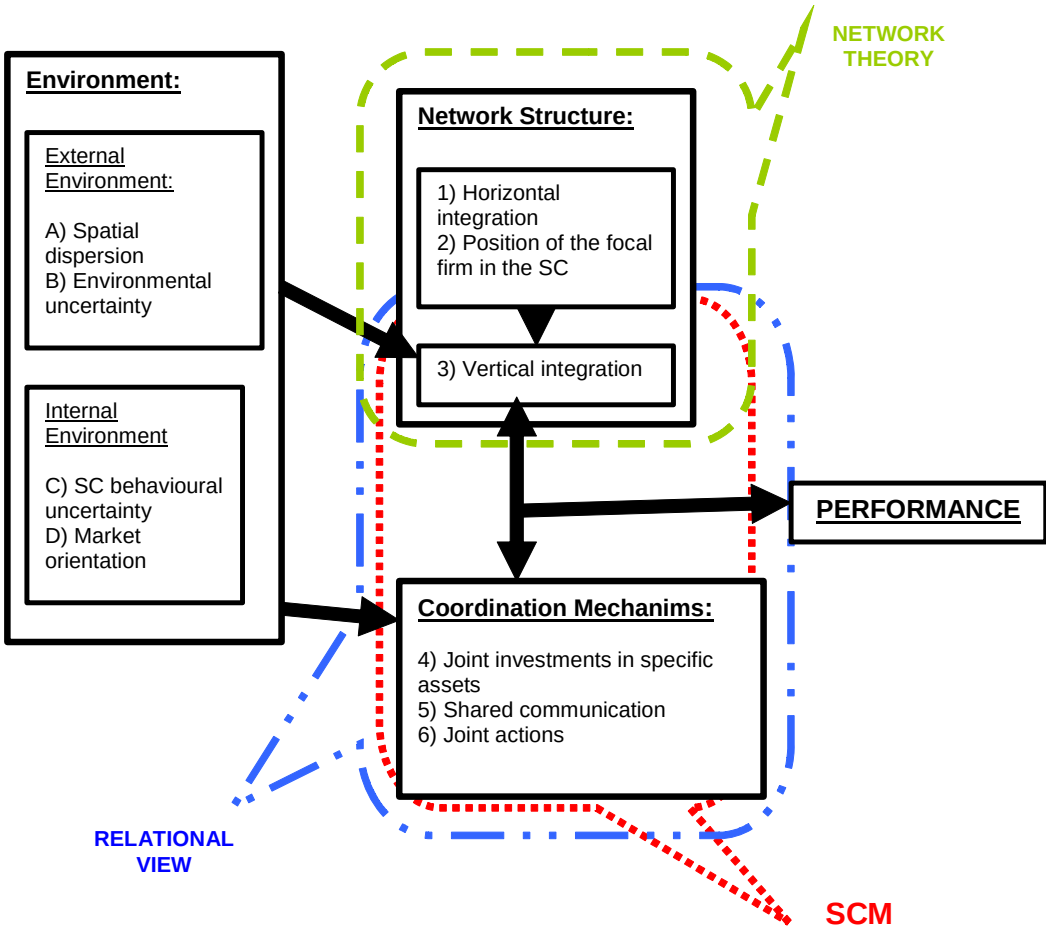


Figure 2. Theoretical framework

Furthermore, second-tier cooperatives can establish cooperative groups or inter-cooperative agreements with other firms resulting in extensive business networks. This implies a wide diversity of relationships, primarily of a horizontal nature (i.e., between actors at the same level in the chain) ranging from legal structures to relationships based on social components, like trust or power, as envisaged in the Theory of Networks (Powell, 1990; Thorelli, 1986).

Lazzarini et al. (2001) argue that SCM is a more suitable approach to study buyer-supplier relationships, given its focus on elements related to vertical transactions like logistic direction or the design of contractual agreements between the buyer and the seller. However, the Theory

of Networks allows considering social dimensions and knowledge transfer that do not necessarily apply to vertical levels. In particular, they propose the analytical integration of SCM and the Theory of Networks, given their focus on different types of inter-dependencies implied in inter-organisation collaboration, which in turn are linked to different value sources and coordination mechanism. By combining both approaches a superior analytical framework will be developed to study inter-organisational collaboration.

This approach is encapsulated in the construct named 'network structure' (Figure 2), which is measured through three indicators: (i) degree of horizontal integration, (ii) position of the focal firm in the supply chain; and (iii) degree of vertical integration (this indicator is also used in the relational view).

Next, we present the theoretical framework and the conceptualisation of the proposed constructs.

3. Proposed Theoretical Framework

As indicated above the theoretical framework of the design and configuration of agrifood chains where the focal firm is a second-tier cooperative proposed in this paper integrates the Relation View (Dyer and Singh, 1998) and the Theory of Networks (Thorelli, 1986; Powell, 1990) (Figure 2). The theoretical framework includes the following four constructs:

3.1. Network Structure

Based on the conceptual model of SCM proposed by Lambert and Cooper (2000), the network structure construct is measured through three indicators:

- Degree of Horizontal Integration: Increasing retail pressure is forcing primary producers to establish horizontal cooperation agreements in an attempt to increase their bargaining power. Moreover, horizontal integration of small-scale producers into second-tier cooperative business is leading to the development of extensive business networks. Moreover, second-tier cooperatives could also establish cooperative groups and/or inter-cooperative agreements with other firms, increasing as a result the degree of horizontal integration. This network structures could facilitate the management of local or regional cooperatives (Lazzarini et al., 2001).

  On the other hand, cooperative members maintain multiple interdependencies (reciprocal, shared and sequential) (Thompson, 1967) resulting from the idiosyncrasy of their business process (i.e., cooperative members are both clients and suppliers), personal relationships between members and strong social bonds. Therefore, the transactional and ownership components of vertical relationships are immersed in a network of personal relationships among members of the cooperatives. This could generate the trust to offset the potential internal conflicts and opportunistic behaviour (Lazzarini et al., 2001).

- Position of the Focal Firm in the Supply Chain: In the Theory of Networks the position of a firm in the network is important as it would determine firm's strategic actions and consequently network dynamics. Firms' strategic actions are aimed to influence their positions in the network. Thereby, in our study it is important to determine the position of the cooperative in the food chain since the increasing rationalisation of supply chains is driving horizontal integration to eliminate the middleman and get closer to food retail chains. By doing so primary producers will get closer to the final consumer. Hence, we would expect a positive relationship between a closer position to the final consumer and vertical and horizontal integration.

- Degree of Vertical Integration: Traditionally, vertical integration has been considered as an alternative to market transactions (Coase, 1937; Williamson, 1975, 1985), and therefore studies in this area have tried to oppose two options from a dichotomy perspective: internalisation (vertical integration) or externalisation (market transactions) of activities. However, the possibility of intermediary structures of vertical organisation has changed the conceptualisation of vertical market arrangements, or vertical coordination (Grandori, 1997; Grandori and Soda, 1995). These intermediate vertical organisations are revealed as organisational structures with a cooperative element built in with varying degrees of vertical integration. Within this continuum (as opposed to the traditional dichotomising and discreet approach) a company can be located at any point in a scale whose extremes are market transactions and vertical integration. A company with a SCM philosophy will be placed in the middle of the scale.

Hypothesis 1: The greater the degree of horizontal integration, the greater the degree of vertical integration and the closer the focal firm will be to the final consumer.

3.2. Coordination Mechanism of the Supply Chain

According to Thompson's (1967) interdependence typology, in SCM occur a sequential interdependence that requires coordination mechanisms by plans, whereas the shared and reciprocal interdependence needs coordination mechanisms based on standardization and mutual adaptation, respectively. However, the author argues that different types of interdependencies could also occur in different degrees and simultaneously.

- Joint Investments in Specific Assets: According to the Relational View approach (Dyer and Singh, 1998), investments in specific assets can be source of competitive advantage. The firm has to do something specialized or unique to develop to a competitive advantage and a firm can choose to seek competitive advantages by creating specialised resources together with other companies. Consequently, firms have to narrow down their business activities and concentrate on few core competences while increasing the frequency and magnitude of collaboration with other firms.

- Share Communication: research in this area has underlined inter-organisational and bi-directional communication as a key determinant of success in buyer-supplier relationships (Newman and Rhee, 1990; Lascelles and Dale, 1989). In order to find jointly solutions to

material and buyer-supplier's business plan problems, actors must share greater amount of information and must agree sharing information related to the business plan.

- Joint Actions: SCM requires joint problem solving and planning, as key determinants of inter-related business relationships. Joint planning refers to the extent to which contingencies and, consequently, duties and responsibilities are specified ex-ante. Joint problem solving refers to the degree to which disagreements between partners, technical failures and other unexpected situations are solved jointly.

3.3. Environment

Given the diversity of the agrifood sector it is probable that different contexts give rise to different supply chain configurations (Dyer, 1997); hence a third construct has been introduced to capture the contextual inferences.

- Geographical dispersion: the geographical dispersion of processes affects coordination costs in industries where operations have to be located close to their customer base (Carman and Langeard, 1980). A high spatial dispersion of production and commercial processes is considered an important determinant of supply chain configurations (Combs and Ketchen, 1999; Tan et al., 2002; Ziggers and Trienekens, 1999). In the fresh produce sector, in particular, the emergence of production locations all around the world to guarantee all-year-round supply and the functioning of global retail chains require collaborative chains with a high level of coordination and integration of work practices and flexible, innovative governance structures to manage increasingly complex relationships and to make adjustments in day-to-day management as circumstances change.

- Environmental uncertainty: Given the multi-dimensional character of uncertainty, we need to distinguish between different sources of uncertainty, particularly between environmental uncertainty and behavioural uncertainty in the supply chain, as they impact on governance structure and coordination mechanisms will differ (Sutcliffe and Zaheer, 1998).

  According to Folkerts et al., (1998) the agri-food sector has a high dependency on historical and cultural aspects. In sectors like the fresh produce sector we find different distribution systems, legal and regulatory environments regarding packaging and food safety requirements (i.e., ISO or traceability). In the fresh produce sector where cooperatives are involved we need to consider the legal and regulatory environment, in particular the Statute for a European Co-operative Society (SCE), which was adopted by the European Council on 22nd July 2003, to provide co-operatives with adequate legal instruments to facilitate their cross-border and trans-national activities.

  The approach taken in this study is the need for flexible and decentralised governance structures with high degree of inter and intra-firm coordination in environments characterised by a high degree of uncertainty as the current one in line with SCM principles (Porter, 1980; Harrigan, 1985; Balakrishnan and Wernerfelt, 1986; Wernerfelt, 1986; Pimentel et al., 2003).

- Supply chain behavioural uncertainty: it has three main components: (i) product quality fluctuations; (ii) product quantity fluctuations; and (iii) time fluctuations (Vorst, 2000). In the fresh produce sector we have additional factors that increase uncertainty such as agricultural production seasonality and product perishability. This together with demand uncertainty (i.e., GMOs, food safety scares, avian flu, etc) makes the agrifood chain very difficult to predict and control (Bailey, 2001).

  When studying behavioural uncertainty we also need to consider the level of trust among partners, viewed as the most effective control mechanism in business transactions (Arrow, 1974). The need to build trust among firms involved in business relationships is considered as a key success determinant of inter-firm relationships (Anderson and Narus, 1990; Geyskens et al., 1998; Rousseau et al., 1998). Previous studies identify trust as a key determinant in buyer-seller relationships (Morgan and Hunt, 1994). Trust allows parties to direct transitional risk and opportunism (Nooteboom et al., 1997), and thereby to reduce uncertainty.

  Authors like Adams and Goldsmith (1999) argue that geographical aspects (i.e., same location) or certain organisational structures (i.e., cooperatives) could strengthen and reinforce trust building. Lazzarini (2001) argues that the social bonds established in cooperatives foster the development of trust among members. However, in general terms, the food sector is characterised by a low level of trust among its members (Hagen, 2002).

- Market orientation: the fresh produce sector faces the challenge of being efficient, innovative and flexible and marketing products that meet stringent safety and quality requirements. To succeed in this challenge the fresh produce sector has to have a clear market orientation. This, in turn, will require a high and intense coordination and collaboration among actors in the supply chain, in line with SCM principles.

Hypothesis 2: The greater the environmental uncertainty, the greater the geographical dispersion and the greater the market orientation; the greater the need to invest in joint specific assets, for shared communication and joint action among actors in the supply chain, but without the need for vertical integration. This would demand greater alignment with SCM principles.

Hypothesis 3: Supply chain uncertainty is negatively related with SCM principles; thereby negatively related with investments in joint specific assets, shared communication and joint action among actors in the chain and positively related with the degree of vertical integration.

3.4 Performance

The theoretical framework includes both operative and financial performance indicators with the former distinguishing between supplier and customer indicators (Chen and Paulraj, 2004).

Hypothesis 4: The greater the investment in joint specific assets, shared communication and joint action among actors in the chain (without being vertically integrated), the greater the operative performance.

Hypothesis 5: The greater the investment in joint specific assets, shared communication and joint action among actors in the chain (without being vertically integrated), the greater the financial performance.

4. Conclusions

This paper presents a theoretical framework to study the supply chain configuration of agri-food cooperatives; in particular it allows determining whether the governance structure and coordination mechanism of agrifood cooperatives are in line with SCM principles. To that end, the theoretical framework integrates the Relational View approach which takes as unit of analysis inter-firms relationships (in our case the vertical relationships between agrifood cooperatives) and the possibility that these firms would develop and exploit assets, routines and know-how that would allow them to generate an inter-organisational competitive advantage. These inter-cooperative vertical relationships are usually embedded in horizontal relationships with social (i.e., trust, power) rather economic connotations, and thereby the need to integrate also the Theory of Networks in the theoretical framework.

The analysis conducted in the paper allows concluding that horizontal integration, vertical integration and a position in the supply chain closer to the final consumer are positively related. Moreover, environmental uncertainty, process geographical dispersion, market orientation, investment in joint specific assets, shared communication and joint actions among actors in the chain are positively related to the establishment of a SCM philosophy, without arriving at vertical integration. Conversely, supply chain uncertainty is in contrast with SCM approach, thereby this uncertainty is negatively related to investments in joint specific assets, shared communication and joint actions among actors in the chain and positively related to the degree of vertical integration.

Finally, investment in joint specific assets, shared communication and joint actions among actors in the chain (without arriving at vertical integration) lead to better operative and financial results.

The theoretical framework developed in this paper could be applied to the general study of supply chain configurations and whether these structures are in line with SCM principles. The framework recognises that chain members, though independent entities, are immersed in far-reaching coordination processes which allow exploiting and developing knowledge and value in the chain.

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