Shaping food supply chains to enhance product quality[1]

Anna Carbone - Università della Tuscia*

**Corresponding author: acarbone@unitus.it*

Introduction

Supply chains are complex entities populated by many agents and, as such, they belong to the broad category of the so called *hybrid institutions* (i.e. institutions in between firms and markets) (Menard, 200). A number of different strands in the economic literature are challenged by their complexity and try to better understand their role in the functioning of the economy.

Since the contributions by Davis and Goldberg and by Malassis (Davis and Goldberg, 1958; Malassis, 1969), it is also commonly acknowledged that in industrial economies the production of food is organized in complex systems where diversified specialized firms interact intensively and progressively modify raw materials, adding intermediate inputs ingredients services and increasing value to the final consumer. The complexity of the system increased to the point that it has been often referred to as the industrialization of agriculture (Traill and Gomes Da Silva, 1996). Food production is commonly perceived as a "black box" also due to ongoing globalization, delocalization and the prominent role taken by multinational corporations (Fonte and Cucco, 2015). All these processes also drive a marginalization of small family-run traditional strongly rooted on specific narrow places production units. As a reaction, policy makers as well as producers' and consumers' associations in different parts of the world try to foster more transparent tighter and less captive and more relational supply chains.

There is general consensus – both among researchers and practitioners- on the idea that in order to market their products and to be profitable, firms increasingly need to be embedded in a network of relationships that goes beyond those of spot markets (Dyer and Singh, 1998; Oliver and Ebers, 1998; Galizzi and Venturini, 1999; Bouamra-Mechemache et al., 2015).It is, though, less clear which kind of relationships are better suited for the different tasks to be performed and what are the most effective ways to promote these patterns of relations under different settings. Awareness of possible limits and drawbacks of hybrids is even less widespread, especially among those in charge of designing and implementing the institutional framework in which hybrids should be put in place and operate.

The aim of this work is to contribute to better understanding organizational forms in the agri-food sector, with reference to how food supply chains are featured and work. To this end, some food chains are depicted, focusing on the role of the different stakeholders, the kind of relation they establish among each other, the scope for coordinating and the kind of governance assuring the overall working of the chain.

[1] The text is a short and partial summary of the presentation prepared for the second plenary session of the 52th Sidea meeting, Rome/Viterbo September 17th/19th 2015.

DOI: 10.13128/REA-18622
ISSN (print): 0035-6190
ISSN (online): 2281-1559

While dealing with the entire food chain, the emphasis is especially on the role of farmers and of the agricultural sector that shows interesting peculiarities, only partially explored in the perspective of hybrid institutions so far.
Furthermore, the attention will be devoted to the high quality segment of the food sector, broadly defined, as this is particularly demanding in terms of ways of coordinating stakeholders and presently represents a major challenge for food supply chains.
The text is organized as follows: Section 2 is devoted to shape the theoretical framework for understanding the role and scope of supply chain analysis as hybrid institutions with special reference to the agri-food sector. Section 3 presents three chain typologies with their distinctive features, governance modes, kinds of coordination and the strengths and limits of each one. Concluding remarks are given in Section 4.

A theoretical framework for Hybrid Institutions

The trade-offs between the market and the firm

The first logical step in understanding to what extent the market and the firm can be effective alternatives for organizing production is to consider the degree to which the process itself is technically separable into stages. The less (more) separable the different operations of the production process the larger(smaller) the scope for the firm. With respect to the agri-food sector, separability of the different steps of the production process that transforms agricultural raw produce into food has increased with the so called industrialization of agriculture and of the agri-food system.
Segmentation actually occurs depending on the advantages brought by the consequent specialization of the production units. When specialization is associated with higher gains in efficiency, the less integrated will be the process and the larger scope will be observed for one single vertically integrated firm. Efficiency gains may be explained with idiosyncrasies in inputs and differences in the optimal scale at each stage of the production process (Teece, 1992)[2]. Furthermore, in agriculture the use of land as a fundamental input raises the importance of idiosyncrasies and has deep implications in terms of the optimal scale, this is usually smaller compared to that of the subsequent steps of the process.
Specialization that follows segmentation brings advantages also via increased ability to get higher quality and hence a higher value output.
On the other side, factors that push towards vertical integration and fewer transactions may be relevant and contribute to push towards a different pattern of production organization.
Typically, benefits associated to markets are lower when transaction costs are high and market failures are frequent/relevant (Hobbs, 1996). Among the diverse situations related to these premises, the focus here is on managing quality, investing and innovating: all tasks requiring a perfect alignment of the whole production process (Lazzarini et al., 2001). We refer to these requirements as to complementarity and idiosyncrasy. As for complementarity

[2] This includes the time required to complete each stage, an aspect that is often quite relevant in the agrifood sector.

one should understand the necessary association between two or more inputs, or actions, as one is useless, or less valuable, without the other. Idiosyncrasy refer to the specificity of an investment (input or action) that is valuable only in one well determined production process and otherwise turns into a sunk cost. Both situations ask for continuous communication between the different stages and reciprocal adjustments through time. Communication about quality is often not easily codified in formal norms. It requires informal judgments, experience and tacit communication. All factors calling for proximity and long-lasting relations so as in the vertical integration case. Firms and other agents acting in the supply chains need a lot of information in order to attain high quality products. This information is neither freely nor easily available. In cases of information asymmetries, uncertainties and the risk of free riding and other moral hazard behaviors may impinge the effectiveness and efficiency of the market. However, these negative behaviors are less likely to arise within a firm where levels of trust and/or effective contracts are highly available.
So far, the rationale discussed above indicates that whenever one of the two groups of factors pushing towards the market or towards the firm the outcome that follows is clear and definite. On the contrary, in cases when both groups of factors are relevant and no clear dominance emerges, the production process would be organized within hybrid institutions. Furthermore, resulting hybrids would be looser or more condensed according to which set of factors will play a larger influence.

Hybrid Institutions: pulling factors, incentives and drawbacks

Besides the factors reviewed in the previous section there are situations that specifically pull the economic organization into hybrids. Starting with reputation, we first recall the contribution by Tirole who pointed out (1996) that reputation of individuals is always related also to the reputation of the group to which the individuals belong and, thus, is by its very nature a collective issue. Furthermore, small producers rely of collective actions in order to establish a common reputation on larger markets especially in cases where the produce is reputed after the place of origin. In this sense, sharing the same location in the agri-food sector, calls for further sources of collective action.
Also for trust -that has been encountered previously among the factors that are relevant in managing production processes and transactions- there is a relevant feature related to collective action. Building trust requires connections and being embedded in social networks. Trust is a component of social capital that may ease exchanges and makes them more effective and efficient. It is favored by repetition of interactions over time, by proximity and embeddedness in the local society (Putnam et al., 1994).
In agriculture, idiosyncratic variable conditions related to the use of living beings as inputs and to the role of climate as an exogenous relevant factor, make knowledge and communication informal and contextualized and increase the role of trust.
External economies – both those related to networks and location economies- improve efficiency and may increase the value of output and call, by definition, for collective action ((Ketchen et al., 2004; Porter, 1998; Schmitz, 1995). Likewise, the management of Common Pooled Resources (CPR) (i.e. partially rival, partially excludable resources localized in relatively small areas) require collective action at the local level (Ostrom, 1990). Once again

in agriculture these features are particularly relevant due to the localization of the production processes, the role of land and of living beings.

Last but not least, collective actions within hybrids may be also aimed at raising countervailing power against larger firms. The tendency to form cooperatives, consortia, and the like, has been interpreted as countervailing actions to the bargaining power of counterparts. In addition, firms operating at inefficiently small scales tend to associate in order to be able to lower unitary costs and to access costly fixed inputs. This is frequently the case in the primary sector where suboptimal scale is frequent.

It is important to underline that, while providing effective solutions to limits and drawbacks of markets and firms, hybrids also faces their own specific drawbacks and limits and that this, are often undervalued, though quite relevant. Among the major ones it is here worth recalling:

- A high level of complexity, especially when compared to individual firms and spot markets relationships. Any change in the external environment requires internal adjustments and overall alignment. Complexity increases with the size and the level of heterogeneity of the hybrid (Olson, 1965).
- Complexity implies uncertainty in the outcome of the hybrid reaction to changes and that the timing of reaction tends to be slow. In a market environment of frequent and sudden changes this may impinge the competitiveness of the hybrid.
- Firms involved in a collective action are usually linked by twofold relationships. On the one side, they are supposed to collaborate, to cooperate for the common ends that gave birth to the hybrid; on the other side, they are either competing on the same markets or counterparts in exchanges and, thus, they are likely to have conflicting and/or diverging interests.
- The points already mentioned converge in one additional difficulty that lies in the increasing complexity of functions assigned to the management of the firms involved within the hybrid.

Supply chains for quality food

Supply chains may be much diverse spanning from a line of firms strictly driven by the focal company (almost a hierarchy) to a sparse bundle of firm with spot relationships and no governance at all.

This Section discusses three food chain typologies focused on quality products with the goal to provide some insights on the key features of their way of functioning, drawbacks and factor of success. It is important to keep in mind that these typologies are never completely separated and/or independent one from the others (Gereffi et al., 2005). Interactions and intersections are frequent and individual stakeholders frequently participate at the same time to different chains with different products/services or with exactly the same one. The basic reason for this is the need to differentiating and segmenting markets in order to: i) enlarge their shares; ii) reduce risk; iii) locate products with different quality.

However, the behavior and the position of each stakeholder in the different chains is substantially different so that for clarity reasons these will be described separately. The

different food chains sketched hereafter share the focus on high quality, that is essential to the performance of them all and that influence their behavior and the kind of relationships established by the stakeholders.

Supply chains driven by a specialized high quality retailer

Supply chains specialized in high quality food with the retailer as the focal company are increasing in number and represent a dynamic target market. Examples are: Eataly, iGourmet, d'Artagnan, Cybercucina, Eat's Food Market, Whole Foods, NaturaSí, and so forth. The retailer is large and reputed, although operating in relatively smaller market segment compared to that of globalized retailers such as Wall Mart, Carrefour or the Italian Conad. Differently, the retailers specialized in high quality food specialties, sell a narrower and more focused array of products, mainly featured in one or more of the following: *traditional ethnical organic dietar, healthy* and so forth. They may be nationally or internationally based and may operate with stores and/or on the web. The basic feature here is quality while price in itself is less important, although, of course, the price/quality ratio remains as usual of key importance. The core ability of these retailers is to scout the excellence of food around the world. They present and launch to the wider public the so called "food icons" or items that have the premises to become one; as it may be the case for typical foods that are initially confined in small local niches.

In this kind of chains vertical coordination is important and the retailer clearly holds the governance of the chain. However, the governance is less driven that in conventional large retail chains and the producers are less captive thanks to the peculiarities of their products and to their reputation that it is, in turn, an important asset for the retailer. Producers also enjoy a better position in the chain thanks to their know-how and capacity to innovate within tradition, to adjust and modify the packaging, the labelling and other features of the product and of the process. Forms of horizontal coordination among producers may be in place and further enhancing their bargaining power in the chain.

The key message conveyed to consumers by these retailers is that of a strong cooperation, an intimate alliance and deep knowledge between the seller and the producers; where the seller- seen as a gourmet specialist- is committed to linking directly these excellences of food with the final consumer. Small producers, handicraft productions, typical products from small areas may find here their window in the larger market.

When compared with short chains (see below), these chains enjoy important advantages. The first advantage is the larger number of stakeholders coming from different production areas. This brings more possibilities to offer a wider set of products. Second, the larger scale investing in image, reputation and outlets and also allows for specializing and being more effective in managing different marketing tools compared to small spare producers in short chains.

On the other side, when compared to large retailers, this kind of chain faces a challenge: thanks to their huge flexibility and financial availabilities, large retailing companies recently developed the capability to extend, at least in part, also to higher quality market segment. They often display delimited well visible and demarked spaces devoted to local producers and

to diverse food specialties and ethnic food, somehow mimicking the atmosphere/ambiance of the gourmets' stores.

Supply chains for Geographical Indications[3]

Geographical Indications (GIs) are names for food that refer to the location where production takes place; in the EU they are ruled by Reg. EU 1151/2012[4]. Their use is based on the idea that the quality of the product is strictly linked to their place of origin. Hence, all the producers based in the area are entitled to sell their product with the same name, *alias* the protected name of the place of origin. The reputation of the GI is associated to the reputation of the place and relies on the behaviors of all the stakeholders involved (farmers, processors, packagers, etc.) and on the way the GI is managed. Both horizontal and vertical relationships are, hence, relevant within a GI, with the Consortium that should act as the focal institution that aligns the overall actions taken within the GI, settles controversies among members, detects frauds, control product quality foster the GI reputation and undertakes promotional activities. It is clear, then, how complex and delicate the whole apparatus behind the collective reputation of a GI is (Carbone 1997; Anania and Nisticò, 2004). GIs have faced a proper boom in the last years and have had the undoubted merit to widely foster the reputation of products that were previously confined in small local markets.
Notwithstanding, supply chains for GIs show mixed evidences on their functioning and effectiveness (London Economics, 2008; Carbone et al. 2014). There are several reasons for this mixed outcome.
First, there are many PDOs/PGIs that remain on paper or sell only very small certified quantities compared to the potentials of the area. This is due to the scarce involvement of producers when the GI is set. In such cases producers may not be able and/or aware to fulfil the product specification or to market the product through channels that may create value for the certification.
Second, in case of highly heterogeneous stakeholders, a major threat is to reach a fair and effective alignment of actions that will result in a competitive product with the desired (by clients) quality specifications (Brunori&Rossi, 2000). The larger the protected area, the larger the number of producers included and the more heterogeneous they are, the more difficult it is to reach an effective agreement and the more likely that conflicts arise. To this respect, there are two different kinds of situations that may arise that are worth recalling. When producers involved largely differ in size, besides the differences in their commercial strategies, they enjoy different degree of influence within the GI governance, with extreme cases where the Consortium is somehow, more or less openly, ruled by one (or few) large firm(s). A different situation (even if the two cases may also overlap) arises in cases where there are many small farmers producing the raw material and fewer larger processors that enjoy

[3] Many of the considerations expressed in this sub-section are based on the Italian situation while only indirect information on other EU countries is available to the author; however these confirm many of the evidences stemming from Italy.
[4] For simplicity purposes we include in GIs both Protected Designations of Origin (PDOs) and Protected eographical Indications (PGIs) will not distinguish between them, with the implicit assumption that our line of reasoning basically holds for both.

significant market power as buyers of the agricultural produce. The presence of the GI, paradoxically worsen the trading position of the farmers as if they are willing to value their produce according to the origin they have no alternatives that selling to the processors within the GI.

Many diverse organizational forms may be found in GIs. Some are actually ruled by Consortia that are well capable to represent the different kind of stakeholders involved (i.e. farms, processing firms, cooperatives, professionals selling their consultancies, and more); some are run basically by cooperatives that acts as focal companies but may not be fully representative of the production system but only of a segment; while others are populated with many diverse kind of stakeholders with no effective governance and are, thus, characterized by significant conflicts. It is not unlikely to find GIs populated almost only by firms that are so small that they face severe difficulties in directly marketing their products and, thus, there is almost nobody able to enjoy the potential benefits of the GI (Galtier et al., 2013).

Furthermore, as being gathered under the same GI requires cooperation, while, at the same time, enhances competition as products from different producers under the same GI become stricter substitutes; free-riding and other opportunistic behaviors may arise that may damage some of the producers and as well as the consumers (Carbone, 1997and 2003; Dentoni et al, 2013).

Last, one external insidious threat to these chains, is represented by what can be referred to as *GI sounding*; a rapidly spreading phenomenon. Actually, besides proper frauds and counterfeits, a sort of soft imitation phenomenon of the local/typical product style is frequently adopted by large retailers and producers, partly challenging the advantages of these chains.

Short supply chains

The case of supply chains populated by small firms that vertically integrate downwards the whole process till the final consumer in confined markets is increasingly more common (Abatekassa&Peterson, 2011; Renting *et al.*, 2003). The focal company of these chains may be a farm or a small processing firm or even a very small scale retailer. Examples of alternative ways of marketing goods in the short chains are: on-farms' shops, farms' stores in nearby towns, farmers' markets, home deliveries to final consumers (whether or not organized in groups). One more possibility is to open stands in local store of large retailing chains. Advantages and disadvantages of each channel, as well as complementarities among them, are largely product and location specific. Reaching the final consumer is challenging for these small and localized producers that are usually based in rural areas and, thus, farther from the majority of final consumers that leave in urban areas. However, the NITs allows for e-commerce and hence enable also small producers to reach farther clients and to build up their own reputationSome authors have pinpointed the possibility, and advantages, of using social networks as a cheap and effective tool to reach this goal (Dentoni and Reardon, 2010).

Vertical integration is a strategy that producers may adopt when seeking at: meeting trends in final demand; increasing their quota of the final value added; consolidating their market position and shares via a larger visibility in a smaller final market and via more direct relationships with final consumers. Furthermore, internalizing more diverse functions may seek

at better using inputs as these may not be fully utilized in-house and it may not be possible (easily/conveniently) to use them off-farm.
However, farms that engage in the market of final product face significant difficulties. They shall perform more tasks and reorganize the whole process. This effort is not at all trivial. First, dealing with the final consumer is complex, it takes time, appropriate facilities and specific competences are required. Producers are usually not trained to this end and tend to underestimate the costs. Furthermore, these firms may operate some of the different tasks at non-optimal scale, thus adding sources of inefficiencies.
Another set of drawbacks arises when thinking to the relations of these chains with the final consumers. The first constraint is represented by the small basket of products available in each single moment as well as over time. Also, each produce is available for a much shorter period with respect to chains that use more extensively the market and thus are able to gather products from different areas with different crop/production calendars. In the whole, it is difficult for a single producer to balance supply as he shall manage stocks in order to limit exceeding production, but, at the same time, he shall avoid leaving clients without product as this will probably turn into the loss of clients. This is even more undesired as finding new clients is one of the more difficult complex goals and it takes time, while losing them is more likely and very quick. The case of perishable goods is, needless to say, the most delicate, under this regard. All these limitations impinge consumers' choice and reduce the attractiveness of short chains.
Forms of horizontal coordination may at least partially help to overcome the above recalled difficulties and constraints. Usually, the farm/firm that acts as the focal company of the chain sells its product(s) and gathers products by nearby producers selling them together with its own. In this way, the variety of the supply increases and the calendar is prolonged while supply may also result in a more stable and reliable pattern. Furthermore, scale economies and significant scope economies may stem from collective actions (i.e. sharing transport and selling facilities, jointly using skilled labor and cooperating for innovating and problem solving), thus improving the cost effectiveness of the chain and increasing the value of its products. However, also in cases where these forms of collective action could be regarded as possible sources of advantages for the stakeholders that may join the initiative, the difficulties recalled in subsection 2.2 may prevent them to actually doing so.

Concluding Remarks

The discussion presented in the previous pages was aimed at shading light on the essential role that relationships going far beyond mere market transactions do play in reaching an efficient organization of production. This is particularly the case in sectors such as the agri-food where fragmentation is high and especially when quality, innovation and other idiosyncratic features are relevant. Relations within hybrids link different kind of stakeholders and may be shaped differently involving different tasks and actions. Length of time and intensity of these interactions are also variable.
Focusing on supply chains, the discussion showed that both the competitiveness of the final products and the economic results of all the firms involved rely deeply on the nature, the

intensity and the stability of the relationships net that embed each stakeholder and to the kind of governance of the chain.

Small stakeholders not embedded in a proper set of relationships suffer from low investments in innovation and quality; low human capital and know-how; furthermore, they act on the marketplace, both intermediate and final, mainly via spot variable unreliable transactions and have no market power. Diversely, producers embedded in supply chains framed in the context of a captive governance face tight relationships that may ensure market access in the short run but do not provide any stable operating framework and give then no voice in the shaping of the relationships and in the targeting of the chain product(s). The captive nature of the governance implies that their relations that command on the production process and on the rules for sharing profits may be changed or even broken easily and quickly by the focal company almost at his own convenience.

The paper also discussed three different food supply chains, all focused on quality but seeking at a different market segment. These are populated by different stakeholders and are shaped by different kind of relationships and with different forms of governance. Each of these chains enjoys its own strengths and suffers from specific weaknesses and constraints. The discussion of these chains highlighted situations where the intensity and kind of relationships and the form of governance are not appropriate, thus, compromising the sustainability of the chain and the competitiveness of its product(s).

The policy makers in charge of framing the institutional settings in which the agri-food sector shall operate are increasingly acknowledging the importance of the relational environment in which the various stakeholders operate. Under this respect, it must be said that even in the recent past the awareness of the importance of such dimension was lower among researchers, policy makers and even practitioners. For example, the Regulation for GIs and the set of related incentives included in the CAP to foster the adoption of GI schemes, was not enough determined and clear in acknowledging the chain dimension behind GIs; some authors have seen in this a reason of the reduced effectiveness of such schemes. Analogous considerations may be done also for different measures included in past Rural Development Regulations by the EU. It is, hence, a positive evolution that the proper functioning of the entire chain is now regarded as an important policy goal beside that of improving the production conditions within each farm/firm or whatever stakeholders.

However, there are some comprehensive and somehow underling factors that play a major role in the possibility to shape effective supply chains, and more generally effective hybrids, that are commonly undervalued when not neglected *tout court*. An overall lack of social capital can be related to (and it manifests itself in) the nature of firms and their behaviors. In particular, the discussion showed how the scarcity of trust impinges hybrids. Trust has been found as a major substitute of formalized forms of coordination and alignment, especially in a framework of informal relationships and weak governance (Mènard, 2004). Furthermore, McKnight et al. (1998) found that trust is even more important in the initial creation of a hybrid institution. Trust and reciprocity may reduce the ambiguity of the competition-cooperation attitude reinforcing the capacity to cooperate that is a necessary ingredient of the relationships within hybrids (Bengtsson&Cock, 2000)

Clear enough, also the effectiveness of the Public sector plays a major role together with the functioning of a legal system. Marsden *et al*. (2000) underline the relevance of the role that

effective Regional Agencies and active producers associations may play in promoting GIs and designing competitive short chains by the means of setting incentives to foster the appropriate relational behaviors.

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