

Supply Chain Management Practices in an Alternative Food Network: The First Organic Marketplace of Turkey

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Abstract

With a climate and biodiversity very suitable for organic agriculture, Turkey's organic sector developed in response to external demand, in particular to demand from Europe. The domestic market remained underdeveloped until the first marketplace solely for certified organic products has been established in 2006. In this paper, we study this pioneering organic marketplace from the perspectives of supply chain management paying special attention to the network structure and critical activities. Special inventory handling approaches such as cross-docking are applied and transportation is a major issue. The meeting of the consumers, farmers and middlemen facilitates the formation of collaborations and the development of strategic alliances. We explore the dynamics of the marketplace with a non-governmental organization as the chain captain. The reasons leading to and consequences of this specific governance mechanism are discussed. In our study, we use (i) sales and participation data, (ii) unstructured interviews with farmers, consumers, middlemen, and NGO officials, and (iii) participant observation. We also highlight research questions arising from the network of farmers, processors and retailers.

Keywords: Organic foods, Organic agriculture, Organic market, Supply chain management, Chain captain, Farmers' market, Food logistics

1. Introduction

First introduced in the beginning of the 1980s, supply chain management started to engage the attention of researchers and business practitioners in the nineties; the number and variety of papers and presentations on the subject demonstrated a steady increase since then, (Alfalla-Luque and Medina-López, 2009). Simchi-Levi et al. (2003) give a practical definition of supply chain management as a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system costs while satisfying service level requirements. Council of Supply Chain Management Professionals defines¹ the term by explicitly mentioning the collaboration and coordination between companies along the chain integrating supply and demand management within and across companies. Mentzer et al. (2001) argue that the supply chain has to involve the flow of products, services, finances or information across three or more organizations and define its management as “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole”. Lambert and Cooper (2000), noting that in effect it is a network rather than a chain, argue that management of the supply chain is about managing multiple relationships across the network. Lambert and Cooper (2000) also point out the differences of the term with logistics, claiming that it involves the network structure, business processes and the management components and emphasizing that the objective is to create the most value, not for the company alone, but for the whole supply network including the customer. Lambert and Cooper (2000) argue that competition is no longer between companies but between supply chains.

¹<http://cscmp.org/about-us/supply-chain-management-definitions>

A major change in supply chain management throughout the years is the shift from understanding of it as an extension of logistics to as managing relationships across complex networks, Christopher (2011). Food comprises a large segment among commodities traded through supply networks. Food supply chains are being studied in terms of their state, prospects and challenges in UK, (Bourlakis and Weightman, 2004) and in US (Pullman and Wu, 2012); the role that information technology plays, (Mangina and Vlachos, 2005); an integrated approach to the whole food supply chain, (Manzini and Accorsi, 2013); different aspects of agri-food chains such as sustainability, safety, traceability and environmental friendliness, (Zylbersztajn and Omta, 2009); reducing energy and input needs of agri-food chains by way of a move towards organic farming and local and seasonal consumption habits, (Amate and González de Molina, 2013); and the role of short and alternative food supply chains in sustaining rural development, (Marsden et al., 2000).

In this paper, we provide an overview of an organic marketplace from the perspectives of supply chain management. The work reported is from research conducted on Turkey's first marketplace solely for certified organic products, mainly food products. Using the same research, Demir(2013a) displayed the growth and seasonality trends in the marketplace and gave a comparison with the conventional fresh produce market. The contribution of the current paper lies in describing the importance of taking the whole supply chain into account. Among major stakeholders of the marketplace, there are middlemen (suppliers) and farmers (suppliers or suppliers' suppliers). The study reveals relationships between these supplier groups and with consumers. Buğday Association for Supporting Ecological Living, an NGO in the role of a chain captain, manages these relationships. The marketplace displays both similarities and differences from classical supply chains in terms of inventory management, use of information technology, transportation costs and strategic alliances.

2. Methodology

As in (Demir, 2013a), research reported in this article is compiled from three sources of information: (i) sales and participation data gathered at the marketplace by the NGO; (ii) unstructured interviews with farmers, middlemen, consumers and the NGO members; and (iii) participant observation.

Sales and participation data is from the time frame between June 2006 and November 2009, due to the simple reason that the second organic marketplace of Istanbul is opened in December 2009, a fact that would drastically change the demand patterns of the first marketplace. The data on the amount of fresh produce transported to the market and on actual sales has been collected by the volunteers of the overseer NGO to be primarily used for control purposes. Unstructured interviews are carried out with five farmers, three middlemen, ten consumers and three Buğday employees; the coordinator of the market, the communications coordinator and the chairman of the board. The interviews took place at the marketplace on Saturday mornings at the stalls with the farmers and middlemen; at the eating area with consumers while they were having breakfast. We met with Buğday employees both at the market and at the association for the interviews. The questions asked differed depending on the entity interviewed but include the following subjects: organization and administration of the marketplace; reasons and consequences of the price premium for organic foods; availability of other retail outlets for organic products; marketplace features such as the wholesale market property and the proximity of the consumer and producer; the change observed in the availability of organic products at the market and at other retail centers after the launch of this first marketplace; role and responsibility of the NGO. Participant observation at the marketplace and at committee meetings is utilized to understand the workings of the organic market and the relationship, collaboration and strategic partnerships between the farmers, middlemen and the NGO.

3. Organic agriculture and the first organic marketplace in Istanbul-Turkey

Driven by exports, organic agriculture has been developing in Turkey since the mid-eighties, (Rapunzel, 2012) and eventually in 2004, the Turkish parliament passed the organic farming law. The countries' climate and biodiversity, very suitable for organic farming, are being utilized by appropriate production efforts, (Karakoç and Baykan, 2009). As of 2009, the proportion of Turkey's organic agricultural land to the world total reached the ratio of Turkey's whole agricultural land to the world total. The stage of development of trade in the domestic market was not as advanced though. Noticing this deficiency earlier, civil society took an active role and pioneered the founding of the first marketplace dedicated solely to certified organic products. With the support of a local municipality (Şişli) in Istanbul, the first organic market opened in June 2006 and since then consumers have been frequenting the market happily, talking to the farmers, exchanging information and cooking organic meals.

In December 2009, Buğday pioneered the founding of the second organic marketplace in Istanbul. As of today, there are a total of seven organic markets in Istanbul only. The first organic market of Istanbul had a mobilizing effect on the domestic organic sector and also gave rise to organic markets in other cities scattered around the country such as Konya, Eskişehir, İzmir and Samsun. Consumers, store owners, farmers, NGO officials, in short most actors involved in the first organic market reported that since the launch of the first market, the number and variety of organic products has increased, so has the number and variety of marketing channels. In the next section, we report results of investigating this first organic marketplace of Turkey from a supply chain management perspective.

4. Supply chain characteristics of Turkey's organic marketplace

Supply chain management is a process encompassing all stages that products or services go through from obtaining the raw materials until the meeting of the end product with the customer. Due to the nature and definition of organic agriculture and its legislation, organic produce, from the seed to the consumer, cannot be mixed with conventional products. Hence, their management needs an integrated approach and is very much in line with supply chain management practices. In a classical supply chain, an entire network of suppliers, factories, warehouses, retail centers, and customers need to be linked and goods, finances, and information among all actors of the chain have to be managed. Besides quantitative techniques and decision support systems, strategic alliances and information sharing are important for the success of the supply chain, (Simchi-Levi et al., 2003).

Started with 10 participating farmers in June 2006, Istanbul's organic marketplace has become a national market as of 2009 where organic produce from about 70 farms situated in 15 different cities of Turkey are traded. In Figure 1 we display the location of organic farms. The star in the figure represents the location of the organic marketplace and numbers belong to the location of organic farms. Although there are 70 farms there are only 40 numbers because in some instances one number represents more than one farm, for farms in the same municipality. In addition to farms, 14 distributors aid in trading about 1000 tons of goods to 1500 customers annually.

Although the majority of products traded at the organic market are fresh produce, processed foods such as honey, molasses, dried fruits, olives and olive oil, rice, beans, bread and spaghetti, certified organic cosmetics and textiles also find buyers. Even after the opening of several other organic markets in Istanbul, fresh produce sales only in the first organic marketplace have reached 613 tons in the period between March 2012 and February 2013. The different groups trading in Istanbul's organic market fall into three categories: farmers, middlemen and importers, see Table 1. The percentages are computed as the ratio of the number of participating entities from a group to the total number of participants. About half of the participating farmers are smallholders (5-20 acres) and the other half own medium sized farms (20-200 acres). Less than a handful of the farmers own more than 500-acre farms. Into the middleman category fall all processors, packagers and owners of branded products and other actors like distributors and farmers' representatives. Importers mainly sell organic certified soaps, detergents and cosmetics.

4.1 Network structure and supply chain activities

Different network structures coexist in the marketplace representing a variety of channel relationships embedded in the organic market. Following Mentzer et al. (2001), we refer to these networks as direct or extended supply chains. The simplest one is the distribution network for organic fresh produce, Figure 2, including farmers who grow organic fruits and vegetables and sell at the organic marketplace to individual consumers. The extended supply chain displayed in Figure 3 includes farmers, individual or by contract; farmers' representatives who buy organic produce from farmers and sell at the organic marketplace; store representatives who collect organic produce from the marketplace to sell at their own stores (physical or Internet) and who further sell the collected fresh produce to restaurants (some restaurant owners make purchases at the organic market in person and offer organic menus). Finally, there are individual consumers who purchase organic through these channels other than the organic marketplace.

The network becomes more complicated when combined with processed and imported foods; see Figure 4. In a complete picture of the supply chain, there exist the locations of farmers, of depots used to store organic produce, of processing and packaging plants, of stores and restaurants, and of the organic marketplace in Şişli-Istanbul.

The imported foods, detergents and textiles traded, all organic, are represented by foreign enterprises. In any case, the organic marketplace plays a focal role in the network, having both retail and wholesale market features.

Based on previous research of several authors, Mentzer et al. (2001) lists the following activities necessary for successful supply chain management: integrated behavior; mutually sharing information; mutually sharing risks and rewards; cooperation; the same goal and the same focus on serving customers; integration of processes; and partners to build and maintain long-term relationships. Istanbul's organic market is a lively place and many of these activities listed take place naturally. Customers play crucial role in integrated behavior, mutually sharing information, and mutually sharing risks and rewards. They communicate with fellow customers, the NGO officials and with all supplier groups openly stating their needs ("we want domestic pasta cheaper than the imported counterparts"), likes ("the spinach of last week was delicious"), and concerns ("how can a supplier bring zucchini in the middle of winter"). When there is rumor on the "organicness" of a food item, this harms all suppliers due to decreased trust towards the organic marketplace. Rewards are shared in a similar fashion. Indeed when the Turkish Parliament at the end of October 2009 tried to pass a law that prohibits the labeling of GMO-free products as such, the sales in Istanbul's organic market soared. The official website of the organic market, (Buğday, 2011), is a portal where news and articles on organic agriculture and prices, announcements of trips to organic farms and results of farm audits are shared.

The information shared includes important data and analysis on sales at the organic marketplace. This is a perfect example of sharing strategic and tactical information with other actors of the supply chain. Cooperation occurs in a wide spectrum ranging from day to day activities like selling produce for a fellow farmer in need to developing the rules for participation at the marketplace. The leading role of Buğday in enabling such cooperation is indispensable. Naturally different stakeholders of the market have varying business goals. Nevertheless, the ultimate goal is the production and consumption of organic products, a common good, and as such members of the supply chain have the same goal and same focus on serving customers. Supply chain management provides an appropriate governance structure in this setting. However, in terms of integration of processes there is more to be done. For example, small farmers use cargo companies for the transportation of organic produce, a fact that increases unit transportation costs. A collective transportation arrangement could prove cost-effective, see (Demir and Demir, 2012). There are attempts to build partnerships among suppliers but the organic market is yet at an early stage to find examples of long-term partnerships.

4.2 Governance mechanism: an NGO as the chain captain

Turkey's first organic marketplace has a complex governance mechanism. By law, marketplaces are governed by municipalities in which they are located. Hence from a legal perspective, the organic market is under the control of Şişli municipality. A serious problem results from this arrangement: the municipality officials are not knowledgeable in organic farming laws and regulations, hence they cannot control the "organic" aspect of the organic market. On the other hand, Buğday Association has been the leader in establishing the marketplace, and as the project owner, this NGO feels responsible for ensuring the reliability of the marketplace. This responsibility, felt towards all stakeholders of the project, towards producers and consumers in particular, is expressed by all employees and board members of Buğday in almost all occasions and interviews. Consumers also expressed that they feel secure through the existence and control of Buğday, a third party with no commercial interest. As the owner of the organic market project, Buğday is responsible for ensuring food safety and reliability and all participants of the organic marketplace agreed to provide data on transportation and sales quantities. Each week since the launch of the market on June 17, 2006, data on amounts of fresh produce transported to the market and on actual sales has been collected. Data collection and recording is performed by the volunteers of Buğday. The data are primarily used for control purposes. Any amount sold by a farmer above the production capacity or any product sold by a farmer that is not on his/her list of organic certified products are signals of potential fraud; these are communicated to the certification agency to be further investigated. Besides administering the marketplace, Buğday's employees keep track of the results of routine farm controls performed by the certification agencies. By organizing visits for consumers to organic farms, the NGO maintains a high level of trust among consumers to the marketplace.

All employees, board members, and volunteers of Buğday work hard to ensure the healthy progress of the organic sector. Having initiated and designed, and presently coordinating the organic marketplace, the association in effect acts as the chain captain (Hanf et al., 2011; McAdam and McCormack, 2001).

However, this governance mechanism is not without its problems. Although, Buğday displays the performance of one, it doesn't possess the power of a supply chain captain legally or commercially (Hanf et al., 2011). The support of the municipality provides Buğday with some authority in administering the marketplace and a majority of the participants; farmers, exporters and middlemen; respect Buğday's decisions on participation rules, procedures, and unit prices. In this compliance, a contributing factor is the NGO's tremendous efforts in the past that came to a successful conclusion with the founding of the marketplace and supplied several farmers and traders of organic products with a sales channel. Still, the authority of the NGO needs to be supplemented with the goodwill of participants which Buğday tries to achieve by applying democratic methods whenever possible in reaching decisions. There are discussions in the marketplace and at committee meetings; the disagreeing parties compromise when a majority of participants agree with a decision. Nevertheless, there exist participating farmers and middlemen (sometimes with conflicting objectives) who would rather not be controlled by Buğday. As a result, a group of these founded their own association² and established other organic marketplaces in Istanbul. In this break up, the disagreement in the timing of the second organic market was crucial; Buğday waited three and a half years before opening the next organic marketplace while farmers, to take advantage of economies of scale, advocated for a second market much earlier. The NGO's unwavering confidence in its own judgment on the right approach to the marketing and control of organic products, seems to irritate several farmers who themselves have been pioneers of organic agriculture. Buğday needs to make a more sincere effort to ensure the cooperation of other network participants (Hanf et al., 2011).

4.3 Social interactions

The meeting of different stakeholders interested in a common good enriches the organic marketplace through trans-group interactions. Consumers influence farmers and increase their motivation in applying organic agriculture (Hunt, 2006); farmers admit to feel responsibility towards their customers they meet in person every week. There are several real examples of social learning, innovation and entrepreneurship (Hinrichs et al., 2004). An actual partnership occurred when two consumers and a farmer, after lengthy discussions, decided to acquire chicken, cattle and bees together. These individuals started herding cattle, collecting eggs and selling products of these animals. One Internet store owner consulted with a consumer whose profession is to put up trade centers on the Internet on how to upgrade the functionality of the store's website for farmers; such an exchange of ideas has the potential of ending in partnerships in the future. In another instance, a producer invites consumers to his organic garden every year during the cherry season so that consumers experience picking and eating cherries and mulberries. One consumer bought an apple orchard and started to experience the difficulties and pleasures of agriculture. Consumers also get advice, seeds and seedlings for their urban gardens from farmers at the marketplace. In this fashion at the organic marketplace, communication between producers of food in the countryside and their consumers in cities is facilitated enabling an understanding of each other's problems.

A quick comparison with traditional marketplaces of old times such as the one in Morocco studied by Geertz (1978), shows that the organic marketplace of Istanbul bears both similarities and differences; it is a system of social relationships formed around the production and consumption of goods and services; due to organic certification, the problem is not finding out what options are; still trust is a major issue, search for authenticity is existent, clientelization is very frequently utilized but bargaining occurs less frequently. With its suppliers and consumers, the market makes up a community and a communication network having achievements and deficiencies. Besides purchasing organic produce, consumers also socialize at the marketplace. One consumer called the organic marketplace "Saturday morning party" while another argued that he would come here for the interaction and communication with farmers and the friendship with fellow customers even if these products were not organic. Some of the communication among consumers takes place at the eating stalls while they were having breakfast. A similar phenomenon reported in Spilková et al. (2012) is the recent appearance of farmers' markets in Prague with customers who go there not only for shopping but also for chatting with people over a glass of wine or cup of coffee. Although relatively small with offerings not limited to organic products, these farmers' markets seem to provide a venue for communication similar to what takes place at the eating area in Istanbul's organic market.

²Ecological Farmers Association (EÜD), URL <http://ekolojikureticiler.org/>

4.4 Strategic alliances, cooperatives and committees

It has been recognized throughout the years that supply chain management is more about managing relationships than logistics operations, Christopher (2011). As in all supply chains relationships are abundant in the organic market. One approach to managing relationships is the forming of strategic alliances: vertical and horizontal. Forming of cooperatives is one example of alliances.

First, a producers' cooperative has been formed to solve problems of small scale farmers such as collectively getting packaging and processing certificates that are very expensive for individual farmers. Only then could, valuable organic products, such as tomato paste and dried beans from organic ingredients, be sold at the organic marketplace that previously could not be labeled as organic due to lack of a certificate for processing and packaging.

Consumers began meeting regularly to assume a more active role in the development of the organic sector. In these meetings, consumers discuss the problems they experience at the market, propose solutions and express their needs for new products. Recently one of the products demanded by consumers for a long time, a domestic brand of organic pasta, started to be produced by two organic food processors. However, the most important issue that brought consumers together is trust and their primary demand is the traceability of products. Consumers want to be sure that the products sold at the organic market are certified organic, that they are genuine and not fraudulent. This requires a well-defined process of tracing a product from the market bench back to the farm and the farmer as well as tracking the vehicles that the product travelled in and the warehouses that it is stored in. This is a very important task that remains to be done and needs the cooperation of farmers, middlemen, certification bodies and the municipality, with Buğday and other NGOs. Both the consumer's initiative and the producers' cooperative are examples of horizontal alliances (Yanes-Estévez et al. 2010; Ghisi et al. 2008). An example of a vertical alliance found at the organic market is the one formed between farmers and certain middlemen. One middleman organized a whole village in the city of Bursa to convert to organic agriculture and has begun to sell their produce since the launch of the marketplace.

Finally, a committee was formed when producers, consumers, processors, store owners, and farmers' representatives came together with the goal of developing policies and methods for the healthy growth of the whole organic sector. Here, the work of Buğday is indispensable that puts great effort to build a working relationship between farmers, distributors, processors, consumers, other NGOs, and the local government in order to write down the standards for a fair and safe organic food production, marketing and distribution system. The job of the committee includes modeling, standardization and control of procedures, mediation in case of conflict, establishing rules and regulations, and lobbying.

4.5 Information technology

Organics is a progressive sector where the impacts of the Internet and electronic commerce on trade are easily observable. There are several companies and farms using information technology. Most of these have put up web sites and use online retailing. Consumers of organics too are well suited to use information technology; besides shopping at the organic marketplace, they search for products, farms and new information on the Internet frequently.

Buğday's marketplace coordinator regularly communicates with farmers and middlemen via email; communicating decisions regarding the product range of the organic marketplace; announcing the necessary documents and deadlines for application or renewal of participation at the organic marketplace; the proposed changes in the organic farming law and gathering criticisms to it; announcing decisions on the operation of the organic marketplace on holidays and other more operational issues regarding the usage of the parking space etc. Buğday also reaches about 17,000 people via its e-bulletin containing information on farm visits, news on organic farming and the marketplace, changes in laws and regulations of the farming and marketing of organic food products, and the debate on the entrance of genetically modified organisms to Turkey, besides several other topics related to ecological living. In this fashion, Buğday takes a leading role in generating and distributing information (Simchi-Levi et al., 2003) that is important for the smooth functioning of the supply chain. The supply and sales data at the marketplace is gathered manually by volunteers and then converted to digital form. For the first time in March 2013, the coordinator of the marketplace has announced to all participants a summary of the sales data for the period between March 2012 and February 2013 at the website of the marketplace.

There is no database at place yet to be shared appropriately by all participants and the use of information technology is still at an early stage at the organic marketplace.

4.6 Inventory management

In contrast to the conventional system with wholesale markets in every city operating 6 days a week, there is no wholesale market for organic agricultural products. Instead, Istanbul's organic market currently acts as a wholesale market for organic goods that is open for one day only, (Demir, 2013a). Representatives of almost all stores selling organic products, of Internet groceries, of restaurants with organic menus and of health food stores in the Istanbul area, come to the market to purchase products in order to satisfy weekly demand. Most fresh produce are perishable and therefore long term storage is not an option. In that sense classical inventory management techniques such as the economic order quantity model cannot be applied. However, when we closely examine the organic market we see that certain modern techniques are actually used. One of those modern techniques is cross-docking (Simchi-Levi et al., 2003). Fresh produce coming from farms are unloaded and they are loaded again, without being stored in a warehouse, into vehicles that take them to other destinations, be that a store, the facility of an Internet grocery, or a restaurant. There are of course some organic products that can be inventoried for a limited amount of time, for example, apples, lemons and oranges. There is still work to be done in determining the standards that warehouses for organic products should comply with. Choosing the location for these warehouses could then be modeled as a facility location problem, a well-studied operations research problem.

4.7 Transportation

High unit transportation costs pose a problem for the supply chain by reducing profit margins of farmers, increasing unit prices of organic produce, and hence scaring away consumers with a limited buying power. Buğday officials list high transportation costs as one of the reasons behind the volume of organic products traded domestically to yet remain far from quantities desired by the actors of the organic sector. Demir (2013a) compared the organic market with the conventional market for fresh produce and reported that unit transportation costs incurred by organic farmers reaches six-fold that of conventional farmers. For small scale farmers, unit transportation costs make up about 12-20% of sales revenues. A vehicle routing solution that reduces unit transportation costs by more than a half is proposed by Demir and Demir (2012).

5. Conclusion

In this paper, we examined Turkey's first organic open air marketplace to understand its supply chain characteristics. Data used is mainly from the first three and a half years of the organic market since its launch in June 2006. The market forms a food supply network; embedded are both simple and extended network structures. Activities for successful supply chain management such as cooperation, integrated behavior and mutually sharing risks and rewards take place naturally. The meeting of producers with each other and with the consumer facilitates first-hand information exchange, the development of relationships, collaborations, innovations, and strategic alliances. An NGO that planned, lobbied, and initiated the market is acting as the chain captain and administering the marketplace. This arrangement has both positive consequences, such as increased trust by the consumers, and negative consequences such as difficulty in ensuring the collaboration of other supply chain actors. Although at an initial stage, use of information technology is observable. Modern inventory management techniques like cross-docking are used at the marketplace. The high level of transportation costs is, as in all supply chains, a major problem.

The development of the domestic organic market involves several important problems. There is ample opportunity for the scientific community to contribute to the understanding of issues and their solutions. For example, lack of data, especially on domestic organic food sales in Turkey, prevents analysis of organic produce traded via channels other than the organic marketplace, such as supermarkets, stores, Internet, and via direct shipments to customers. There is also no data on the activities of processors and packagers. These pieces of data are important and should be gathered using appropriate techniques for truly grasping the extent at which the organic sector has expanded.

Secondly, the price premium, although partially justified, appears to be an impediment to the widespread consumption of organic products.

A quick glance reveals that organic fresh produce at the organic market are priced comparable to conventional produce at luxury supermarkets and are almost twice as much expensive as conventional produce at neighborhood marketplaces. In addition, due to high prices, shoppers at the organic market are mostly people with high income levels and the organic market is in danger of becoming a place for elites. A thorough study of the price differences between organic and conventional products is needed.

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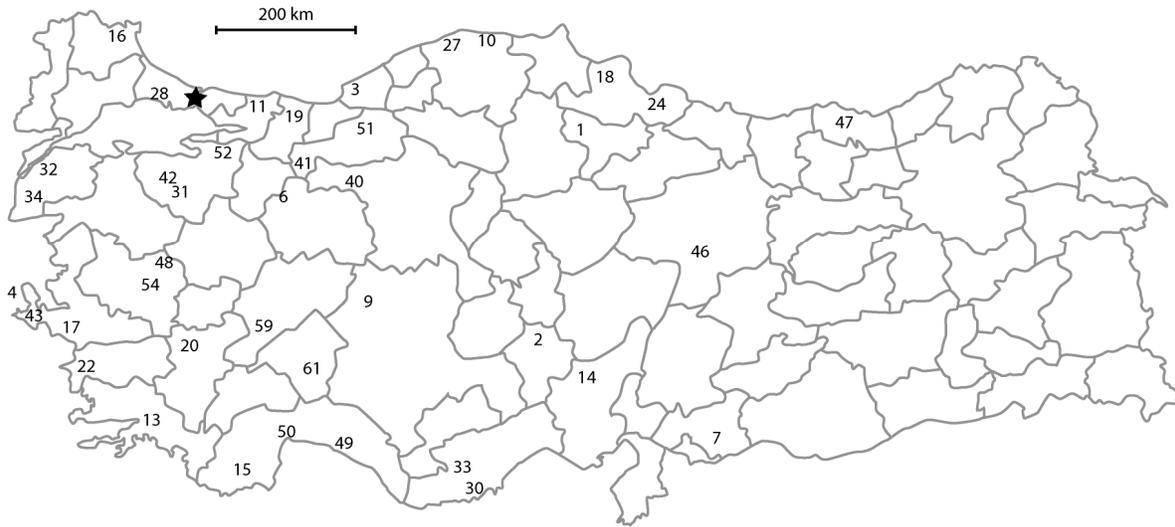
Figures and Tables

Table 1: Composition of the marketplace in 2009

Group	Farmers	Middlemen	Importer
Percentage	57%	41%	2%

Source: Author

Figure 1. Geographic location of farmers supplying fresh produce to the organic marketplace



Source: Author

Figure 2. Organic market fresh produce direct supply chain



Source: Author

Figure 3. Organic market fresh produce extended supply chain



Source: Author

Figure 4. Organic market extended supply chain with external actors



Source: Author