

Theoretical aspects of the supply chain in food production

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Abstract

The paper aims to present the conceptual definition of the supply chain in agribusiness as well as to observe all its advantages and disadvantages. Using the method of analysis, the topic gains particular importance today due to the interruption of supply chains of agricultural products, which undoubtedly affects the further character of the development of certain countries in the immediate and distant environment. Analyzing the importance and conceptual definition of value chains, as well as the importance of food supply chains, differences between conventional (standard) supply chains and specific (alternative) supply chains have been observed, and their character has been described. Undoubtedly, each of the analyzed types of supply chains has its own specific goals and tasks according to the end user (consumer). The future period leaves more room for the introduction of alternative ways of supply and eventual corrections of existing supply chains, especially in food supply and agribusiness.

Key words: supply chain, agribusiness, agriculture, food

INTRODUCTION

With the emergence of globalization and information technology development, supply acquires a new dimension to which particular attention is paid in the business operations of a business entity. Derived from logistics, supply chains cover diverse and complex tasks of business organizations and individual business functions. Thus, the supply chain represents a network of entities, connected and interdependent, organized to realize the flow of materials, finished products, information, and money (Anđelković, 2015). Also, Anđelković (2015) states that there is an increasingly pronounced need to create a value delivery system following the changes occurring in the market and with a pronounced reliability in the delivery of value by the requirements. In the beginning, the first task of supply chains was to deliver goods at the lowest possible price, i.e. to reduce the transportation costs themselves (Puška et al., 2018), while as time passed, the procurement task would become more and more complex (Manavalan & Jayakrishna, 2019). According to Kozarević & Puška (2015) today, supply chains include all operations that connect suppliers on the one hand and customers on the other.

When it comes to economic entities in food production, according to some authors, the application of supply chains is to reduce all unnecessary costs in the product flow of a company and thus ensure competitiveness in the existing market (Pamučar et al., 2021; Aldrighetti et al., 2019). The special need to recognize the importance of supply chains in agriculture is expressed today when we have its great instabilities and interruptions caused by extraordinary events in certain parts of the world.

For this reason, the work aims to provide conceptual definitions of the supply chain in agribusiness and agriculture and to identify its weaknesses and strengths, which can be of essential importance for further business on a wider and local level. The methodology that results from the goal set in the work is the

analysis of the content of previous research in this area, as well as the synthesis of the concluding views of the subject of the work.

DEFINITION OF SUPPLY CHAIN

In their earlier research, many authors developed theoretical aspects of the conceptual definition of supply chains. According to the traditional approach, Bošković (2013) sees supply chains as linear systems where the raw material is the input, and the finished product in the hands of the customer is the output. According to the same author, the supply chain includes all participants and processes from the producer of raw materials to the final consumer. Such a system in today's market can be a big risk precisely because of the big and fast changes that happen every day. Looking at one of the definitions of the supply chain which represents a set of three or more organizations that are directly connected to one or more product, service, financial and information flows from the source to the end user in modern supply chains, it is very often necessary to coordinate activities and flows into the extent that exceeds the current limits (Monczka et al., 2015). Given that agriculture, that is, the food sector, is one of the most important sectors of any economy, supply chains are also an extremely important business segment. Until now, a large number of authors have defined the supply chain as such and tried to adapt it to the era of current economic and social development. The following table 1 provides a timeline of the conceptual definition of the supply chain.

Table 1. Defining the term supply chain

Author(s)	Definition
Simchi-Levi et. al. (1999)	Supply chain management is a set of approaches used to effectively integrate suppliers, manufacturers, warehouses and retailers so that goods are produced and distributed in the right quantity, to the right location and at the right time, to minimize costs in the system while satisfying service requests.
Mentzer et. al. (2001)	Accomplishing the supply chain management goal of synchronizing customer requirements with material flow from suppliers requires balancing what is often seen as the conflicting goal of high levels of customer service, low levels of inventory, and low unit costs.
Hensher & Brewer (2001)	They consider supply chain management to encompass the entire range of business and management activities used to convert input resources into products and services.
Min & Zhou (2002)	They see the supply chain as an integrated system that synchronizes a series of interdependent business processes to: 1) procure raw materials and parts, 2) transform these raw materials and parts into finished products, 3) add value to these products, 4) distribute and promote these products either sellers or users, 5) facilitate the exchange of information between different business entities (such as suppliers, manufacturers, distributors, logistics service providers and retailers).
Frazelle (2002)	He sees the supply chain as a network of facilities (warehouses, factories, terminals, ports, retail stores, and households), means of transportation (trucks, trains, planes, and ocean vessels), and logistics information systems that are connected through the supplier's suppliers and the customer's customers.
Lambert et. al. (2006)	Supply chain management is defined as the integration of key business processes from the end user to the initial suppliers that provide products, services and information that add value to users and other investors.
Blanchard (2007)	If we wanted to describe the supply chain in four words, they would be: plan, source, deliver and return. It is important to note that supply chain management integrates supply and includes management within and across companies.
Olugu & Wong (2009)	A supply chain includes a global network of suppliers, businesses, warehouses, distribution centers and stores through which raw materials are acquired, transformed and delivered to customers.
Christopher (2010)	A supply chain is a network of organizations that are involved and connected in both directions in various processes and activities that produce value in the form of products and services for the end user.
Monczka et. al. (2015)	A supply chain is a set of three or more organizations that are directly related to one or more product, service, financial and information flows from source to end user.
Christopher (2016)	The supply chain is defined as a mutual relationship with suppliers and users to deliver greater and better value for the user with the lowest possible cost of the complete supply chain.

Source: Stević (2018)

Stević (2018) concludes that the management of the supply chain has not fundamentally changed and that since the period of its origin, i.e. the period of the beginning of consideration of the supply chain as a possible important factor in the optimization of business, efforts have been made to integrate activities in it as much as possible, in order to ensure safe and secure development commodity flows.

SUPPLY CHAINS AND THE VALUE CHAIN OF AGRICULTURAL PRODUCTS

According to Lehman et al. (2012), the agro-food sector includes agriculture, the food industry, distribution, and finally consumers, i.e. all members of society. The largest part of food sales and distribution is carried out by large conventional food supply chains, which represent a network of related organizations through which products move from producers to end customers, i.e. consumers. However, these are food systems that are organized in such a way as to "exclude" contact between producers and consumers (Gajdić, 2019). It should also be pointed out that in a world dominated by supermarkets and global supply chains (Nellemann et al., 2009) the imperative competitiveness is the economy of scale and low unit cost (Ruganec & Bokan, 2021).

Some of the authors in their earlier research dealt with certain segments of the supply chain in agriculture and agribusiness. In some of them, the central place was occupied by the choice of suppliers as well as sales channels, i.e. distribution centers (Puška et al., 2021; Puška et al., 2023; Nedeljković, 2022).

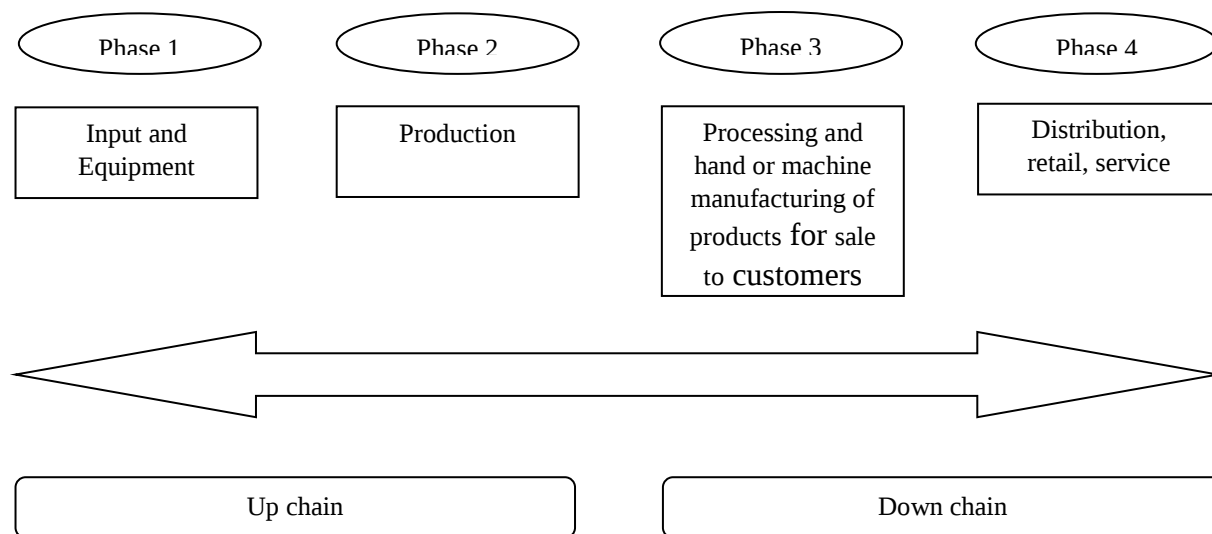
When we talked about the food supply chain, we meant a dynamic system that connects agricultural producers with consumers (Gajdić, 2019). Depending on the number of intermediaries involved in the processing and distribution of the final food product to the consumer, and the geographical distance between the farmer and the consumer, food supply chains can be distinguished in terms of spatial proximity (short or long), in terms of business relationships of the actors involved, and in terms of form (Renting et al., 2003; Parker, 2005; Wubben et al., 2013; Haas and Petz, 2017; Todorovic et al., 2018).

As stated by Engelsen (2016), food producers use two main forms of distribution channels for their products, namely direct distribution and the use of intermediaries. Supply chains as such can have various organizational goals, among which the most common are: reducing costs, creating greater added value, social justice, ecology, and according to some authors, a means to encourage rural development and rural tourism (Tanasă, 2014; Melece & Krievina, 2015).

According to Popović & Paraušić (2016), the supply chain is part of the broader concept of the value chain. It differs in that it refers to logistics, i.e. transportation, storage and procedural steps for bringing the product from the place of production to the consumer. Also, we should not forget that these two concepts of the value chain and the food supply chain into a great extent and intertwine. Webber & Labaste (2010) note that the essence of the problem is that supply chain approach practitioners often do not consider the extent to which cost reduction and inefficiency in logistics affect adding value to the product, and who benefits in the supply chain itself.

In earlier research, a single definition of the value chain of agricultural and food products was not established. Certain sources interpret the value chain of agricultural products as a set of actors and activities that serve to bring the agricultural product from the field to the final consumer and in which value is added at each stage of the production process (WTO & OECD, 2013). According to the same source, a value chain can be a vertical link or a network between different business organizations. Norton (2014) gives the following definition of the value chain in agriculture, which he presents as a series of connected activities aimed at improving or adding value to, agricultural products, at the same time connecting farmers with processors and markets. According to Webber and Labaste (2010), value chains focus on value creation, through innovations in products or processes, as well as marketing. Feyaerts et al. (2020) conclude that in developing countries, positive effects of the global food value chain spill over through investments, and technical and institutional improvements, to local value chains, increasing their efficiency. Also, when it comes to developing countries, Norton (2014) identifies the following problems in the value chain in the agricultural sector, namely: poor quality of seeds and varieties, poor quality of products in the harvest, inadequate threshing techniques, inadequate assessment of product quality, insufficient training of farmers and lack of financial resources for improved management of post-harvest activities. He also points out that agriculture in these countries is characterized by double

value chains that exist simultaneously for the same product. The first is an informal or traditional chain where small farmers are involved, and the second is formal or modern, which is often export-oriented and conditioned by the rapid development of the supermarket market. The stages that appear in the food value chain, that is, agribusiness, are shown in the following scheme.



Scheme 1. Stages in the food and agribusiness value chain
Source: According to Cucanga & Goldsmith (2018)

Today, small farmers are in an increasingly unfavorable position due to insufficient produced quantities, which results in a decrease in the purchase price of products. Therefore, small and medium-sized agricultural producers are forced to look for alternative ways of increasing their competitiveness. One of the solutions lies in alternative, ie short supply chains.

SHORT SUPPLY CHAINS

Short supply chains are a relatively new concept whose definition does not exist consensus, and are most often defined as supply chains with a small number of intermediaries (Kneafsey et al., 2013; Galli & Brunori, 2013; Ilbery & Maye, 2006), and as an additional criterion the reduced physical distance between the place of production and sale is often cited (Aubry & Chiffoleau, 2009; Ilbery & Maye, 2006). When it comes to family farms, short supply chains represent a way of greater diversification of products as well as higher farm incomes. In the FAO report (2020), points out that smallholders and family farms are mostly active in short value chains with local standards, and there are only a few examples of their integration in international market spaces. In our area, traditional types of placement are dominant, from the green market, through sales in retail stores, then door-to-door sales, fairs, festivals, etc. Figure 1 provides a graphic example of the functioning of a short supply chain in agriculture.

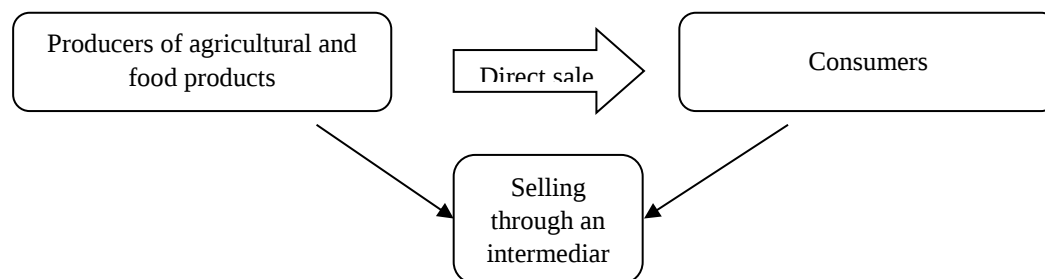


Figure 1. Short supply chains
Source: Gajdić (2019)

Short food supply chains are different from conventional food supply methods in many ways. Thus, Holloway et al. (2007) point out that short food supply chains focus on the quality of food, and emphasize the ethical, ecological, social and economic conditions of its production in the foreground. Many authors in their research classify different forms of existence of short food supply chains (King et al., 2010; Galli & Brunori, 2013; Kneafsey et al., 2013; Wuben et al., 2013; Melece & Krievina, 2015; Engelseth, 2016; Todorovic et al., 2018).

It is important to note that the very authenticity and excellence of the product come in circumstances where the supply chain is shorter. Thus, Conceição et al. (2018) point out that proximity is one of the outstanding characteristics of short chains, and that short supply chains in this sense are more characterized by "quality", "transparency" and "place" due to the connection between quality and small production, traditional practices, nature and local resources.

OTHER ALTERNATIVE WAYS OF FOOD SUPPLY CHAIN

Recently, other alternative ways of supplying agricultural products, that is, food, are attracting more and more attention. Some authors have also identified them as alternative food networks, and the consequence is current concerns regarding the level of food safety, as well as negative social and environmental disturbances arising from traditional supply chains (Sonninno & Marsden, 2006). As Gajdić (2019) points out, the aim is to develop new alternative forms of agricultural local food supply chains, combined with production practices, rural tourism, traditional food production and local community/economy development. Their goals are focused on improving direct contact between producers, facilitating the pooling of resources between producers, developing new technical collaborations between producers, increasing the value of local products, their sustainability, etc.

In the following table 2, we can see some successfully developed types of these chains that exist today in Europe.

Table 2. Types of alternative food supply chains

Types of alternatives	Explanation
Box Schemes	The method of sale is in which the farmer sends the products directly to consumers at their home address. (Netherlands, Denmark, Austria)
Community Supported Agriculture - CSA	More united consumers who give support to more local companies, i.e. producers or processors of food.
Civic Food Networks - CFN	Association of consumers for the purchase of food and further distribution among other consumers.
Consumer cooperatives	Consumers who are associated in cooperatives and further in cooperative unions.
Food Hubs	Intermediary companies whose activity is supply chain management.
Urban gardening for commercial purposes	Food production in an urban environment according to the needs of the local community. (USA)

Source: Editing by the author according to Gajdić (2019)

CONCLUSION

The supply chain has been changing its definition over the past tens of years. It was adapted and obtained specific objectives as well as participants, all to satisfy the end user. Expanded aspects of its operation and was exposed to extraordinary short-term and long-term disruptions. The supply chain showed particular sensitivity in its existence in food, that is, agricultural products. Also, it can be undoubtedly concluded that food supply chains create benefits not only for producers and consumers but also for a local community or a country. Today in practice we meet various types of food supply

chains. Each of them has its own advantages and disadvantages. Recently, special attention has been paid to short supply chains, which find the simplest way to end users with their appearance, which is extremely important for small and underdeveloped family farms. Also, the presence of other types of supply chains in agribusiness, such as Box Schemes, Community Supported Agriculture, Civic Food Networks, Food Hubs and others contribute to the development of the quality of services that end users can expect.

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