Integrating the supply chain with the agricultural value chain[1]

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Abstract

The agricultural sector supply chain is a complete chain of units directly or indirectly interrelated and interdependent in terms of serving an agricultural consumer or customer. Supply chains are at the heart of value chains in the agricultural sector, as without them no farmers would not be able to provide their customers with the products said customers require, when, where, and at the price they require to buy them. The purpose of this article is to present basic principles on how the supply chain works and how it relates to the value chain. The methods of synthesis, deduction, analysis, correlation, and retrospection have been used for the purpose of this study.

Key words: supply chain; value chain; correlation

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Introduction

In recent years, scientific economic literature has increasingly focused on coordinating approaches to managing material, human, capital, and information flows in all areas of the economy. This is a topic of interests, as is developing and expanding potential opportunities for increasing the positive impact of the operation of businesses in the agricultural sector, by carrying out new, value-adding activities to its core business, such as managing inbound and outbound logistics flows, production operations, marketing, and sales, offering a ready, finished product, and reaching the end client.

Materials and methods

One of these integrated management approaches in the agricultural sector is the skillful combination of material and information flows and related business activities in the supply chain and the value chain. Their skillful combination can be used and applied in the management of all business organizations in the agricultural sector. In our opinion and in the opinion of many other scientists in the field of economics (Aramyan, Ondersteijn, Kooten, Lansink, 2006; Beamon, 1999; Porter, 2010), the basis for effective management is the kind of management in which the firm adds value to its product at every stage of its operations and enhances its competitive advantages. To achieve this, we can integrate some basic management approaches such as supply chain and value chain. Let's find out what the supply chain involves and when it even occurs first. Most accurately and generically, a supply chain is a network of individuals and companies involved in creating products and delivering them to the consumer (Fernando, James, Kvilhaulg, 2022).

Supply chain links start with the raw material producers and end when the finished product is delivered to the end user, thus achieving a higher degree of efficiency in the production process economy (Aramyan, Ondersteijn, Kooten, Lansink, 2006).

The term "supply chain" emerged in the 1980s but became more widely used in the economic literature in the 1990s. The Council of Logistics Management (CLM), which in 2005 changed its name to the Council of Supply Chain Management Professionals (CSCMP, 2005), has contributed the most to its establishment in practice and in academia as a concept.

According to Jamez and Fernando (Fernando, James, Kvilhaulg, 2022), specific supply chain functions include:

• The creation of products through the good combination of all inputs and factors of production;

• Marketing, by way of the best methods of determining the production and sales price, promotions, advertising, and sales, aimed at the correct distribution of the product or service in the agricultural sector;

• Financing of this whole production and payment process, here, the most important and most significant thing is to determine whether we will be operating with private or borrowed equity. It is important to note that borrowed equity, other than from banking institutions, can also be obtained from mutual funds under European operational programmes. Such a programme in the agricultural sector is the Rural Development Programme, but it could also, if the project has relevance to environmental and water resource protection, apply to the Operational Programme "Environment", if it is aimed at fish farming and aquaculture to OP "Maritime Affairs and Fisheries". Some other key operational programmes of the EU are OP "Enterprise Competitiveness and Innovation", and OP "Human Resources Development". Financial intermediaries can also be used, such as "Innovation Capital", as well as national programs to support specific sectors in the agribusiness for example: "National Support Programme for the Wine Sector in Bulgaria" and "National Beekeeping Programme" (Ministry of Agriculture, Food and Forestry in Bulgaria, 2022).

Another crucial function of the supply chain is customer service, and essential here is their consumer sentiments, consumer tastes and preferences, expectations, new trends; however, for manufacturers and retailers, the most essential and important thing is whether their customers are solvent.

The main objective of the supply chain, according to Jamez and Fernando, is to reduce costs but in a way that keeps the agribusiness competitive (Fernando, James, Kvilhaulg, 2022). We have to consider that the agricultural sector is changing very rapidly – from a sector with fragmented production and marketing relations, to integrated market systems, or market chains. Improving productivity, competitiveness, and participation of small owners in these value chains are outlines as priorities in the National Strategy for Sustainable Agricultural Development in Bulgaria. Integrated production and a shorter route to market are identified as a way to achieve high added value, hence higher income for farmers. Directly in relation to the above, the agricultural sector is undergoing changes that affect new production patterns and its marketing. All of this is in direct correlation with the changing focus on demand for agricultural commodities and farm produce, not just finished agricultural goods and food products. Concurrently, and in line with EU requirements, our country has adopted new requirements for food traceability and safety. All of this is in direct correlation to people enjoying healthier lifestyles. New quality standards and major environmental regulations have been introduced and adopted, aimed at protecting the environment. This development requires a better understanding of the nature of any integrated chain in the agricultural sector. Knowing the supply chain, therefore, provides a clear opportunity to look for its points of contact and even intersections with the value chain. It is the creation and management of agrarian integrated value chains that is a way of effectively enacting these changes.

Our view that the supply chain can be integrated with the value chain can be explained as

follows. The process of integration, derived from Latin, means "whole", or can also be interpreted as "restored". In this case, integration can be defined as the unification of separate parts and functions of the agrarian production system into a single whole.

In chain management theory, integration is seen as a process of interactions between chain stakeholders, aimed at achieving common goals, through expansion and intensifying production and technological links, and the joint use of resources, pooling of capital, and the creation of favorable partnerships for the implementation of joint economic activities.

Donaldq J. Bowersox and David Kloss in their monograph "Logistics: Integrated Supply Chain" define logistics as an integrated process of managing material and information flows that encompass all business activities, from the extraction of raw materials to the delivery of the finished product to the end user while maximizing satisfaction of their needs at minimal cost (Bowersox, Kloss David, 2017). This suggests that the supply chain itself can be complemented very successfully with the value chain

In his economic studies, Beamon defines the supply chain as "an integrated set of business functions encompassing all activities from the acquisition of raw materials to the delivery to the end user" (Beamon, 1999a). Other well-known scholars define it as "a linear sequence of operations organized around the flow of materials from the source of supply to their distribution as finished products to end users" (Lazzarin, Chaddad, Cook, 2001). A third group of scholars perceives the value chain as "a set of organizations and processes interconnected along the lines of creating products and services and bringing them to end users" (Tradi, Brock, Kvilhaulg, 2022).

"In summary, we can conclude that the supply chain consists of sellers who supply raw materials; producers who convert raw materials into products; warehouses where products are stored; distribution centers that supply wholesalers, and retailers who deliver products to the end clients. Supply chains are based on value chains, because without them manufacturers would not be able to deliver the products customers want, when and where they want them, and at the price they want to buy them" (Business Dictionary, Supply chain, 2022).

In order to be able to merge the functions of the supply chain with that of the value chain, it is necessary to understand the nature of the value chain. In turn, it represents a chain of activities along which products pass sequentially, and after each activity, they increase in value (Tradi, Brock, Kvilhaulg, 2022). Value chain is a business management concept first proposed by Michael Porter in his work "Competitive Advantage" (Porter, 1998). He developed it further in his excellent book "Competitive Strategy – Techniques for analyzing industries and competitors" (Porter, 2010). In it, he suggests that vertical integration based on value creation is one of the best strategic solutions for the successful development of any strongly growing company in the market. He presents the firm as a collection of distinct, value-adding activities that directly contribute to value and enable the company to generate value and create its own strong competitive advantage (Porter, 2010). Michael Porter defines value as the service, good, product that buyers are willing to pay for with its added utility. Thus, he arrives at the basic idea of the "value chain" as a combination of several common value-added activities operating within a firm – activities that work together to provide value to customers (Porter, 1998). The main emphasis in the value chain, in his view, but also in ours, is placed on the benefits that accrue to customers, the interdependent processes that generate value, and the resulting demand and flow of resources created. We could add here that adding value is not only good for consumers; the producers themselves also have a very high incentive to add value to their production process for several main reasons, which are:

- This is how they reach the end client;
- They eliminate the involvement of intermediaries in the process of selling their goods, services or products;
- They get a higher percentage of the profit from the finished product because the cost of the added value stays with them and not with the retailers in the chain;
- Furthermore, this gives them an incentive to

create a finished product and expand their product list, besides having a competitive advantage over their competitors, as they add value, and are not just involved in the raw materials production process.

In the agri-food sector, we can provide a huge variety of examples of adding value and closing the production and sales cycle. For example: In bread-making. We don't just stop at the production of grain and the flour from it, but go on to make finished products, such as bread and other baked products. In sunflower production, we could go upstream and add value by producing oil, margarine, and other products derived from it. In the lavender industry, value addition can and does take the form of the production of lavender oil and other derived products with surplus value, such as soaps, shampoos, and other pharmaceuticals and cosmetics. The diversity is great, and the purpose of this article is not to list them all, but to understand that the value-added process is part of the overall idea of integrating the manufacturing process. Integration of the supply chain with the value chain is also seen in vegetables with the production of chutneys, köpalo, ajwar, pickles, and other finished products, and in fruits with the production of juices, jams, marmalades, compotes, fruit drinks of all kinds, dried fruits, etc. We are also seeing it in beekeeping, with the production of complete products that include honey or other bee products, and in viticulture by developing wine production and adding value by developing wine tourism to get to the end client by adding not only wine tasting, but also accommodation. In other words, development of an integrated process between value chains and supply chains is the way we can obtain higher incomes, often at higher costs incurred by companies, but in this integrated approach, there are also some economic advantages, such as:

• Economy of scale;

• Using the same suppliers in a much more extended and complete production process;

• Using the process of adding value as a source of additional profit from what we had when we only produced the resources or raw materials for the finished product;

• The end value created by the company is measured by the amount customers are willing to pay for the respective goods or services.

• A company is profitable if this profitability exceeds the aggregate cost of carrying out all the activities necessary to produce and sell the final product, good or service.

• To gain a competitive advantage, a business organization must either produce products that are comparable in value to competitors, but with lower production costs (cost advantage), or create unique and high-quality products that differentiate themselves from competitors, bring more value to customers, and sell at a higher price (differentiation advantage).

• Analyzing the activities that add value to the bottom line enables managers to identify exactly where value is being created and where there is potential for greater value creation in the future by reconfiguring activities.

Michael Porter's model separates these activities into two main groups. These are:

Core – those that directly contribute to the production and delivery of a product, i.e., they directly add value to the customer and ancillary, those that add additional value (Porter, 1998).

If we are to represent with a figure the process of delivery and value addition in the agricultural sector, the mandatory elements that the process of integration between the two processes has to cover, are: resources, suppliers, production, value addition, storage, transportation, distribution, reaching the end client and specific ways of selling the output and reaching the end client.

Inbound logistics in the agrarian company – this includes receiving, storing, managing inventories, such as seeds, mineral fertilizers, plant protection products, pesticides, hybrids and other stocks and materials, necessary for agricultural production, and their distribution to production, according to the stated needs. Specific supply and production operations in the agribusiness and agricultural sector include all activities that convert inputs into outputs (such as blanking, machining, packaging, etc.).

Outbound logistics in agribusiness includes the activities required to deliver the final product to customers (such as warehousing of finished agricultural produce, transportation, cold storage

and warehouse management, order management and fulfillment, distribution of finished products, agricultural commodities).

Marketing and sales in the agricultural sector include activities related to customer research, promotions, and sales implementation (such as channel selection, advertising, promotions, sales, pricing, retail management, etc.

In the agricultural sector, servicing consists of all activities that maintain and increase value after products and services are sold to customers (such as after-sales customer service and other activities, such as servicing for agricultural machinery and specialized agricultural units).

According to Michael Porter, but also according to us, for each of the main activities, there are auxiliary (supporting) activities that are specialized in performing certain tasks (Porter, 2010). Each of these adds value through the value chain. This is done by: Purchase from an external source of inputs, goods, and services that the agrarian firm does not produce but are also necessary to carry out the main production activities, whereby control is exercised over both the costs and the quality of inputs and hence outputs in the agricultural sector. An extremely important element in the agrarian sphere of activity is also the technological level of development, which is closely related to the improvement of existing and creation of new products and processes through the introduction, use and improvement of modern technological equipment, both information and communication technologies in the organization. In the agrarian sphere, the size of the field, the agromechanical operations carried out with precision, the number of mineral fertilizers and plant protection products applied, as well as the calamity of attack of the various pests, the diseases of the crop species are all fully mechanized and automated as processes.

However, in order for the process of integration between the value and the supply chains to take place, there needs to be a human factor. It is difficult to imagine any production process without human involvement, although automation and robotics are becoming more and more widespread, but it is necessary to have someone to monitor and be responsible for all processes that are carried out in the agricultural company. Therefore, the quality, qualification and motivation of the staff working in the agricultural sector is paramount. These factors have a direct relation to the value-adding process of agricultural production and the goods produced for the food sector.

It is a fact that the agricultural sector is the only one that produces biological living organisms, and is most influenced by natural and climate factors, which do not have such strong impact on other sectors, except potentially tourism, but the agricultural sector is also the sector that uses one of the indispensable classical factors of production – agricultural land. It is, in turn, characterized by a number of specific features, such as immobility, non-depreciation, categorization, etc., and production in the sector is therefore at a much higher risk, because there is animal mortality, plants death, crops diseases, plants and animals' diseases, requirements for humane treatment and environmentally friendly practices, recommendation for bio organic production. All of this impedes work processes organization in the sector, and their aggregate management. It also makes adding value more difficult, but once the venture of transferring value has been undertaken, we cannot easily abandon the process, because much of the agricultural machinery and inventory purchased is strictly sector-specific, their liquidity rate is low, and therefore once the decision has been made, it is not easy to object to and change the decision. The entire management process involves the following: planning, organization, financing, legal activities, quality management, control and strategic analysis, hence strategic management, and all of this ensures the success of the agribusiness unit and leads to the successful implementation of the corporate strategy.

The value chain that can be applied in the agrarian sector of activity, in the most precise terms, is a series of sequential steps that proceed to the creation of a finished product with value addition. Change happens from the initial type of raw materials, their combination in the production system, to the delivery of the final product to the end client. The chain identifies each step in the process where value is added, including

the stages of sourcing, manufacturing, and marketing throughout the production process (Tradi, Brock, Kvilhaulg, 2022).

Realistically, every value chain helps increase the efficiency of a business, including agribusiness. Thus, the particular business can provide the most value for the least possible cost. The ultimate goal of the value chain is to create a competitive advantage for agribusiness by increasing productivity while keeping costs reasonable, but also improving the entire sector by creating competitive commodities. Value chain theory analyzes the five main activities of the firm proposed by Peter Drucker (Drucker, 2015). Each core activity is associated with adding value and creating competitive advantage. These activities are related to the planning process of setting specific goals, organizing the production process, controlling, and implementing, as well as inbound and outbound logistics; the process of converting raw materials into finished products, marketing and maintenance until the goods are delivered to the end client.

Results from the research

In the agricultural sector, inbound logistics includes functions such as the receipt of seed, hybrids, plant protection products and other materials, animal breeds, fertilizers, veterinary medicines and preparations, and other specialized inputs for the sector, such as animal feed. In addition to their procurement and timely delivery at price levels that are as balanced as possible, this should also include the storage and management of agricultural inventory and, if necessary, some of the unfinished agricultural produce. The most significant part of the whole value chain process is the transfer of additional value in the process of converting agricultural raw materials into a finished product. From the research done, understood that this is achieved by producing a final product, suitable for marketing, most often targeting the food portion of the agricultural sector (Aramyan, Ondersteijn, Kooten, Lansink, 2006). The production of bakery, dairy, pasta, local products, canned goods, etc. is just a small sample of where we can add value to harvested agricultural produce. For example, instead of selling apricots as fruit, we can process them, adding value to them and produce, jams, marmalades, compotes, brandies, dry them, make confectionery with them or anything else we choose. Regardless of the production of the end product that we like and regardless of which one we will apply in each of the above cases, we will add value and utility to the apricot product. Outbound logistics in the agricultural sector will include activities to distribute the final product to the consumer. Marketing and sales include strategies to improve visibility and target relevant customers, such as advertising, promotion, and pricing. In the example of adding value to a fruit in the case of apricots: we could offer a promotion, such as selling three jars of jam for the price of two, or advertising for healthier joints and bones when eating dried apricots, as this type of fruit contains potassium and calcium, mineral elements necessary for diseases of the musculoskeletal system, such as osteoporosis, coxartrosis, and others. If we offer, for example, agricultural services with mechanized implements, we need to provide product maintenance and improve the level of mechanized service. In agriculture, the degree of customer satisfaction is paramount; if customers are happy with us, they will come back; if they are not – they will find other companies, which better address their needs. Therefore, the agricultural sector, and, in particular, companies operating therein, must maintain a high level not only in their logistics processes, but particularly in their production and distribution processes in the way they keep their produce and finished agricultural goods.

If it is needed to represent with a figure the process of integrating the value chain to the supply chain and to the distribution chain, we could represent it like in Figure 1.

Interestingly, an integrated chain can consist of both horizontal and vertical links, or upstream links with suppliers and downstream links with distributors and customers. Also note that the value system reflects both the relationships a company has with its business partners, and the fact that these relationships may be common to its competitors (Trady, Brock, and Kvilhaulg, 2022).

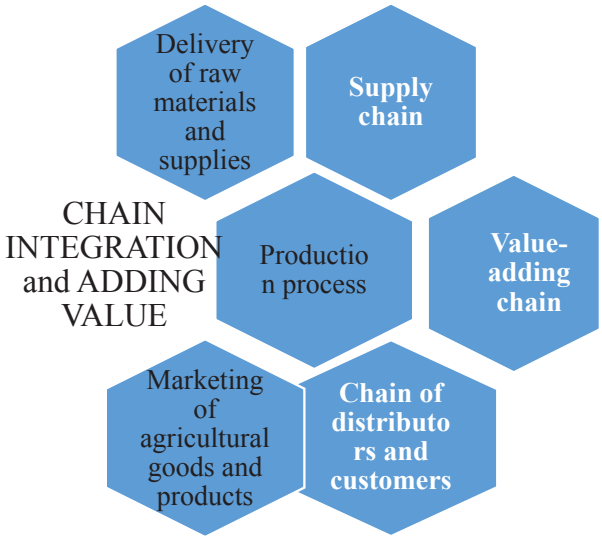

Fig. 1. Integrating the supply chain with the value chain and the distribution chain of the finished product to reach the end client

In conclusion, we can summarize that integration can cover the whole process in an agrarian company, starting with the supply chain of the inputs and materials themselves, including the production process itself, adding the value chain and the chain of distributors and reaching the end clients. The purpose of all this is to get a complete cycle of production and marketing, wherein the management of the agribusiness will be much more focused and more comprehensive to the overall activity of the agribusiness. Furthermore, the added value will remain with the company that produced and marketed the product and will not go to resellers and vendors outside of the company. Therefore, the idea of integrating the different systems or chains will allow agribusinesses to consolidate their activities and achieve their objectives

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