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The Importance of Logistics in The Food Sector and A Research in Çorum Province

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Food refers to all kinds of nutrients that people consume in order to survive and function in a healthy way. Food contains the nutrients necessary for the human body to meet its energy needs, grow, develop and maintain health. Foods are generally derived from natural sources and may undergo processing. It is important for people to have a balanced and varied diet to live a healthy life, as this helps provide all the nutrients the body needs. Logistics is a concept that refers to the management of processes responsible for the effective supply, storage, transportation, and distribution of goods and services. The purpose of these processes is to ensure that products or services are delivered to consumers or users at the right place, at the right time, and at the right cost.

With this study, customer satisfaction in the logistics of businesses operating in the food sector in Çorum province, food safety, warehouse management, stock management, supply chain, data analytics in logistics, problems in transportation, important parts in food logistics, green logistics in the food sector, technological development in the food sector and food. A survey was conducted on the future of logistics in the sector. According to this research, it has been revealed that businesses have to follow the developments in food logistics and focus on customer satisfaction in order to hold on to the market in today's world. However, it has been revealed that since the products in the food industry are sensitive, that is, perishable, food safety should be given importance in logistics and the necessary precautions should be taken. It has been revealed that while businesses keep their products in the warehouse, they pay attention to the tracking system in the warehouse and stock management. According to the results obtained from the research, businesses expressed that they were open to current developments on the mentioned issues and stated that they followed these issues carefully. They noted that they pay extreme attention to the problems and difficulties that may arise during transportation and in the supply chain in food logistics. They said that they attach importance to knowledge in transportation and shipping, and noted that they pay attention to data storage and backups along with technology. According to the results obtained from the study, businesses also stated that they engage in activities that do not harm the environment while carrying out their logistics activities.

Keywords: food firms, logistic, supply chain, corum province

JEL Codes: R40; R41; R49

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1. Introduction

The purpose of this study is to investigate the issues that need to be considered in the transportation and shipping field of enterprises operating in the food sector in Çorum province. The food sector has an important place in the world market. The timely delivery of food products without spoiling is very important. Today, with the development of technology and knowledge, the transportation and shipping service of food products in the logistics sector has begun to be realized in accordance with its purpose.

Logistics refers to the process from the suppliers to the customers to be transported. This process includes storage, transportation, distribution and stock management. Regarding food logistics, strategic planning and operational management are required to maintain the freshness of the products, transport them safely and deliver them to the consumer on time. In addition, complying with hygiene standards and ensuring food safety are among the important elements of this process. Effective logistics management in this field is a critical factor for success in the food industry.

Supply chain management in the food sector refers to a critical area covering the processes from the point of production of products to the point of reaching consumers. These processes include all interactions between food manufacturers, suppliers, production, storage, transportation and retail sales points.

In the study, a field study on Logistics Judgment Features in the Food Sector of Çorum Province was conducted. The survey method was used as the data collection technique in the study. The questions in the survey form were prepared by the thesis advisor and the student by benefiting from the literature. The survey created for the study basically consisted of two parts. In the first part, demographic information about the subjects participating in the survey was collected. In the second part, the subjects' judgments about logistics were investigated. A total of 10 questions were asked in the first part of the survey. In the second part, a total of 73 questions consisting of 11 parts were asked. In the study, it was tried to reach all the subjects in the universe (within the scope of Çorum province). Within the scope of the study, 126 enterprises returned survey forms in an evaluable format from the survey questions. The evaluations within this scope are given in detail in the third part of the study. The results obtained from the study and the suggestions made to the stakeholders are presented in the conclusion and suggestions section.

2. The Concept of Logistics and Logistics in the Food Industry

Today, the place of the food sector in our country and in the world has always been at the forefront. Nutrition, which is one of the basic needs of people, is done with the food taken into the body. Food is the greatest need for people to be born, grow and continue their lives. With the transition to settled life in human history, agricultural areas and irrigation canals began to be built. People who started to plant their own seeds and saplings and grow vegetables and fruits began to meet their meat and milk needs with the domestication of animals. Over time, people who formed neighborhoods, villages and cities began to multiply rapidly and settle in different parts of the world. As the human population increased in the world, the need for food also began to increase with it (Keskin, 2015).



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Increasing needs in the food sector have caused the problem of access to food for individuals in various regions. As the transportation problem increased, it became inevitable for individuals to turn to various transportation methods with vehicles. Thus, the development and improvement of logistics in the food sector has also become necessary (Cebeci, 2021).

The need for transportation, which is one of the inevitable needs of humanity in history, has led to the development of the logistics field. In the past, in 1620, immigrants could only cross the Atlantic from England to America in three months with the Mayflower ship. In 1927, Charles Lindbergh, who wanted to go from the USA to Paris, crossed the Atlantic and took 33.5 hours. With the development of science and humanity, today, the Atlantic can be crossed in less than an hour with an aircraft called the SR-72.

Although there have been many developments in logistics in the past, developments in terms of academic studies began in Japan, the USA and a few European countries after the 1960s. In Turkey, which developed late in terms of logistics compared to these countries, the importance of logistics increased with the increasing needs and investments made. Logistics magazines were published, associations were established, and foreign academic sources were translated into Turkish. The term logistics, which also comes across in daily life, has now started to appear in television commercials, on trucks, lorries and minibuses, and on shopping packages (Keskin, 2015). The increasing export, import, communication and development between countries every passing day has brought the fastest access to information, science and communication. With the development of the logistics field, far away places have become close and the time to reach everything has shortened.

The concept of logistics has begun to emerge in 3 areas. We can name them as military, academic, and business. Increasing global competition in the world has forced companies to review their ways of doing business and competitive strategies; and to improve their processes in this context. In the globalization environment where developments are unlimited and rapid, geographical boundaries have disappeared and new markets have emerged spreading to different geographies. In addition, businesses have started to constantly develop and renew themselves in order to provide the best service to the unique demands and needs of conscious customers

The situation of delivering the products they demand to customers in different regions of the world has caused supply and distribution works to gain a global character and costs to increase. The orientation of increasing costs in businesses has directed them to find the answer to how to create effective and efficient logistics activities with low costs. The increase in logistics costs has caused an increase in the share of expense items in businesses and the advantage of logistics in competitive markets in businesses to rapidly develop the logistics sector (Uludağ, 2013). The development of the logistics field, which has gained momentum in production, has increased the competitiveness of businesses in the global market and has enabled customers to receive more efficient and purposeful services. Thus, production planning, resource planning, and transportation planning in businesses have become actions taken according to the logistics unit.

The origin of the word logistics dates back to ancient Greece. In ancient Greece, it was attributed with meanings such as 'arithmetic association' or 'skilled in calculation'. During the Roman and Byzantine periods, there were officers in administrative positions with the title 'logista'. In the 1800s, it was used in France to mean a person who coordinates and combines transportation. Although there are those who



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claim that the word logistics is derived from the combination of the terms logic and statistic, this idea has not been accepted because it has little connection with the meaning of the word (Keskin, 2015). The Council of Supply Chain Management Professionals (CSCMP) defines logistics as "the part of supply chain management that plans, implements and controls the efficient, effective flow and storage of goods/services and related information between the origin and destination." It can be expressed as destination planning in terms of consumables to meet customer requirements (Bektemur, 2023).

Following the studies that basically meant supporting military activities, logistics, which was related to economic life, has transformed into business logistics due to factors such as globalization, industrialization, development of international trade between countries, developments in the economy, technological innovations, and the spread of business activities. As mentioned in the following sections, logistics required more specialization over time for companies that were initially focused on physical distribution. These practices developed over time and could not fit into a whole and were divided into two logistics management and supply chain methods (Koçak, 2020, p. 246). Many factors have contributed to the importance of the rapidly developing concept of logistics from the past to the present. These factors are summarized under five headings. These factors can be listed as globalization, post (new) economic approach, extraordinary competition conditions, scientific-technological developments, and other factors outside of these (Şekkeli, 2016, p. 9).

Globalization: The term globalization, which does not have a single definition, is explained as follows: "Increased communication and interaction between societies and states living in different regions of the world, cross-border mutual economic integration and interdependence in the process of inclusion of national interests. "Economies in world markets as a result of the increasing mobility of goods, services, and capital." (Kıvılcım, 2013, p. 221). Globalization has economic, political, technological, communication, and cultural elements. Economic globalization, which means the integration of relevant state economies, is expressed as the coming together of all world states in a single common market (Kıvılcım, 2013, p. 224). The increase in economic dependency between countries, the increase in cross-border trade in goods and services, and the increase in international finance and labor volumes are the expressions of economic globalization (Fischer, 2003, p. 3). With globalization, the world began to become aware of other raw material and labor markets that were previously closed to the international system. As a result, companies began to prefer regions where they could achieve lower production costs. Of course, these developments also affected logistics concepts and practices to different extents. These elements "The increasing geographical distance between production facilities, raw material sources and markets served has brought new and more complex distribution problems to the agenda. Increasing distances have required sophisticated solutions that create additional costs for companies. Increasing contributions by managing these costs, and logistics has also been reflected in the competitive structures of companies. They have started to seek answers to the question "How can people conduct their logistics activities more effectively, efficiently, and at lower costs?" (Uludağ, 2013, p. 16)

Post (New) Economy Concept: Post (new) economy is defined as "the economy in which new economic connections are created, new jobs are created and existing jobs are transformed based on studies conducted over the internet, software and hardware" (Şekkeli, 2016, p. 9). With the inclusion of this new economy understanding in daily life, old habitual methods of doing business have lost their power in terms of both profitability and production capacity, and technologies in the field of information and



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communication have come to the fore. With the combination of the basic factors of growth, globalization, and technology, the market understanding of companies has changed and companies providing local services have become global companies (Barışık and Yirmibeşcik, 2006). With this concept of economy on the agenda, the internet and communication have become widespread and cheaper. They have become of higher quality. Thanks to these factors, manufacturers have started to procure raw materials and materials from cheap places, to produce in places where the labor factor is cheaper, and thanks to these factors, they have had the opportunity to reach intercontinental markets that they would not normally be able to reach or sell to. All these different applications that have entered our lives have also affected the structure of logistics activities and inevitably developed them (Şekkeli, 2016, p. 9).

Competition Element: With globalization, more economically suitable elements have begun to be included in the economic system. With the supply of raw materials from different markets and the production carried out in different regions at lower costs, logistics activities have become an extremely important strategic tool for companies and an effective element that provides serious advantages to their competitors.

"One of the advantages has been the provision of the main materials required for the system from the most suitable sources. With globalization, companies have emerged that can provide the required elements at the lowest cost, and that can establish a supply chain that can provide goods and services to consumers at the fastest and lowest cost. At the same time, these companies stand out as companies that can manage this chain most effectively. For this reason, the importance of logistics activities in competition has increased rapidly and logistics has become the most important competitive element." (Bektemur, 2023).

Logistics, which can provide companies with a competitive advantage, is a costly and important process. Therefore, logistics activities represent a fine line of cost-benefit balance. For companies to remain profitable in their fields of activity, logistics costs must be minimized, as in all production areas. However, these savings must not lead to sales losses. We can summarize this situation as follows:

"For companies to continue their existence, it is extremely important for them to be able to deliver the right product, in the right quantity, under the right conditions, to the right place, at the right time, to the right customer, and at the right price. The indicator expressed with these lines is called customer service level. The common goal is to increase the level of customer service and to ensure that this is provided at the lowest possible cost." (Canöz, 2021, p. 28).

Technological Developments: With the development of technology, internet access and use have become increasingly widespread. The impact of this development is also reflected in the logistics sector. Logistics processes aim to deliver products to buyers at the right time and place; order acceptance, document preparation, and cargo-delivery-return processes. There are many processes in it. Technology is frequently used in these processes and with this integration, operational costs decrease and customer satisfaction increases.

Other factors: Other factors affecting the concept of logistics can be expressed as differences in consumer desire-demand structure, market conditions, the presence of more developed countries in the field of activity, and various labor needs (§ekkeli, 2016, p. 9).

The concept of logistics includes complementary activities such as packaging, value-added services, order management, customs, inspection and surveillance, warehouse management, and insurance in

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addition to the main activities of transportation and storage (T.C. Ministry of Economy, 2022). Logistics, which is of vital importance in the value creation process of the business; It plays a key role in providing business inputs, providing product flow and product-related information, and distributing the products produced by the business to appropriate market segments. In addition, logistics also provides the physical flow of products in the integrated structure we call the supply chain (Acar, 2020, p. 3). If we look at the definition of logistics again; It refers to a process in which production materials are passed through different departments of the organization, first received from suppliers and then delivered to customers. Logistics is basically divided into three main sections and this distinction is expressed as follows:

Supply logistics: It defines the process of transporting raw materials and materials needed in any way from suppliers to the organization that will produce the goods and services. It includes the activities of supplying raw materials and materials and preparing them for production.

Material management/production logistics: It defines the process of transporting materials to the relevant units within the element that will produce the goods and services and is the element responsible for the movement processes related to the presence of raw materials, materials, and semi-finished products in the required places in the production facility.

Distribution logistics: It defines the process of delivering the goods and services that are produced to the consumers who demand them. In other words, it is the unit that is responsible for delivering the completed and ready-to-use products to the end consumer (Waters, 2003, p. 6, Uludağ, 2013, p. 27, Bektemur, 2023).

3. Food Industry and Supply Chain

The supply chain is a set of relationships and connections that cover the entire life cycle of a product from its creation to its consumption. Although the history of the modern supply chain concept dates back to the early 1980s, it has been fully adopted by very few companies (Tanyaş et al., 2017).

IT includes the flow of products, services, and information in the chain from the supplier to the customer (Demirdöğen et al., 2007). According to Özdemir (2004), "the supply chain is the chain formed by producers and distributors who procure raw materials, transform them into intermediate and final products, and distribute the final product to customers."

Companies create a chain consisting of suppliers, distributors, and customers to offer their goods and services to the market. Each company is considered a supplier of the other, from the extraction of exhausted products from nature to their delivery to the end consumer, called the supply chain. In such a chain, the integration of the activities and processes of each company by creating value for the final customer provides a significant advantage for market success (Pulanya, 2019).

The supply chain is a long journey from raw materials to consumers. It is a chain of activities that starts from the raw material sources of a product, procures raw materials and materials, takes them to the production facility, produces them and delivers them to the final consumer, and even returns to waste, waste, and then use them. These activities are rarely carried out by a single organization. In general, many different organizations play different roles in this process.

The sources that supply raw materials and materials are supplier organizations. Production organizations transform raw materials and materials into products. Wholesalers and retailers deliver



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products to consumers. Transportation organizations carry out the transportation of raw materials from the source to the producers and the manufactured products to the final consumer. Apart from this, banks and financial institutions that provide the flow of money and telecommunication organizations that provide communication are also indirectly involved in this chain (Nebol, 2016).

To date, many people have created various definitions that are similar to each other while searching for the definitions of supply chain and supply chain management. Some of these definitions are as follows:

According to Bowersox et al., "It is the cooperation that companies make to increase their operational efficiency and strengthen their strategic positions" (Bowersox).

According to Simchi-Levi et al., "Supply chain management is the effective integration of suppliers, manufacturers, warehouses, and stores to produce and distribute products at the right time, place, and quantity to maintain high service levels and minimize overall costs." According to Nahmias, "a supply chain is a network that connects suppliers, factories, warehouses, stores, and consumers. The definition given by the Stanford Supply Chain Forum (1999) is as follows: "Supply chain management is concerned with managing the flow of materials, information, and finance through a network of suppliers, manufacturers, distributors, and customers." To bring uniformity to the subject, a comprehensive definition was created in 2001 by the Council for Logistics Management (CLM), now the Council of Supply Chain Management Professionals (CSCMP). The council's definition is as follows: "Supply chain management includes finding and delivering resources, transforming resources into products, and planning and managing activities, including all logistics management activities, as well as collaborating with distribution partners involved in this process, including suppliers, intermediaries, third-party service providers, and finally customers and coordination" (Council of Supply Chain Management Professionals, "Supply Chain and Logistics Terms -Glossary", http://www.cscmp.org.) The supply chain has the following objectives: The primary objective of the supply chain is the customer: to create value for the customer. Its primary objective is to meet customer needs in the most effective, efficient, and economical way, to serve the customer. The final cost arises in providing this service, that is, the other objective of the supply chain is to minimize consumer costs, which depends on fulfilling the main objective, that is, increasing the level of service. customer requirements and needs, that is, creating more value in the eyes of the customer, thus creating strategic advantages for companies in the chain. For this reason, the supply chain is also called the "value chain" (Bowersox et al., 2002).

4. Relationship Between Logistics and Supply Chain

The relationship between logistics and supply chain can be explained as follows:

• Supply chain is a chain that includes functions such as production, distribution, sales, logistics, planning, supply, etc. logistics, and logistics is also a link in this chain.

• While a supply chain is defined as a coordinated network design that works together, logistics is an activity that takes place within the boundaries of a single organization.

• While there are many types of logistics activities such as inbound logistics, production logistics, outbound logistics, and reverse logistics within an organization, the existence of a single supply chain is mentioned (Şekkeli, 2016, p. 15).



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In this context, the connection between the supply chain process and logistics is examined using common concepts, and the interaction of these two processes is discussed:

Production: When the connection between logistics and supply chain is considered, the first concept that comes to mind as a common point is production. In order to avoid disruptions in the production process, which aims to produce advantageous products with inputs that include material and human capital elements, the timely supply and provision of inputs is of great importance. In fact, production-logistics cooperation also comes into play here. Providing the inputs needed for production activities and making them ready at the desired time, in the right quantity, in the desired quality, and at a reasonable price are among the basic objectives of the logistics process (Uludağ, 2013, p. 30-31).

Customer satisfaction: Determining customer expectations correctly and producing goods and services in line with these expectations are important for the competitive power of companies. However, today, it is no longer enough to produce products that are only suitable for customer needs. Delivering these products and services to the customer as quickly as possible, at the desired time, and under the desired conditions, in other words, providing the highest possible quality of logistics service, also plays a key role in terms of customer satisfaction.

Inventory management: Stock, which plays an important role in the continuous continuation of production, also represents a significant cost related to logistics. Since keeping a large stock is a financial burden for companies, the most appropriate balance must be found.

"Optimizing stock levels at the lowest level in a way that will not lead to customer loss and ensures the continuity of operations both keeps customer satisfaction at a certain level and contributes financially to the business. At this point, logistics helps keep the company's stock levels at the desired minimum level while meeting customer targets by increasing order frequency and reducing order quantities to a certain level." (Acar, 2020, p. 11).

5. Logistic Jurisdiction Characteristics in the Food Sector of Corum Province

5.1. Literature Review

In the changing world, the logistics management process is also changing with globalization. Companies operating in logistics gain an advantage in global competition by organizing effective and efficient business processes. Global competition between companies reveals the importance of logistics. Logistics, which has become one of the most important issues today, is an effective factor in determining the mission and vision of companies (Fredriksson and Liljestrand, 2015, Wajszczuk, 2016). The food sector is developing in the world and Turkey and food logistics has become an important issue. Food logistics is a specialized field related to the transportation, handling, and storage of food and beverage products produced by companies, and is implemented by taking into account the shelf life, production, climate control, and health legislation of food. For this reason, companies and organizations operating in the food sector need to use health-friendly logistics systems when transporting and storing the food products they produce. Systems developed on the basis that food is a living product and poses a threat bring a different perspective to the logistics sector. In the food logistics sector, companies with special equipment have many tasks such as ensuring the temperature control of foods, as well as storing, transporting, and preserving products (Fidan, 2018). Therefore, researching logistics in the food sector, revealing its



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importance, and identifying and solving problems will be a guide for companies and businesses interested in the food sector.

Puligundla et al. In 2012, we emphasized the importance of safety in food transportation in terms of food logistics. Verghese et al. In 2015, we talked about the importance of preserving, transporting, processing, consuming, and even preserving food in homes for food businesses. Demirbaş's 2019 study emphasizes that increasing efficiency in food transportation, ensuring environmental sustainability, and facilitating access to safe and nutritious food should be a strategy for food companies and their employees.

In addition, demand forecasting, inventory management, customer service, purchasing and ordering, warehouse management (storage), handling, packaging, and transportation/shipping processes should be taken into account in food logistics and companies should pay attention to the employees working in these processes. Storage, processing, and distribution of food. In order for food logistics processes to be efficient, useful, and safe, employees in companies must have a high level of knowledge on these issues. In this way, a high level of customer satisfaction is achieved and the food produced is controlled through the intended distribution channels from the starting point to the destination (Aydın, 2019).

5.2. Research Problem and Hypotheses

Food logistics is one of the most difficult services and before the use of 3PL, most companies were carrying out transportation and storage operations themselves. With the development of technology and increasing competition in the market, logistics companies have expanded their current business to include food transportation and storage. Food logistics companies need to learn both academic and practical applications of their work in terms of food safety. Therefore, it is very important to determine the status of companies operating here in terms of customer satisfaction, food safety and logistics relationship, warehouse, and stock management, supply chain, food transportation, problems experienced in international transportation, optimization of products, logistics processes, sustainability and the future position of logistics. This is very important in terms of revealing the emerging problems and finding solutions. Therefore, this thesis aims to determine the food logistics status of food industry companies in Çorum province.

5.3. Assumptions and Limitations of the Study

The research is based on the general assumption that the sample represents the universe and the measurement subject is fully understood by the participants. Another assumption of the research is that the participants answered the survey questions sincerely and honestly and that they spent enough time to reflect their real situation. In order to ensure this, the participants were given sufficient information about the content and purpose of the survey, they were assured of the confidentiality of the survey, and their questions were answered. It can be stated that the research has some limitations because it is based on the personal perceptions of the managers. However, the fact that some of the participants did not answer the questions sincerely for certain reasons, the answers were based on personal perceptions and the possibility that there may be differences between the actual situation and personal perceptions are other limitations of the study.

5.4. Universe and Sample of the Research



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The majority of the study consists of food sector companies in Çorum province. The sample selection in the study was carried out using the convenience sampling method. Convenience sampling is a method of collecting data from the easiest and most accessible topics until the researcher reaches the required sample size for his/her study. Its use is rapidly increasing in the research world because it is economical and requires less time (Göllü, 2014, p. 74; Gürbüz and Şahin, 2018, p. 132). Although it varies according to the type of social science research, a sample size between 30 and 500 is often considered sufficient. 126 samples were obtained in this thesis.

5.5. Data Collection Method

Quantitative research is a type of research in which numerical interpretations and results can be made based on a previously prepared data collection tool. In this method, by using data collection tools that enable digitalization, the characteristics of the variable representing the research object are collected from a sample group that can represent the universe (Gürbüz and Şahin, 2018, p. 175). The data used for this study were collected using a structured questionnaire.

5.6. Findings Obtained in the Research

As a result of the survey, demographic information about the sample is given in Table 1.

| Demographic Characteristics | n:126 | % |
|-----------------------------|-------|------|
| Your Gender: | | |
| Male | 110 | 87,3 |
| Female | 16 | 12,7 |
| Age: | | |
| 30 and below | 38 | 30,2 |
| 31-35 | 16 | 12,7 |
| 36-40 | 22 | 17,5 |
| 41-45 | 18 | 14,3 |
| 46-50 | 18 | 14,3 |
| 51 and above | 14 | 11,1 |
| Monthly Income: | | |
| 17,000 and below | 2 | 1,6 |
| 17,000 | 24 | 19,0 |
| 18,000-25,000 | 48 | 38,1 |
| 26,000-30,000 | 18 | 14,3 |
| 30,000 and above | 34 | 27,0 |
| Education: | | |
| Primary School | 16 | 12,7 |
| Secondary School | 10 | 7,9 |
| High School | 66 | 52,4 |
| Vocational School | 18 | 14,3 |
| Bachelor's Degree | 14 | 11,1 |
| Master's Degree | 2 | 1,6 |
| Doctorate | 0 | 0 |

Table 1. Demographic Characteristics of Logistics Companies in Corum Province



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| Workplace Position: | | |
|--|-----|------|
| Employee | 58 | 46,0 |
| Chief | 28 | 22,2 |
| Foreman | 6 | 4,8 |
| Director | 16 | 12,7 |
| Senior Manager | 8 | 6,3 |
| Partner | 10 | 7,9 |
| Last Year of Work at Work: | | |
| Less than 1 year | 12 | 9,5 |
| 1-5 years | 52 | 41,3 |
| 6-10 years | 28 | 22,2 |
| 11-15 years | 6 | 4,8 |
| 16 years and above | 28 | 22,2 |
| Total Employment Year: | | |
| 5 years and below | 16 | 12,7 |
| 6-10 years | 16 | 12,7 |
| 11-15 years | 18 | 14,3 |
| 16-20 years | 20 | 15,9 |
| 20 years and above | 56 | 44,4 |
| Business Area of Activity: | | |
| Manufacturing Industry | 6 | 4,8 |
| Trade Industry | 14 | 11,1 |
| Service Sector | 106 | 84,1 |
| Current Market Area: | | |
| Local | 14 | 11,1 |
| Regional | 56 | 44,4 |
| Domestic | 38 | 30,2 |
| International | 18 | 14,3 |
| Distribution of Products: | | |
| Provides its own logistics | 112 | 88,9 |
| Uses a distribution company in its logistics | 14 | 11,1 |

In Table 1, it was determined that in the survey conducted with workplaces operating in the food sector in Çorum and 126 personnel working in the food sector, 87.3% of the personnel were male, 30.2% were 30 years old and under, 38.1% had a monthly income between 18,000-25,000 TL, 52.4% were high school graduates, 46% had an employed worker status at their workplace, 41.3% had a working year of 1-5 years at their last workplace, and 44.4% of the personnel had a total working year of 20 years or more. According to the survey conducted with the workplaces, it was determined that 84.1% were operating in the service sector, 44.4% had a regional market area, and 88.9% of the workplaces provided their own logistics while distributing their products. The opinions of the logistics companies in Çorum province regarding logistics concepts and practices are given in the following tables.



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Table 2. Logistics Judgments of Logistics Companies in Corum Province

| In order to increase customer satisfaction in food logistics processes; | Strongly Disagree | | Disagre | e | Undeci | Undecided | | | Strong Agree | ly |
|--|----------------------|---|---------|-----|--------|-----------|----|------|-----------------|------|
| | n | % | n | % | n | % | n | % | n | % |
| Hygiene (health) in production conditions should be taken into consideration. | | | | | | | 20 | 15,9 | 106 | 84,1 |
| Production conditions should be improved up to date | | | | | 2 | 1,6 | 29 | 23 | 95 | 75,4 |
| Order and durability should be taken into consideration in packaging of products | | | | | 2 | 1,6 | 27 | 21,4 | 97 | 77 |
| Hygiene in transportation should be taken into consideration. | | | | | | | 25 | 19,8 | 101 | 80,2 |
| The right transportation method should be decided | | | | | 4 | 3,2 | 29 | 23 | 93 | 73,8 |
| The appropriate logistics company should be selected for the product. | | | | | 4 | 3,2 | 32 | 25,4 | 90 | 71,4 |
| Attention should be paid to the timely delivery of products. | | | 2 | 1,6 | | | 31 | 24,6 | 93 | 73,8 |

In order to increase customer satisfaction, 84.1% of food logistics processes strongly agreed that hygiene should be taken into consideration during production conditions. 75.4% strongly agreed that production conditions should be improved on a daily basis. 77% strongly agreed that order and durability should be taken into consideration during packaging of products. 80.2% strongly agreed that hygiene should be taken into consideration during transportation. 73.8% strongly agreed that the right transportation method should be decided. 71.4% strongly agreed that the appropriate logistics company should be selected for the product. 73.8% strongly agreed that attention should be paid to the timely delivery of products.

Table 3. Judgment on the Relationship Between Food Safety and Logistics

| The relationship between food safety and logistics; | Str Dis | ongly agree | Disagree | | Undecided | | Agre | е | Strongl Agree | |
|---|------------|----------------|----------|-----|-----------|------|------|------|------------------|---------------|
| | n | % | n | % | n | % | n | % | n | % |
| It should be strengthened by employing trained personnel | 6 | 4,8 | 6 | 4,8 | 2 | 1,6 | 43 | 34,1 | 69 | 54,8 |
| It should be strengthened by implementing technological | | | 2 | 1,6 | 6 | 4,8 | 41 | 32,5 | 77 | 61,1 |
| monitoring into the company | | | | | | | | | | |
| It should be strengthened by daily monitoring of the stock | | | 2 | 1,6 | 18 | 14,3 | 40 | 31,7 | 66 | 52 <i>,</i> 4 |
| It should be strengthened by choosing the company that has | | | 2 | 1,6 | 22 | 17,5 | 38 | 30,2 | 64 | 50 <i>,</i> 8 |
| the most equipped technology with its machinery and | | | | | | | | | | |
| employees. | | | | | | | | | | |
| It should be strengthened by choosing cold chain logistics. | | | 8 | 6,3 | 2 | 1,6 | 20 | 15,9 | 96 | 76,2 |
| (Transportation of products such as food, medicine at | | | | | | | | | | |
| appropriate temperatures) | | | | | | | | | | |

54.8% of the participants agreed that the relationship between food safety and logistics could definitely be strengthened by employing trained personnel, 61.1% agreed that it could definitely be strengthened by implementing technological monitoring in the company, 52.4% agreed that it could definitely be strengthened by daily monitoring of stock, 50.8% agreed that it could definitely be strengthened by choosing the company that has the most equipped technology with machinery and employees, and 76.2% agreed that it could definitely be strengthened by choosing cold chain logistics.



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| The problems you encounter in the warehouse management of the food sector; | Strongly Disagre e | | Disa e | Disagre e | | ecid | Agre | e | Stro Agre | ngly e |
|--|--------------------------|----|-----------|--------------|----|------|------|------|--------------|---------------|
| | n | % | n | % | n | % | n | % | n | % |
| It is due to not using the warehouse area efficiently | 2 | 1, | 6 | 4, | 6 | 4, | 46 | 36,5 | 66 | 52 <i>,</i> 4 |
| | | 6 | | 8 | | 8 | | | | |
| It is due to not complying with the Occupational Health | | | 6 | 4, | 10 | 7, | 54 | 42,9 | 56 | 44,4 |
| and Safety rules | | | | 8 | | 9 | | | | |
| It is due to not providing a hygienic environment | | | 8 | 6, | 4 | 3, | 48 | 38,1 | 66 | 52 <i>,</i> 4 |
| | | | | 3 | | 2 | | | | |
| It is due to not dividing the warehouse area into sections | | | 10 | 7, | 6 | 4, | 46 | 36,5 | 64 | 50,8 |
| suitable for its purpose | | | | 9 | | 8 | | | | |
| It is due to not using information technology in | | | 14 | 11 | 10 | 7, | 40 | 31,7 | 62 | 49,2 |
| warehouse management | | | | .1 | | 9 | | | | |

Table 4. Warehouse Management Judgment of the Food Industry

52.4% of the problems encountered in warehouse management in the food sector are due to the inefficient use of the warehouse space, 44.4% due to non-compliance with occupational health and safety rules, 52.4% due to failure to provide a hygienic environment, 50.8% due to the failure to divide the warehouse space into sections suitable for its purpose, and 49.2% strongly agree that the problems encountered in warehouse management are due to the lack of use of information technology in warehouse management.

| Problems you encounter in the food sector regarding | Stror | Strongly | | Disagree | | ecided | Agree | е | Strongly | | |
|---|-------|----------|----|----------|----|--------|-------|---------------|----------|------|--|
| stock management; | Disag | gree | | | | | | | Agree | 2 | |
| | n | % | n | % | n | % | n | % | n | % | |
| It is due to the increase in storage costs. | | | 24 | 19,0 | 8 | 6,3 | 24 | 19,0 | 70 | 55,6 | |
| | | | 24 | 20,6 | 6 | 3,2 | 36 | 28,6 | 60 | 47,6 | |
| The decrease in demand for stored products causes an | | | 14 | 11,1 | 16 | 12,7 | 30 | 23,8 | 66 | 52,4 | |
| increase in waste costs. | | | | | | | | | | | |
| It is due to uncertainties in order policies. (when and | 2 | 1,6 | 6 | 4,8 | 4 | 3,2 | 38 | 30,2 | 76 | 60,3 | |
| how much to order) | | | | | | | | | | | |
| It is due to the lack of the right amount of stock for | | | 10 | 7,9 | 10 | 7,9 | 34 | 27 | 72 | 57,1 | |
| each product. | | | | | | | | | | | |
| It is due to the lack of use of the stock tracking | | | 16 | 12,7 | 12 | 9,5 | 46 | 36 <i>,</i> 5 | 52 | 41,3 | |
| program. | | | | | | | | | | | |
| It is due to the lack of alternative suppliers. | 6 | 4,8 | 24 | 19,0 | 10 | 7,9 | 54 | 42,9 | 32 | 25,4 | |

Table 5. Food Industry Stock Management Judgment

Of the problems encountered in stock management in the food sector, 55.6% strongly agreed that this was due to increased storage costs, 47.6% that there was an increase in wastage costs due to decreased demand for stored products, 52.4% that this was due to uncertainties in order policies, 60.3% that this was due to not having the right amount of stock for each product, 57.1% that this was due to not using the stock tracking program, and 41.3% that this was due to not having alternative suppliers. 42.9% agreed that this was due to the lack of campaigns for products.



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| The biggest challenges you encounter in the supply chain; (from raw material supply to | Stro Disa | Strongly Disagree | | gree | Und | ecided | Agre | e | Strongly Agree | |
|--|--------------|----------------------|----|------|-----|--------|------|------|-------------------|------|
| the product reaching its final destination) | | 0 | | | | | | |) | |
| | n | % | n | % | n | % | n | % | n | % |
| Results from the customer support service unit | 2 | 1,6 | 20 | 15,9 | 24 | 19,0 | 58 | 46,0 | 22 | 17,5 |
| Results from the scarcity of raw materials | 4 | 3,2 | 30 | 23,8 | 4 | 3,2 | 54 | 42,9 | 34 | 27,0 |
| caused by risks in the economy. | | | | | | | | | | |
| Results from difficulties in providing workers. | 4 | 3,2 | 20 | 15,9 | 6 | 4,8 | 44 | 34,9 | 52 | 41,3 |
| Results from the process of the product | 2 | 1,6 | 8 | 6,3 | 26 | 20,6 | 58 | 46,0 | 32 | 25,4 |
| reaching the customer. | | | | | | | | | | |
| Results from the lack of training of the working | 2 | 1,6 | 22 | 17,5 | 10 | 7,9 | 24 | 19,0 | 68 | 54 |
| personnel | | | | | | | | | | |
| Results from not working with a sufficient | 4 | 3,2 | 16 | 12,7 | 2 | 1,6 | 56 | 44,4 | 48 | 38,1 |
| number of suppliers | | | | | | | | | | |
| Results from unpredictable processes | | | 6 | 4,8 | 4 | 3,2 | 38 | 30,2 | 78 | 61,9 |
| (pandemic process, work accident, | | | | | | | | | | |
| earthquake, civil war, etc.) | | | | | | | | | | |

Table 6. Judgment on Challenges in the Supply Chain

The biggest challenges encountered in the supply chain were 46% agreed with the customer support service unit, 42.9% agreed with the raw material shortage caused by the risks in the economy. 41.3% strongly agreed with the difficulties in finding workers. 46% agreed with the process of the product reaching the customer. 54% strongly agreed with the lack of training of the staff. 44.4% agreed with the insufficient number of suppliers. 61.9% strongly agreed with the unpredictable processes.

Table 7. Data Analytics Judgment in Your Logistics Operations in the Food Industry

| In the food sector, data analytics in your logistics operations; (collection, storage, categorization and analysis of data) | Strongly Disagree | | Disagree | | Undecided | | Agree | | Stro Agre | ngly ee |
|---|----------------------|-----|----------|------|-----------|-----|-------|------|--------------|------------|
| | n | % | n | % | n | % | n | % | n | % |
| We use it in production | 4 | 3,2 | 38 | 30,2 | 12 | 9,5 | 24 | 19,0 | 48 | 38,1 |
| We use it in warehouse and stock management | 2 | 1,6 | 2 | 1,6 | 8 | 6,3 | 62 | 49,2 | 52 | 41,3 |
| We use it in personnel training and accumulation | 2 | 1,6 | 4 | 3,2 | 10 | 7,9 | 66 | 52,4 | 44 | 34,9 |
| We use it in transportation methods | | | 4 | 3,2 | 4 | 3,2 | 58 | 46,0 | 60 | 47,6 |
| We use it in logistics information programs | 2 | 1,6 | 10 | 7,9 | 6 | 4,8 | 52 | 41,3 | 56 | 44,4 |

In the food industry, 38.1% of the participants definitely use data analytics in logistics operations, 49.2% use it in warehouse and stock management, 52.4% use it in personnel training and accumulation, 47.6% use it in transportation methods, and 44.4% use it in logistics information programs.



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| Problems encountered during transportation of food products; | Stror Disag | Strongly Disagree Disagree | | Unde | ecided | Agree | 9 | Strongly Agree | | |
|--|----------------|-------------------------------|----|------|--------|-------|----|-------------------|----|------|
| | n | % | n | % | n | % | n | % | n | % |
| Results from temperature differences in the environment | | | 14 | 11,1 | 4 | 3,2 | 44 | 34,9 | 64 | 50,8 |
| | | | | | | | | | | |
| Results from transportation, customs clearance, etc. | | | 14 | 11,1 | 8 | 6,3 | 54 | 42,9 | 50 | 39,7 |
| transportation time. | | | | | | | | | | |
| Results from lack of quality control | 2 | 1,6 | 26 | 20,6 | 12 | 9,5 | 46 | 36,5 | 40 | 31,7 |
| Results from technological inadequacy. | 2 | 1,6 | 36 | 28,6 | 10 | 7,9 | 36 | 28,6 | 42 | 33,3 |
| Results from lack of instructions | 2 | 1,6 | 32 | 25,4 | 2 | 1,6 | 38 | 30,2 | 52 | 41,3 |
| Results from lack of information labels. | 4 | 3,2 | 20 | 15,9 | 20 | 15,9 | 42 | 33,3 | 40 | 31,7 |
| Results from not choosing the right transportation method | 2 | 1,6 | 18 | 14,3 | 6 | 4,8 | 42 | 33,3 | 58 | 46 |
| Results from lack of knowledge of the personnel | | | 14 | 11,1 | 6 | 4,8 | 68 | 54,0 | 38 | 30,2 |
| Results from limited storage time of the product | | | 14 | 11,1 | 4 | 3,2 | 44 | 34,9 | 64 | 50,8 |
| Results from not having enough products in stock | 2 | 1,6 | 30 | 23,8 | 10 | 7,9 | 40 | 31,7 | 44 | 34,9 |
| Results from damages incurred during transportation of the | | | 6 | 4,8 | 10 | 7,9 | 52 | 41,3 | 58 | 46,0 |
| products | | | | | | | | | | |
| Results from the geographical location of the destination of | 6 | 4,8 | 22 | 17,5 | 12 | 9,5 | 34 | 27,0 | 52 | 41,3 |
| the product | | | | | | | | | | |
| Results from the quality standards of the destination of the | 6 | 4,8 | 14 | 11,1 | 18 | 14,3 | 40 | 31,7 | 48 | 38,1 |
| product | | | | | | | | | | l |

Table 8. Judgment on Problems Encountered While Transporting Food Products

As for the problems encountered during the transportation of food products, 50.8% definitely agreed that they were due to ambient temperature differences during loading and unloading, 42.9% agreed that they were due to transportation, customs clearance, etc. transportation times, 36.5% agreed that they were due to lack of quality control, 33.3% agreed that they were due to technological inadequacy, 41.3% agreed that they were due to deficiencies in instructions, 33.3% agreed that they were due to deficiencies in information labels, 46% agreed that they were due to the incorrect transportation method not being selected, 54% agreed that they were due to lack of knowledge of the personnel, 50.8% agreed that they were due to the limited storage period of the product, 34.9% agreed that they were due to insufficient stock, 46% agreed that they were due to damages incurred during the transportation of the products, 41.3% agreed that they were due to the geographical location of the destination of the product, and 38.1% agreed that they were due to the quality standards of the destination of the product.



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| The most important part of food logistics; | Strongly Disagre e | | Disagree | | ree Unde ided | | Undec Agree ided | | Stron Agree | |
|--|--------------------------|---------|----------|------|------------------|---------|---------------------|------|----------------|----------|
| | n | % | n | % | n | % | n | % | n | % |
| The supply chain part. (It is the management of the process from the supply of raw materials to the final destination of the product with the necessary product, sufficient timing, appropriate pricing at the lowest cost.) | | | 6 | 4,8 | 4 | 3, 2 | 34 | 27,0 | 82 | 65, 1 |
| The production planning part. | | | 28 | 22,2 | | | 42 | 33,3 | 56 | 44, 4 |
| The storage and inventory management part. | 2 | 1, 6 | 22 | 17,5 | 4 | 3, 2 | 38 | 30,2 | 60 | 47, 6 |
| The development of transportation and distribution. | 2 | 1, 6 | 2 | 1,6 | 2 | 1, 6 | 42 | 33,3 | 78 | 61, 9 |
| The product tracking and monitoring part. | 2 | 1, 6 | 8 | 6,3 | 6 | 4, 8 | 36 | 28,6 | 74 | 58, 7 |
| The development of customer services. | 2 | 1, 6 | 14 | 11,1 | 8 | 6, 3 | 28 | 22,2 | 74 | 58, 7 |
| The development of programming and informatics in logistics. | | | 14 | 11,1 | 4 | 3, 2 | 36 | 28,6 | 72 | 57, 1 |

Table 9. Judgment on the Importance of Food Logistics

The most important part of food logistics is definitely 65.1% of the supply chain, 44.4% of the production planning, 47.6% of the storage and inventory management, 61.9% of the transportation and distribution, 58.7% of the product tracking and monitoring, 58.7% of the customer service development, and 57.1% of the logistics programming and informatics development.

Table 10. Green Logistics Judgment in the Food Industry

| Green logistics in the food sector (environmentally | Stron | ngly | Disagre | ee | Undecided | | Agre | e | Strongly | |
|---|----------|------|---------|------|-----------|------|-------|------|----------|------|
| friendly logistics); | Disagree | | | | | | Agree | | | |
| | n | % | n | % | n | % | n | % | n | % |
| It aims not to use fossil fuels in logistics (coal, oil, natural gas) | 6 | 4,8 | 12 | 9,5 | 14 | 11,1 | 34 | 27,0 | 60 | 47,6 |
| It aims to benefit from renewable energy (solar energy, wind energy, electrical energy). | 2 | 1,6 | 4 | 3,2 | 10 | 7,9 | 44 | 34,9 | 66 | 52,4 |
| It is mandatory to have waste collection centers in terms of environmentally friendly food logistics | | | 2 | 1,6 | 4 | 3,2 | 44 | 34,9 | 76 | 60,3 |
| Electronic invoicing should be used in environmentally friendly food logistics. | 4 | 3,2 | 4 | 3,2 | 4 | 3,2 | 50 | 39,7 | 64 | 50,8 |
| Packaging should be recyclable in green logistics | | | 16 | 12,7 | 2 | 1,6 | 50 | 39,7 | 58 | 46,0 |
| In green logistics, vehicles should be used in a planned and efficient manner | | | | | 2 | 1,6 | 42 | 33,3 | 82 | 65,1 |

In the food sector, 47.6% of the participants definitely aimed to avoid using fossil fuels in logistics, 52.4% definitely aimed to benefit from renewable energy, 60.3% definitely agreed that there should be waste collection centers, 50.8% definitely agreed that electronic invoicing should be used, 46% definitely agreed that packaging should be recyclable, and 65.1% definitely agreed that vehicles should be used in a planned and efficient manner.



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| In order to make your logistics operations efficient in the food sector, technologically: | Strongly Disagree | | Disagree | | Undecided | | Agre | e | Strongly Agree | | |
|---|----------------------|------|----------|------|-----------|------|------|------|-------------------|------|--|
| | n | % | n | % | n | % | n | % | n | % | |
| Autonomous robots are required (robots that move without resorting to human control) | 14 | 11,1 | 36 | 28,6 | 18 | 14,3 | 20 | 15,9 | 38 | 30,2 | |
| Cyber security is required (security of computers, network connections, internet servers, mobile devices) | 2 | 1,6 | 2 | 1,6 | 4 | 3,2 | 68 | 54,0 | 50 | 39,7 | |
| Cloud computing systems are required (backup and processing of internet-based data) | | | 4 | 3,2 | 2 | 1,6 | 50 | 39,7 | 70 | 55,6 | |
| Automatic recognition system is required (a system that shows when products enter the warehouse with which vehicle; which personnel performs the operation and where exactly those products are placed) | | | 6 | 4,8 | 4 | 3,2 | 54 | 42,9 | 62 | 49,2 | |
| Systems that establish remote communication between machines with mobile technologies are required. | | | 8 | 6,3 | 12 | 9,5 | 44 | 34,9 | 62 | 49,2 | |

Table 11. Technology Judgment in the Food Industry

In order to make logistics operations in the food sector efficient, 30.2% of the participants definitely agreed with the necessity of autonomous robots, 54% with the necessity of cyber security, 55.6% with the necessity of a cloud computing system, 49.2% with the necessity of an automatic recognition system, and 49.2% with the necessity of systems that establish remote communication between machines using mobile technologies.

| Table 12. L | ogistics. | Judgment | in the | Food | Industry |
|-------------|-----------|----------|--------|------|----------|
|-------------|-----------|----------|--------|------|----------|

| In the future of food industry logistics; | | Strongly | | Disagree | | Undecided | | Agree | | Strongly | |
|---|--|----------|----|----------|----|-----------|----|-------|----|----------|--|
| | | Disagree | | | | | | | | Agree | |
| | | % | n | % | n | % | n | % | n | % | |
| Strengthened with digitalization (in e-commerce, vehicle tracking | | | 2 | 1,6 | 4 | 3,2 | 50 | 39,7 | 70 | 55,6 | |
| systems, product tracking systems, stock tracking systems, | | | | | | | | | | | |
| warehouse tracking systems) | | | | | | | | | | | |
| Strengthened with automation (with mechanization and robotic | | 1,6 | 10 | 7,9 | 18 | 14,3 | 34 | 27,0 | 62 | 49,2 | |
| systems) | | | | | | | | | | | |
| Strengthened with smart storage systems | | | 2 | 1,6 | 6 | 4,8 | 64 | 50,8 | 54 | 42,9 | |
| Strengthened with information-sharing fast shipping methods | | | 16 | 12,7 | 6 | 4,8 | 40 | 31,7 | 64 | 50,8 | |
| Strengthened with the development of online services | | | 10 | 7,9 | 12 | 9,5 | 36 | 28,6 | 68 | 54,0 | |
| Strengthened by continuously developing our customer | | | 2 | 1,6 | 6 | 4,8 | 28 | 22,2 | 90 | 71,4 | |
| satisfaction-focused work | | | | | | | | | | | |

In the future, logistics in the food sector will be strengthened by 55.6%, definitely by strengthening digitalization, 49.2%, definitely by strengthening automation systems, 50.8%, definitely by strengthening smart storage systems, 50.8%, definitely by developing fast shipping methods with information sharing, 54%, definitely by developing online services, and 71.4%, definitely by customer satisfaction-focused work.

6. Conclusion and Recommendations

In this research survey study, it was concluded that in order to increase customer satisfaction, hygiene in production conditions should be taken into consideration in food logistics processes, production



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conditions should be improved up-to-date, order and durability should be taken into consideration in the packaging of products, hygiene should be taken into consideration during transportation, the right transportation method should be decided, a suitable logistics company should be chosen for the product, and attention should be paid to the timely delivery of the products.

It was concluded that the relationship between food safety and logistics can be strengthened by employing trained personnel, implementing technological monitoring in the company, daily monitoring of the stock, choosing the company that has the most equipped technology with its machinery and employees, and preferring cold chain logistics.

It was concluded that the problems encountered in warehouse management in the food sector are due to the inefficient use of the warehouse area, due to non-compliance with occupational health and safety rules, due to failure to provide a hygienic environment, due to not dividing the warehouse area into sections suitable for its purpose, and due to the lack of use of information technology in warehouse management.

It has been concluded that the problems encountered in stock management in the food sector are due to the increase in storage costs, the decrease in demand for stored products and the increase in the cost of wastage, the uncertainties in the order policy, the lack of the right amount of stock for each product, the lack of use of the stock tracking program, the lack of alternative suppliers, and the lack of campaigns for products.

It has been concluded that the biggest difficulties encountered in the supply chain are due to the customer support service unit, the scarcity of raw materials caused by risks in the economy, the difficulties in providing workers, the process of the product reaching the customer, the lack of training of the working personnel, the lack of working with a sufficient number of suppliers, and the unpredictable processes.

It has been concluded that the food sector uses data analytics in logistics operations in production, warehouse and stock management, personnel training and accumulation, transportation methods, and logistics information programs.

The problems encountered during the transportation of food products are due to ambient temperature differences during loading and unloading, transportation, customs clearance, etc. It has been concluded that it is due to transportation times, lack of quality control, technological inadequacy, lack of instructions, lack of information labels, not choosing the right transportation method, lack of knowledge of the personnel, limited storage period of the product, not having enough products in stock, damages during transportation of the products, geographical location of the destination, quality standards of the destination of the product.

It has been concluded that the most important parts of food logistics are the supply chain part, production planning part, storage, and stock management part, transportation and distribution part, product tracking and monitoring part, development of customer services, development of programming, and informatics in logistics.

It has been concluded that green logistics in the food sector aims not to use fossil fuels in logistics, to benefit from renewable energy, to have waste collection centers, to use electronic invoicing, to be recyclable, and to use vehicles in a planned and efficient manner at the highest level.



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It has been concluded that in order to make logistics operations in the food sector efficient, autonomous robots in a technological sense are necessary, cyber security is necessary, cloud computing systems are necessary, automatic recognition systems are necessary, and systems, where communication between machines is established remotely with mobile technologies are necessary. It has been concluded that in the future, logistics in the food sector will be strengthened by strengthening digitalization, strengthening automation systems, strengthening smart storage systems, developing information-sharing fast shipping methods, developing online services, and customer satisfaction-oriented studies.

According to the results obtained from the study, the following suggestions can be presented to stakeholders:

1-All businesses should constantly update their customer satisfaction-focused work.

2-Since the food sector is a sensitive sector, all businesses should prioritize hygiene, food safety and periodic training for their personnel to raise awareness.

3-In order for the logistics department in the food sector to work successfully and regularly, warehouse and stock management should be monitored with daily and up-to-date information programs.

4-We must protect nature in order to make our world livable. We should also prioritize green logistics (environmentally friendly logistics) in food logistics.

5-Logistics in the food sector should be supported with up-to-date technological knowledge and tools, and the products should be delivered intact and without spoilage in the shortest time possible.

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